



Knowledge Strategies for making Safeguarding decisions in Social Work

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Abstract

Decision-making within social work remains a contested and complex realm, filled with challenges and intricacies. Although extensively researched, many ambiguities remain, especially surrounding factors influencing individual decision-making processes. The uncertainty that underscores social work decisions reflects the unpredictable nature of human behaviour. Nevertheless, criticisms persist about the inconsistency and occasional bias in social workers' judgments, often overshadowing their many right decisions. In this study, the central focus is to explore the internal reasoning strategies utilised by social workers, particularly when identifying children at risk of immediate harm. The research employed a Decision-Making Exercise and the Thinking Aloud method, administered alongside the Human Value Questionnaire, to capture these strategies. The sample consisted of 24 social workers with experience in safeguarding children, offering diverse insights into their decision-making processes. Understanding the internalised logic of practice behind these decisions holds promise for refining educational training and enhancing decision-support systems through advanced technologies such as machine learning. The research found that the accumulation of information often heightened risk assessments, with key themes present in a case including "parental capacity," "domestic violence," and "mental health" strongly affecting reasoning strategies. Specific case characteristics like drug use, antenatal care, and domestic violence significantly influenced decision-making. Distinct variations were observed between novices, competent practitioners, and experts, especially in their risk evaluations and intervention choices. The research revealed two overarching value dimensions: self-enhancement vs. self-transcendence and openness to change vs. conservation, affecting participants' decisions. The participants relied on set protocols and crucial case factors during their decision-making. They prioritised information categorisation and adherence to established procedures, demonstrating a strong inclination towards adhering to the default "child protection" threshold. A closer analysis of participants' argumentative structures emphasised primary blocks like evidence and claims, suggesting room for improvement in argumentative depth. While competent practitioners and experts tended to prioritise evidence from the given data, novices leaned towards

warrants to substantiate their claims. A differentiation in focus areas was noted based on participants' value patterns. Those inclined towards conservation prioritised understanding family dynamics, whereas those open to change focused more on factors like abuse. Claims played a pivotal role, often serving as interim judgments that could change with the influx of new information. Although more frequently utilised by novices, Warrants underscored the decision-making complexity, illuminating the thought process behind specific decisions. The limited use of backups, including references to personal experiences and theoretical frameworks, suggests the innate challenges in decision-making. Qualifiers, expressing levels of certainty or the need for additional information, differed significantly among novices, competent practitioners, and experts. In conclusion, even when seemingly straightforward, social work decision-making is complex and affected by different case and decision-maker characteristics. The relative lack of rebuttals across expertise levels underscores contrasting reasoning patterns' challenges. The central takeaway emphasises the necessity of viewing information from varied perspectives to craft informed decisions, underscoring the complexity inherent in social work decision-making processes.

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1 Introduction

Even though decision-making in general and social work is a well-researched subject (O'Sullivan 2011; Spratt et al. 2015; Ebsen 2018; Roesch-Marsh 2018), there continues to be a wide range of unresolved questions about the “elements of individual decision making” (Regehr et al. 2022a, p. 1345). Decision-making in social work is complex by default, as there is a high degree of uncertainty regarding factors that must be considered when making decisions or coming to a judgment (Provost and Fawcett 2013; Roesch-Marsh 2018; Botha 2023). This uncertainty reflects the complexity of human life that makes it impossible to predict a person's future actions with any degree of certainty. In light of this uncertainty, it is not surprising that the perennial criticism that social workers too often make decisions that are inconsistent, biased or simply wrong prevails (Jones 2014; Preston 2022) without acknowledging how often the right choices are made (Pritchard and Williams 2010; Stevenson 2018).

This project picks up on this complexity and aims to take existing research further by looking more closely at the reasoning processes involved in social work decision-making. Specifically, this project asks what reasoning strategies social workers use to identify and bring together relevant information to decide if a child is at risk of immediate significant harm. This research aims to better understand the decision-makers internalised logic of practice (Bourdieu 1977) and in particular the application of reasoning social workers use when making safeguarding decisions. Greater insight into this logic of practice can help inform social workers' education and ongoing training. This understanding can subsequently be used to establish how decision-support systems could be improved by using technologies like machine learning or text mining. These improvements would help social workers to identify essential cues and patterns in the vast amount of information about their service users available in current databases, thereby assisting professional decision-making.

This study uses a mixed-methods approach to identify reasoning strategies used by social workers and links this with the participants' values as a proxy

for their habitus. It asked participants to think aloud whilst undertaking a computer-based decision-making exercise. In addition, all participants completed a human value scale (Schwartz 2006).

1.1 Background

Decision-making and judgements are core elements in all aspects of social work practice (Taylor 2010) and essential skills for social workers (Department for Education 2014). These include decisions about thresholds, allocation of resources or plans of intervention. Also, social workers' decisions have significant and long-term implications for the people concerned. A decision is a choice about a course of action (Simon 1960), or the strategy for action (Fishburn 1964) leading to a particular desired outcome (Churchman 1968). Proponents of the Expected Utility theory explain that decisions are a choice "between prospects or gambles" (Kahneman and Tversky 1979, p. 263), based on a "discrete and finite set of mutually exclusive alternatives" (Aliev and Huseynov 2014, p. 304).

The success of social work in improving outcomes for children (Pritchard and Williams 2010) suggests that social workers mostly make decisions that have positive outcomes. However, learning from serious case reviews (Brandon et al. 2008) suggest that decision-making in social work can be prone to errors and lacks consistency (Munro 1996a, 1999). Social workers often struggle with the responsibility of making judgements and can find it challenging to manage the complexity of information involved in making decisions (Munro 2010). Due to the significance of social work decisions and the potential long-term impact, the profession strives to be evidence-based to avoid biases and errors in decision-making (Van de Luitgaarden 2009; Tupper et al. 2016) and attempts to improve social work decision-making through strategies like introducing structured decision-making tools (Veale et al. 2018), actuarial risk assessments (Hilton et al. 2010) or taking a managerial approach (Engelbrecht 2014).

A challenge for social work decision-making are small, contextual but intangible factors that social workers often are unaware of even though they influence their judgments. These factors increase the complexity of the

process of making even simple decisions. This makes it difficult to insist on a rational choice approach to decision-making where decisions are based on an explicit weighing up of the available evidence. In response to the complexity of human life decision-makers appear to be using heuristics or shortcuts to manage the available information Tversky and Kahneman (1986). These strategies reduce the complexity of information (Gigerenzer and Gaissmaier 2011a), but may be seen as reasoning errors, as highlighted in a series of serious case reviews (Brandon et al. 2008). It is also important to note that decision-making happens within an organisational, political, cultural and social context. This means that decision-making strategies, regardless of how successful they are in achieving the desired outcomes, should be seen as a response to the context in which decisions are made and that they are mediated by the decision-makers resources and abilities.

The expectation of making rational decisions means that decisions in social work are supposed to be based on the objective evaluation of information when identifying possible courses of action. Given the complexity of social workers' situations, this expectation appears somewhat unrealistic, especially considering the cognitive limitations in human decision-making. Simon (1947, 1957, 1960) described these limitations as bounded rationality. Tversky and Kahneman (1974) showed that humans use foreseeable decision-making strategies like anchoring and adjustment instead of taking a "rational approach" by objectively calculating the expected utility of a decision.

There are issues regarding consistency of decision-making because various factors impact the social worker's ability to make decisions. According to Kirkman et al. (2014) and Price et al. (2008), these are:

- Information quality
- Bias
- Contextual factors like workload
- Sequential decision making
- Level of Expertise
- Values

Against this backdrop, it is no surprise that some social workers may avoid or

delay making decisions so that decisions are responses to a crisis rather than as part of a long-term plan (Munro 2002). This strategy is prone to behavioural biases that impact the ability of social workers to make objective judgements, which, together with decision fatigue and workload pressures, reduce the effectiveness of social work decision-making (Kirkman and Melrose 2014).

1.2 Objectives

The first objective of this study is to understand reasoning strategies that social workers apply when making decisions in high-stakes situations under great uncertainty better. Typical for this type of decision are safeguarding decisions as part of the s47 Children Act 1989 investigation process, which defines the scope of this research. Decisions regarding safeguarding children can have massive, potentially long-term implications and therefore require professional decision-making. This research aims to identify the type of information that social workers use in their reasoning to make these decisions, how this information is weighted and the way they process the pieces of information in order to conclude whether a child should be subject to safeguarding procedures under s47 of the Children Act 1989 or is deemed to be a Child in Need under s17 Children Act 1989.

Kirkman et al. (2014) suggest that this type of research is required to develop more straightforward, fast and frugal decision strategies that improve the quality and consistency of decision-making in social work. Such research could lead to a better understanding of what information social workers consider, their strategies to evaluate this information and how they fill the gaps of missing information. This improved understanding can help develop more efficient ways of understanding how the vast amount of information available in existing knowledge management systems could be presented to those who make significant judgements on somebody else's life. As stated, social workers make many decisions and judgements in their practice. In doing so, the assumption is that they apply various decision-making strategies, of which social workers will have varying awareness. In addition to this, the effectiveness of decision-making strategies can be questioned

(Kahneman and Tversky 1979; Gigerenzer and Gaissmaier 2011a) because they are influenced by contextual factors like emotions (Bachkirov 2015) bias (Munro 1999) or attitudes (Shemmings 2000; Davidson-Arad and Benbenishty 2016). This lack of effectiveness can lead to cognitive errors, especially when applying intuitive decision-making strategies.

This study assumes that due to existing cognitive limitations of the human mind, social workers cannot consistently make rational choices as policy and regulations require them to do. Instead, they will have to use strategies to make decisions within this bounded rationality (Simon 1947, 1957, 1960; Gigerenzer and Selten 2001) to overcome these limitations and then rationalise these decisions using a broader scope of available information. Exploring this question is of significance for social work practice. Knowledge generated in the process could inform the development of structured decision-support tools (Barlow et al. 2012) or contribute to the discussion about the value these tools may have for social work practice (Gillingham and Humphreys 2010; Gillingham 2011). Also, this research will inform the education of social workers and add strategies to improve critical thinking in social work practice (Rutter 2008) that add to approaches taken by Regehr et al. (2022b) who show that a multi-dimensional strategy to develop social workers decision-making skills can positively affect social work practice.

1.3 Research Questions

This project focuses on safeguarding decisions within social work. Decisions in social work are characterised by great uncertainty as not all information is available and include high stakes (O'Connor and Leonard 2014). As the stakes are high, this is a highly regulated area of practice where legislation (Children Act 1989, Children Act 2004) and statutory guidance (Working Together 2018) define accountability. Decisions must meet these statutory requirements, and the process leading up to a decision, including what information practitioners consider, needs to be based on clear evidence. However, there are doubts about whether the Rational Choice model of evidence-based decisions in social work represents day-to-day practice (Adams et al. 2009; van de Luitgaarden 2009). Despite the procedural

structures in place to create a sense of coherence, the actual process of decision making remains unclear and, as Kirkman et al. (2014) and Munro (1999, 2011) highlight, prone to errors. The literature review for this study has shown that there is a significant body of research on decision making in social work available that covers the complexity of social work decision making (Benbenishty et al. 2003; Osmo and Benbenishty 2004; Taylor and White 2006; Samsonsen and Turney 2017), the assessment of risk (Davidson-Arad et al. 2008; Benbenishty et al. 2015; Devaney et al. 2017; Keddell and Hyslop 2019), balancing decisions (Kettle 2017, 2018) including the nuances of decisions (Bradt et al. 2015a; Molina et al. 2019; Tufford et al. 2019) and specific decisions like out-of-home care decisions (Biehal et al. 2018). These themes cover what Bauman et al. (2014) bring together in the Decision-Making Ecology that describes the interplay of case characteristics, decision-maker characteristics and the organisational context in decision-making. However, a bespoke approach to exploring the reasoning processes behind decisions made by social workers still appears to be outstanding. These considerations lead to the following question for this study:

What reasoning strategies are social workers using to make threshold decisions regarding s47 of the Children Act 1989?

This research assumes that it is feasible to observe these strategies as part of their internalised logic of practice (Bourdieu 1977). This observation is possible by looking at the cues that social workers use to inform their decision making. If this assumption is correct, the following question will help to identify the cognitive strategies mentioned in the previous question:

What cues are social workers using to decide if a child is at high risk of immediate significant harm?

Once possible cues that social workers are looking for are identified, and possible cognitive strategies are deduced, it becomes crucial to put this new knowledge into context. As a starting point, it is possible to use the decision-making ecology mentioned above. This ecology consists of the following factors influencing decision making and, subsequently, the outcomes of these decisions:

- Case Factors
- Organisational Factors
- External Factors
- Decision Maker Factors (Bauman et al. 2014)

This research controls external factors by using a structured decision-making exercise (Klein 2000; Crandall et al. 2006). Organisational factors can be established by reviewing available sources about social work practice. If the external and organisational factors are covered, the two sets of factors affecting decision-making this study needs to establish are: Case and Decision Maker Factors. Case factors are defined in the case vignettes that form the basis for the decision-making exercise. What remains is to understand the characteristics of the decision-maker. Hence data around this will also have to be collected. This consideration means that the following inquiry will supplement the above question:

How are decision-making strategies moderated by the individuals' dispositions, resources and abilities?

Ultimately an answer to the questions raised in this section could inform more efficient ways to build decision-support tools, inform the training of social workers and improve consistency in decision making.

1.4 Anticipated Outcomes

There are two overarching outcomes that this study aims to achieve. The first anticipated outcome of this research is a better understanding of reasoning strategies that will inform an outline of a development program for social work students, social workers and other decision-makers in the field of health and social care. Such a program will offer strategies to help practitioners to develop their decision-making and strengthen their skills to identify biases and counteract these using reflection.

The second anticipated outcome is the outline of a new strategy to analyse multi-dimensional research data and use this as a draft for a proof of concept of a new type of decision-support systems that aid social worker navigating large databases containing large amounts of text-based or unstructured

information by using text-mining and machine learning. Especially text-mining is used in this study to help analyse current literature and the data generated in the research to increase repeatability, efficiency and objectivity. The text-mining strategies used here are also the backdrop for the aforementioned proof of concept of new decision-support systems.

1.5 The use of Text Mining in this study

Text mining describes the “*process of distilling actionable insights from text*” (Kwartler 2017, p. 1) and is in itself is a way of producing a “*new source of knowledge*” (Usai et al. 2018, p. 1472) that is valuable to inform human interpretation. Text mining algorithms can help to extract “*facts and relationships in a structured form*” (Westergaard et al. 2018, p. 2) from unstructured data. These algorithms transform text and unstructured data, into a structured form. The use of text mining helps reduce bias and covers a broad scope by making the analysis of data “*replicable, scientific and transparent*” (Tranfield et al. 2003, p. 209). Whilst acknowledging the benefits, it must be emphasised that text mining can only assist in reducing large amounts of information to a more manageable level. Deriving meaning relies on human interpretation of the output of text mining processes.

Using text mining to support research is increasingly common and is applied in different scientific fields yet not in social work to the same extent with a few exceptions for example in identifying factors predicting child abuse (Amrit et al. 2017). It is not surprising that publications on computer science and artificial intelligence are dominant in their use of text mining approaches. These take a focus on developing text mining techniques for various applications like online forum hotspot detection (Li and Wu 2010), mining social networks for brand sentiments (Mostafa 2013) or finding determinants of voting for the helpfulness of online user reviews (Cao et al. 2011). The field of biomedical research methods is an example of a scientific field where researchers use text mining strategies to deal with the complexity in this particular dynamic field where knowledge is developing fast (Verspoor 2015). Text mining is an effective way of managing information. One example is the use of text mining to construct a database of associations between genes and

cancer indicators (Xie et al. 2013) and identify the associations between diseases and genes (Pletscher-Frankild et al. 2015) or detect public health rumours (Collier et al. 2008). Literature reviews also use this technique to cover research subjects like forest management (Andresen et al. 2015), Gamification in education (Martí-Parreño et al. 2016) and Tourism (Ćurlin and Jaković 2019).

Even though text mining is a crucial part of various fields of science, it appears as if in social sciences, its use is still underdeveloped despite the significant potential of using text mining to cope with the increasing amount of unstructured data (Westergaard et al. 2018). Amrit et al. (2017) present a unique text mining application in social social work. They focus on identifying child abuse through text mining and machine learning. This study shows the potential of this technology to do predictive risk modelling in a field of interest for social work research. These authors apply text mining to “*predict cases of child abuse in a public health institution*”. They use text mining to create a model that “*achieves a high score in classifying cases of possible abuse*” (Amrit et al. 2017, p. 402) based on a complete sample of all children under four in the Amsterdam region incorporating quantitative measures and free notes produced by paediatricians. This example shows the importance and potential to develop the use of text mining strategies in social work research to keep up to date with current research findings and identify possible ways of applying text mining in practice.

The previous sections outlined the overarching framework for this study. Chapter two and three discuss key theories of decision making and an overview of statutory social work practice to safeguard children in England. The literature review in chapter four gives an overview of current studies into social work decision making. In chapter five the methodology and research design of this study are introduced, followed by the analysis of the data captured in the fieldwork phase of this project in chapter six. The last chapter, seven, discusses the findings from the analysis. The next section discusses three key theories of decision-making to provide a starting point for this study.

2 Theories of Decision-Making

Decision-making has been the subject of, mostly psychological, research for a long time and there are many different approaches of how researchers conceptualise decision making. Chapter two gives an overview of key terms and concepts that need to be defined for the discussions in the following chapters. This overview includes terms that appear to be easily defined like the words decision or judgment and more complex constructs like the mind for example. This chapter introduces some of the research into decision making, and the pitfalls of it, that has captured a wider audience like research by Kahneman and some of the works of Gigerenzer. This exploration starts with defining decisions, extending this by looking at decisions under uncertainty and consideration of good and bad decisions.

2.1 What are decisions?

Decision-making is an integral part of social work practice and life in general. People constantly make decisions in their personal, private and professional life whenever there is a choice to make between several options that are exclusive to each other. A decision requires a motivation to address a problem. That is the foundation for activities to establish what the problem is and what alternatives there are to address the problem (Figurska and Matuska 2013). From this angle, it is logical why the noun “decision” is usually followed by the verb “make”. “Deciding” is more than an act; defining a decision requires linking the word to an action that someone is taking following a decision. In a decision, someone is allocating energy (or resources) into pursuing one of at least two options. Any decision is aimed at achieving a specific desired outcome (Churchman 1968), and to achieve this outcome, a strategy defining what actions will be taken has to be chosen (Fishburn 1964). Hence, a decision is a conscious and deliberate choice between possible courses of action (Simon 1960; Ackoff 1978; Taylor 2013). Different types of decisions can be classified by the level, domain area and degree of structure inherent in a decision (Holsapple 2008). There are *everyday* decisions which, mostly, do not have a long-lasting impact (e.g.

What will I have for breakfast?), *tactical* decisions, which may have a mid-term impact (e.g. How can I improve my job satisfaction?) or *strategic* decisions with a long term impact (e.g. Should I change my career path?). There are two overarching categories regarding the structuredness of decisions (Holsapple 2008). *Structured decisions* are taken routinely in established and stable contexts with apparent alternatives and where the criteria for choices are well defined, and *unstructured decisions* are unexpected, infrequent with unclear alternatives and criteria for choices are ambiguous. The first group refers to small-world decisions, environments where all variables are known and clearly defined. The latter refers to significant world decisions in which variables and some relevant pieces of information are unknown (Gigerenzer and Gaissmaier 2011a).

Each decision contains acts, states and outcomes as fundamental building blocks (Newell 2015). *Acts* refer to the different practical choices the decision-maker must choose from, *and states* describe the different ways the world may be transformed. Outcomes refer to the potential consequences of each act mediated by each possible state.

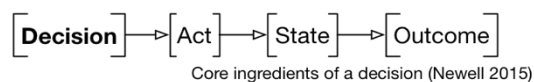


Figure 1: Core Ingredients of a decision

From this perspective, to be seen as a decision the course of action, including not to do anything, taken by a decision maker needs to change the status quo as the outcome. In this sense, decisions are more than simple choices between a limited list of clearly defined alternatives. The necessary condition for a decision is that the decision-maker can choose from a selection of alternatives.

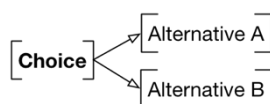


Figure 2: A choice between two alternatives

A decision consists of acts, states and outcomes that require a selection of alternatives results in a high level of complexity, and each possible outcome is a function of the potential acts available to the decision maker and the

states the world can take as a result of each act. This high level of complexity makes it difficult for the decision-maker to choose the “right” course of action or in other words make a “good” decision. To establish a baseline for further discussion, it is necessary to explore what constitutes a good decision.

2.2 What are “good” decisions in social work?

The answer to the question what a “good” decision is, is difficult to find. It seems easier to find an answer to what constitutes a “bad” decision, and a good decision is defined by not making a bad one (Ahmed et al. 2012). This refers to the outcomes of a decision which is, according to Higgins (2000) the classic answer to the question. In line with this perspective, a good decision would be one that has a high value in terms of outcomes and a low cost attached to it. To answer the question, what constitutes a “good” decision more clearly, Ratliff et al. (1999) suggest splitting a decision into two components. First, a technical judgment like “What is the risk?”, second, a value judgment about questions like “Is it worth taking this risk?”. According to these authors, a bad decision arises when these components are confused. From this perspective, professionals need to make the technical judgment and the service users the value judgment. This would mean that a good decision is one that is based on a factual appraisal of the available information and is perceived to be good enough from the perspective of the service user (Schwartz et al. 2011).

The Expected Utility Theory suggests that a decision maker aims to maximise the utility of a decision (Von Neumann and Morgenstern 2007). From this perspective a good decision in social work would be one that achieves the maximum utility or the best possible outcomes for a service user. Prospect theory is concerned with the gains and losses in relation to a reference point (Kahneman and Tversky 1979). From this perspective, a good decision in social work would be one that maximises possible outcomes for and minimises risk to the service user. However, as will be discussed later, as a complex and multi-dimensional learning environment (Jönsson and Flem 2018) social work presents as “wicked learning environment” (Hogarth et al. 2015) where the link between actions and their outcomes is often weak due

to the long time it may take until changes are implemented and the results could be observed. In other words, measuring the quality of a decision only through the beneficial outcomes for the service user is too narrow and does not help to develop a framework that can be used to measure progress in developing decision-making skills (Schneider 2018).

One starting point to define good child safeguarding decisions in social work are the Children's Services inspection reports from the Office for Standards in Education (Ofsted). This section is an extract of a content analysis (Erlingsson and Brysiewicz 2017) ¹ of all n=152 reports published by Ofsted under their Single Assessment Framework² that aims to "*test the decision-making at all stages of a child's journey*" (Ofsted 2013, p. 6). As the regulator for Children's services, Ofsted sets standards that have a strong influence on social work practice. Therefore, it is reasonable to use their perspective to establish a working definition of good decisions in social work even though Ofsted, like any regulatory body, faces accountability pressures. These pressures may lead to a focus on compliance rather than a comprehensive assessment of social work practice. This can limit the ability of Ofsted to set meaningful benchmarks for social work.

This analysis revealed four characteristics of good child safeguarding decisions from the perspective of Ofsted:

- 1 Social work decision-making as a deliberate activity.
- 2 Social work decisions as a balancing exercise.
- 3 The use of thresholds to achieve consistency is explored,
- 4 The importance of the child's voice is reviewed.

2.2.1 Decision making as a deliberate activity

First, Ofsted reports highlight the importance of deliberation in decision-making. The high frequency in which reports of outstanding Children's

¹ The entire script is available in appendix 9.3.

² The full list of all reports, including the codes used to reference the quotes is included in appendix 9.2.

Services use words like accompanied, contingency, measurable or urgency point toward social work as a deliberate activity. In context, the word *accompanied* suggests that decisions are not supposed to be made ad-hoc but are *accompanied* by a clear and well-recorded rationale (E06000053). Contingency planning means that at the point of decision-making, social workers have to consider different possibilities of what may happen in a case and plan for these possibilities and their preferred course of action. The word *measurable* highlights that plans, including contingency plans need clear goals and outcomes. In addition, decisions need to be *effective*, *clear* and based on *realistic* assessments (E08000006, E10000024) to keep children safe and protected. This highlights that decisions require the decision-maker to clearly express the rationale for their decision so that others can understand the thought processes behind such a decision.

2.2.2 Social Work as a balancing exercise: Proportionality and Consistency of Social Work Decision Making

The idea of social work decision-making as a deliberate activity is closely linked with the suggestion that decisions should be part of a balancing exercise. That is evident in the frequent use of word combinations that include the terms *appropriate*, *proportionate*, *consistent*, and *timely*. The words timely, proportionate and appropriate regularly occur together, most pronounced in the phrase that decisions need to be "timely, proportionate and appropriate". These words define the balancing point between too fast or too slow, too much or too little and suitable or not suitable. The reports often use the words proportionate and appropriate together. When these words occur, there is a reference to needs and risks, as the quotes in the table below indicate. Decision-making in child protection is a "*response to presenting risks and needs*" (E06000011), whereby appropriate is associated closely with the words effective and necessary and proportionate closer to the words response(s) and intervention. Appropriate in this context means that decisions successfully produce the desired result but only if the decision is essential. Proportionate means that the decision in reaction to an event in the form of the intervention needs to be an answer linked to this event and not a

reaction to something else, such as the decision maker's personal views.

The third word of the above phrase, timely, is closely associated with the word appropriate which suggests that there is a right timing of decisions. In other words, a decision must be made at the right moment to produce the desired results. This does not mean to preclude a phase of consideration, an analysis of risk or a thorough assessment. Ofsted accepts that these steps lead to delays, but these are acceptable if the decision-maker minimises delays and possible uncertainty due to due diligence. Ofsted uses the words *prompt*, *swift* or *immediate* to highlight the importance of taking actions after making decisions without delay. Without taking action, even a good decision becomes almost meaningless for example, when a decision to assess the risk, a child is exposed to is made, but the assessment is not started immediately.

2.2.3 Achieving consistency: The use of Thresholds

Consistency is a crucial feature of what Ofsted deems to be good or outstanding decision-making, whilst inconsistencies in making decisions are a decisive characteristic of poor decision-making. One way of achieving consistency in decision-making appears to be by adhering to thresholds that define different categories of risk and service responses that children could be exposed to. Thresholds seem to hold significant importance for decision-making evidenced by the frequency in which this word is used in the reports. From Ofsted's perspective, clearly defined thresholds help reduce this complexity and make decisions more consistent and predictable.

2.2.4 Considering the Child's voice and best interest in decision making

Decisions in social work are high stake decisions that have a potential long-term impact and are often irreversible and, in some cases (adoption) permanent, even if an error has been made. The seriousness of social work decision-making is evident in the regular use of the word *lives*. *Lives* refer to the lives of children who are the subject of social work decisions. Its frequent use indicates that the Ofsted reports are keenly aware of the effect social work interventions have on the lives of children and the different social work decisions they can make in these lives and the lives of parents.

Ofsted reports repeatedly emphasise the expectation that social workers, senior managers, and councillors listen to children and help them understand decisions made regarding their lives. This expectation goes beyond just listening. The social worker needs to translate what the child says into an "understanding of the children" (E10000028), which requires the ability to change perspective. Children are supposed to be able to *take part* in decision-making, have their *views considered* and *inform decisions*.

Given that Ofsted regulates Children's services, the answer to the question what constitutes "good" decision-making maybe perceived to be limited even though relevant for this study which focusses on making safeguarding decisions for children. Nonetheless, the characteristics derived from this analysis that describe good decision making as a deliberate balancing exercise that needs to be timely, appropriate, proportionate and consistent whilst considering the service users views appears to be a reasonable working definition for social work generally.

One fundamental limitation of using Ofsted to define good decision-making is its normative approach. As the regulator of social work practice with Children and their Families, Ofsted sets a standard or definition of what they want to see in reports rather than understanding how social workers decide in practice. Instead, Ofsted considers frontline practice and compares this practice against the standards they set. This creates a loop in which practitioners look at standards to guide their practice and Ofsted sets standards by highlighting what they see as good practice. This loop creates the risk of ignoring the broader context in which social workers make decisions. This context involves considering the service user experience and the ethical dimension of looking at multiple perspectives. For instance, when presenting information in court, a social worker aims to be transparent and consider the impact and outcomes of their decision on individuals their context as well as society as a whole. Also, it is part of good social work practice to adapt previously made decisions to changes in the context.

Based on this discussion, a good decision in social work can be defined by highlighting the following characteristics:

1. **Informed and Deliberate:** It's made after careful consideration and assessment of all available information and factors, ensuring that the decision is not rash but rather well thought out.
2. **Balanced:** The decision considers both the immediate needs and the long-term well-being of the individual or community involved, ensuring that there's a balance between timely action and thorough assessment.
3. **Consistent:** It aligns with established professional standards, practices, and ethical guidelines, ensuring predictability and fairness.
4. **Client-Centred:** The decision is made in the best interest of the service user and, where possible, includes their input or perspective, acknowledging their autonomy and rights.
5. **Outcome-Oriented:** It aims to produce the most beneficial outcome with the least possible harm or cost, maximising the utility of the decision for the service user.
6. **Transparent:** The rationale behind the decision is clear, allowing others to understand the thought processes and factors that influenced it.
7. **Responsive and Flexible:** It considers the dynamic nature of human circumstances, allowing for adjustments when necessary and being open to re-evaluation.
8. **Ethical:** The decision respects the dignity, rights, and worth of every person, promoting social justice and cultural responsiveness.
9. **Collaborative:** Whenever possible, it involves a collaborative process with other professionals, stakeholders, and most importantly, the service users.

In essence, a good decision in social work is one that is made with the utmost consideration for the well-being of the service user, rooted in ethical standards, and is both evidence-based and responsive to the unique and evolving needs of the individual or community.

Making good decisions is a significant challenge for social work practice. Social work practice is an incredibly complex and multifaceted field, operating

at the intersection of individual needs and broader societal contexts. To understand and navigate the context of social work, practitioners must consider a variety of environmental, systemic, and individual factors which all feed into the so-called decision-making ecology (Bauman et al. 2014; Saltiel and Lakey 2020). These include socio-political elements such as legislation and policy, economic climate, and political climate; cultural and societal factors such as diversity, social norms and values, and historical context; organisational elements such as agency mission and values, resources and funding, and inter-professional collaboration; individual and relational contexts such as client factors, worker values and beliefs, and relationship dynamics; technological and global influences such as digital tools, and global issues; and ethical considerations such as respect for individuals, social justice, and confidentiality. By understanding this complex context, social workers can be better equipped to provide effective and ethical practice.

2.3 Decision-making under uncertainty

Decisions are inherently complex, especially concerning the complexity of human life. Complexity, and alongside it uncertainty, are common aspects of human life (Rosati 2017), and most decisions are made under the condition of uncertainty where the outcomes are unknown. Therefore, these decisions are called decisions under risk or a "*choice between different prospects or gambles*" (Kahneman and Tversky 1979, p. 263). This complexity results from the multi-dimensionality in which various aspects of social life (social, cultural, political) "*interact and influence each other*" (Goergen 2010, p. 4) and complex behaviour originates "*from the inter-connectivity of elements within a system and between a system and its environment*" (p. 7). Decisions are not independent of other factors that, on the surface, may not seem to be directly related.

The reality is that the context in which problems exist is dynamic and forms complex systems of problems that are interactive with each other. This situation is what Ackoff (1978) calls a mess, in which it is only known that a problem exists but where it is not clear what the problem is or the best way to

resolve it. After all, a decision could be a choice of different acts that all leave to potentially different states that result in many potential outcomes. That makes it hard to predict the outcomes of a decision, especially when one talks about large world decisions which are decisions that require more than a binary yes/ no choice.

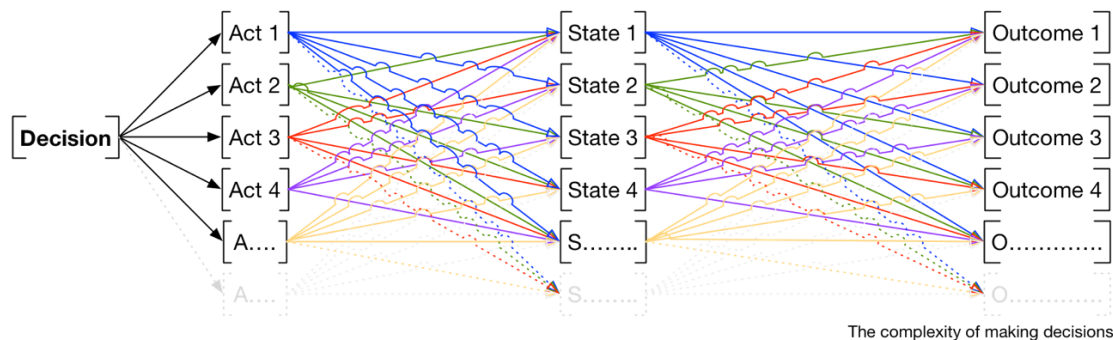


Figure 3: The complexity of making decisions

Due to this uncertainty, a decision maker cannot know the outcomes of a decision in advance and choose the best course of action to achieve the desired outcome (Rosati 2017). With this uncertainty, “*the potential for variations in interpretation of risk is [...] greater*” (Vaughan 2016, p. 63). As people often need to make decisions without having all information to determine the consequences of their actions and the risks involved, it is necessary that a decision maker collects and evaluates sufficient information to make an informed guess or a judgment about the possible outcomes. Judgments refer to appraising and drawing conclusions from available information (Helm 2016a). They describe the “*cognitive aspects of our decision-making process*” (Bazerman 2013, p. 1) as such judgements are prerequisites for decisions which “*involves deciding on the likelihood of various events using incomplete information*” (Eysenck and Keane 2015, p. 547).

2.4 Expected Utility Theory - Rational Choice

“Nature has placed mankind under the governance of two sovereign masters, pain and pleasure. It is for them alone to point out what we ought to do, as well as to determine what we shall do. On the one hand the standard of right and wrong, on the other the chain of causes and effects, are fastened to their throne. They govern us in all we do, in all we say, in all

we think: every effort we can make to throw off our subjection, will serve but to demonstrate and confirm it. In words a man may pretend to abjure their empire: but in reality he will remain. subject to it all the while. The principle of utility recognizes this subjection, and assumes it for the foundation of that system, the object of which is to rear the fabric of felicity by the hands of reason and of law”

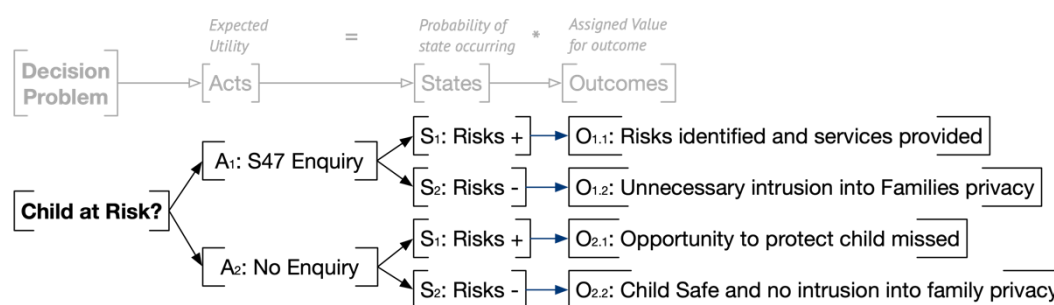
(Bentham 2000, p. 14).

The Expected Utility theory formulated by von Neuman and Morgenstern (2007) has been the dominant paradigm for explaining decision-making under uncertainty, especially in economic theory. The expected utility theory assumes that the decision-maker makes a choice "*between prospects or gambles*" (Kahneman and Tversky 1979, p. 263) based on a "discrete and finite set of mutually exclusive alternatives" (Aliev and Huseynov 2014, p. 304) evaluated against their expected utility (von Neumann and Morgenstern 2007). From this perspective, agents make decisions by maximising the utilities of outcomes [that] are "*weighted by their probabilities*" (Kahneman and Tversky 1979, p. 265).

The idea of utility goes back to Jeremy Bentham, who describes utility as pleasure or the avoidance of pain which are the "*two sovereign masters*" (Bentham 2000, p.14) of human behaviour. In economic decision theory, utilities are "*numerical measurable quantities [...] based on some immediate sensation*" (von Neumann and Morgenstern 2007, p.16). This immediate sensation is the smallest denominator that cannot be broken down any further and therefore becomes the basis for building the theory of games and economic behaviour. This theory refers to the measurable preference between at least two options expressed by an agent (the authors emphasise that the utility is not something that can be used to compare two different agents). The underlying assumptions of this normative theory include the axioms cancellation, transitivity, dominance and invariance, as explained and criticised by Tversky and Kahneman (1986). These axioms by von Neuman and Morgenstern (2007) define the expected behaviour of rational agents. Cancellation refers to the notion that only states that produce a different outcome should be considered when making a choice. Transitivity means that the values assigned to different options (A, B, C) are not dependent on other

available options, and the options can be evaluated separately. Dominance states that if one option is better than another, this option should be chosen. Invariance explains that different ways to present a choice should not change preferences. According to the Expected Utility Theory (von Neumann and Morgenstern 2007) these axioms help to predict choice behaviour.

Figure 4 illustrates the logic of the Expected Utility Theory on a simplified example of a social work decision in the context of the Children Act 1989 and the Human Rights Act 1998. In this example, a social worker must decide if a child is at risk or not. As defined above, a decision consists of different acts an agent can take when faced with a decision problem. Each of these acts could lead to different potential states of a situation. Each of these states could have different consequences or outcomes relating to the decision problem. In this example, there are two acts that the decision maker can choose. The decision maker could either trigger an enquiry to determine if the child is "suffering, or is likely to suffer, significant harm" under s47 of the Children Act 1989, which would also mean an intrusion into a family's right to respect for private and family life under the Human Rights Act 1998 (A1) or not (A2). Either act could result in two states, one where risks exist (S1) and one where there is no risk (S2).



A simplified Social Work Decision

Figure 4: A simplified Social Work Decision

Following the Expected Utility Theory, as discussed by (Newell 2015) and (Farmer 2015), the first step to determining what a rational decision maker should do as a rational agent is to assign a numerical value to each possible outcome to allow ordering the preferences for the outcomes. Newell (2015) suggests assigning 100 to the most preferred outcome and 0 to the least

preferred outcome, and values between 0 and 100 to the other possible outcomes. In the spirit of not intervening when no intervention is necessary, option O2.2, where the child is safe and no intrusion into the family's privacy did take place, seems to be the best possible outcome and is therefore valued at 100. O2.1, where an opportunity to protect the child is missed, is the least desirable option and therefore is rated as 0. The second best option would be O1.1, where risks are identified and services are provided, thereby protecting the child at the cost of intruding on the family's privacy. Let us assign the value of 75 to this outcome. The enquiry outcome confirms that there are no risks to the child, which means an (in hindsight) unnecessary intrusion into the family's privacy (O1.2) is assigned the value of 25.

Now that each outcome has a numeric value attached, the next step is establishing the probabilities for each state to occur. That is significantly more difficult, especially in a complex situation like social work, where there is hardly any objective way of assigning a probability that a child is at risk or not. In the absence of objective probabilities, the decision maker would have to make an educated guess about the existence or absence of risk. For this example, the Child in Need Statistics (Department for Education 2019) could be used as this includes data about the proportion of children where a decision has been made to undertake an enquiry and how many cases this has led to the identification of risk. In 2018/19, there were $n=201170$ s47 enquiries with $n=66680$ new Child Protection Plans leading to a statistical probability of 0.33 that a risk has been identified. As the sum of the probabilities of all states has to be one, the chance that no risk has been identified is assumed to be 0.77. Even though this is a gross simplification, the same chances are applied here for cases where there has been no enquiry to demonstrate the principle behind this theory. Choices generally contain a risk factor as there are different probabilities of possible consequences resulting from a choice. That means that a choice does become a lottery where an act produces leads to states, each with an individual probability.

Outcome	Utility	Probability of state	Expected Utility
O2.2	100	0.77	77
O1.1	75	0.33	24.75
O1.2	25	0.77	19.25
O2.1	0	0.33	0

Table 1: Example of Expected Utility Theory

In this example the expected utility of undertaking a s47 enquiry is the weighted sum over the two possible states (risk or no risk):

$$EU(A_1) = 75 * 0.33 + 25 * 0.77 = 44$$

The expected utility of not undertaking a s47 enquiry is:

$$EU(A_2) = 100 * 0.77 + 0 * 0.33 = 77$$

von Neuman and Morgenstern (2007) argue that agents, when faced with a choice under uncertainty, will aim to maximise their expected utility if (and this is a big if) the agents behave rationally. Here this would mean not to commence an s47 enquiry.

There are significant problems with this simplified example that also highlight the problems with Expected Utility Theory to explain social work decision-making. The calculations do not consider how risk-seeking or risk-averse the decision-maker is. This characteristic would affect the desirability of the possible outcomes. Also, it does not take information about the case or the organisational context into account, nor does it differentiate between the fact that freedom from risk of harm to the child weighs more than a potential intrusion into a family's privacy. All these factors would make quantifying this decision problem significantly more complex.

This complexity leads to another problem that emerges from the boundedness of our cognitive abilities (Simon 1955; Thaler 2015). To choose the option with the highest expected utility, the agent must compare all available options. That appears to be an intractable mathematical problem, especially in the face of large world problems as they occur in the natural

world; as the figure shows, the number of possible pairs that would have to be evaluated indicates. This approach assumes significant computing abilities that humans do not tend to have, especially when the alternatives are not clearly delineated or if there are plenty of them.

2^2	4
3^3	27
4^4	256
5^5	3125
6^6	46656

.....

In addition to these points against the Expected Utility Theory, there have been observations by Tversky & Kahneman and others that contradict the prediction of behaviours made based on the Expected Utility Theory that led to the development of the Prospect Theory.

2.5 Prospect Theory

Prospect theory originates from observations by Kahneman and Tversky (1979) of choices individuals make in an experimental context. They evidenced inconsistencies with the axioms of expected utility theory by Von Neuman-Morgenstern noted in the previous chapter. Probably the most prominent example of such an inconsistency is the framing effect (Bazerman 1984), which describes the observation that the way choices are framed, either positive or negative, can trigger risk-seeking or risk-averse behaviours. The framing effect is a breach of the axiom of invariance in EUT that states that a choice should not change regardless of variations in the way it is presented. Alongside the framing effect, Kahneman and Tversky have identified other examples of choice behaviour that contradict the expectations of the Expected Utility Theory. These are:

- Certainty effect refers to the psychological effect that occurs when the probability of a gamble is reduced from certainty to probable (Kahneman and Tversky 1979; Tversky and Kahneman 1986)
- The isolation effect describes the strategy of people who are presented

with two options that have the same outcome of reducing their cognitive load by ignoring similar information (Kahneman and Tversky 1979)

- The reflection effect (Tversky and Kahneman 1981) refers to having opposite preferences for gambles depending on whether the outcomes are gains or losses. For example, most people would choose a sure gain of £20 over a one-third chance of gaining £60. Nevertheless, they would choose a one-third chance of losing £60 (and a two-thirds chance of losing nothing) over an inevitable loss of £20.

Prospect Theory suggests a model of choice where the decision maker evaluates potential outcomes that are “*expressed as gains or losses relative to [a] fixed neutral reference point*” (Bazerman 1984, p. 334). In other words, the value of an outcome is a function of the current status quo and the size of the positive or negative change concerning this status quo (Kahneman and Tversky 1979). However, the value of positive or negative choices is not linear. Instead, decision-makers usually prefer risky choices when choosing between losses and avoid risky choices when choosing between gains (Whyte 1991). Also, the value of gains and losses tails off as they increase. This effect is explained in economic terms, “*a gain of \$100 and a gain of \$200 is greater than the subjective difference between a gain of \$1,100 and a gain of \$1,200*” (Kahneman and Tversky 1979, p. 258). Values can also be affected by a relevant frame of reference for the decision-maker. An organisation focused on economic growth has a different reference frame than a charity.

Prospect Theory introduces two phases of decision-making. In the editing or framing phase, the available options are reformulated to simplify the evaluation and the choice. That is done by setting a reference point for evaluating gains and losses (Coding), combining identical probabilities, segregating the risky from the non-risky elements of the prospect and discarding the elements of choices common to all prospects (Tversky and Kahneman 1986; Edwards 1996). In addition to the way a problem is presented, “*norms, habits, and expectancies of the decision maker*” (Tversky and Kahneman 1986, p. 257) influence the way a problem is framed. Once

the editing phase is complete, the decision-maker evaluates the attainable prospects of a choice to choose the option with the highest prospect. As in the Expected Utility Theory, the decision maker assigns a subjective value to each possible outcome. That value is a function of the probability of an outcome occurring and a decision weight that indicates the impact of this probability on the overall value of this prospect.

Prospect Theory is based on observations of relatively simple choices, and the errors in human judgment agents make when researchers present these choices to them. These errors in decision-making are used to understand decision-making in itself. Even though some of these experiments appear to be very simple, have a limited scope and therefore are somewhat unrealistic, the theory deduced from these experiments “*is likely to be most useful outside it*” (Kahneman 1991, p. 143). As the following example illustrates, this theory is helpful outside of what appears to be the case for social work. This case study is included here to highlight the relevance of Prospect Theory as an academic tool to analyse decision-making in social work.

2.6 Prospect Theory in Social Work

Case W is a high profile and “*a very complex and worrying case*” (Munby 2017) that took five years to be decided in court despite the expectation that Public Law Cases in respect of children should be decided within 26 weeks. This case provides the opportunity for a hypothetical application of prospect theory to illustrate the basic ideas behind this theory.

W is the youngest of four siblings whose mother suffers poor mental health for which she receives psychiatric treatment, and which, at times, makes it impossible for her to care safely for her children. Before her pregnancy with W, the mother self-reported about her concerns regarding her anger and that she was frightened of her feelings and of harming the children. The hospital admissions and attendances at A & E by the mother increased substantially with repeated overdoses and further self-harming. This continued and the mother was also subject of detentions by the police under s138 of the Mental Health Act (MHA) 1983. The mother was again detained by the police under s136 MHA. She was evidently unwell and the children were reported as saying that they had witnessed more than one incident when their mother had assaulted their father. Two months before W's birth a meeting before action was held at which the parents agreed to place their unborn baby with the father. They were living separately and talking of remaining separated for a year. After

birth W went home with her father. Two weeks later the father took the baby to hospital because she had rolled off the sofa. W was discharged following an examination as there were no concerns, apart from some excess saliva and disorientation. The children had complained at school and nursery X about feeling upset and a nick to her mouth caused when her father had helped her to brush her teeth, and Z about how he had received a minor bruise to his right ear.

(Munby 2017)

The reality is that this case contains a significant amount of information that makes any decision in this or similar cases very complex and creates a significant amount of uncertainty about possible outcomes and the risks involved. According to Prospect Theory, a decision maker would first frame the choice problem in a way that simplifies the choice and outcomes to reduce the case's complexity. Following this model, the decision maker may look for relevant cues in the available information, acquire information and combine it in a way that helps to make a decision. This framing would also be affected by the organisational context and characteristics of the decision-maker. In this case, a social worker acting on behalf of the Local Authority (LA) may see this problem as a choice between the following acts.

(A1) Leave W in the care of father or

(A2) Remove W from the care of the father.

Each of these acts could lead to the following states:

(S1) W is safe from harm or

(S2) W's is not safe from harm.

This results in the four possible outcomes or prospects:

(O1.1) Family stays together and W is safe.

(O1.2) Family stays together and W is not safe.

(O2.1) W is in care and is safe.

(O2.2) W is in care and is not safe.

Only for illustration, explicit probabilities for possible outcomes are set, ignoring possible decision weights that an actual decision maker would assign to each possible outcome. The probabilities for outcomes 1.1. and 1.2. are

set to 50/50. That is an arbitrary figure representing a 50/50 chance. In reality, a social worker with much more detailed knowledge about the case would be able to set other estimates that are better aligned to the case. Placement in foster care would almost certainly ensure the safety from non-accidental injuries to W. Therefore, one could assume that the chances of Outcome 2.1 are 100%. That would leave the decision maker with the following choice:

Which of the following would you prefer?

Keep family together:

Remove W from her family

A 50% Chance for W to be safe.

B 100% Chance for W to be safe

50% Chance for W not to be safe

Figure 5 shows the value function identified by Kahneman and Tversky (1979), including critical aspects of the above choice problem. The reference point is the situation summarised at the beginning of this section; W is now in the father's care. From the perspective of the social worker and assuming the validity of Prospect Theory, having W in out-of-home care would be seen as a gain relative to the reference point or status quo as the outcome would be that child W is safe, and no harm is occurring. The anticipated loss would be where W (or one of the other children) suffers harm.

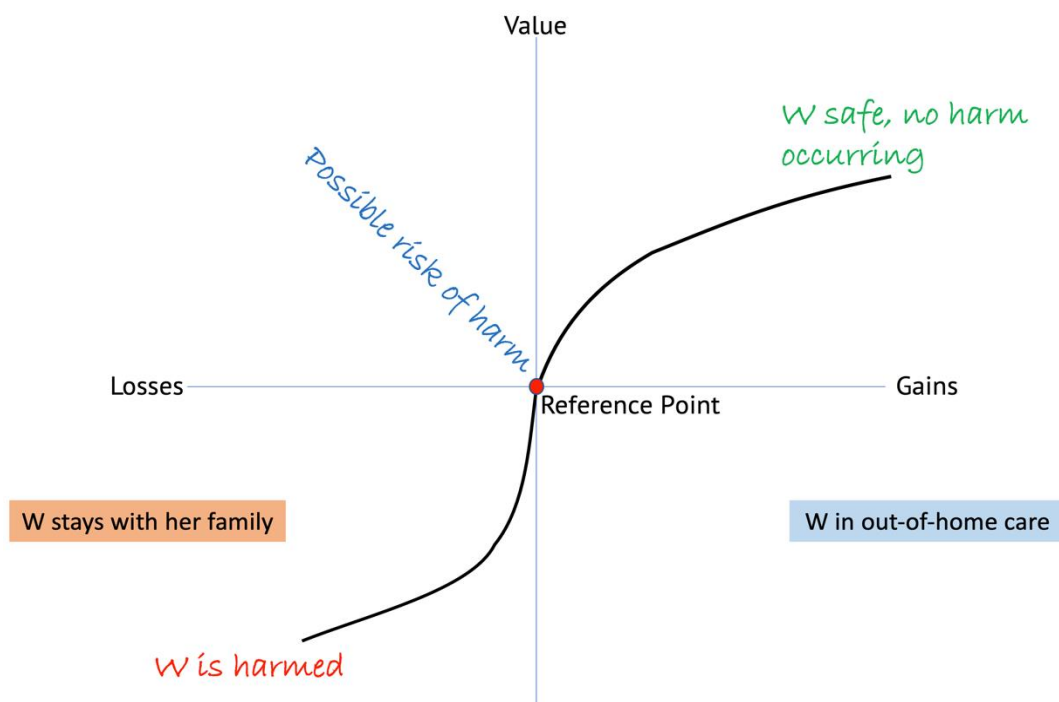


Figure 5: Case Example for Prospect Theory – State A

In Case W, the choice was to issue care proceedings and remove W from the father's care. One possible explanation could be the certainty effect identified in Prospect Theory, where people overweigh outcomes that are seen as certain relative to outcomes that are just probable. In the complex presenting situation, the outcome for W to be safe and in out-of-home care would be the most desirable outcome for the Local Authority if only the safety of Child W is considered. Now that Child W is in the care of the Local Authority, this becomes the new reference point.

Now that Child W is safe from harm, the attention would turn to long-term needs rather than the immediate need for protection. The Local Authority started to look into long-term or permanent options. In this case, this includes seeking expert opinions as part of an application for a permanence order (adoption). One of these experts describes the father as "*an exceptional father who has managed, despite a very difficult childhood, to overcome those difficulties and provides careful, patient reparative parenting to his children*" (Munby 2017, para. 53). In light of a statement like this one could assume that the Local Authority would consider a possible return of W to her birth family now with the long-term needs in focus. The chances of the option involving out-of-home care are likely to change as it is possible that out-of-home care in itself can have adverse outcomes considering the overall needs of a child, including the importance of attachment to the primary caregiver. These include physical and mental health, education, employment, offending behaviours, substance misuse and general wellbeing (DfE 2017). As quantitative data is not forthcoming, this illustration provides an assumed estimate of the probabilities of the long-term outcomes for W in care, considering the possible adverse outcomes of out-of-home care.

Which of the following would you prefer?

- | | |
|--|--------------------------------------|
| Return W to her birth: | Remove W from her family |
| C 50% Chance to meet W's needs.
50% Chance that W's needs are not met | D 80% Chance for W's needs to be met |

This new situation is depicted in figure 6 where the choice problem is whether

or not to return W to her birth family. However, this choice now has to be made from a new reference point with W being in out-of-home care. Whyte (1991, p. 28) points out that a change of “*the reference point can change people’s preferences and affect attitudes towards risk*”.

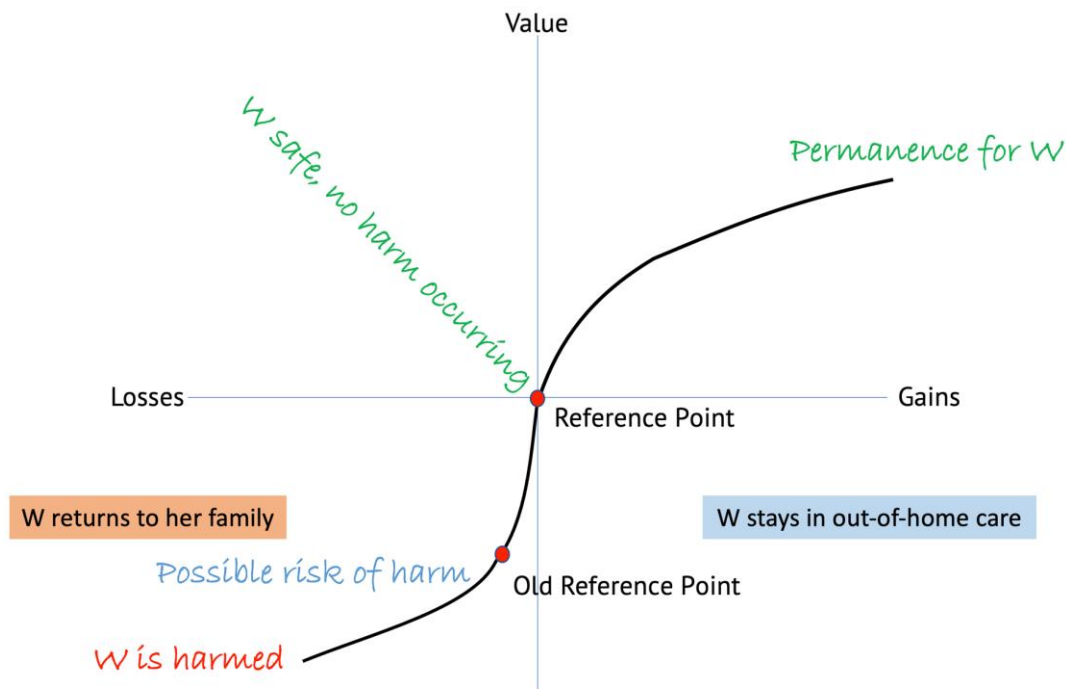


Figure 6: Case Example for Prospect Theory – State B

A significant change to the previous reference point is that even the possibility of a risk of harm would now be considered a loss in welfare as the reference point is now that child W is safe. That is where the value function of Prospect Theory is of interest, especially the observation that possible losses weigh more than gains and that decision-makers seem to be risk averse when protecting gains and risk seeking when avoiding losses.

In this case, this could mean that the Local Authority may decide to take steps to protect the gains made so far by heightening the threshold of allowing W's return to her birth family and increasing the standards that the father must meet. In the information available, there is no evidence for this strategy. An alternative strategy would be to avoid losses through dramatising language used in court about the possible risk to Child W to avoid a judge ordering case W to return to her birth family. Without claiming that this was the actual strategy used, this possible strategy would align with the way that

the Local Authority changed the initial description of the incident of W falling off a sofa. This description was changed from "*the father took baby [W] to hospital after reporting that she had rolled off the sofa and hit her head whilst in his care*" (Munby 2017, para. 33) to "*while in the care of [the father, W] reportedly fell off the sofa despite being pre mobile. This and injury to [Z] 's ear increased concerns of physical abuse being perpetrated by [the father] on the children*" (Munby 2017, para. 38). That could be classed as a risk-seeking strategy to avoid losses given the stakes involved and the possible loss of reputation when reporting in a "*cavalier approach to the facts and disregard for precision*" (Munby 2017, para. 37) which judge Munby highlights in his review of the previous court judgments.

This particular case is of great interest in many ways. However, there is no room to analyse this further and go beyond a simple illustration of applying Prospect Theory to a social work case to show the relevance of this theory to social work decision-making. This theory can help analyse social work's decision behaviour as a lens to make sense of decisions that, in hindsight and with limited information, may look surprising. For the case of child W, this theory offers an analytical framework that not only helps to understand why it took the courts five years to decide this case took but also why the local authority continued to make decisions in a way that protected their respective status quo(s) despite of evidence that the initial concerns were unfounded and that the outcome of this case, Child W being adopted, "*might perhaps have been different had the case been resolved sooner*" (Munby 2017, para. 4).

This case can also illustrate some of the biases involved in decision-making that can help explain how decision-making may be skewed through relatively simple psychological processes. As already mentioned, the research of Kahneman and Tversky, as well as others, have focussed on identifying errors in decision-making to understand decision-making in itself. Other authors, like Gigerenzer, highlight that these errors are not errors but effective responses to cognitive limitations that hinder people from processing the available information. Instead of calling these observations errors' researchers like Gigerenzer prefer to speak of heuristics in response to

bounded rationality (Gigerenzer and Selten 2002).

2.7 Heuristics and Biases

“A heuristic is a strategy that ignores part of the information, with the goal of making decisions more quickly, frugally, and/or accurately than more complex methods” (Gigerenzer and Gaissmaier 2011a, p. 454).

Decision-making in social work is, as already stated, a complex undertaking in what Savage (1954) calls a large world context defined by a lack of complete knowledge about the world and a vague definition of goals. Choice problems in social work are what Simon and Newell (1958) call ill-defined problems framed as symbols and verbal data that do not have clear definitions of goals. These problems require strategies that disregard aspects of the available information to choose within the constraints of the decision makers' cognitive abilities and the structure of the environment in which a decision must be made. Tversky and Kahneman (1974, p. 1124) explain that decision-makers use so-called heuristic principles to reduce the complexity of "*assessing probabilities and predicting values to simpler judgmental operations*" when faced with this level of informational complexity.

Gigerenzer and Selten (2002, p. 37) classify these heuristic principles as goal-specific tools adaptable to the context. They are a composite of different building blocks to search for information, identify when to stop this search and make decisions. Heuristics adapt to a new situation by modifying some or all building blocks (Gigerenzer 2008). As a result of this adaptability to the context, heuristics offer solutions to problems that logic and probability cannot resolve within the cognitive abilities of the decision-maker (Gigerenzer 2008).

Unlike Expected Utility Theory and, to a lesser extent, Prospect Theory, heuristics do not aim to optimise possible outcomes of a decision, nor do they require a complete analysis of factors relevant to a choice problem as suggested in Expected Utility Theory. Instead, the success of heuristics results from the interaction with the environment that enables the decision maker to make "*fast and frugal*" decisions in varying environments benefitting

from less-is-more effects. In these environments, "*less information or computation leads to more accurate judgments than more information or computation*" (Gigerenzer and Gaissmaier 2011a, p. 453). This interaction with the environment, or ecological rationality, provides a backdrop for considering how the organisational and cultural frame influence decision-making. Here heuristics are the rules of thumb social workers use to navigate the complex landscape of decision-making in a highly constrained context governed by policies and procedures, the law, professional standards and a limited amount of available resources and time.

Considering that heuristics are a function of the "*computational capabilities of the actor*" and "*the structure of the task environments*" (Simon 1990, p. 7), it can be assumed that there is an infinitive range of heuristics. However, Gigerenzer and Gassmaier (2011a) suggest four categories organise heuristics as they occur. These are heuristics based on:

- Recognition,
- one good reason only,
- trade-offs or
- social intelligence.

All of these are based on different combinations of search, stop and decision rules that help decision-makers deal with the complexity of information to consider. In their review of know heuristics, Gigerenzer and Gassmaier (2011a) identify four categories of heuristics with different search, stop and decision rules:

- Recognition-based decision-making
- one-reason decision-making
- trade-off or tallying strategies
- social heuristics.

In recognition-based decision-making, the decision maker first searches for alternative cues to compare and stops when they recognise a cue. They then infer that the recognised alternative has a higher value than the ones not

known so far. In one-reason decision-making, decision-makers search through cues in order of their validity and stop when they find a cue that discriminates between the different alternatives. The basis for the decision is that the alternative with the higher criterion value is superior. In trade-off or tallying strategies, the decision makers search through cues in any order and stop to weigh up pairs of cues. If the number of positive cues is the same for both alternatives, the search continues until no more cues are found. At this point, the decision maker chooses the alternative with more cues. Decision makers who use social heuristics look for similarities in the responses of other decision makers and imitate, average the wisdom of others or jump to an existing default if one is available.

As already indicated, this list is potentially endless, resulting from the so-called "Adaptive Toolbox" (Gigerenzer and Selten 2002) that enables a decision-maker to adapt fluently to new situations. The following paragraph explores the building blocks for heuristics within a theoretical appraisal of social work practice to illustrate how this decision-making model applies to social work.

2.8 Heuristics in Social Work

Common assessment strategies represent organisational search rules that "*specify in what direction the search extends into the search space*" (Gigerenzer and Gaissmaier 2011a, p. 456). These are used to illustrate the application of heuristics in social work. As already suggested, social work problems are ill-defined due to the complexity and the amount of information about service users in social work potentially available. The volume of available information means that too many cues have to be considered, which can negatively impact performance (Pitt et al. 2002) as it becomes increasingly challenging to choose the relevant cues to make the decision. Therefore, a social work decision-maker must have a strategy to search for the appropriate choices for potential paths of interventions and cues to evaluate each alternative. That would happen in an assessment at the beginning of each episode of supporting a service user.

There are various ways in which attempts have been made to guide the

search for information at this stage to streamline this aspect of social work that can arguably be classed as organisational search rules. These include managerial approaches (Harris 2005; Lees et al. 2013) or Signs-of-Safety (Department for Child Protection 2011; Turnell 2012; Baginsky et al. 2017). The first includes the use of the Framework for the Assessment of Children in Need, the use of structured decision-making tools (Gillingham and Humphreys 2010; Macdonald et al. 2014; The Children's Research Centre 2015; Gillingham et al. 2017), predictive risk modelling (Gillingham 2016; Cuccaro-Alamin et al. 2017; van der Put et al. 2017). The second provides an example of an organisational search rule to illustrate the heuristics model.

Compared to the wide range of parameters in the Assessment Framework used historically across Children's Services in England that made this time-consuming and prescriptive (Millar and Corby 2006), a Signs-of-Safety Assessment (Turnell 2012; Salveron et al. 2015) focuses on past harm, future danger, what is working well and complicating factors. It uses scaling questions to judge the safety of the child(ren) (Baginsky et al. 2017). Based on this approach, a search rule that social workers could use to find cues to evaluate the risks for the child could be formulated this way:

Search examples of previous harm, what works well and what complicates matters or "What are we worried about?"

In this case, the social worker may stop the search for additional cues once they have reached a personal threshold for concerns.

Compared to the Assessment Framework that covered twenty different domains (Department of Health and Department for Education and Employment 2000) and was accompanied by eight questionnaires and scales (Cox and Bentovim 2000), this is a significant reduction in the parameters used to identify relevant cues in a family system. These cues are used to evaluate the safety of the child on a scale from 0 (certainty that the child will be (re) abused) to 10 (enough safety for child protection authorities to close the case). The tallying heuristic would apply here where the number of cues "*favouring one alternative in comparison to others are counted*" (Gigerenzer and Gaissmaier 2011a, p. 469). That means the relevant factors are

categorised as aggravating or mitigating, weighted through scaling questions ("How worried are you?") and added up to determine the child's safety. This leads to the next building block of a heuristic, the stopping rule determining when a search should be stopped. A hypothetical stopping rule in the context of the Signs-of-Safety could be:

Stop search after m out of M cues and compare aggravating and mitigating cues. If the cues are equally important for both, search for another cue.

The decision rule to clarify how a final decision is reached could be:

Add cues to determine level of risk.

These kinds of heuristics could help social workers in practice to deal with the complexity they are facing and avoid a potentially endless search for more information. By adding a simple stop rule a decision-maker can stop adding information to an internalised risk assessment at the point where they identified a risk that they know meets the organisational or legal threshold.

2.9 Intuitive Decision Making

Using intuition to make decisions appears more acceptable in everyday life than in a professional context. In everyday life, intuitive decision-making is often referred to as making "gut decisions", and generally, stories about people, especially reports of experts, making decisions based on a feeling in their gut have positive connotations, even described as "*magical*" (Kahneman 2013, p. 11). This perception differs in a professional social work context where gut decisions receive a more negative appraisal. It does not fit the paradigm of evidence-based practice and the importance of making unbiased decisions that can be rationally explained. Nonetheless, intuition or practice wisdom (Samson 2015; Cheung 2017) is important in human decision-making. It requires little effort as opposed to a more deliberate analytical strategy, is fast and adapts well to decisions involving complex information (Seligman and Kahana 2013). This description fits the categorisation of information processing approaches by Kahneman (2013) into a fast and a slow system or Epstein's delineation between the *experiential* and *rational* ways to process information (Epstein 2013). People experience the fast, experiential or tacit system as automatic, often

driven by emotions and the slow, deliberate system as effortful based on language (Hogarth 2001). The tacit nature of intuition means that it is less accessible to introspection and is, therefore, not easily articulated. Intuitive judgments are surprisingly effective, as Ambady and Rosenthal (1992, 1993) report. They found that judgments based on short video clips of a teacher's non-verbal behaviours in their interaction with pupils accurately predict the target evaluation of this pupil's educational performance. This finding reflects the work of Wilson and Schooler (2008), who highlight that people's judgment can improve when they use intuition instead of reasoning.

The effortless nature of intuition has a clear advantage over deliberate information processing in the face of large worlds. Hogarth (2001) highlights that a deliberate, analytical approach requires an explicit hypothesis about reality that often does not match this reality. Another advantage is that intuitive decision-making can adapt to small changes in the variables to be considered. Therefore, decision makers tend to put more emphasis on intuition to capture the complexity of large worlds. This essence of the effortlessness of intuition does not mean that developing intuition is in itself without effort. Instead, intuition requires the effortful development of expertise. Klein (2008, 2015) and Simon (1997) explain that intuition is based on the recognition of similarities in patterns that professional decision-makers have accumulated in the journey from the status of a novice to an expert, as described by Dreyfuss & Dreyfuss (1986). Professional intuition requires a high level of expertise represented by the "*vast stores of prior experiences*" (Seligman and Kahana 2013, p. 399). Previous experiences help practitioners to develop a growing list of field-specific cues. Together with learning about positive and negative outcomes of choices, these form patterns that can be compared to the scenario that a decision maker faces at any given moment. As a result, the decision maker does not have to evaluate alternatives and pick the best but can see if a pattern matches a problem that can then be resolved by using previously used strategies with only minimal adaptations. That means that expert decision makers can make intuitive decisions with a high level of confidence but will find it hard to articulate the process of how they came to make a specific decision, which has implications for developing

intuition.

Intuition is based on direct experience. In order to learn intuition, the decision maker needs to deploy their deliberate system after making an intuitive decision. For example, social workers would use their tacit knowledge (Polanyi 1998, 2009) to make quick judgements about a situation and then use the deliberate system to challenge their initial tacit judgment based on the information available. The prerequisite for this learning is that the decision maker has a chance to see "*why and when their intuitions are accurate*" (Hogarth 2001, p. 24). To realise this, the decision maker has to be in a learning context where feedback about the outcomes of a choice is accessible rapidly and where patterns are repeated often and follow clear rules. For social work, this is a challenge as the outcomes often take a long time to realise. In short-term interactions like communication with service users, where the results of an action are immediately observable, learning intuition is much more easily achieved.

2.10 Intuition in Social Work

Social Work and intuition appear to be a challenging mix. On the one hand, the reality of social work entails the non-linear nature and complexity of human life. On the other hand, social work expects that decisions must be based on clear rationales and that social work decisions are evidence-based. Whenever things go wrong in social work practice, critics (Gove 2013; Department for Education (DfE) 2015) highlight the failings of applying the latter. Even though social work professionals need to be able to give a rationale for decisions they have made, there is a great likelihood that, in practice, social workers use their intuition when faced with the complexity of situations that are not too dissimilar from some of the scenarios that Klein (2006) used to analyse the decision making of firefighters.

The nature of home visits in social work practice is an excellent example of the need to use intuition in social work. The study by Cook (2017) shows that social workers use intuition in their first encounters with families. According to her, the social workers' intuitions in the initial home visit are essential to assess risks. The "*emotional responses, 'niggles' and 'gut feelings' sensitised*

them to potentially salient information before it was rationally accessible" (ibid 2017, p. 431). From this perspective, the initial intuition of social workers seems to set a path through the complexity of the information that can potentially be extracted from the richness of families' daily lived experiences. For example, the pictures below are taken from an immersive simulation of a social work home visit produced for a follow-on project about social work decision-making. Here, it illustrates the complex visual information social workers perceive in-home visits. Depending on the initial referral information, social workers would start to look for cues that allow them to assess risks. Mostly, this is done under significant time constraints and in the case of an initial home visit, social workers would not necessarily know what to look for. This task gets even more complicated in situations where there are contradictions like the mix of a child's duvet, toys and bottles of alcohol and indicators of drug use or a toilet that looks like it is usually clean on the surface but has elements that do not fit the picture of a well-cared for home.



Figure 7: Screenshots of a virtual homevisit (Personal Collection 2024)

Under uncertainty and time constraints, these decisions often rely on the practitioner's ability to quickly assess a situation and decide what kind of cues to look for to establish a possible explanation for a situation. Faced with this scenario, the decision-maker may rely on their gut feeling and consider that something may be off. It could be some small detail like a button battery or bleach within reach of children in the bathroom that triggers a feeling that there are underlying risks which triggers a more thorough search for further cues.



Figure 8: Screenshot of bathroom detail (Personal Collection 2024)

Gofman (1959; Verhoeven 1985) described this process as framing, the construction of a way to represent a situation or a person in a specific way. Depending on how a decision-maker frames a situation, the path taken through different possible interpretations of what is happening could vary significantly. The idea behind intuition is that an experienced social worker "knows" which path to take without necessarily being able to explain why they chose this particular path.

The overview of common theories sets the theoretical concept for the main object of this study. The review of the different theories showed that validating these theories relies on observations of decision-making behaviours and not on the direct observation of internal reasoning processes. These theories provide models that can help to explain the choices between courses of action. However, the thought experiment of applying these theories to social work practice shows some limitations in translating the theories into advice on how one should decide on courses of action in social work.

3 Social Work

The following discussion's premise is that it is essential to consider the organisational context of individual decision-making behaviour. The Decision-Making Ecology states that an interplay of the case and external factors, decision-makers characteristics and case characteristics influence decisions. Therefore, the field of social work practice needs to be looked at to show the underlying "*unthought' categories, perceptions, theories and structures [...] of the social environment*" (Deer 2014a, p. 197) of the field of social work. The context influences how people act through exposure to an organisational culture of working in an organisation for prolonged periods. This study assumes that the context includes "*most profound effects upon what one knows, believes, attends to, hopes, wishes, emphasises, fears, and proposes*" (Simon 1997). Therefore, the organisational context, seen here, similar to what Bourdieu defines as a field of practice (1977, 1999), is vital to this study as the context frames the environment that shape individual characteristics and habits (Simon 1997).

As a profession and academic discipline, social work strongly focuses on practice and promotes social change and justice (IFSW 2022). The foundation of social work lies in the principles of Human Rights (Healy 2008), respecting the value of each human being in their rights and aiming to promote social structures that offer security and the potential for development. Social work is not a theoretical discipline but a practice that focuses on interactions between someone who aims to promote social change by offering assistance and someone who struggles in everyday life because of personal challenges, structural barriers, or injustices. According to Payne (2015, p. 54), social workers intervene in people's lives based on the "*human communication within a relationship as the basis of social worker's actions*", professional knowledge and the use of the self. In this sense, professional social work is a personal interaction between at least two people. In this relationship, social workers constantly walk the tightrope of representing public interests whilst using their values, knowledge and persona to help someone else. This tightrope represents a tension that influences decision-making in social work

and the added pressure of what can be described as a neoliberal context, austerity and blame culture that appears to be hostile to what social work as a profession tries to achieve.

3.1 The Socio-political context

“Social work aims to advance the causes of the vulnerable and marginalised with the aim of promoting social justice, equality and human rights in a global context” (Palattiyil et al. 2016, p. 4).

The fact that social work occurs in a globalised and neo-liberal world is an obvious statement is a well-established argument. Authors like Dominelli (2010; Dominelli and Hackett 2012), Ferguson & Lavalette (2006) and Jones (2005) have discussed the implications of globalisation for social work practice extensively, which is why this section does not present a detailed discussion here. Instead, this discussion explores the idea that neo-liberal Doxa, a set of unwritten and unquestioned rules, creates a backdrop for social work decision-making by shaping the way individuals think about the actions and interactions of people.

Globalisation means *“the increased integration of the world’s commodity and finance markets and its cultural and social values”* (Yeldan 2012, p. 221). It refers to *“the embedding of capitalist social relations in daily routines in personal lives, public life in general and professional practices”* (Dominelli 2010, p. 601) or, more critically, the *“programme for destroying collective structures which may impede the pure market logic”* (Bourdieu 1998).

Globalisation has many well-documented positive effects like the improvement of health care, the reduction of infant deaths and the global reduction of poverty; these achievements should not be underestimated (Rosling et al. 2018). The World Bank (2018) reports that between 1990 and 2015, the rate of extreme poverty globally dropped from 36% to only 10%, even though the latest predictions of the impact of Covid-19 (World Bank 2020) highlight that the trend of poverty reduction could reverse and increase again for the first time since 1998. Despite the achievements and enormous opportunities that result from globalisation, it is essential to point out that many lose out in a more competitive environment that threatens to colonise more and more aspects of everyday life (Boltanski and Chiapello 2003;

Candeias 2004). Reuter (2004) poignantly highlights the balancing act of the enormous opportunities of globalisation with the incalculable risks that this process brings to almost all aspects of life. These risks overwhelm many people who struggle to find a path through the complexity that a globalised world brings to their everyday life.

Globalisation is closely connected to a neoliberal ideology that endorses the creation of a free market through de-regulation on a large scale (Bourdieu 1998), supported by societal forces that aim for a complete overhaul of society to introduce a market logic in all aspects of societal life (Candeias 2004). This overhaul is deemed necessary because, according to Hall (2011), the advocates for neoliberalism see the strategy of unleashing market forces as the only option to adapt to globalisation, which creates complexity. From this perspective, this complexity can only be managed by allowing competition in a free market to identify the best solution to respond to the dynamics of a globalised world. In this logic, political systems like democracies, autocracies or dictatorships are not evaluated against ethical standards like human rights. The welfare provided to their citizens or the cultural, natural or social contributions they make to Humanity as a whole are not considered through the lens of human rights but solely on their economic growth and the overall wealth measured by the Gross Domestic Product. This development affects social work practice in many ways summarised here in two dimensions.

On one hand, the impact on the welfare state and political agendas like austerity mean that social work withdraws from all activities that support the welfare of people and is reduced to only statutory aspects of state social work as an extension of government policy. On the other hand, there are the effects of the neo-liberal Doxa, the way society operates (Chopra 2003) on those who are potential service users of social work services. Together these dimensions highlight how tight the proverbial tight rope of decision-making is when social workers need to balance the protection of a child with maintaining the upbringing of children in their families within a context of decreasing resources and increasing demand.

3.2 Safeguarding Children in England

It is helpful to provide a picture of the sheer volume of safeguarding decisions in England. The map below presents the 152 Local Authorities providing Children's Services in England who have the duty under the Children Act 1989 to safeguard and promote the welfare of children within their area. Each dot represents ten children for whom social workers needed to make decisions about their primary needs between the first of April 2019 and the thirtieth of March 2020. Each dot represents concerns about risks to the welfare of children raised with Local Authorities as the statutory point of contact, who will have to assess the risk in line with the safeguarding thresholds set in their protocol and decide a course of action.

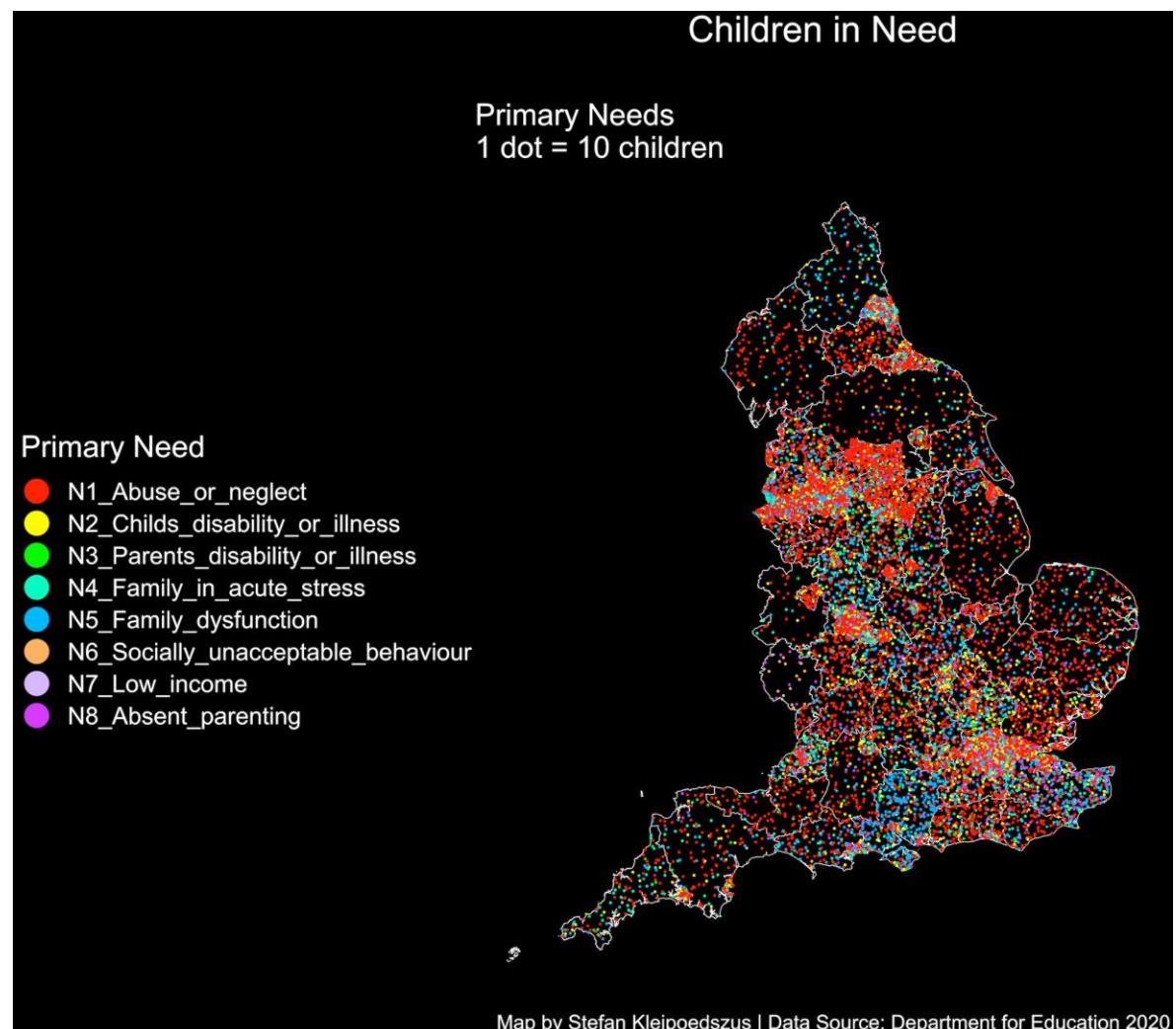


Figure 9: Map of Children in Need In England

Children and young people may come to the attention of Children's Services for many reasons that vary for each individual. When children meet the

threshold for Children Social Care, they are deemed to be Children in Need under s17 of the Children Act 1989 who receive a service from their Local Authority. According to data from the Office for National Statistics (Department for Education 2020), visualised in the map above, for most Children in Need, there are concerns about abuse or neglect, absent parenting or family dysfunction. Upon a closer look, there appears to be some variation in the distribution of primary needs. For example, in Hampshire, the primary need appears to be family dysfunction, whilst in the metropolitan area of Manchester and Liverpool, the primary need appears to be Abuse and Neglect. This variation in the distribution highlights significant regional differences in primary needs and illustrates how the regional context (rural vs urban, north vs south) and the impact of social deprivation affects the assessment of needs.

England has a highly centralised and regulated child protection system with the Children Act 1989 and 2004 at its heart. Specific statutory guidance about how local authorities have to assess the needs of children and protect their wellbeing is set out in a document called "Working Together 2018", which is supposed to ensure consistency in how services respond to safeguarding concerns. Nonetheless, the safeguarding system in England continues to be subject to significant public scrutiny and a culture of blame in response to well-publicised cases of errors in social work decision-making (Munro 1996b, 1999; Laming 2003; Department for Education (DfE) 2008, 2009).

It is worth highlighting that according to the Office for National Statistics (2021), the children's social work workforce consists of 32502 full-time social workers, who hold an average caseload of 16.3 cases. In 2021 4995 social workers left the profession resulting in 6522 vacancies (the highest number in five years) only partly due to Covid-19. 5997 agency social workers cover significant gaps in the workforce at high costs to Local Authorities (Department for Education (DfE) 2022). These numbers mean that a decreasing workforce is facing an increasing demand visualised in the density map above. There are decreasing resources due to austerity when significant pressures on services exist and increase (Murphy 2021). Current geopolitical events such as the Covid Pandemic and the cost-of-living crisis make the

situation even more challenging. However, the current pressures on social work result from a long history of political decisions that have dismantled the welfare state since the Thatcher government (Dowling 2017).

3.3 Social Work and Austerity

The government under Margaret Thatcher introduced market-orientated reforms by reducing state interventions and large-scale privatisation of nationalised assets (Marsh 1991). This development is ongoing, and Harris (2005) gives a succinct overview of the development of Neo-liberalism and the impact on social work practice in the UK up until the New Labour government. The Thatcher government and the subsequent conservative governments followed the ideology that only de-regulated states that allowed a free market would thrive in a globalised world. The New Labour government changed direction but stuck to the neoliberal agenda. The (failed) aspiration to eliminate child poverty by 2019 and the introduction of the national minimum wage, tax credits for working families and increases in child benefits symbolise this change of direction. The Blair government significantly increased funding for Children and their Families between 2001 and 2010. Nevertheless, this was not a return to a socialist ideal of a welfare state. Instead, the Blair government fully embraced the Neo-liberal agenda by requiring those who need assistance to meet behavioural requirements (Garrett 2003), and emphasising market forces in the social care sector.

The latter was achieved by introducing Best Value principles for commissioning services and a culture in which Key Performance Indicators become the measure for good services. Compared to previous conservative governments, this was accompanied by more active promotion of the Neo-liberal agenda through "*external audit, inspection and review*" (Harris 2005, p. 91). As a result, a culture of managerialism emerged in social work that is evident in prescriptive risk and performance management techniques (Lees et al. 2013) and the failure "*to recognise the importance of the emotional life of human beings and the importance of the relationships we build in social work*" (Trevithick 2014, p. 287). Instead of focusing on crucial aspects of relationship-based practice that would align with social work values, New

Public Management emphasises the importance of performance measures and creating a paper trail of professional activity that limits social workers' autonomy (Hood 1995). Jones (2005) documented the consequences of this neoliberal culture in social work, which shows the realities of working in what he describes as a stressful, unhappy atmosphere where social workers regularly develop serious health problems.

Since New Labour mainstreamed neoliberalism, the conservative governments that took over in 2010 increased the pace of dismantling the welfare state. The new government introduced austerity as the cloak for reducing the achievements of the welfare state even further at the cost of those who already live in precarious contexts. Data provided in a report commissioned by the Children's Commissioner (Kelly et al. 2018) highlight that in 2018, 30% of children lived in relative poverty and benefit spending for children dropped to £4700- per child, the same level of spending as in 2006/07. Education as a whole has suffered significantly. Spending on education is now at the same level as in 1990. This de-facto cut in spending created a significant attainment gap that, according to Hutchinson et al. (2019), has stopped closing and is likely to increase due to the Covid-19 Pandemic. The reform agenda of the current conservative government, especially the introduction of Universal Credit, is estimated to reduce the income of low-income families by 10-15% compared to the period before the reforms (Kelly et al. 2018). Funding for preventative interventions like SURE Start by Children's Social Care has dropped by approximately 60% since 2009-10, which means that by now, the focus of interventions is not on providing support but on the top-end statutory services like safeguarding children and Looked After Children (Bywaters et al. 2018). The result is that decision-making in social work is increasingly limited to rationing decisions about thresholds rather than selecting from a menu of services to support families and their children (Devaney 2019).

The austerity politics of the conservative government introduced in 2010 introduced "*novel forms of suffering [that] are the product of economic politics*" (Graham 2018, p. 6) and this includes the increase of people who rely on a decreasing amount of wealth transfer payments in the form of

benefits. The Institute for Fiscal Studies (Browne and Hood 2020) highlights that absolute child poverty in the UK will have risen in 2020/21 by 3.2% as a result of tax and benefit reforms that lead to a sharp rise of families with three or more children who live in poverty. The IFS also warns that relative child poverty will increase from 17.8% in 2015/16 to 25.7% in 2020/21, which will set families back to the level achieved in 1997/98.

This increase in child poverty coincides with a significant increase in the number of children in need, subject to child protection plans or living in out-of-home care, as the Children in Need and Children Looked After Statistics suggest (Department for Education 2020). This increase may suggest a link between poverty and the rate of interventions at this statutory level.

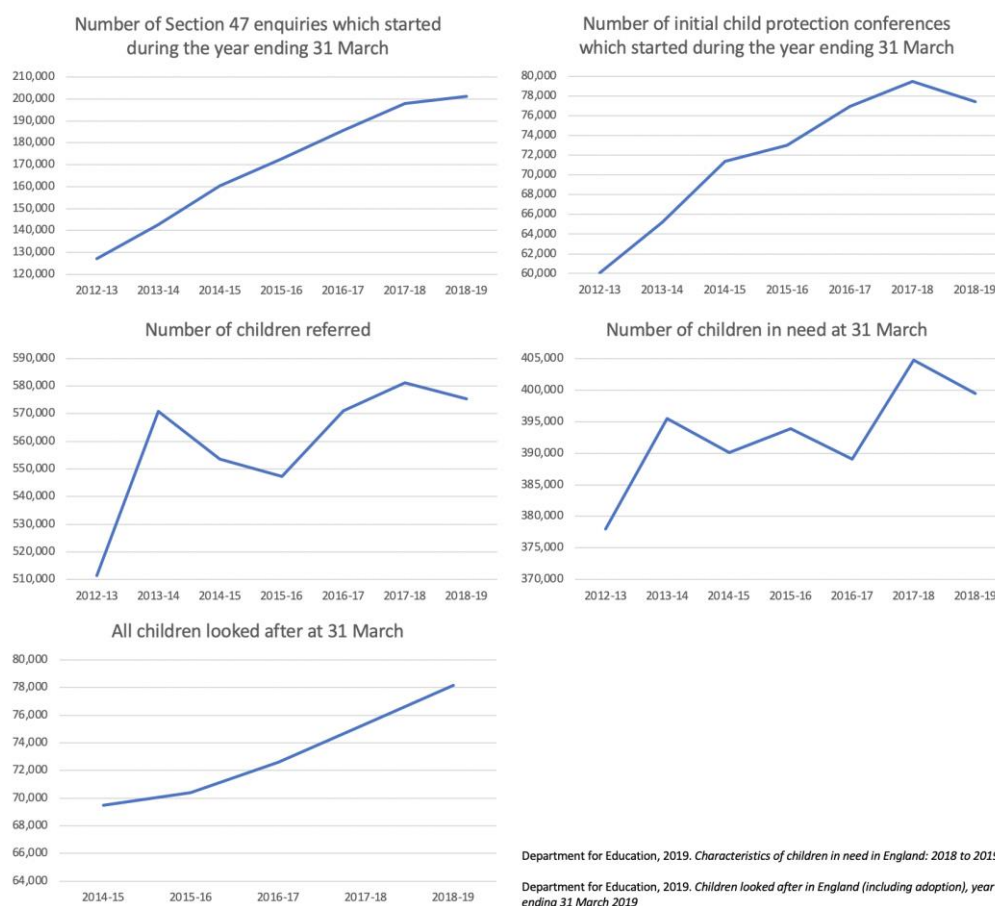


Figure 10: Children in Need Statistics (DfE 2019)

Bywaters (2020) confirms that there has been a steep increase in intervention rates with more children that are looked after by Local Authorities or subject to child protection plans, and that there are significant inequalities regarding the socio-economic situation of the families involved. Children from lower

socio-economic backgrounds are more likely to be subject to protection plans or live in out-of-home care (ibid). Similar effects of a link between a family's income situation and the likelihood of children's services intervention have been reported elsewhere, for example, by Luitgarden (2009) or Álvarez-Dardet et al. (2016), which indicates that this socio-economic bias is a widespread problem in social work. Bywaters (2020) also highlights that social worker who participated in their study emphasised the link between geographic areas of deprivation and hotspots for statutory social work. In addition to this picture is the observation of Bywaters et al. (2018) that the quality of Children's Services, as rated by Ofsted, is lower in areas of high deprivation compared to areas of low deprivation.

This significant deconstruction of the welfare state went without major opposition. The deficit can be explained by the existence of a hegemonic ideology that portrays market forces as the only possible way of managing in a complex and globalised world. This hegemony and a neoliberal agenda were already established by this time at all levels of society. A vital aspect of this development is the ideology of competition as the driver for success is embedded in the individuals themselves. The use of individual performance indicators and the evaluation of the individual's performance against these indicators results in delegating responsibility to the individual (Bourdieu 1998). The effects of this are pronounced in the development of the so-called blame culture.

3.4 Blame Culture

This delegation of responsibility to the individual despite significant budget cuts means that social workers find themselves in a position where they are damned if they do and doomed if they do not. This dilemma was most pronounced on the 3rd of March 2015. On this day, Prime Minister David Cameron threatened social workers with up to five years in prison for failing to protect children from sexual abuse. With this, he implied that it is not the structural problems surrounding social work that may lead to child abuse tragedies but the personal failures of social workers.

Munro (2010) identifies two strategies that are used in response to the

identification of errors in the protection of children. The first of these strategies is "*punishment and rewards to shape behaviour and encourage people to work at a higher level*" (ibid. 2010, p. 1141). This culture of blaming individual social workers for failing to protect children from abuse-related death has a long tradition in the media (Ayre 2001; Garrett 2009; Jones 2014). Shoemith (2016) emphasised the corrosive impact of a culture of blame that can lead to a defensive practice of social work in response to uncertainty (Leigh 2017). Defensive practice changes practice towards compliance with rules rather than "*carrying the personal responsibility for exercising judgment*" (Munro 2011, p. 6). The focus on compliance with rules is defined in detailed policies and procedures governing practice in Local Authorities. It results from attempts to reduce decision-making errors identified in serious case reviews, investigating incidents where children die or come to severe harm due to neglect or abuse.

The second strategy is to reduce the degree of autonomy in decision-making by providing detailed procedures and guidance like the statutory guidance Working Together (HM Government 2018), and local policies and procedures. This strategy also explains the increasing use of structured decision-making tools and designated computer systems that limit a practitioner's options to make decisions that deviate from organisational constraints. Together these strategies show a lack of trust in the professional's capacity to make correct decisions based on their professional judgment.

Making errors is human and inevitable, but, according to Whittingham (2004, p. 254), it is "*the inevitable consequence of defective systems*". However, as long as there is a societal obsession with avoiding risks (Beck 1992, coupled with a person-centred approach to explaining errors (Munro 2010), the individual is likely blamed for errors that are bound to occur in a complex world of social work practice. Blame, the process of placing "*the responsibility for an error with the individual making the error*" (Whittingham 2004, p. 254), is not a new concept. In modern times blame has become associated with risk. Historically, risks were deemed outside the sphere of human influence as they were unpredictable acts of God or fate. With the rise of modernity came a preoccupation with the future and possible risks. Beck (2004)

describes this new form of risk that results from human actions as manufactured risks for which individuals can be blamed. Blaming someone is a strategy to mitigate the experience of living in a world so complex that it is impossible to control all inherent risks, despite the illusion that it should be possible to control these risks. Blaming an individual makes it possible to ignore the fact that we live in a constant state of uncertainty resulting from modern life.

Instead of accepting that those unthinkable things that in hindsight appear to be predictable happen, like a parent killing their child, there is a tendency to blame someone who should have intervened. Blaming an individual for not thinking the unthinkable, and preventing a tragedy from happening, maintains the illusion of being in control and the idea that "*errors are avoidable, not just acts of fate*" (Munro 2010, p. 1142). For social workers, this results in the constant stress of being blamed for something they have not done, a box they have not ticked or recording a visit that in social work speak has not happened until it is recorded. All of this enhances the difficulties of making decisions in social work. This problematic context is confounded by the fact that it is difficult to learn from successes and failures in social work practice.

3.5 Social Work as a wicked learning environment

Humans tend to learn from failure (Edmundson 2011), and Tetlock and Gardner (2015) suggest that people learn through the cycle of "*try, fail, analyse, adjust, try again*". The result of people not going through this cycle can be overconfidence (Moore and Cain 2007; Moore and Healy 2008; Anderson et al. 2012). Generally, Moore and his colleagues found that decision-makers are overconfident in their judgments when there is no direct feedback loop between a decision and an outcome. This effect grows as practitioners gain experience because they assume that experiences alone improve decision-making skills. However, this assumption is not reflected in reality, as Tetlock and Gardner (2015) highlight by writing, "*to learn from failure, we must know when we fail*". Identifying failure is easy when playing chess or predicting the weather but more complicated when the outcomes of a judgment or decision are unavailable for months or years. That is the case

in social work, a so-called wicked learning environment where the outcomes from decisions are disconnected from the actual decision due to high levels of uncertainty and ambiguity (Parton 1998; Fook 2007). This uncertainty is the result of the observation that social phenomena are "*inherently inter-subjective, reflecting the variable and (to some extent) individualised nature of the human beings they are comprised of*" (Fish and Hardy 2015, p. 101). This observation is often ignored, especially in light of the requirements for evidence-based practice and in response to high-profile service failures reported widely in the media. Due to high workloads (Office for National Statistics 2021), social workers have to make judgments and decisions at a high pace with limited information and limited opportunities to engage service users as experts by experience in decision-making, thereby increasing ambiguity and uncertainty even further.

The complexity in social work derives from uncertainty and ambiguity (Devlieghere and Roose 2022). Uncertainty in social work means there is no strong knowledge about the outcomes of interventions chosen in particular situations. Similar interventions in comparable situations can lead to very different outcomes. For example, children who experienced similar types of abuse can either develop into well-adjusted people or develop clinical depression. These differences make it difficult to predict what will happen to a child who experiences abuse or neglect with or without a social work intervention. This difficulty to predict is confounded by ambiguity in social work where practitioners have, for example, the legal duties to protect children and promote the upbringing of children in their families (Children Act 1989, s17).

In other words, Social Work is a wicked learning environment. The game's rules are unclear because the feedback between actions and their outcomes is weak or of poor quality (Hogarth 2001). The task characteristics of social work suggest the practice is rooted in uncertainty, complexity and intractably 'wicked' problems (Devaney and Spratt 2009). Situations change fast, and there are large numbers of indicators social workers have to process at a high pace. These indicators are hard to measure objectively. Social Workers who make decisions are caught in this context where they have to make decisions

quickly and under immense pressure (van de Luitgaarden 2009; Helm 2011). This environment is wicked because decision makers do not get direct feedback about the outcomes of their decisions as these outcomes are often delayed and not clear.

Social Work as a profession has high ambitions that are founded on a relationship-based ideology. However, the significant demand on a workforce that appears to be decreasing, diminishing resources resulting from austerity, neoliberal policies that lead to a blame culture, and social work as a wicked learning environments decision-making by individual professionals increasingly tricky. This mix of pressures on professionals is likely to affect decision-making processes. The following section, provides a review of existing research to further understand these dynamics and complexities of social work decision making.

4 Literature Review: Studies of Social Work Decision Making

This literature review considers the current state of research into social work decision-making, particularly on safeguarding children. An initial overview of the papers published about social work decision-making suggests a great interest in this subject. However, there was not a clear way of identifying papers that focus mainly on the internal thought process of practitioners making safeguarding decisions. In response, this review takes a pragmatic approach to deal with this range of papers representing a broad diversity of topics. The following section describes the process of undertaking this review, followed by an overview of the academic field and a more in-depth analysis of the topics covered in the included papers.

4.1 The process of this review

A significant challenge for literature reviews is that the scientific community produces knowledge at an ever-increasing pace. The volume of available papers exceeds humans' processing capability. It creates significant problems for literature reviews as it is impossible for a human researcher to review many articles about a topic. In response to this increasing pace, this review experiments with using text mining strategies to select and structure a corpus of articles about decision-making in social work for the researcher to then interpret and analyse.

This review is based to a large extent on the analysis of bibliometric data. It applies text mining strategies to the abstracts to organise the collection of texts identified in the search strategy. Bibliometric Analysis and, in particular science mapping, help to "*find representations of intellectual connections within the dynamically changing system of scientific knowledge*" (Cobo et al. 2011, p. 22).

Text mining refers to the process of extracting insight from unstructured data in the form of text (Kwartler 2017). The benefit of text mining is that crucial parts of a review process can be undertaken in an automated way. This automation avoids the possible bias and limited scope of a manual review

(Yang and Hong 2018), which is "*time-consuming, labour intensive and prone to errors*" (Feng et al. 2018, p. 41). It is unnecessary here to go into detail about the process taken in this review. The process entails a script in the statistical programming language R, which is available in the appendix. This script helps to organise the data, but it is essential to highlight that it is still the researcher analysing the data who has to make the interpretation and draw conclusions from it (Cobo et al. 2011).

This literature review uses the Web of Knowledge to find articles relevant to this study's research focus. The benefit of the Web of Knowledge is not only the high quality of data contained in this database but also that it provides bibliometrics data that is useful for the particular methodology applied in this review. The Web of Science is used as this is a unique scientific database that contains references to high-quality research and meta-data required for specific steps in this analysis. The broad criteria for inclusion in this review are that the articles are peer-reviewed and focus clearly on decision-making in social work. The PICO approach is used to translate this into a framework that informs the development of a search strategy. The table below shows what framework is used for the literature search.

Population	Social workers making decisions
Intervention	Safeguarding decisions made by social workers in practice
Comparator	Practitioners with different level of expertise
Outcome	Decisions made in best interest of children

Table 2: Literature Review PICO

Key concepts and synonyms are identified based on the above elements of the search strategy as summarised in the table above to determine potential search terms using the Concept Map shown in Figure 14.

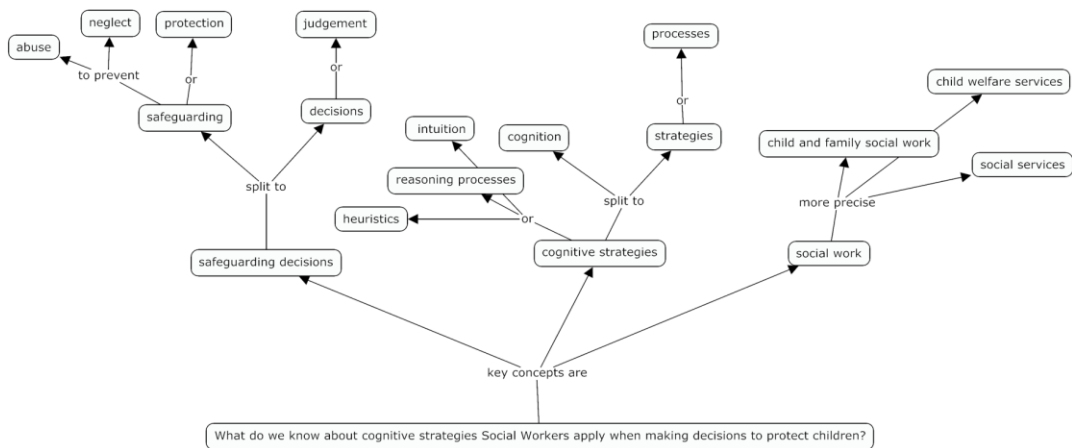


Figure 11: Literature Review Mind map of key concepts

These search terms inform the development of a search strategy to identify the texts to be collected. For this review, the research question of this study has been translated into a boolean search string using the above PICO scheme, which was fine-tuned based on the results of the initial searchers. The search string is a combination of the following expressions:

- #1 TS= (Decision NEAR/3 making OR judg*ment* OR Choice NEAR/3 behavio*r) OR TI= (Decision NEAR/3 making OR judg*ment* OR Choice NEAR/3 behavio*r)
- #2 TS= (cognition OR heuristic* OR Intuit* OR bias*) OR TI= (cognition OR heuristic* OR Intuit* OR bias*)
- #3 TS=("social work*" OR "social service*") OR TI=("social work*" OR "social service*")
- #4 TS=(safeguard* OR protect*) OR TI=(safeguard* OR protect*)

These searches were combined as follows

((#1 OR #3) AND #2) AND #4), resulting in 501 Articles.

The results were downloaded from the Web of Science as a BibTex File. Then, they were imported into R, including all available data stored for each article. The dataset includes standard information about the title, source, author, and cited references shown in the screenshot below.

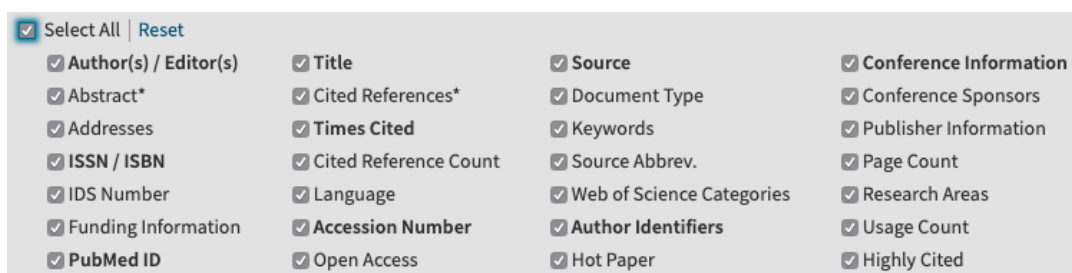


Figure 12: Metadata for bibliographic analysis

This dataset is prepared for further analysis, including creating summaries of

the abstracts and additional keywords and cleaning the data. The script generates a data frame imported into NVivo12 to code the abstracts of the articles analysed in each stage of this review.

This literature review contains two sections that provide an overview and analysis of themes. In this first part, bibliometric data provides the foundation for creating a higher-level overview of the scientific field covering decision-making in social work to structure the articles and select the most relevant articles for this study. In the thematic analysis, an unsupervised machine learning approach uses this selection to identify topics that this review interprets.

It is important to emphasise that the division of labour is as follows.

Computer-based text mining strategies do the hard labour of organising the unstructured data in titles, keywords and abstracts and present this data in a way accessible to human interpretation. This review is the result of this interpretation, and the data is used as the inspiration for the researcher creating a narrative about the existing research on social work decision-making.

4.2 Overview of the scientific field

The first part of this review is an overview of the scientific field. This overview contains a consideration of research into human decision-making, a short bibliographic description of the corpus considered in the literature review, a review of keywords and the most productive authors. To go into a little more depth, the work of the most productive authors and the bibliographic coupling of the articles in this corpus are used to establish the central discussions in the scientific field. All these blocks help to narrow down the corpus and focus on the actual interest of this study.

4.2.1 Research into human decision-making

The field of decision-making research is a vast and multidisciplinary area of study that encompasses, amongst many other topics, psychology, economics and neuroscience. The current state of research in this field is quite advanced and rapidly evolving, with ongoing developments in theory and empirical

research.

Research into the psychology of decision-making includes leading authors such as Gigerenzer, Kahneman, Tversky, Simon and Slovic. Gigerenzer presented that decision-makers use simple heuristics or "rules of thumb" in decision-making, arguing that they can be more effective and efficient than complex decision-making strategies (Gigerenzer and Gaissmaier 2011b; Gigerenzer 2012). Kahneman made significant contributions to the study of decision-making, including developing the dual-process theory and identifying numerous cognitive biases that affect decision-making (Kahneman 2013). The dual-process theory is one of the most influential theories in decision-making research. It posits that there are two distinct cognitive processes that people use when making decisions: a fast, intuitive, automatic process (System 1) and a slower, more deliberative, effortful process (System 2). According to this theory, people tend to rely on System 1 processing in many everyday decisions but will switch to System 2 processing when they face more complex or unfamiliar decisions.

Together with Tversky, Kahneman contributed to the development of prospect theory, which describes how people make decisions under uncertainty (Tversky and Kahneman 1974; Kahneman and Tversky 1979). Simon, an economist and psychologist, developed the concept of bounded rationality, which suggests that people are limited in their ability to make entirely rational decisions due to cognitive constraints and limited information (Simon 1956, 1965). Economics is essential in understanding decision-making with leading authors like Akerlof, Kahneman, Thaler and Shiller. The economist Akerlof has studied the role of asymmetric information in markets and decision-making and has significantly contributed to developing the theory of adverse selection (Akerlof 1997; Akerlof and Snower 2016; Akerlof and Michailat 2018). The prospect theory by Kahneman and Tversky (Kahneman and Tversky 1979) has significantly impacted the study of economics and the identification of cognitive biases that affect decision-making (Tversky and Kahneman 1974, 1981). Thaler significantly influenced the so-called behavioural economics by developing the concept of "nudges" - small interventions that can affect people's behaviour and decision-making (Thaler

and Sunstein 2008; Thaler 2015). Behavioural economics is a subfield of economics that incorporates insights from psychology into economic decision-making models. This field has generated a wealth of empirical findings that challenge the assumption of rational decision-making that underlies traditional economic models. For example, researchers have found that people tend to exhibit various cognitive biases, such as loss aversion, confirmation bias, and anchoring bias, that can lead them to make suboptimal decisions. Shiller made significant contributions to the study of behavioural finance, including developing the concept of "irrational exuberance" and identifying various psychological factors that can drive financial markets (Shiller 2002, 2003, 2021). Neuroscience research has revealed that decision-making involves complex interactions between multiple brain regions, including the prefrontal cortex, amygdala, and striatum. Researchers have identified neural correlates of various decision-making processes, such as risk assessment, reward processing, and social cognition. Leading authors in this field are Damasio, O'Doherty, Schultz and Fehr. Damasio is a neuroscientist who has made significant contributions to understanding the neural basis of decision-making, mainly through his work on the somatic marker hypothesis, which proposes that emotions play an essential role in decision-making (Bechara et al. 2000a, 2003; Damasio 2001a). O'Doherty studied the neural basis of decision-making and learning, mainly through his work on reward processing and the role of the prefrontal cortex in decision-making (O'Doherty et al., 2021; Winston et al., 2002). Schultz made significant contributions to understanding the neural basis of reward processing and decision-making, particularly through his work on the role of dopamine in these processes (Schultz et al. 2011; Grabenhorst and Schultz 2021). Fehr is an economist and neuroscientist who has made significant contributions to the study of decision-making, particularly through his work on the neural basis of social preferences and cooperation (Bartling et al. 2014; Krajbich et al. 2015; Jaeger et al. 2022).

The wider discussion outlined here emphasises the interdisciplinary approach to understanding decision-making in social work, drawing from psychology, economics, and neuroscience. Psychological theories, like heuristics and

cognitive biases, can help understand the intuitive and deliberative processes of social workers. Economic concepts, such as bounded rationality, shed light on how social workers manage resources, uncertainty, and biases.

Neuroscience offers insights into the brain's role in decision-making, highlighting areas involved in emotion, cognition, and reward processing. The interdisciplinary nature of research into decision-making means it is unlikely that there are any simple answers to the question how social workers make safeguarding decisions. It also means that the literature review needs to take a broad view on capturing research that could inform this study.

4.2.2 Bibliographic Overview

Before the bibliographic data is reviewed, articles that do not have an entry for author, keywords or an abstract are deleted (n=72) as these pieces of information are crucial for the analysis. The resulting data set provides the basis for descriptive bibliometrics analysis. First, the table below provides an account of the articles included in the corpus.

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	1992:2021
Sources (Journals, Books, etc)	141
Documents	429
Average years from publication	6.67
Average citations per documents	12.38
Average citations per year per doc	1.41
References	16979
DOCUMENT TYPES	
article	379
article; early access	18
article; proceedings paper	2

editorial material	2
proceedings paper	3
review	23
review; early access	2
AUTHORS	
Authors	937

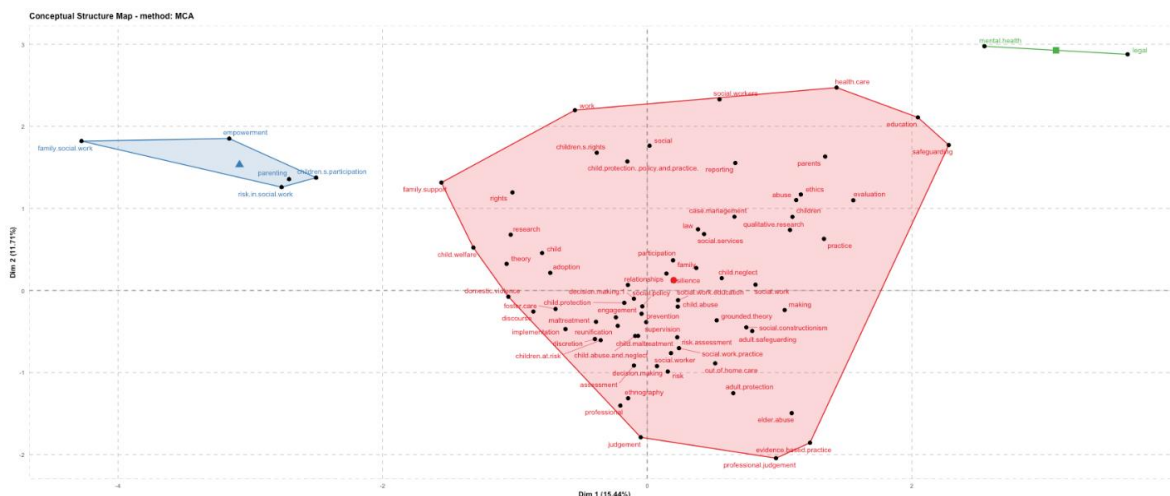
Table 3: Overview of literature for review

The articles included so far appear to cover significant ground. Nine hundred thirty-seven authors have contributed $n=429$ articles covering the period between 1992 and 2021. On average, the articles are now 6.67 years from a publication which suggests reasonable currency of the corpus. However, there are document types that do not appear to be relevant for this review that focuses on research findings. Hence the script deleted $n=30$ documents classified as editorial materials, proceedings papers and reviews from the review. Whilst the remaining dataset of $n=399$ articles looks promising in terms of having enough substance for a computer-based analysis, none of this information indicates if the articles included are relevant for this research. The script uses keywords assigned to each publication to estimate the search term's accuracy and confirm the relevance of the articles.

4.2.3 Keywords - Overarching Topic

Keywords are helpful to describe a scientific field as the co-occurrences of keywords represent the knowledge base in a corpus (Aria et al. 2020). This review used keywords as a first basic check if the search strategy found relevant articles for this review. For this, a map of the Conceptual Structure of the corpus has been generated using a function in R (Aria and Cuccurullo 2017) that represents a map of a scientific field. Figure 16 shows this map which is available in a larger scale in appendix 9.1.1. In this case, the review of the map highlighted a group of articles ($n=23$) related to adult safeguarding, adult protection and elder abuse. These articles were deleted from the corpus. The keywords from the remaining $n=376$ articles are used to produce the map below. This map shows a reasonable focus on safeguarding

decisions in social work.



3

Figure 13: Bibliographic network of keywords

Next, the 30 most used keywords provide the basis for a map of co-occurring keywords, showing that the search strategy appears effective in identifying relevant articles.

Keyword Co-occurrences of 30 most used keywords

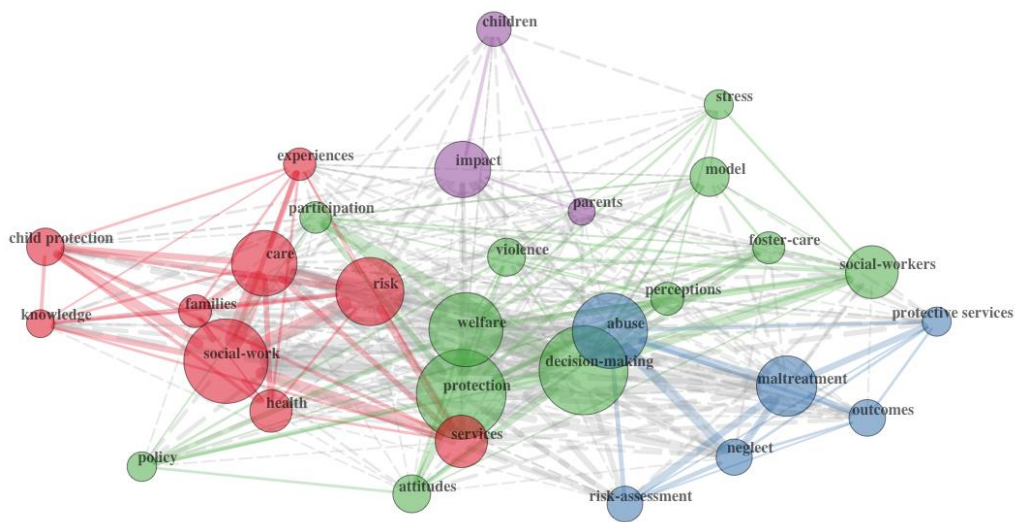


Figure 14: Keyword Co-occurrence of 30 most used keywords

In figure 17, there are four clusters based on keyword co-occurrences. The words *social-work*, *risk*, *child-protection* and *care* dominate the red-coloured

³ This graph is available as a larger version in the appendix 9.1.1.

cluster suggesting a group of documents linked to decision making at the child protection and care threshold defined by section 47 and 35 of the Children Act 1989. The green cluster includes the terminology of *protection*. However, it appears to focus more on the *perceptions, attitudes* of social workers and factors like *stress* or *policy* that impact their decision-making about the *welfare* of children. The keywords *abuse, maltreatment* and *neglect* appear to be characteristic of another group of articles, represented by the blue cluster, that look at risk assessments required to decide when protective services should step in to improve the outcomes for children. The purple cluster is somewhat less insightful, but it is possible to assume that there is a group of articles that look at the impact of social work decisions on children and their parents.

Even though the above considerations are only hypotheses about the content of the articles included in the corpus, it appears that the search strategy has resulted in a good yield of relevant articles for the research subject. These articles are taken forward to review the works of the most productive authors.

4.2.4 Most productive authors - Central Discussions

The examination of an author's productivity is used as a proxy to demonstrate intellectual maturity, as Aaron et al. (2010) suggested. In line with this assumption, the authors listed in the barplot below seem to influence the overall discussion in the field, given the number of contributions. It would be a stretch to suggest that the total number of publications indicates quality. Nonetheless, this section assumes that their productivity impacts and that their publications should be considered when attempting to capture the current state of research in this field.

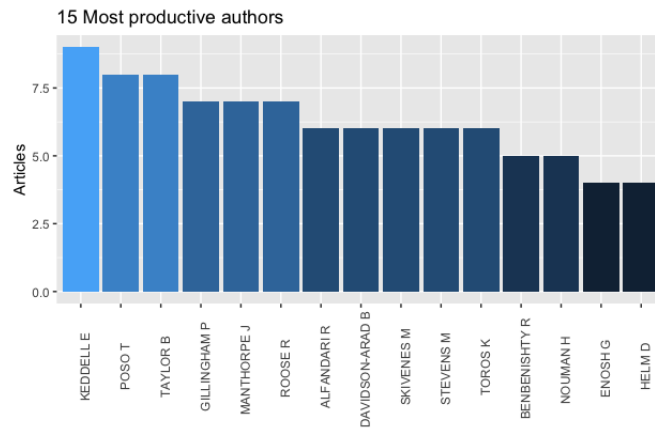


Figure 15: 15 most productive authors

This list of authors provides the basis for establishing their collaboration networks which are of interest as it gives a deeper insight into the thematic structure of the scientific field. This insight is based on the assumption that the collaboration between authors is an indicator of shared research interest that results in repeated collaboration. The map in figure 19 (and appendix 9.1.2 for a larger copy) is a visual representation of these collaboration networks that likely represent themes within the corpus.

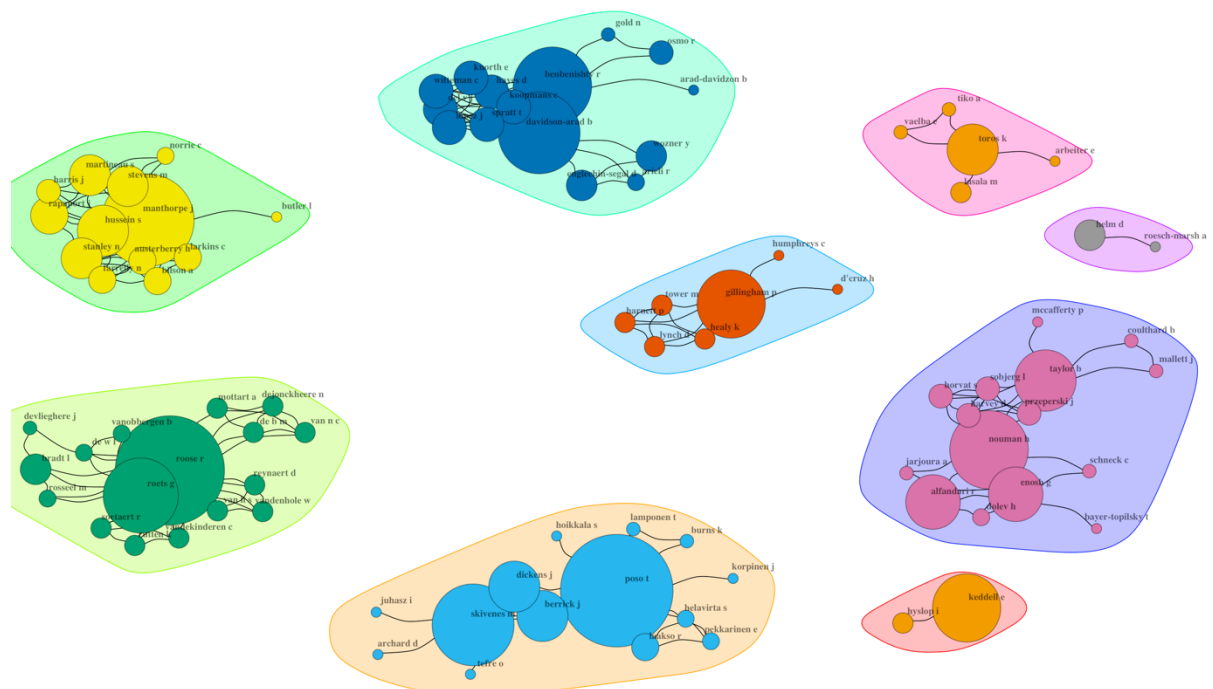


Figure 16: Collaboration Network

The first cluster in the bottom right corner is defined by the works of Keddell, who uses the decision-making ecology discussed previously to investigate decision-making from different angles. Overall, the main focus appears to be

on how risks that need to be judged are constructed and reasoned (Keddell 2011). This focus includes differences in how practitioners perceive risks (Keddell 2017a; Keddell and Hyslop 2019), define the best interest of children (Keddell 2017b), apply assessment tools to establish if risk thresholds are met (Keddell and Hyslop 2020) or if risks have been reduced (Keddell 2012).

The articles in the second cluster around Poso result from a research project comparing Finland, England, Norway and the USA (California) (Berrick et al. 2018) regarding children's out-of-home care decisions. Overarchingly, the articles explore the legal context of decision-making and how social workers act in their respective contexts (Skivenes and Tefre 2012; Juhasz and Skivenes 2018).

Rudi Roose is at the centre of the third cluster that appears to address, broadly speaking, the power imbalance in constructing the child at risk. This imbalance is evident in the existence of a homogeneity of white-middle class values in child welfare decisions (Bradt et al. 2015b) and the introduction of Electronic Information Systems (Devlieghere et al. 2017) that create consistency across social work practice rather than relying on individual judgments of professionals in response to the individual circumstance of families. On the other hand, the authors explore ways participative report writing could help to include the views of children and their families in the construction of risk (Roose et al. 2009; Roose 2013).

Adult Social Care seems to be the main focus of the fourth group of articles with one exception (Stanley et al. 2013), even though the main thrust of the articles in this cluster can be summarised broadly by ways to improve the service delivery through personalisation (Manthorpe et al. 2009; Butler and Manthorpe 2016; Stevens et al. 2017). Based on this focus, this cluster with n=5 articles is taken out of the corpus for this review, leaving n=371.

In the fifth cluster centred around Benbenisty and Arad-Davidzon, the discussions are primarily concerned with the attitudes of professionals towards welfare (Davidson-Arad and Benbenisty 2016), case characteristics like the mothers' view on removal decisions (Davidson-Arad 2005; Arad-Davidzon and Benbenisty 2008; Benbenisty et al. 2015) and the perceived

quality of life for the child after a decision have been made (Davidson-Arad, Englechin-Segal, and Wozner 2003; Davidson-Arad 2005). Another aspect of the research of this group, closely linked to the first aspect, are the rationales of professional social workers for their decision-making compared to the rationales given by laypersons (Benbenishty et al. 2002; Osmo and Benbenishty 2004).

Gillingham leads the discussion in the sixth cluster, which is concerned chiefly with the introduction of Structured Decision Support Systems (Gillingham and Humphreys 2010; Gillingham 2013; Gillingham et al. 2017) and the possibility of using predictive risk modelling to develop technological solutions to guide social workers decision making and thereby formalising decision making (Gillingham 2016, 2020).

The seventh cluster appears to have less of a focus on a specific aspect of decision-making. One focus area seems to be a review of the national reform of welfare services in Israel (Alfandari 2017a), including the introduction of a Structured Decision-Making tool (Alfandari 2017b) and the strengthening of multi-agency working by establishing committees to make decisions about the welfare of children (Alfandari 2019). Another focus area can be outlined around articles about the subjectivity of decision making (Enosh and Bayer-Topilsky 2015; Enosh et al. 2019, 2021) and possible responses to the challenges deriving from this subjectivity, namely the use of actuarial risk assessment models (Coulthard et al. 2020; Sobjerg et al. 2021).

Helm discusses how social workers make sense of complex information in the second to last cluster (Helm 2011, 2016b, 2017) within the framework of the decision-making ecology discussed previously (Helm and Roesch-Marsh 2017). This cluster gives an exciting insight into individual decision-making based on ethnographic observations.

The last cluster is grounded in the development of social work practice in Estonia after the collapse of the Soviet Union, with a particular focus on the importance of engaging children and their families in the process of doing assessments and making decisions, an approach that contradicts local traditional approaches to social work (Arbeiter and Toros 2017; Toros 2017;

Toros and LaSala 2018). This cluster also does not appear to contain helpful research findings relevant to this review; therefore, these five articles are manually removed from the corpus, leaving n=366. The remaining articles are used to analyse the themes contained in the corpus.

4.2.5 Bibliographic Coupling - Themes in the corpus

Bibliographic Coupling was first proposed by Kessler (1963), who used the shared references between papers to establish their similarity. Bibliographic Coupling occurs when two articles refer to the same third article. Articles that are bibliographically coupled or share a high number of common references between them, have a high probability that these articles refer to a common subject matter (Ferreira 2018). Hence the coupling strength helps understand what research topics exist in a field (Huang 2018; Mas-Tur et al. 2021). In this review, biographic Coupling is another strategy to identify topics within the collection of texts. For this purpose, the script generates a map shown in figure 20 (and appendix 9.1.3 for a larger copy) of the biographic coupling network of all included articles using a function provided by (Aria and Cuccurullo 2017).

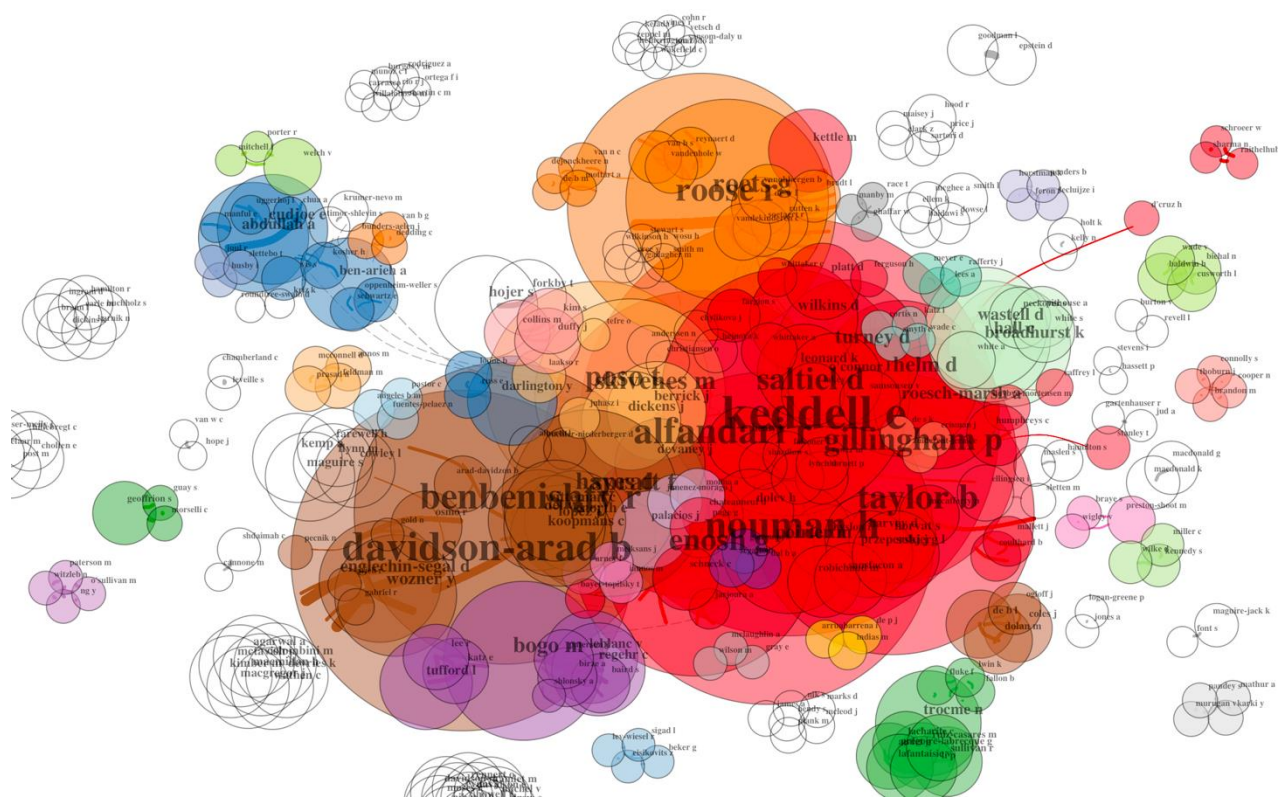


Figure 17: Bibliographic Coupling Network

A large (red) cluster of articles is centred around research by Keddell, Taylor and Alfandari. Keddell is the most productive author in this corpus and seems to focus on the overarching drivers for the variability of decisions made by social workers. Taylor (2017) explores heuristics in decision-making, and Alfandari (2017a) investigates a national reform to strengthen social worker judgments by introducing standardised tools into practice. Overall, the common theme of this most dominant cluster appears to be factors influencing the variations in social work decision-making and strategies to improve consistency of decision-making. The brown cluster is anchored by two more top authors, Benbenishty and Davidson-Arad. Their research considers decision maker characteristics (Benbenishty et al. 2015; Davidson-Arad and Benbenishty 2016), their rationales for making decisions (Benbenishty et al. 2003) and their appraisal of case characteristics (Davidson-Arad et al. 2005) which is a theme also covered by Spratt et al. (2015). The theme of this cluster can be summarised by a closer focus on the individual decision-makers characteristics and their internal processing of information compared to the articles in the previous cluster, which take a more contextual view on explaining variations in decision making.

The other clusters contain fewer articles beyond the centrality threshold. They discuss distinctive aspects of social work decision-making like (in the blue cluster) participation (Vis and Fossum 2015; Cudjoe et al. 2020; Kosher and Ben-Arieh 2020), a systemic approach to engaging with children and families (Toros et al. 2013; Arbeiter and Toros 2017; Vaelba et al. 2017), decision making in high-risk situations (LeBlanc et al. 2012; Regehr et al. 2016), the increasing formalisation of decision making in social work (Broadhurst et al. 2010; Pithouse et al. 2012) and the way social workers construct the child at risk (Bradt et al. 2015b; Roets et al. 2015) including the way children and their families can be part of this construction (Roose et al. 2009, 2013).

All titles and abstracts of articles in the emerging clusters were reviewed manually at this stage to select those clusters where the common theme fit into the decision-making ecology. Namely, these clusters focus on the impact of case characteristics, organisational context and decision maker characteristics on decision making. The articles in the clusters that did not fit

into this framework are excluded (n=235) from the review at this stage, leaving n=114 articles. These articles form the basis for the more in-depth thematic analysis based on topic modelling, an unsupervised machine learning technique that automatically helps organise unstructured data.

Keddell's focus on the overarching drivers for the variability of decisions made by social workers suggests that their research may provide insights into the contextual and systemic factors that influence social workers' reasoning strategies. Exploring Keddell's work can help understand the contextual and systemic factors that shape decision-making in social work practice.

Taylor's study on heuristics in decision-making is relevant to understanding the cognitive processes and shortcuts that social workers may employ when making decisions. Taylor's research can shed light on the specific reasoning strategies, biases, and decision-making shortcuts that social workers may use in their practice. This can provide valuable insights into the efficiency and effectiveness of these strategies and their impact on decision outcomes.

Alfandari's investigation of a national reform aimed at strengthening social worker judgments suggests a focus on the impact of policy changes on decision-making processes. This research can provide insights into how external factors, such as policy reforms, influence the reasoning strategies employed by social workers. This can help understand how social workers adapt their decision-making approaches to broader social work landscape changes.

Overall, the mentioned authors' research can contribute to a study on social workers' reasoning strategies to make decisions. Incorporating these perspectives into this study can enhance the understanding of the reasoning strategies employed by social workers and their implications for decision-making outcomes.

4.3 Thematic Analysis

At this review stage, the remaining articles in the corpus provide the basis for identifying themes that this review discusses in more detail. For this identification, the script uses an unsupervised machine learning technique called Topic Modelling. This technique aims to find similar topics across

different articles by grouping different words together so that each topic contains words with similar meanings (Blei et al. 2003; Sievert and Shirley 2014). In this case, the script identified nine topics described by the top 10 words most likely to be used in each topic shown in figure 21. A review of all titles and abstracts showed that the allocation of articles to each topic was coherent, and the themes embedded in each could easily be identified.

These words are the starting point for interpreting the topics through reviewing the articles using NVivo12 to code the abstracts and extract commonalities of the articles combined through this algorithm. The differences in the topics were surprisingly apparent despite the already very narrow focus on decision-making in child safeguarding in the articles. The topics cover (1) risk assessments, (2) balancing complex information, (3) the professionals' room for discretion, (4) the construction of risk, (5) intuition and deliberation, (6) factors influencing decision making, (7) out-of-home care decisions, (8) complexity and decision making, (9) maintaining therapeutic relationships when making difficult decisions. The articles that inform this review are used here to create a narrative interpretation of the themes represented rather than a systematic extraction and representation of research findings.

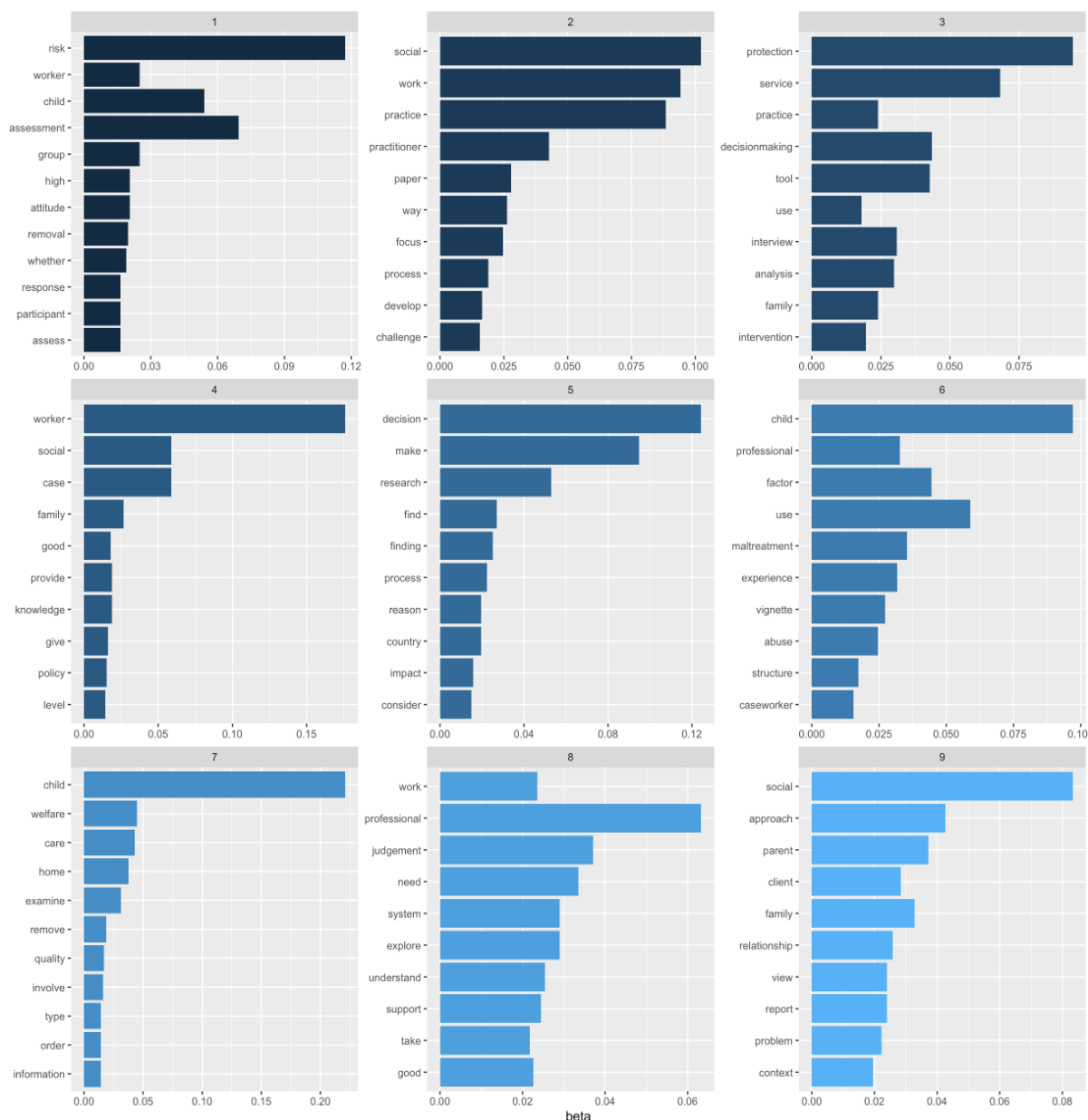


Figure 18: Most often used words in each theme

4.3.1 Complexity (Topic 8)

The first topic to explore focuses on the complexity of assessing risks in child protection which appears to be a defining feature of professional social work. This complexity is located in the interplay between policy orientations, work culture and the family. Decision-making in this context deals with conflicting demands and expectations, and practitioners must find strategies for making sense of information to make a decision.

Topic 8

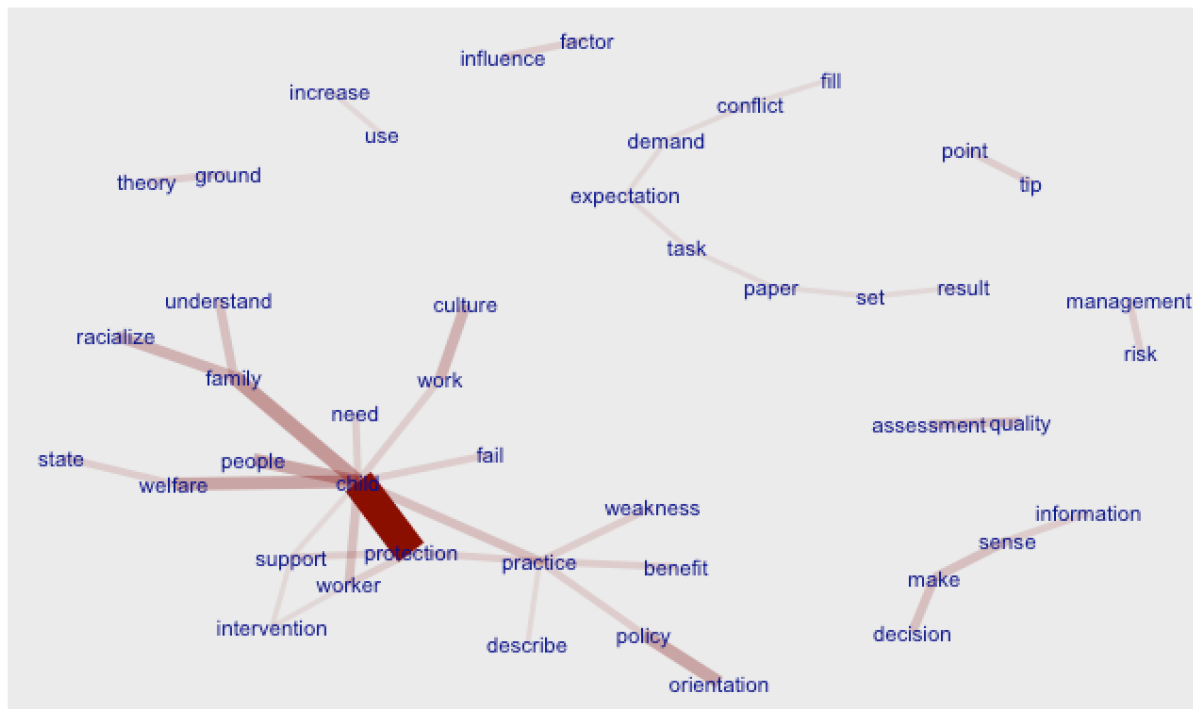


Figure 19: Co-occurrence map of topic 8 (Complexity)

Helm (2011), Helm & Roesch-Marsh (2017), Taylor (2017) and Saltiel (2013) emphasise the complexity of risky decision-making in social work. This observation is the starting point for research into practitioners' strategies to make sense of the information (Helm 2011, 2016b; Helm and Roesch-Marsh 2017) and how difficult this sense-making can be (Saltiel 2013). Keddell (2017b) provides an example of the complex social workers deal with in their practice resulting from conflicting demands and expectations by exploring the Children's Best Interests concept.

From a theoretical perspective, Helm et al. (2017) argue that the response to this complexity resulting from dealing with "*non-linear interactions*" (p.1361) lies in an ecology of judgment based on systemic practice and ecological rationality. In this ecology, practitioners "*explicitly reflect on the multi-layered and interacting factors influencing the way they interpret data and frame judgments*" (ibid., p. 1372). The paper of Samsonsen & Turney (2017) provides a broader view of national approaches in response to the "*wicked problem*" (p. 112) of making decisions in Child Protection by comparing the assessment process in Norway and England. They argue for a system called "*Grounded Projectional Judgment*" based on epistemic responsibility and

accountability. The first means critical thinking and reflection by the individual practitioners and taking responsibility for their decisions considering the individual limitations in knowledge. The second refers to organisational accountability that strengthens an organisational culture that focuses on support and learning. This idea derives from the observation that neither bureaucratic processes in England nor the reliance on professional discretion in Norway are the answer to improving judgements.

The work of Taylor (2006) helps show the complex landscape social workers must navigate in their practice. This work highlights the "reciprocal tensions" between identifying and meeting needs, reducing risk, protecting people, "balancing benefits and harms, " considering available resources and priorities, and navigating conflicts between stakeholders. Additional complexity results from navigating different social policy orientations and social work cultures, "*a minefield of sort, filled up with conflicting demands, expectations and tasks*" (Fargion 2014, p. 24). Furthermore, the consequences of austerity measures increase the pressure on social workers to add financial considerations to their professional judgments (Devaney 2019).

Robichaud et al. (2020) study investigate child protection decisions of racialised families in Canada. The study is based on n=18 in-depth interviews. One focus group adds critical insight into the complex nature of decision-making, especially when decisions are made in cases that deviate from what is perceived as the socio-cultural norm. First, there is the issue of time constraints and high workloads that potentially lead to defensive decision-making. Second, formal guided procedures add challenge to practice because they leave practitioners "*little if no flexibility*" (ibid., p.7) when making decisions regarding different types of maltreatment reported. Additionally, the authors report that practitioners felt a lack of skills and knowledge as a limiting factor for dealing with the complexity of practice.

The individual responses to this complexity are of interest to this study. In particular, the work of Helm (2016b, 2017) on sense-making provides excellent insight into strategies social workers use when dealing with complex information. A significant aspect of this is the difficulty of balancing available

information, discussed later in this review. The complexity of this balancing act means that social workers have to constantly re-configure their knowledge and skills, the way they work with "*service users, colleagues and other professionals [...] to respond in ways which satisfy numerous, often competing imperatives*" (Helm 2016b, p. 26). Based on ethnographic observations, Helm finds that social workers use dialogues with their colleagues to make sense of information. At the beginning of these dialogues, the observed social workers frame the information through their opening statement, which, according to Helm, suggests a preceding intuitive judgment. This initial frame acts as the starting point for a roadmap of a discussion that helps to bring information together by limiting the options of how the information available can be read. As a result, social workers seem to make decisions that are good enough rather than considering all available information to arrive at the best decision. In line with findings from Saltiel (2013), this could be an indicator for using intuition. He shares the findings of a study based on observations and semi-structured interviews into how social workers deal with complexity and uncertainty. He claims that a significant aspect of the complexity of social work lies in the complexity of families, the challenging and demanding conditions of practice and inaccurate or incomplete information. A response to the "*fluid, diverse networks of relationships that social workers were trying to make sense of*" (Saltiel 2013, p. 22) lies in the "*situated awareness*" of the family's situation. In other words, social workers rely on the intuitive nature of the direct experience when doing home visits.

This topic emphasises the complexity of risky decision-making in social work and highlights the challenges practitioners face in making sense of information. This observation is a starting point for studying social workers' reasoning strategies in decision-making. This means the study could explore practitioners' sense-making strategies and understand how complicated this process can be. It can delve into the complexities of the social work context and the various factors that influence decision-making. The study could also consider the impact of external factors, such as policy changes, on decision-

making processes. Incorporating these perspectives can enhance the understanding of the reasoning strategies employed by social workers and their implications for decision-making outcomes. The study can contribute to identifying effective strategies and interventions to support social workers in navigating complex decision-making situations.

4.3.2 Reducing Complexity (Topic 4)

The theme that combines the articles in this group of articles is that of how child protection risks are the product of social construction rather than an objective measure, as suggested by D'Cruz (2002). In this context, social construction means that decision-making regarding risks to children results from negotiations between agents with different interests, which feed into how risk to children is rationalised.

Topic 4

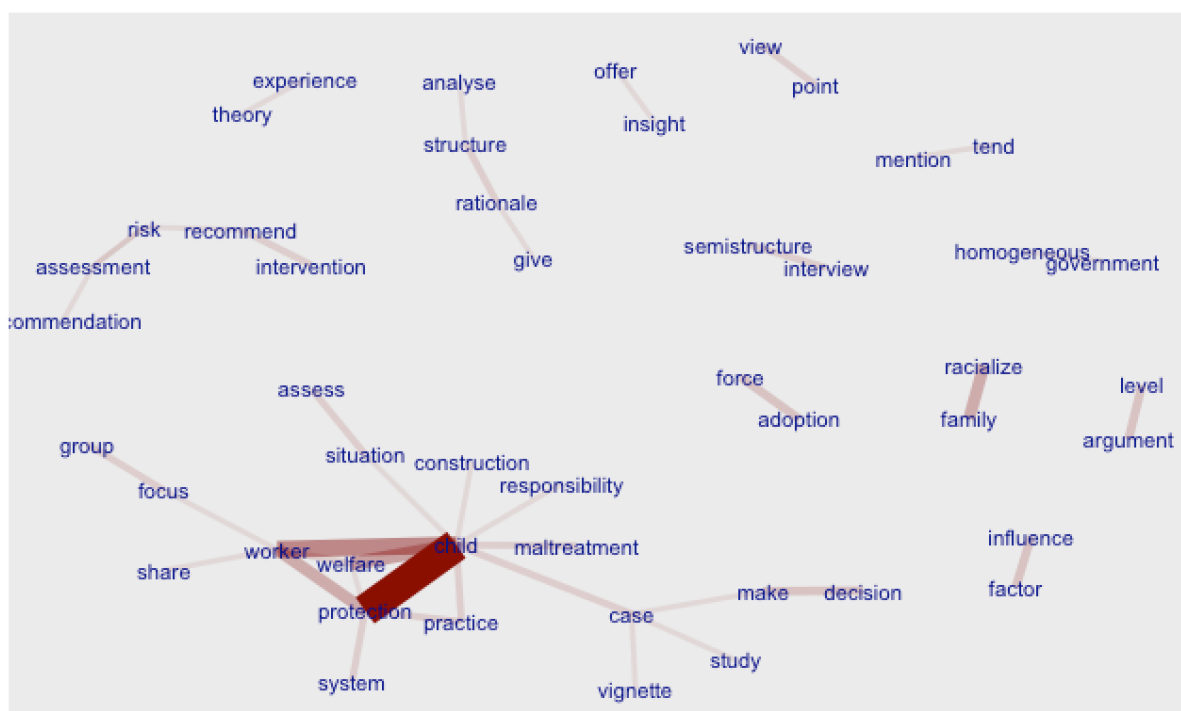


Figure 20: Co-occurrence map of topic 4 (Reducing Complexity)

The rationales of social workers are the subject of studies by Benbenishty and Osmo (Benbenishty et al. 2003; Osmo and Benbenishty 2004). Benbenishty et al. (2003, p. 138) highlight the already mentioned complexity of decision-making as a consequence of a lack of "*objective conditions (physical or interpersonal) that are unanimously recognised as constituting*

maltreatment or abuse". This lack of objectivity means that decisions result from risk construction between stakeholders who introduce their ways of "*silently arguing with him- or herself*" (ibid. p. 139) and evaluating risks. According to this vignette-based study, this reasoning includes an appreciation of case characteristics and shared knowledge, practice experience or empirical evidence to infer the observation and the judgment. However, the participants in this study did not use qualifiers to state their confidence level in their decision or the consideration of alternative scenarios. This observation that social workers do not tend to use complex reasoning is supported by findings by Osmo and Benbenishty (2004), who compared the reasoning processes of social workers and laypersons. Skivenes et al. (2012) investigate the reasoning processes of Norwegian, US American and English Social Workers based on a vignette about adoption. They also identify that the reasoning for or against forced adoption hinges on case characteristics (the parents' behaviour) and is supported by professional knowledge or expertise (permanency and attachment are essential). The study of Segatto et al. (2020), based on focus groups with n=22 Italian social workers, provides an example of the implication for social workers who have a significant room for discretion due to a lack of a consistent organisational frame that provides the opportunity to go beyond the individual professional judgments. In this situation, social workers appear to use minimal case characteristics (age and severity of abuse or neglect) and the availability of resources to determine the level of risk and the intervention required. These four studies support the idea that social work decisions about risks are not based on objective factors that determine a decision but a construction that uses selected case characteristics and the social workers' general knowledge and experience and limited use of the consideration for alternative narratives. If this is correct, the implication is that there is a need to mitigate against the risk of individual decision-makers being biased in the way they construct risk. This challenge could be overcome by involving different professionals in this construction to enforce a more varied consideration for available information. However, the study of Alberth et al. (2015) shows that this is not necessarily the only answer because each involved professional may consider their mandate instead of seeing the overall picture.

Lamponen et al. (2019) offer insights from their study into how organisational and legal contexts in Finland and Ireland frame decisions about at-risk children. These authors also highlight the limitations of analytical reasoning as part of their theoretical discussion. They explain with "*tension between the demand to make a quick decision and the time it takes to gather and revise the information*" (ibid., p. 486). Their comparison is basically about decisions made by a single person in Finland versus team-based decision-making in Ireland. The team-based approach benefits from an effective way of capturing and challenging the information required to decide on out-of-home care for children in emergencies at the cost of the timeliness of decision-making. The single social worker approach prevalent in Finland relies on the social worker's expertise with all the potential pitfalls of reasoning highlighted previously and the additional emotional burden on the social workers. This tension between timeliness and a deep analytical reflection on the available information presents the essential challenge of social work decision-making and why practitioners must rely on a simplified risk construction to make decisions.

Another strategy to go beyond the individual construction of risk is the involvement of independent experts. Dickens et al. (2017) investigate the use of experts in the USA, England, Finland and Norway. They found that the involvement of experts can result in a greater child focus and fill gaps in the social workers' expertise, even though their involvement can also be viewed only as a way of confirming the original decision of the social worker without adding additional perspectives to a case. Nonetheless, this study shows a positive aspect of involving independent experts to strengthen decision-making by avoiding the idea that risks in child protection are somewhat "*a simple binary categorisation*" and not a "*complex, contingent and contested continuum*" (ibid. p. 1040).

The studies reviewed on this topic again stress the inherent complexity in social work decisions due to the lack of universally recognized conditions that constitute maltreatment or abuse. That means decisions arise from social workers' internal debates with themselves and their interpretation of risks.

The reasoning process of social workers is primarily based on case characteristics, professional knowledge, and personal experiences. Notably, social workers often do not employ complex reasoning or tend to express confidence levels in their decisions or consider alternative scenarios. When comparing the reasoning processes of laypersons and social workers, both groups showed similarities, suggesting that complex reasoning is not necessarily a standard in the profession. The research reviewed in this topic highlights that decisions in social work are not based on objective, clear-cut factors but are a construct that leans on specific case characteristics and the social workers' expertise. The subjective nature of these decisions points to a potential bias in how risks are perceived and constructed. One proposed solution is to involve a diverse group of professionals in the decision-making process, aiming for a more varied and holistic view. However, this topic highlighted that while team-based decision-making provides a broader perspective, it might delay the decision-making process.

In contrast, a single social worker approach might be quicker but could suffer from the previously highlighted pitfalls. Introducing independent experts can provide a fresh perspective and mitigate biases in decision-making. While they can help ensure that child welfare decisions are not oversimplified, there is also a risk that they might merely validate the original decision without providing a new viewpoint. The studies reviewed under this topic underscore the nuanced and multifaceted nature of decision-making in social work. They highlight the need for a more structured and collaborative approach, incorporating varied perspectives to ensure the best outcomes while acknowledging the complexities and challenges inherent in the process.

4.3.3 Assessing Risks (Topic 1)

This topic covers how risk assessment for a child is affected by different, mostly not case-related, factors. This topic includes the social worker's attitudes toward the removal of a child from their family (Davidson-Arad et al. 2008; Devaney et al. 2017), their attitudes (Benbenishty et al. 2015; Davidson-Arad and Benbenishty 2016; Keddell 2017a; Enosh et al. 2019; Keddell and Hyslop 2019), stress responses (LeBlanc et al. 2012) or the

social work practice, social workers deal with tremendous complexity that reports or assessments can potentially never genuinely represent. According to Roets et al. (2017), the response to this complexity may be story-telling to construct the child at risk. This response acknowledges this complexity in "*constructing definitions of problems while writing reports*" (ibid. p. 465). It highlights the importance of reflexivity or self-reference in constructing the child at risk.

Research findings identify how social workers' attitudes can affect their decisions highlight the importance of such reflexivity, especially in light of the uncertainties about what constitutes a risk to a child or what actions professionals should take if social workers identify such a risk. In their vignette-based study, Arad-Davidson and Benbenishty (2008) used a Child Welfare Attitudes Questionnaire to explore how these attitudes influence the risk assessments of n=210 child protection workers in Israel. They found that general attitudes toward removing the child from the family had a more significant impact on the level of assessed risk than the actual wishes of the child or the mother. The studies of Benbenishty et al. (2015) and Davidson-Arad & Benbenishty (2016) use the same methodology and identify that, alongside the attitudes towards removal or not, the attitudes towards parental or children's participation in the decision-making process seem to have a moderately more extensive influence on the decision than the wishes themselves. The authors also highlight the importance of the context, which could explain the differences in attitudes between different countries.

In light of the finding that it may be the decision-makers attitudes that moderates case characteristics, the observation of Enosh & Bayer-Topisky (2015) that a lower socioeconomic or minority status (Enosh et al. 2019) of a family influences social work decisions is of interest. This vignette study, based on n=106 (Enosh & Bayer-Topisky 2015) and n=120 (Enosh et al. 2019) social workers from Israel, showed that including information about the socioeconomic status and ethnicity affected the assessment of the risk in a negative way. Social workers were up to six times more likely to recommend out-of-home care than children from a moderate or higher socioeconomic status for lower socioeconomic status. The findings of Kedell et al (2019)

support that the family's ethnicity affects the identified risk level. Even though the authors of this study did not include information about the socioeconomic or minority status of the decision-makers, the hypothesis could be that this results from an in-group bias with social workers having at least a moderate socioeconomic status. This observation would indicate that the social workers' attitudes towards the socioeconomic or minority status of others are more likely to influence their decisions than the actual case characteristics.

Social workers' decisions, especially regarding removing a child from their family, are influenced by complex factors that are not directly related to the case. These include the social worker's attitudes towards the action, their general disposition, stress responses, and the family's socioeconomic or ethnic status. Risk plays a pivotal role in the decision-making of social workers. Risk assessments should be grounded in objective evidence, but the complexity of human behaviour makes this challenging. Suppose the portrayal of a "child at risk" is based on a narrative construction as suggested in the reviewed research. In that case, risk assessments are narratives rooted in the observers' interpretations, which personal biases or attitudes might influence. Several studies indicate that a social worker's attitudes, especially towards removing a child from their family or involving parents and children in decision-making, significantly influence their risk assessments. The apparent inclination of social workers to make decisions based on a family's socioeconomic or ethnic background rather than the actual case's specifics suggests an inherent bias. The possibility of an in-group bias, where social workers might tend to favour those of similar socioeconomic backgrounds as themselves, is particularly concerning. For this study into the reasoning strategies of social workers, this raises the question of how to address and mitigate biases in decision-making to ensure risk assessments are as objective and evidence-based as possible so that decision-making processes are consistent and fair.

4.3.4 Family Maintenance vs Risk (Topic 9)

The articles in this cluster give limited insight into the reasoning processes of

social workers making safeguarding decisions and shed light on an aspect of social work practice that can indirectly influence decisions and judgments about risks. The dominant focus of this topic is the tension between child protection and family maintenance. This tension represents different social policy orientations and social work cultures (Fargion 2014). These different orientations and cultures have shifted from a child protection discourse to a child welfare discourse (Roose et al. 2013) that views the relationship between professionals and families as partnerships with greater emphasis on participation (Roose et al. 2009) and a more robust engagement of families (Platt 2012; Turney 2012). The conflicting demands and expectations between managing risks and the requirement to protect the child's welfare, maintaining family unity where possible, and the importance of working in partnership with parents (Keddell 2012, 2014a, 2016a) reflect this shift in social work practice.

Topic 9

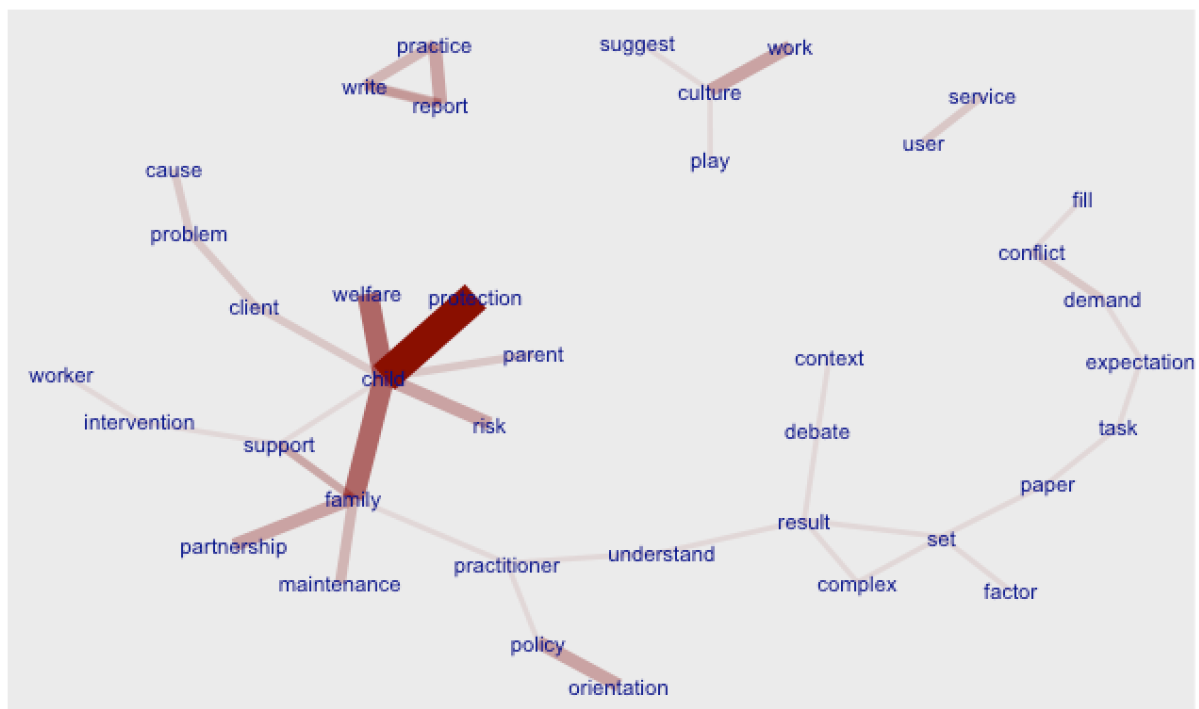


Figure 22: Co-occurrence map of topic 9 (Family Maintenance vs Risk)

The most relevant contribution to the topic of this group of articles comes from Keddell (2011, 2012, 2014b, 2016b, 2016a), who explores these tensions between the legal tasks of family maintenance and keeping children safe in great detail. In a qualitative study into the reasoning processes of social

workers, Keddell (2011) identifies that social workers appear to construct a narrative based on the facts of a case, mainly poor mental health and lack of support (Keddell 2011), to explain the reasons for parental behaviours. This construct affects how social workers handle a case and "*can either maximise or minimise the possibilities for client engagement and personal change*" (ibid., p.1264). In this and a later paper (2016a), Keddell highlights that the social workers in her study seem to prioritise family maintenance, which means that social workers tend to create a narrative that limits parental culpability for their actions. A potential explanation for the focus on family maintenance could be a dominant social policy orientation toward child welfare that includes the family's welfare instead of an orientation that focuses on child protection without including the family's welfare (Fargion 2014). Alternatively, the focus on family maintenance could result from a desire of social workers to build and maintain "*relationships with clients that have therapeutic, educational and social control functions*" (Keddell 2012, p. 604).

These papers highlight a significant tension between prioritizing child protection and maintaining family unity, which could affect the reasoning of social workers. This tension has evolved due to shifts in social policy and practice culture. Over time, there has been a move from a child protection discourse (focused solely on the child) to a child welfare discourse (considering both child and family). This newer perspective emphasizes collaboration with families and sees the relationship between professionals and families as more of a partnership. For instance, Keddell's research suggests that social workers often contextualize parents' behaviours regarding factors like mental health or lack of support, which can either limit or magnify perceptions of parental responsibility. Social workers prioritize keeping families together, potentially because of the dominant child welfare policy focus or because they believe maintaining relationships with families serves multiple beneficial purposes, including therapeutic, educational, and monitoring functions.

4.3.5 A balancing act (Topic 2)

This topic is possibly best defined through words found on the right side of the graph below, the conflicting demands and expectations of tasks in social work practice. These tasks are on a continuum between supporting families and protecting children, working in partnership with families and intervening to protect. Social Work Decision Making is located in this tension, and the articles on this topic deal with ways practitioners can navigate this ambiguity.

Topic 2

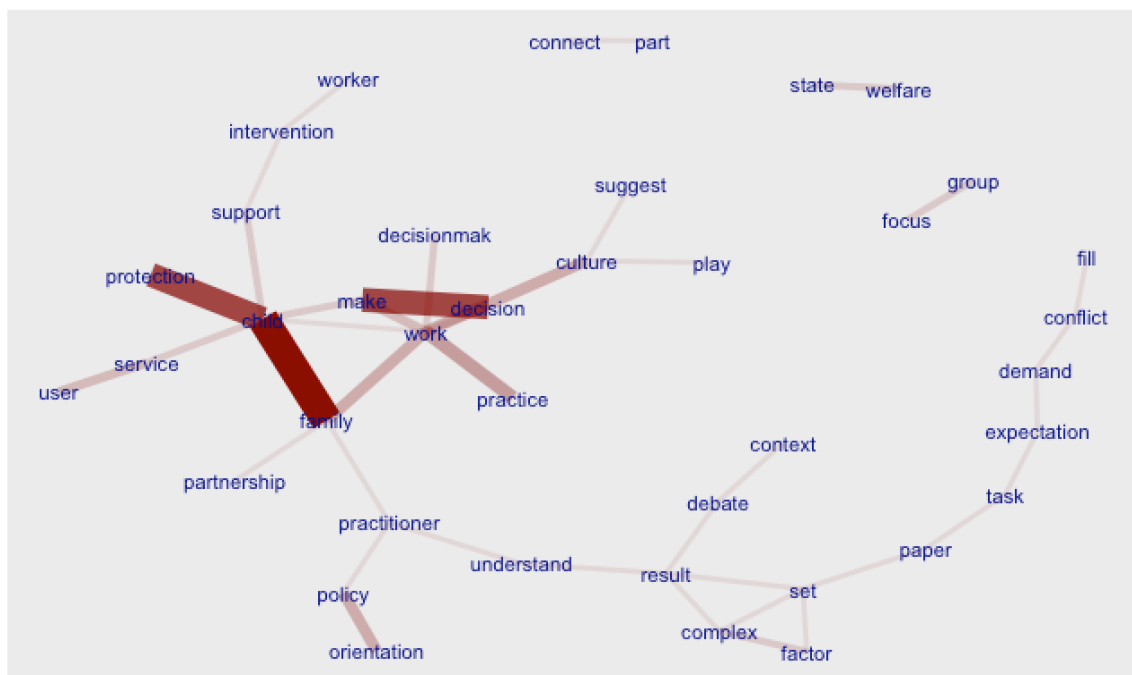


Figure 23: Co-occurrence map of topic 2 (A balancing act)

Social Work has a dual-task defined in the Children Act 1989, s17. On the one hand, social workers need to protect children, and on the other, they need to support the upbringing of children in their families. This duality creates "potential ethical and legal minefields" (D'Cruz and Gillingham 2017, p. 434) that social workers need to navigate or a "potential minefield of sort, filled up with conflicting demands, expectations and tasks" (Fargion 2014, p. 24). The study by Leonard and O'Connor (2018) gives a detailed account of how practitioners with different levels of expertise experience these conflicting demands. The authors locate these demands in the triangle between organisational cultures, troubling emotions of decision-makers and ambivalence in the social work role.

At the heart of this complex field that social workers have to navigate are threshold decisions where they need to choose if the risks for a child are so high that they legitimise an intervention or if more generic welfare support (or no support at all) is sufficient. According to Kettle (2017), these decisive moments require finely balanced and nuanced judgments. These "*tipping points [...] where the categorisation of a child's situation changes*" can potentially lead "*to a very different response to their needs*" (ibid. p.31), like removal of the child into out-of-home care or continuation of the child living with their parents. The study by Kettle focuses on the thinking process of those who make these threshold decisions in practice. Using a grounded theory approach based on n=22 interviews with social workers and the analysis of n=20 serious case reviews, Kettle found conditions or triggers for tipping points. Overarchingly, social workers appear to reach a tipping point as concerns accumulate rather than individual incidents of concern. Social workers seem to be a "*repository of concerns of others*" (ibid., p. 34) which seems to run over at some point. The actual triggers include concerns from other agencies, especially when they were "*loaded with anxiety*" (ibid., p.34), concerns raised by extended family members or a fresh pair of eyes who can see the situation from a different perspective. According to the author of this study, these trigger points can be part of the external context (i.e. procedural decision points, supervision) or the internal world of social workers. The latter could be an increasing sense of anxiety in light of decisions that "*may all have negative consequences and where there may be potentially very significant consequences of getting it wrong*" (ibid. p.36). This concern highlights the tension between the decision-makers' inner experiences and the complex facts of the case when making a decision.

The complexity of information affecting threshold decisions is the subject of a qualitative study by Keddell and Hyslop (2020). This study is based on n=26 interviews and n=25 focus groups with social workers from New Zealand. Keddell and Hyslop highlight the complexity that results from the interactions between case factors (the child's age and developmental stage, seriousness of abuse, family history and family compliance), "*internal and organisational processes and practices, social negotiations and hierarchical power*

differences" (ibid., p.1961). The authors of this study state that selecting some of the case-related factors (age, developmental stage and seriousness of abuse) seems to provide a baseline for a decision. Nevertheless, social workers relied on additional factors like non-compliance and low informal support and surveillance levels to reach the threshold of removing a child. In the context of Kettle's study (2017), the latter factors appear to be triggers for a more intrusive form of intervention.

Together, these two studies emphasise the complexity of relatively well-defined decision points in social work practice based on a finite number of factors. Overall, a key learning point from these studies is that there needs to be a balanced understanding of how individual practitioners approach threshold decisions against the backdrop of working directly with families. Threshold decisions are not just paper-based exercises with a clearly defined number of variables to consider. Direct engagement with families means that social workers need to make sense of variable and individualised information due to human beings' complexity. At the heart of the family, engagement is the home visit, where social workers work with children and their families to undertake assessments or offer support. These are rich sources of information that feed into social work decision-making. Ferguson's (2016) ethnographic study into how social workers engage with families on home visits and the case study presented by Saltiel and Lakey (2020) show the complexity of the information social workers need to manage.

There are different means that social workers use to respond to this complexity. Stanley (2013) states that social workers use heuristics to manage this complexity. They focus on what is known early about a case and what is already recorded rather than allowing challenges from alternative views about risks. Professional encounters seem to be essential for managing complexity. A study by Roesch-Marsh (2018) into secure accommodation decision-making based on observations, semi-structured interviews and focus groups highlights those professional relationships are important to exchange and make sense of information. Helm (2017) writes about an ethnographic study in social work offices. He highlights the importance of informal interactions and discussion between social workers for decision-making

against the backdrop of complexity. The participants in this study were observed practising methodical doubt to create alternative hypotheses in informal interactions. They used reflexivity to evaluate their influence on constructing a situation and applying "*knowledge from their training, reading, experiences and reflections*" (Helm 2017, p. 393) to help each other make sense of complex information. Saltiel (2017) presents findings about the use of supervision as "*a repeated, routinised practice*" (ibid., p.545) to construct knowledge "*against a background of uncertainty and complexity*" (ibid., p. 533) to assist decision-making.

Social workers face a tension between supporting families and protecting children. This duality creates challenges where social workers must balance potentially conflicting demands. Central to these challenges are pivotal decisions about whether a child's risk level necessitates intervention or if essential welfare support suffices. These decisions can drastically alter the trajectory of a child, such as remaining with their family or being placed in out-of-home care. Kettle's study reveals that decisions are not typically based on isolated incidents but build up over time as concerns accumulate. Various triggers can catalyse a decision, ranging from external concerns to the internal emotions of the social worker. Keddell and Hyslop's research shows that while certain factors provide a baseline for decisions, like a child's age or the severity of abuse, other subjective factors, like family non-compliance, can tip the balance towards more drastic interventions. Engaging directly with families provides a wealth of nuanced information. Home visits, in particular, allow social workers to gather detailed insights into family dynamics. To navigate this intricate landscape, social workers utilise various strategies. As per Stanley, social workers lean on what is known early in a case or what is already documented. Roesch-Marsh and Helm's studies emphasise the value of professional relationships, informal discussions, and reflexive practices in deciphering complex information and making informed decisions. Highlighted by Saltiel, supervision serves as a structured practice to help construct knowledge and facilitate decision-making amidst uncertainty.

4.3.6 Professionals Room for Discretion (Topic 3)

The co-occurrence map below indicates that the articles in this topic group present attempts to reduce the variability of decision making and thereby the practitioner's room for discretion by standardising practice by introducing decision-making tools or practice frameworks like committees.

Topic 3

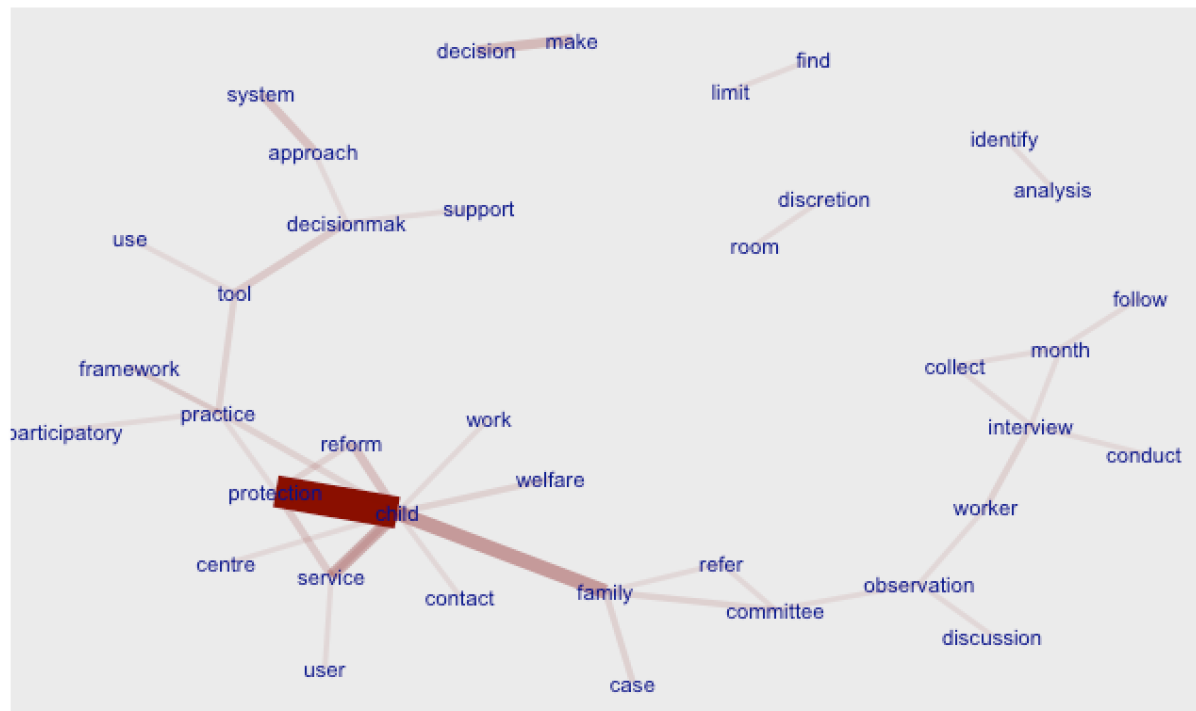


Figure 24: Co-occurrence map of topic 3 (Professionals rooms for discretion)

The articles on this topic have a strong focus on decision-making tools and decision support systems (Gillingham and Humphreys 2010; Gillingham 2013, 2016, 2020; Gillingham et al. 2017), and approach standardise decision-making practice by changing the organisational context (Gillingham 2014; Alfandari 2017b, 2017c, 2017a, 2019). However, the underlying combining theme appears to be the tension between a social worker's room for discretion and "*legal norms and principles, subjective views of the children and their parent as well as the economic and bureaucratic conditions*" (Pösö and Laakso 2016, p. 314). In their study, Falconer and Shardlow (2018, p. 120) identify this as the link between "*the lower levels of discretion and more proceduralised nature of child protection*". The more proceduralist nature characterises English child protection practice compared to a more

"horizontal decision-making approach, in which social workers use a range of support sources to guide their actions" found in Finland.

The findings of Alfandari (2017b, 2017c, 2017d, 2019) from the evaluation of a national reform of Child Protection Decision Making in Israel indicate this tension. The professionals' rejection of the interference with their room for discretion potentially hindered the implementation of organisational and bureaucratic changes in respect of including the views of children and their families (Alfandari 2017c, 2017d) or the introduction of decision-making tools (Alfandari 2017b) and decision -making committees (2019).

The ethnographic study by Gillingham and Humphreys (2010) investigated how social workers use structured decision-making tools in child protection and found that practitioners do not use these tools as intended. Instead, practitioners used these tools after they had already made decisions and even manipulated the information feeding into them to *"achieve an outcome that agreed with the decision they had already made"* (ibid. p. 2605). The authors use the observation that the tools overestimate risks, oversimplify and thereby restrict practice and undermine the expertise of practitioners to explain this behaviour. Due to how these tools were used, the overall intention to improve the consistency of decision outcomes and the way decisions were reached was not achieved. They became an additional bureaucratic burden that *"added another layer of difficulty"* (Gillingham 2013, p. 440), with forms often completed after the fact to comply with the prescribed recording processes.

A later study by Gillingham et al. (2017) revealed a more positive attitude towards decision support tools. The participants identified similar limitations of these tools, particularly their risk assessment accuracy and simplifying a family's situation. However, in this case, social workers could use the tools to supplement their practice and expertise rather than using them, as in the 2010 study. The tools in this study were less prescriptive than the earlier one, allowing for greater room for discretion, potentially increasing their acceptance. These last two factors highlight the importance of acknowledging professional room for discretion. The need to acknowledge the professional's room for discretion suggests that decision-making tools should support social

workers' decisions rather than replace their decision-making.

In the theoretical papers, Gillingham (2016, 2020) considers predictive risk modelling as the next step to develop decision support systems instead of decision support tools and help practitioners make more consistent decisions than using decision support tools alone. Predictive risk modelling would take the effect outlined in Gillingham's (2017) study. Practitioners used a decision support tool to supplement their decisions rather than restrict them further and help practitioners focus their expertise on cases that a predictive model identified as a potential risk. In these papers, Gillingham points toward the limitations of these approaches due to the mismatch between the quantitative data a computer model requires and the qualitative evidence practitioners record to justify their decisions. This mismatch highlights another limitation of procedural approaches to decision problems in social work.

The qualitative study of Hoybye-Mortensen (2015a) offers a helpful way of interpreting the challenges for acceptance in practice that come with introducing decision-making tools or decision support systems. They suggest that it is essential how these tools are framed and restrict the social workers' room for discretion and the ability to "*interpret and alter formal rules and policy*" (ibid. p. 601) to adapt to unforeseeable events in social work practice. In the discussion, there are two sides, one where the tools can form a "*normative chart*" that makes social workers look broader, thereby enhancing the quality of assessments. One is where practitioners use the tools as a recording template that potentially fragments the case narrative. If used in the latter sense, Hoybye-Mortensen predicts that social workers are likely to see these tools as intrusive and limitations to their room for discretion and therefore are more likely to reject them. This prediction could explain the observations by Alfandari and Gillingham about the failure to implement structural and procedural changes to improve decision-making.

The papers reviewed for this topic discuss the reasoning strategies of social workers, focusing on the introduction and use of decision-making tools and decision-support systems in the field. Some literature suggests attempts to

standardize social work decision-making to reduce variability and discretion among practitioners. That involves the introduction of decision-making tools, frameworks, and committees. A recurring theme is the balance between social workers' discretion and the system's procedural requirements. In certain instances, there is resistance among professionals when their discretion is limited. Social workers may only sometimes use decision-making tools as intended. Instead, some made decisions first and then used the tools post hoc to justify their decisions. This behaviour is attributed to the perception that such tools oversimplify situations and undermine the expertise of practitioners. Later studies revealed a more positive stance towards decision-making tools. When these tools were less prescriptive and allowed more discretion, they were more acceptable to practitioners. This is seen as an advancement to help practitioners make consistent decisions. While it does not entirely replace human judgment, it can aid in focusing attention on potential risk areas. How decision tools are introduced and perceived plays a role in their acceptance. If tools are seen as merely bureaucratic checkboxes, they may be rejected. However, if they are presented as aids that help enrich a practitioner's understanding, they might be better received.

4.3.7 Intuition and Deliberation (Topic 5)

This cluster of papers appears to cover a broad thematic mix. It includes engaging with the child's views (Archard and Skivenes 2009), dealing with time and work pressures (Saltiel 2016), reasoning skills (Whittaker 2018), institutional support for decision making (Berrick et al. 2016), threshold decisions (Platt and Turney 2014a) and actuarial tools to determine the future development of a case (Coulthard et al. 2020). Nonetheless, these papers help shed light on the challenge of balancing decision-making as an intuitive and a deliberative activity. At least, this is how this review interprets these articles in this instance.

Topic 5

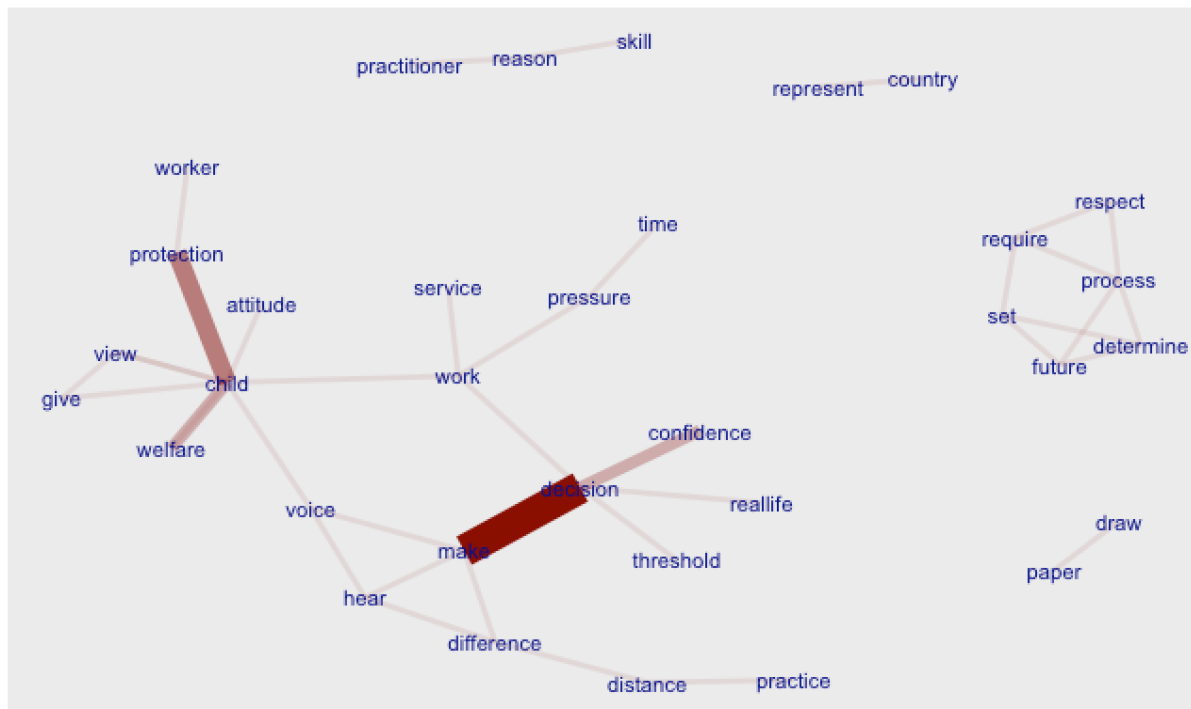


Figure 25: Co-occurrence map of topic 5 (Intuition and Deliberation)

The psychological processes involved in social work decision-making are central to this theme. Whittaker (2018) explores these in an ethnographic study involving child protection practitioners. He found evidence for the dual-process model, as suggested by Kahneman (2013), where social workers manage complex information by applying fast, intuitive judgments that are then analysed more rationally. Whittaker's second finding links the dual-process model with the pattern recognition model suggested by Klein (2006, 2008, 2015). It appears that participants in Whittaker's study use their experience to identify patterns that help them make connections and build a narrative of what is happening in a situation.

Saltiel (2016) undertakes another ethnographic study to investigate how social workers make decisions in the face of this complexity. One finding from this study explains why the dual-process model supported in Whittaker's study (2018) may be skewed toward intuitive decision-making with a potential for introducing errors and bias. From Saltiel's perspective, social work practice is hampered by "*unreliable or incomplete information, poorly defined and fluid situations, pressures of time and heavy workloads*" (Saltiel 2016, p. 2114). This observation favours intuitive decisions that could be prone to

errors without the opportunity to analyse the situation in more detail. To help improve decision-making, Saltiel suggests creating more opportunities for practitioners to interact with their colleagues and managers to revisit intuitive decisions in a more deliberative way and consider the benefits of decision tools to tilt the balance between intuition and analysis towards the latter. The conceptual paper of Coulthard et al. (2020) highlights the benefits of decision tools. They argue that actuarial decision tools can effectively aid, rather than replace, social work judgments. This argument would be in line with Platt and Turney (2014), who oppose a "*technical-rational model of decision making*" (ibid., p. 1487) and argue for the inclusion of naturalistic-decision making in social work decision-making.

Berrick et al. (2016) find that time pressures are a vital barrier to deploying a deliberative process when making decisions. Their survey of n=758 Child Protection Workers in England, California, Norway, and Finland shows that time pressure is a common experience of social workers and that this time pressure negatively affects the confidence practitioners have in their decisions. The level of institutional support in the form of opportunities to engage colleagues in decision-making and evidence-based decision tools mitigates this effect. This effect holds as long as the latter are not part of a process-driven system that negatively affects "*staff confidence and morale*" (Berrick et al. 2016, p. 461), as in England.

This cluster of papers centres around a central theme: the balance between intuition and deliberation in decision-making. The range of topics in this cluster is diverse, addressing different facets of social work decision-making, such as listening to a child's perspective, managing time and workloads, using reasoning skills, the importance of institutional support, making threshold decisions, and using actuarial tools. These papers explore the balance between intuitive and deliberate decision-making in social work. This duality in decision-making relates to the dual-process model, which suggests that decisions can be made quickly based on intuition or more slowly based on careful deliberation. Whittaker's study underscores that social workers often use intuitive judgments quickly when faced with complex information,

which is then analysed more rationally. The social workers' intuitive judgments are also linked to their ability to recognise patterns from their experience, allowing them to understand and contextualise situations quickly. While intuitive decision-making is fast, it is also susceptible to errors and biases, especially when made under constraints like time pressure or with incomplete information. Saltiel's study emphasises that the social work environment is often characterised by constraints, pushing practitioners towards more intuitive decisions. Berrick et al.'s study reveals that time pressure is a prevalent challenge for social workers across various regions. Such pressure impacts their confidence in decision-making. However, institutional support, like opportunities for collaborative decision-making and evidence-based decision tools, can counterbalance this pressure. Having a supportive infrastructure, including the ability to engage with peers and use evidence-based tools, can benefit social workers. Nevertheless, these tools must not lead to a bureaucratic, process-driven system that diminishes staff morale, as observed in some regions.

For this study, understanding the tension between intuition and deliberation is crucial. While intuition can be quick and efficient, it may sometimes lead to inaccuracies. Deliberative processes, although slower, can be more analytical and accurate. Balancing these two modes and understanding the factors that influence them is critical to improving decision-making in social work.

4.3.8 Nuances in Decision Making (Topic 6)

This topic extends the theme of the previous section. These articles explore the nuanced factors that influence the judgments and assessments of caseworkers about the risk of child maltreatment, abuse and the experience of violence in the home. These factors could be the severity of previous judgments of risk (Molina et al. 2019), the desire to maintain relationships (Tufford et al. 2019) or the influence of biases relating to families (Bradt et al. 2015a). It appears as if the issue with these influences is that practitioners are not necessarily aware of these influences. This assumption highlights the importance of including practices within social work that nudge practitioners towards deliberation so that practitioners can learn from decisions and make

decisions more defensible.

Topic 6

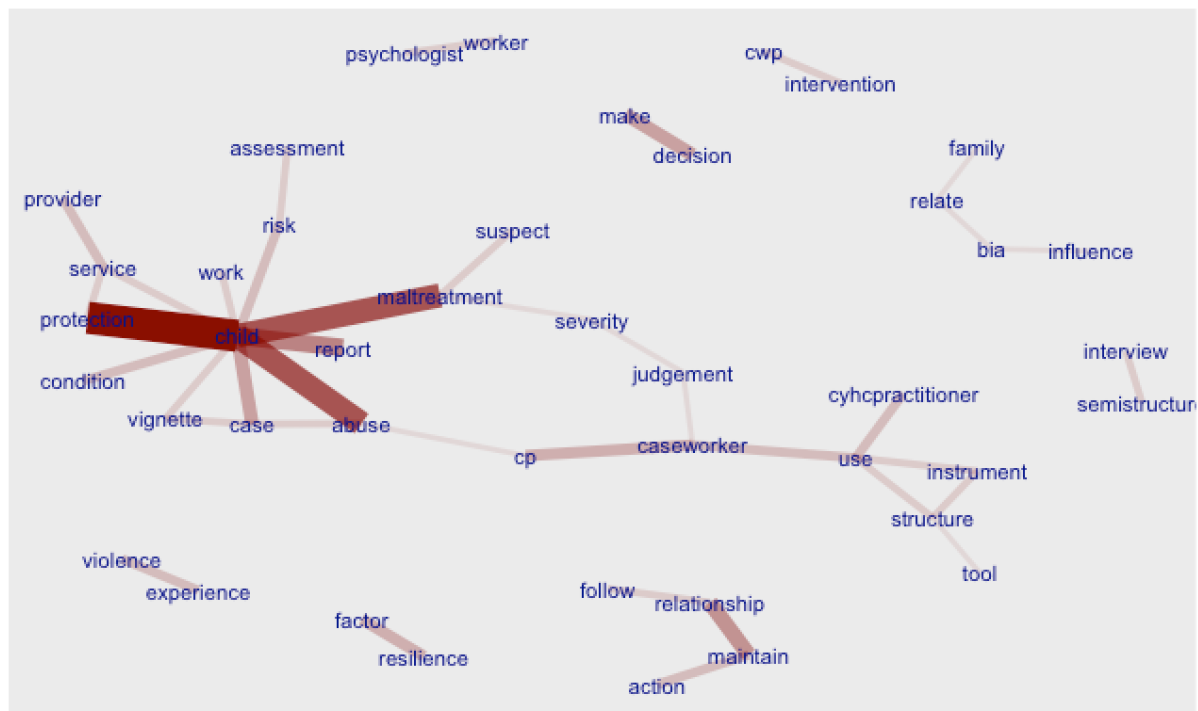


Figure 26: Co-occurrence map of topic 6 (Nuances in Decision Making)

The interpretation of the articles starts with Erisman et al. (2020), who explore how intuition and deliberation depend on each other in practice. Their study focuses on how social workers in the Netherlands perceive intuition. They reveal that social workers use intuition to sense if something is off, differentiate between normal and abnormal, assess risks, balance additional information and communicate with parents. All these practices cover parts of social work practice that require a more sensitive approach than mandated evidence-based practice in the form of "rationalised decision-making" (ibid., p. 1) demands. These authors emphasise the sensitivity of social work practice against the backdrop of child abuse and neglect, which requires a high degree of professional discretion in decision-making.

This sensitive nature of child protection practice also features in the work of Wilkins (2015), who presents findings of a study into how social workers in England analyse referrals. Here, the fine details that feature in social work practice are described in the way practitioners balance risks, use family history and information about the child's broader circumstances and how missing information, the "known and unknown unknowns", (ibid., p. 403) is

handled. Like Erisman et al. (2020), Wilkins highlights how social workers deal with complex decision problems in a nuanced way that does not fit the oversimplification of front-door decisions in children's services, as described by Kirkman and Melrose (2014).

The findings of Erisman et al. (2020) and Wilkins (2015) suggest the need for a practice sensitive to nuanced differences in the data, information and sensory input available in a case. Such practice would reflect the individualistic nature of human complexity. If this interpretation is correct, then it is likely that minor differences in the characteristics of the decision-maker influence decisions. The study of Grégoire-Labrecque et al. (2020) confirms this premise. They found evidence that personal values and experience indeed influence decision-making and judgments about supervisory neglect rated by various professionals working with children and families. Pecnik and Bezensek-Lalic (2011a) show this very effectively in their study. They investigated the influence of Slovenian social workers' personal experience of violence within the family on their professional responses to concerns about children witnessing or experiencing violence in their own families. Even though the authors did not establish statistical significance, the results show that "professionals' *history of victimisation by violence in the family may affect some of their professional responses*" (ibid., p. 538). For example, personal experience of corporal punishment is linked to favouring child protection interventions. The personal experience of violence from parents, witnessing domestic violence as a child and as an adult, was least likely to suggest protective interventions in response to the vignettes in this study.

Another influencing factor, potentially originating from personal experiences or socialisation into middle-class norms, is how social workers perceive the socio-economic and ethnic background of the people they work with.

Arruabarrena et al. (2017) and Bradt et al. (2015a) found such a socio-economic bias. Jud et al. (2015) find that Suisse professionals in schools, including social workers, are influenced in their decisions about making child protection referrals by the family's socio-economic status and willingness to cooperate. This finding suggests a desire by professionals to cooperate with people like them or at least agree with their expectations. That cooperation is

an essential desire of professionals in social work is also evidenced in the study of Tufford et al. (2019), who established that social workers who make child protection decisions also consider how they can maintain their therapeutic relationship with the parents they work with.

This cluster of articles emphasises the nuanced factors influencing those decisions, especially concerning the risk of child maltreatment, abuse, and domestic violence. The reviewed research identified detailed factors that influence social workers' decisions. These include past judgments of risk that can influence current decisions, the desire to keep healthy relationships that might affect judgments and pre-existing biases concerning families that can influence decisions. A significant issue is that social workers may need to know the influencing factors. This unawareness underscores the need for strategies that encourage reflection and deliberation to help social workers learn from their decisions and defend their choices better. Erisman et al. (2020) stress the interplay between intuition and deliberation in social work. They demonstrate that social workers rely on intuition for various tasks, including sensing abnormalities, risk assessment, and communication. This reliance on intuition is particularly evident in the sensitive domain of child abuse and neglect. Evidence suggests biases based on socio-economic and ethnic backgrounds play a role in decision-making. Arruabarrena et al. (2017), Bradt et al. (2015a), and Jud et al. (2015) provide insights into how these biases manifest, indicating that social workers' decisions can be influenced by their perceptions of the socio-economic status of families or their willingness to cooperate. This topic deepens understanding of the multifaceted factors that influence social work decisions. Recognizing and addressing these nuances is vital for training and developing more effective, unbiased, and reflective social work professionals.

4.3.9 Out of Home Care Decisions (Topic 7)

The map below shows that this cluster of articles deals mainly with removing children from their families into out-of-home care. Removal decisions are the Ultima-ratio to protect children from severe maltreatment, a challenging

experience for the child, the family, and the social worker. The process requires due diligence, reflected in the policies that guide practice in this highly regulated part of social work. The high thresholds for out-of-home care also emphasise the importance of this decision. Biehal et al. (2018), in their analysis of n=390 cases in England, confirm this high threshold. They show that children removed from their families had a long history of involvement in children's social care and a high level of concern about their maltreatment.

Topic 7

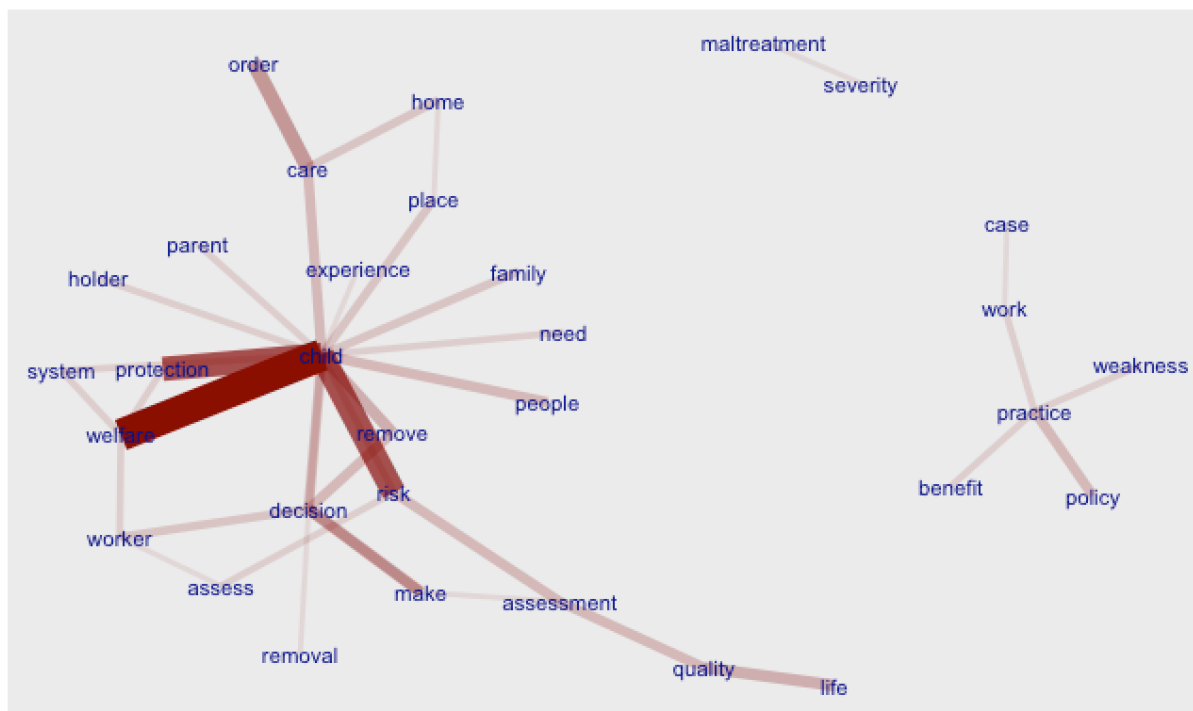


Figure 27: Co-occurrence map of topic 7 (Out-of-Home Care Decisions)

According to Berrick et al (2018), this complicated process, more specifically, the templates used to apply for care orders, embodies the principles of child protection. Within this process, the range between voluntary and involuntary involvement of children and parents adds a challenge to the practice discussed by Poso et al. (2018) by adding complexity to making removal decisions. The dichotomy between voluntary and involuntary removal requires careful consideration of children's rights, given the intrusive nature of this particular decision. Hoikalla et al. (2020) depict two different approaches to this consideration. Children could be seen as holding rights that practitioners responded to in a "routinised", technocratic approach. The alternative is a "particularised manner" (ibid. p. 45) where their contributions to the process

are valued. To some degree, this could be interpreted along the lines of rationalised decision-making using structured decision-making tools versus naturalistic decision-making more in tune with the complexity of human life.

The complexity of this particular choice problem is the subject of a study by Christiansen et al. (2010), who analysed the experience of n=83 Norwegian social workers who make out-of-home care decisions. According to them, the decision-making process for out-of-home care decisions starts with identifying worrying information about the family. This identification is followed by a lengthy back-and-forth of consideration based on the experience of working with a particular family and a trigger factor triggering the removal decision from the care of their parents.

A particular problem of the long back-and-forth process found by Christiansen and Andersen is the findings of Spratt et al. (2015). They identify that there is a confirmation bias when social workers decide to remove a child from the care of their parents. In this vignette-based study, social workers appear to rationalise the parent's attitudes toward removal and the child's attitudes toward reunification in a way that allows them to confirm an already existing hypothesis. This observation suggests again that social workers may reduce the complexity by establishing shortcuts that make the choice problems more tangible.

The work of Davidson-Arad et al. (2003a) about the decisions of Israeli social workers to remove children at risk from their families suggests that this decision could be linked to the perceived quality of life of children at risk. Social Workers perceived these children's quality of life as low at the point of the removal decision. After six months, they saw an improvement for those removed from the home and a decline for those where a decision to remove was not implemented (Davidson-Arad, Englechin-Segal, Wozner, et al. 2003b). Davidson-Arad et al. (2008) show that the decision to remove a child was not affected by the perceived quality of life of the child but that the quality of life was the decisive factor in implementing a decision already made. The reasons why these decisions were not implemented are interesting in light of the above point regarding this decision's voluntary vs involuntary nature. Social workers in this study gave as the reasons for not implementing a

removal decision the objections of the parents and the child, the older age of the child and the lack of cooperation of the child or the parents. Decisions were more likely to be implemented if the mother was addicted to alcohol or drugs (Davidson-Arad, Englechin-Segal, Wozner, et al. 2003b). In a later study, Enosh and Bayer-Topilsky (2015) add that a removal decision is more likely to be implemented if a family comes from a lower socio-economic background. This finding raises whether the child's risk or resistance level against the decision to remove is vital in these cases. Alternatively, the final trigger factor identified by Christiansen and Andersen (2010) that leads to the implementation of this type of decision has not yet appeared.

Removing children from their families into out-of-home care is a profound decision, reserved as a last resort to protect children from severe maltreatment. This decision affects everyone involved, necessitating stringent guidelines to ensure it is the right course of action. According to Berrick et al. (2018), the templates used to apply for care orders represent the core principles of child protection. There is a challenging spectrum between voluntary (family agrees) and involuntary (family disagrees) removal of children. The decision balances children's and parental rights, making it exceptionally complex. This topic highlights the intricacies involved in out-of-home care decisions, illustrating that they stem from concerns about the family and undergo a prolonged deliberation process. These decisions are not impulsive but arise from accumulated experiences with the family and specific triggering factors. Some social workers might be prone to interpreting new information in ways that confirm their pre-existing beliefs or hypotheses about a family or situation. This reliance on mental shortcuts might simplify complex decisions and introduce potential biases. Davidson-Arad's works (from 2003 to 2008) explore the relationship between a child's perceived quality of life and the removal decision. The findings suggest that while the quality of life does not typically initiate the removal decision, it plays a significant role in implementing an already-decided removal. Several factors, such as parental objections, the child's age, and family cooperation, influence the implementation of these decisions.

Additionally, socio-economic factors can play a role, as Enosh and Bayer-Topilsky (2015) confirmed. In essence, the research on this topic shows the intricate, multi-faceted, and often emotionally charged process social workers navigate when making out-of-home care decisions. The papers highlight the balance of strict guidelines, personal biases, children's rights, and the situational context, emphasizing the profound responsibility and challenges social workers face in these scenarios.

4.4 Research updates

The most recent research over the last three years since the initial review covered group decision-making processes, interprofessional collaboration in child protection, social biases in healthcare professionals' decision-making, decision-making dynamics in supervision, differences between experienced and newly qualified social workers, predicting risks, scientific and objective decision-making, and the use of technology in decision-making.

4.4.1 Group decision-making, interprofessional collaboration and social biases

The role of group decision-making processes in child and family social work has become a topic of interest in recent years (Alfandari et al., 2022a). To understand how group decisions are made and how they complement individual professional judgements, theoretical approaches such as group consensus processes, information exchange, naturalistic studies, and incremental improvement processes have been investigated (Alfandari et al., 2022). Individual, organisational, and contextual factors have all been examined in group decision-making (Alfandari et al., 2022a).

Alfandari et al. (2023) conducted a systematic literature review on interprofessional collaboration in child protection practice and the challenges faced in making child protection decisions. The literature review highlighted the limitations of traditional group decision-making in this field and emphasised the need for a comprehensive framework to address the complexity of professional groups. The review identified several factors contributing to effective child protection practice, including policy frameworks, provision of necessary resources, standardised decision-making aids,

communication facilitators, and regular monitoring and review. The paper recommends adopting an inclusive multi-professional approach, implementing flexible working guidelines, providing organisational support, training in multi-professional collaboration skills, and regularly monitoring and reviewing practice.

This study by Alfandari et al. (2022b) conducted in Israel examines how social biases affect healthcare professionals' decision-making in suspected cases of child abuse and neglect. The researchers investigated whether the child's ethnicity, gender, family socio-economic status, and the professionals' occupational group influenced their judgements about suspicion of child abuse. The study found that the professionals' perceptions of the link between social groups and child maltreatment influenced their assessments. Children from low socioeconomic backgrounds and girls were more likely to be identified as having been potentially abused. The child's ethnicity did not significantly impact the assessment.

Furthermore, the study emphasised the importance of professional consultation in decision-making. Participants were more likely to seek consultation where there was higher suspicion of child abuse and neglect. This was a significant predictor of reporting. The study suggests that a more nuanced investigation of healthcare professionals' judgements and the role of talking across different occupational groups will contribute to a more accurate understanding of practice in cases of suspected child abuse and neglect.

The role of group decision-making processes in child and family social work is much debated (Mitchell, 2021; Crampton, 2007; Roesch, 2012). While group decision-making processes may effectively address such issues, it is not the only one. Individual, organisational, and contextual factors have all been discussed in group decision-making (Alfandari et al, 2023). However, other factors, such as cultural or historical factors, may also influence (Meysen and Kelly, 2018). These studies highlighted the limitations of traditional group decision-making research. They suggested that alternative approaches, such as collaborative decision-making processes, may be more effective depending on the expertise of practitioners.

This research topic highlights the dynamics of group decision-making in child and family social work, as opposed to individual decisions. There is an evolving appreciation for the necessity of group consensus and multi-professional collaborations to navigate the complexity of social work decision-making.

Theoretical frameworks like group consensus processes, information exchange, naturalistic studies, and incremental improvement processes have been studied to understand these group dynamics. There are challenges of collaboration among different professional groups in child protection. Traditional group decision-making models need to be revised for the intricacies of child protection as they might emphasise social biases. Both societal and occupational can influence judgments about potential child abuse. Recognizing and addressing these biases is crucial for ensuring fairness and accuracy in decision-making.

These challenges make a more comprehensive framework for group decision-making necessary. Key components facilitating effective child protection practice include clear policy frameworks, necessary resources, standardized decision-making aids, practical communication tools, and ongoing monitoring/review processes. The review strongly suggests a collaborative, multi-professional approach with flexibility, consistent training, and regular practice evaluations. Interprofessional collaboration is pivotal in enhancing the decision-making process. Diverse perspectives can provide a more comprehensive understanding of a situation, leading to better-informed decisions. These findings highlight the importance of understanding the dynamics of group decision-making, recognizing the influence of biases, and promoting interprofessional collaborations in child protection practices for future studies into social work decision-making.

4.4.2 Decision-making in supervision and differences between experienced and newly qualified social workers

Supervision in social work has traditionally been regarded as critical for decision-making and reflection on previous actions. Webb et al. (2022) looked at decision-making processes in case discussions during child and family

social work supervision.

The findings reveal a variety of decision-making dynamics in the supervisory context. Supervisors present their decisions as final in one dynamic, known as unilateral decision-making, even though supervision is intended to be a collaborative process. Supervisors frequently declare future actions without seeking agreement but employ less forceful decision-making techniques. They sometimes engage social workers in shared decision-making, with responses often limited to agreeing or disagreeing with the supervisor's proposal. The supervisor may often propose an action contingent on the worker's acceptance of this model.

The study by Newman et al. (2022) compares newly qualified social workers' decision-making process during home visits to that of experienced social workers. The researchers conducted semi-structured interviews to determine how the practitioners viewed home visits and interacted with families. Experienced social workers rely on their previous experiences to guide their actions and decisions. In contrast, the study shows that less experienced social workers need more confidence and feel that their lack of practice limits their risk assessment abilities. The less experienced workers expressed worry and uncertainty, fearing they would make mistakes. Experienced workers, on the other hand, appeared detached from their own emotional experiences, focusing instead on how fear and anxiety can affect the effectiveness of home visits. The authors also investigated the role of formal knowledge acquired through structured learning in decision-making processes, finding that primarily experienced workers referenced it. According to the findings, newly-qualified social workers appear to be moving towards a more procedure-oriented practice, with a temporary decrease in their ability to apply formal knowledge. New practitioners may face difficulties with emotional labour, while experienced workers may overlook the benefits of moving components of in-home visits due to their detachedness. This study adds to the existing literature by highlighting the differences in decision-making and reasoning between experienced and newly qualified social work practitioners and newly qualified professionals. That highlights the importance to consider the differences between novices and experts in this study.

Supervision in social work is crucial for reflecting on decisions and guiding subsequent actions. The identified difference between novices and experts is significant for this study. The research reviewed here highlighted that newly qualified social workers can exhibit insecurity and apprehension, likely because of their limited practical experience. This anxiety can make them feel that their risk assessments are inadequate or that they might make mistakes. New social workers are more likely to struggle with emotional labour, while their experienced counterparts appear emotionally detached. Both groups view and apply formal knowledge differently. Experienced workers reference their structured learning more, while newer workers seem to be transitioning to a more procedure-driven practice, potentially side-lining the formal knowledge they have recently acquired. Experience levels play a pivotal role in decision-making. Novice social workers and their experienced counterparts exhibit different reasoning patterns, emotional engagements, and applications of formal knowledge. Recognizing and analyzing these differences will be crucial in understanding the broader picture of decision-making in social work. The differences in decision-making approaches between newer and experienced practitioners highlight the importance of distinguishing between these groups in any study. Understanding these variations can offer insights into potential training needs, areas of professional development, and mentoring opportunities.

4.4.3 Predicting risks

The study by Ejrnæs and Moesby-Jensen (2021) examines how social workers assess the risk of specific problems for children in a short amount of time. The study finds a significant disparity in social workers' risk assessments, with different social workers assigning significantly different percentage values to the same risks. This indicates a lack of knowledge and consistency in risk assessment. Those assessing high risk tend to focus more on the personal characteristics of children and parents, while low-risk assessors consider contextual factors. Protective factors social workers identify include the social network, contact with professionals, interventions,

and time perspective. Risk factors identified include severe parental problems), such as depression, exposure to a parent with mental illness, and father's suicide/death, as well as maladapted family interaction and children's trauma. However, there were no significant differences in the risk factors identified between high, medium, and low-risk assessors. The study suggests that a lack of a common anchoring point and limited theoretical risk knowledge contribute to the disparity in risk assessments. The study recommends better information about actual risk and risk assessments and discussions between high-risk and low-risk assessors to promote a more nuanced and holistic view.

The article by McCormack et al. (2020) discusses a regional study conducted in Ireland that looked at child protection decision-making at the point of referral. The study used a random sample of social work team leaders who manage child protection referrals. The study was designed around Bronfenbrenner's ecological model to investigate the influences on decision-making at various levels, and the research methods included a questionnaire and interviews. According to the study, individual factors such as professional judgement, knowledge and skills, and interpretation of "thresholds" were highly influential in decision-making processes. Experience, knowledge of the referred family, involvement in supervision, and knowledge of the referrer were all important factors. Personal values, self-care ability, and emotional well-being were deemed to be less critical. The study's qualitative findings confirmed the importance of professional judgement, individual skills, and experience in decision-making. Knowledge of the referred family and the referee had a significant impact. Organisational factors, such as specific procedures and frameworks, were identified as having the most potent influence. Relationships with colleagues, management, referrers, other agencies, and families were identified as critical in organisational decision-making. The study reveals the complexity of child protection system decision-making and the importance of organisational factors. Interestingly, individual elements like emotional and mental well-being were less influential, while the child's perspective did not emerge as a significant influence. The legislative context was identified as a critical macro influencer on decision-making

processes.

The study by McElhinney et al. (2021) focuses on the challenges professionals face in child protection situations, when concerns arise during pregnancy. The study aims to understand how these professionals apply their experiences and use observed risk factors to judge for possible abuse or neglect. The study identified several risk factors for child abuse or neglect, including the pregnant woman's mental health, age, substance use, childhood experiences, feelings about pregnancy, gestation period, and antenatal care attendance. The study highlighted the importance of professional experience in identifying potential problems with pregnant women. Professionals in child protection cases, particularly midwives and social workers, relied on informal communication or "soft intelligence" to guide their decision-making. Midwives' intuition and familiarity with previous situations played a crucial role. In conclusion, the study emphasises the need for improved services, training, and awareness to support pregnant women better and address child protection concerns. The study also recommends further research into professionals' decision-making processes in this field.

Regarding out-of-home care decisions, Abbotts and Norman's study (2022) examines the factors influencing decisions about removing a child from the care of their family and how social workers acquire these skills. It identifies adequate support and interventions to assist social worker decision-making. The study employs a qualitative technique, specifically reflexive thematic analysis, and collects data through an online survey, follow-on focus groups, and one-on-one interviews. The analysis reveals two major themes: social work skills and structure and processes. Relationship-based practice is emphasised, particularly in adversarial situations like court proceedings. Competent practitioners can navigate complexities and convince parents of to contribute to assessments, whilst less experienced social workers may need help building relationships and managing expectations. Social workers face difficulties because of external factors beyond their control, such as local government systems and court procedures. Social workers are frustrated with excessive demands and procedural hurdles, and timely intervention based on the child's needs is critical. According to the study, fostering an organisational

culture that encourages critical reflection and relationship-based practice can improve assessment skills of children's needs and decision-making outcomes in care proceedings.

The above studies highlight that relation-based practice, critical reflection, and timely intervention based on the child's needs must be emphasised in child protection cases to ensure effective decision-making. Social workers' risk assessments must be accurate for children's safety, and access to reliable information and resources must be provided. Improving social worker training and support is crucial in equipping them with the necessary skills to make effective decisions. Overall, the inherent difficulties of social work decision-making are linked to significant challenges in predicting future risk of harm. This topic has been extensively considered by a group of researchers (Meindl and Wilkins 2022, Wilkins 2022, Wilkins and Forrester 2020). These authors looked at forecasting accuracy among social workers and social work students in England. In the study (Meindl and Wilkins 2022 and Wilkins 2022), participants were asked to rate the outcomes of real-life scenarios on a scale of 0 to 100. Brier scores were used to assess the accuracy of these predictions. According to the findings, forecasts were, on average, 6% more accurate than random guesses. Even when more data is available, social workers' predictions of future harm to children are found to be only slightly better than chance. The authors stress the complexity of social work decision-making and the need for a thorough understanding of accuracy in this context. They claim that the subjective nature of determining whether a child has suffered significant harm, which cannot be objectified, complicates the evaluation of forecast accuracy. Forecasts are inaccurate depending on the family situation, with decisions being more accurate when children have already been removed from their families, possibly due to the stability provided by a care order. The time between the forecast and its resolution also affects accuracy, with longer-term forecasts needing to be more precise. Years of experience correlated with prediction accuracy among the variables studied, but it only accounted for a small portion of the variance.

To explore strategies to improve the accuracy of predictions, Wilkins et al.

(2020) conducted an online randomised controlled trial that tested three interventions aimed at improving decision-making: confidence calibration, cognitive debiasing, and growth mindset with feedback. Participants were given case studies based on actual referrals to children's services, and their responses were compared to actual outcomes. The study examined whether short online interventions could improve social workers' predictions. Social workers and student social workers in England were recruited through various channels for the study. A Brier score was used to assess the overall accuracy of participants' predictions, with 177 out of 283 scoring above chance. There were no significant differences in accuracy across the four situations presented to the participants. Participants did better on the initial case studies than on the post-treatment ones. Personal and professional characteristics data were used in exploratory analyses, but no significant predictors of accuracy were discovered, except for age. Participants' views on the purpose of children's services were also assessed, and those who strongly disagreed that children's services primarily support parents were less accurate with their forecasts. Due to the uneven distribution of responses, this finding should be interpreted cautiously.

In another study, Wilkins (2021) tested if a Checklist intervention improved forecasting abilities and confirmation bias. The study included 88 participants, most of whom were social workers, divided into two groups: a control group and an intervention group. Participants were asked to read and forecast outcomes for real-life social service referrals. According to the findings, the Checklist intervention could have significantly improved forecasting accuracy. There was also no significant link between social workers' forecasting accuracy and their confirmation bias. Furthermore, social workers' personal and professional characteristics did not significantly influence Brier scores. However, the study did reveal that personal and professional characteristics were less significant in predicting accuracy than expected. For example, open-mindedness or comfort with uncertainty was suggested to be more predictive. According to the study, social workers may also make contingent forecasts based on current circumstances and the likelihood of change.

The authors of these papers suggest that interventions such as confidence calibration, cognitive debiasing, and growth mindset with feedback may help to improve social workers' predictions. They believe open-mindedness and comfort with uncertainty may be more critical factors in forecasting accuracy than personal and professional characteristics. Additionally, social workers may make contingent forecasts based on current circumstances and the likelihood of change. Further research is needed to investigate how the complexity of social work decision-making can be better considered.

Ejrnæs and Moesby-Jensen (2021) noted significant differences in risk assessments among social workers, indicating inconsistency and potentially insufficient knowledge in assessing risks. Social workers focused on varying factors based on risk assessment tendencies, with high-risk assessors emphasizing personal characteristics and low-risk assessors focusing on contextual ones. The study suggests that lack of standardization and limited theoretical knowledge might be causes for the inconsistency in risk assessments. The study by McCormack et al. (2020) emphasizes the weight of individual factors like professional judgement, knowledge, skills, and experience in decision-making.

Research by Meindl and Wilkins (2022), Wilkins (2022), and Wilkins and Forrester (2020) examined the accuracy of social workers' predictions about future harm to children. The inherent unpredictability of these situations means decisions were only slightly better than random guesses. Long-term forecasts and years of experience did play a role in prediction accuracy, but other personal and professional characteristics did not significantly affect forecasting outcomes. Interventions like confidence calibration, cognitive debiasing, and a growth mindset were tested to enhance prediction accuracy, but more research is required to determine their effectiveness. In conclusion, the reasoning strategies employed by social workers when making decisions are multifaceted, influenced by various factors from professional experience to organizational frameworks. The discrepancies observed in risk assessments and the unpredictable nature of forecasting future harm underline the complexity of social work decision-making. Interventions, consistent training methods, and a greater understanding of the

multiple influences at play may better equip social workers to handle these complex decisions. The studies collectively highlight the necessity for ongoing research to refine and improve the decision-making processes in child protection.

4.4.4 Scientific and objective decision-making and the use of technology in decision-making

Another area of study has been the development of more scientific and objective decision-making techniques in social work (Botha, 2023). This shift toward greater scientific rigour aims to minimise mistakes made by intuitive decisions and increase confidence in social work decisions (Botha, 2023). This development has been fuelled by the complexity of social work cases and the desire to make the practice more evidence-based (Botha, 2023).

Brigger & Christensen's systematic review (2022) looks at using decision support algorithms (DSAs), which incorporate AI and machine learning technologies, in social work. In various social work contexts, such as child protection, employment services, and crime prevention, the review highlights the functions, benefits, and limitations of DSAs. Accuracy, biases, discrimination, transparency, explicability, accountability, and discretion are all important considerations when applying DSAs in social work. The challenges in selecting data sources, variables, and technology for DSAs are discussed, focusing on accuracy, biases, and discrimination. DSAs are designed to assist social workers in making decisions and share discretionary power between the system and street levels and between social workers and system builders/managers. They are valued for efficiently targeting assistance to those in need, promoting procedural justice. Social workers are hesitant to rely on DSAs, particularly in complex situations, due to concerns about their inability to consider contextual factors and discrimination potential. Social workers' professional experience influences the acceptance of DSAs, with more experienced professionals demonstrating a higher level of scepticism. While DSAs have the potential to improve service delivery and ensure procedural justice, there needs to be more information on how they affect decision-making accuracy, biases, and outcomes for service users. DSAs, according to the authors, can encourage social workers to reflect,

resulting in better decision-making.

Ranerup and Svensson (2023) look at the impact of automated decision-making (ADM) on street-level bureaucrats' autonomy, focusing on social work. The study focuses on municipalities that use Robotic Process Automation (RPA) as a decision-support tool to improve fair and consistent decision-making. From 2019 to 2022, the researchers conducted semi-structured interviews with local managers, caseworkers, and politicians to gain insight into the case management process, the technology employed, and its effects on public values. The introduction of ADM and RPA has resulted in more individualised assistance and increased client meetings. According to the study, following rules and procedures supported by various types of information technology can improve fairness and uniformity in decision-making. However, it emphasises the critical role of human decision-making and direct interaction with clients, particularly in complex situations. The relationship between clients and caseworkers and their meetings significantly influences ADM, underlining the importance of personal connections in social work.

Recent research suggests that while data-driven social assistance (DSAs) and automated decision-making (ADM) can improve efficiency in targeting interventions to those in need, there are still important considerations regarding accuracy, biases, discrimination, transparency, explicability, accountability, and discretion. Additionally, it is important to note that ADM can improve fairness and uniformity in decision-making. Still, more is needed to replace the importance of direct human interaction and decision-making in complex situations. As such, further research is required to assess the effectiveness of DSAs and ADM in social work in terms of decision-making accuracy, biases, discrimination, and outcomes, as well as to consider how these tools can be tailored to different contexts and used to ensure a balance between fairness and individualised assistance.

The use of Decision Support Systems (DSAs) in social work has the potential to improve decision-making accuracy and efficiency. However, it also has its drawbacks. While DSAs may be beneficial in reducing mistakes made by intuitive decisions and increasing confidence in social work decisions, they

may also lead to a loss of autonomy and control for social workers and system builders/managers. Furthermore, social workers may be hesitant to rely on DSAs in complex situations due to concerns about their inability to consider contextual factors and potential discrimination. On the other hand, following rules and procedures supported by various types of information technology can improve fairness and uniformity in decision-making. However, this can lead to a need for more flexibility and creativity. Overall, weighing the pros and cons of DSAs and other technological decision-making tools is important before implementation.

The research reviewed in this topic underscores a trend towards using more scientific and objective decision-making techniques in social work. The primary aim is to reduce errors resulting from intuitive or "gut feeling" decisions and bolster the overall confidence in social work judgments. This push towards evidence-based decision-making stems from the intricate nature of social work cases. There is potential for DSAs incorporating Artificial Intelligence (AI) and machine learning to assist in social work decision-making. That would bring potential benefits like enhanced efficiency and procedural justice but also limitations such as concerns regarding biases, accuracy, and discrimination. Key considerations when implementing DSAs include transparency, discretion, explicability, and accountability. That suggests integrating rules and standardized procedures through technology can enhance decision-making consistency and fairness. However, a crucial insight is that technology cannot fully substitute the human touch required in complex scenarios. The interpersonal relationships between clients and caseworkers and their face-to-face interactions are indispensable in shaping ADM outcomes. While DSAs and ADM offer promising advancements in improving the precision and efficiency of social work decisions, they also bring forth critical challenges and ethical considerations. While these tools can enhance fairness and uniformity, they cannot diminish the value of human judgment, especially in complex situations. The individualized nature of many social work cases necessitates direct human engagement and the social worker's ability to make autonomous decisions. For future studies, it is

important to examine the interplay between human intuition, experience, and technology-driven decision aids. While tools like DSAs and ADM offer innovative solutions for improving decision-making, they also necessitate thoughtful consideration regarding their ethical implications and potential limitations. Balancing technological advancements with the indispensable human touch in social work remains a critical challenge. As such, more research is needed to understand the internalised logic of practice social workers use when making decisions. That could help to design decision support tools that are aligned with the reasoning strategies used by social workers and complement their internalised logic to avoid potential biases.

4.5 Gap Analysis

A computer-aided thematic analysis of the articles in this review identified themes that could be easily identified using the bibliographic coupling technique. Despite the narrow focus of this review on decision-making in child safeguarding, the identified topics revealed distinct differences. The topics include risk assessments, balancing complex information, professionals' discretion, the construction of risk, intuition and deliberation, factors influencing decision-making, out-of-home care decisions, complexity in decision-making, and maintaining therapeutic relationships during difficult decisions.

Risk assessment is a very complex process in child protection that necessitates social workers to navigate numerous variables when making decisions. The reviewed studies have highlighted the difficulties social workers face when assessing risk and the complexity of decision-making. To help practitioners comprehend and respond to the problems, theoretical perspectives such as systemic practice and ecological rationality have been proposed. Practitioners must develop strategies to navigate complexity and make informed decisions in this environment, and organisations must establish a learning and accountability culture.

Benbenishty and Osmo's research reveals the difficulty of child protection decision-making due to the lack of universally recognised objective criteria for maltreatment or abuse. Osmo and Benbenishty, Skivenes et al., and Segatto

et al. reported that social workers use minimal complex reasoning and must consider alternative scenarios. Mitigating the risk of biased risk construction is challenging, but including different professionals or independent experts can provide diverse perspectives. Lamponen et al. discuss how organisational and legal contexts frame decisions, while Dickens et al. look at the use of experts and the benefits they provide. This collection of articles explains the social construction of child protection risks, the difficulties of decision-making, analytical reasoning's limitations, and the potential benefits of engaging independent experts.

In child protection, risk assessment is a complex and multifaceted process, with social workers' attitudes, factors like the wishes of the child and mother, and families' socioeconomic or minority status all impacting decision-making. According to studies, attitudes toward child removal, parental and child participation, and socioeconomic or ethnic groups can influence how social workers assess the risks of a particular case. As a result, social workers must be aware of their attitudes and biases when making decisions, as well as the larger context of the case.

There is a conflict between child protection and family maintenance. This results from the shifts in social policy orientations and social work cultures from a child protection discourse towards a child welfare discourse, which emphasises the family's welfare. Kedell's research is particularly relevant in this context because it looks at the tensions between the legal obligations of family maintenance and child safety and how social workers construct narratives to explain parental behaviours. These narratives can impact how social workers handle cases and decide if family maintenance is most important. Overall, this topic emphasises the difficulties of safeguarding children and the necessity of understanding the tension between child protection and family maintenance.

As practitioners are forced to navigate conflicting demands and expectations, social work is a highly complex discipline. Because of the complexity of information that must be considered to reach a conclusion, threshold decisions, which involve determining the level of risk to a child, take much work. As a result, social workers must employ various techniques to manage

the complexity and make informed decisions, such as heuristics, professional encounters, discussions, systematic doubt, and reflection. Furthermore, interacting directly with families adds a layer of complexity that must be addressed. The reviewed articles help better understand how practitioners navigate these tensions and make decisions in uncertain circumstances.

There is tension between the social worker's discretion and various factors influencing decision-making, such as legal norms, subjective views, and bureaucratic circumstances. Alfandari (2017b, 2017c, 2017d, 2019) and Gillingham and Humpreys (2010) have found that decision-making tools can be met with resistance from professionals and sometimes result in a limited improvement in decision outcomes. According to Gillingham et al. (2017), social workers are more open to tools with less prescription and more discretion. As a way to develop decision support systems, Gillingham (2016, 2020) looks at predictive risk modelling. However, Hoybye-Mortensen (2015a) highlights the difficulties of introducing decision-making tools and the importance of how practitioners perceive them. The goal is to balance enhancing social workers' expertise and ensuring consistency in decision outcomes. The framing and acceptance of decision-making tools are critical to their effectiveness and integration into practice.

Social work decision-making is a complex process requiring intuitive and analytical skills. Social workers make quick, intuitive judgements that are later analysed more rationally, according to Whittaker's (2018) ethnographic study, while Saltiel's (2016) research revealed the limitations of decision-making due to incomplete information, fluid situations, and time constraints. Coulthard et al. (2020) and Platt and Turney (2013) advocate the use of evidence-based decision tools to support social work judgements, while Berrick et al. (2016) emphasise the need for institutional support to mitigate the adverse effects of time pressures. These studies demonstrate the importance of balancing intuition and analysis and providing adequate institutional support to improve decision-making outcomes.

Various nuanced factors, such as the severity of previous risk judgements, the desire to maintain relationships and biases related to families' backgrounds, influence caseworkers' decisions and assessments in child

protection. According to studies, social workers use intuition, analyse referrals based on risks and family history, and consider personal values and experience when making decisions. Furthermore, socioeconomic biases in how social workers see the families they work with have been discovered, as well as the necessity of maintaining therapeutic relationships with parents during decision-making. These studies emphasise the need for practices that encourage sensitivity to nuanced differences, address personal biases, and promote self-reflection and deliberation to make more informed and defensible decisions in child protection.

Making removal decisions for out-of-home care is a complex and highly controlled aspect of social work practice. According to Biehal et al. (2018), these decisions require careful consideration of children's rights and the removal's intrusive nature. Berrick et al. (2018) discuss the distinction between voluntary and involuntary involvement, while Hoikalla et al. (2020) present two approaches to children's rights consideration. Christiansen et al. (2010) describe a back-and-forth discussion based on family information and trigger factors. Spratt et al. (2015) find confirmation bias in social workers' decisions to remove a child. Davidson-Arad et al. (2003a) look at the perceived quality of life of children at risk concerning removal decisions and discover that parental objections, child resistance, lack of cooperation, and socioeconomic background influence their implementation. Separating children from their families is a complex and sensitive decision which must be carefully considered before making a final decision.

Recent research considered in this review showed that child and family social work frequently discusses group decision-making processes. While they may be effective in certain circumstances, there is evidence to suggest that other approaches may be more suitable depending on the circumstances and the expertise of practitioners. Additionally, recent research has indicated that other forms of decision-making, such as shared and unilateral, may be beneficial in certain situations. Social workers must draw on their experiences, keep updated with new knowledge and practice, and use Decision Support Systems (DSAs) tools to make the best decisions. However,

using such technologies has pros and cons, which must be weighed before implementation. Ultimately, the complexity of social work decision-making requires further research into the best ways to ensure accuracy and fairness, something that this study seeks to address.

Making decisions in child protection is a highly complex process due to the many variables that must be considered. Practitioners must consider a range of perspectives, such as the theories of systemic practice and ecological rationality, balancing needs, reducing risk, and navigating conflicts to make informed decisions. Additionally, research has revealed the difficulty of child protection decision-making due to the lack of universally recognised objective criteria for maltreatment or abuse and the potential benefits of engaging independent experts. Furthermore, social workers must be aware of their attitudes and biases when making decisions and the tension between child protection and family maintenance. To navigate this complexity, practitioners must employ heuristics, professional encounters, discussions, systematic doubt, and reflection techniques.

Additionally, decision-making tools may help to mitigate the risk of biased risk construction. However, the framing and acceptance of such devices are critical to their effectiveness and integration into practice.

The topics of the reviewed research cover risk assessments, balancing complex information, professionals' discretion, the construction of risk, intuition and deliberation, factors influencing decision-making, out-of-home care decisions, complexity in decision-making, maintaining therapeutic relationships during difficult decisions, the conflict between child protection and family maintenance, the tension between the social worker's discretion and the influence of various factors influencing decision-making, the importance of balancing intuition and analysis, and the nuanced factors such as the severity of previous risk judgements, the desire to maintain relationships and biases related to families' backgrounds that influence caseworkers' decisions and assessments in child protection. Additionally, group decision-making processes, shared and unilateral decision-making, and the use of Decision Support Systems are important research themes.

The research topics mentioned in the task cover various areas related to risk assessment, decision-making, and the factors influencing decision-making in multiple contexts. However, some research questions should be covered in the mentioned topics. One such question is the role of emotions in decision-making. Emotions are significant in decision-making processes and can influence how individuals perceive and assess risks. Understanding how emotions impact decision-making in the context of risk assessment and complex decision-making situations would provide valuable insights for professionals in various fields. Another research question that needs to be covered is the impact of cultural factors on risk assessment and decision-making. Cultural factors, such as values, norms, and beliefs, can shape individuals' perceptions of risk and influence their decision-making processes. Exploring how cultural factors influence risk assessments and decision-making in different cultural contexts would contribute to a more comprehensive understanding of these processes. The topics mentioned do not sufficiently address using technology and artificial intelligence (AI) in risk assessment and decision-making. With technological advancements, AI algorithms are increasingly used to support decision-making processes in various domains. Investigating the effectiveness and limitations of AI-based decision support systems in risk assessment and decision-making would be a valuable research area.

Furthermore, the topics do not cover ethical risk assessment and decision-making considerations. Ethical considerations are crucial in decision-making processes, especially in sensitive areas such as child protection and security risks. Examining the ethical implications of different decision-making approaches and the potential conflicts between ethical principles would guide professionals in navigating complex decision-making situations.

In conclusion, while the mentioned topics cover a broad range of research areas related to risk assessment and decision-making, research questions still need to be explicitly addressed. These include the role of emotions in decision-making, the impact of cultural factors on risk assessment and decision-making, the use of technology and AI in decision-making, and ethical considerations in decision-making processes. Further research in these areas would contribute to a more comprehensive understanding of risk assessment

and decision-making processes in various contexts.

How social workers apply reasoning when making safeguarding decisions is an essential area of research that has implications for decision-making. While the topics mentioned cover a wide range of research areas related to reasoning, many unanswered questions remain to explore, such as how reason differs in different domains, which cognitive biases affect sense, how logic can be improved, and what benefits artificial intelligence can bring. By understanding more about the role of reason in decision-making, we can develop better strategies to improve our decision-making processes.

The review highlights social workers' complexities and challenges in making decisions in child protection cases. It emphasizes the need for a balance between various factors and the lack of universally accepted criteria for identifying maltreatment or abuse. The review also discusses the influence of biases and external factors such as a family's wishes, socioeconomic status, and minority background on decision-making. It noted the tension between child protection and family welfare, and the use of decision-making tools, such as Decision Support Systems, is explored. However, areas such as the role of emotions and cultural factors in decision-making need more research.

Despite the extensive research on variables and decision-making, there is still a significant gap in our understanding of how social workers process and integrate various pieces of evidence to make a decision or judgment. While studies have made strides in identifying triggers, there is still a 'black box' of decision-making within social workers that remains a mystery. This 'black box' is where emotions, values, and experience are believed to play a crucial role, yet it remains largely unexplored. This underscores the urgent need for more research to understand the complexities involved.

One of the ongoing challenges in understanding the human mind is the gap between what we can observe and what remains hidden in the 'black box' of our brain. While we can observe the behaviours and actions that result from our thought processes, our thoughts' actual mechanisms and workings remain primarily unobservable. This gap raises questions about how we form our thoughts and how they influence our behaviour and highlights the

complexity and mystery of the human mind. Despite advancements in neuroscience and psychology, the challenge of bridging this gap between the observable and unobservable aspects of our thoughts, which are crucial in decision-making, remains significant.

4.6 Investigating reasoning

Based on this, there needs to be more research into social workers' reasoning techniques. This opens the door to discussing Toulmin as a valuable theory for reasoning.

This theory provides insight into the cognitive processes and factors influencing decision-making and reasoning. Because of several reasons, Toulmin's reasoning theory is relevant. First, it provides a systematic framework for analysing and evaluating arguments. Claims, grounds, and warrants are identified as key components of an argument in the theory, with relationships between them highlighted. In various contexts, researchers and practitioners can assess the strength and validity of ideas (Tirri and Pehkonen 2002; Arzarello and Sabena 2010; Becker et al. 2013; Kulatunga et al. 2013; Meyer et al. 2013; Charysma et al. 2018; Khoirunisa and Indah 2022; Leclerc et al. 2022; Groth and Choi 2023). Second, Toulmin's reasoning model applies to multiple disciplines and domains. It has been utilised in organisational research, mathematics education, chemistry education, political discourse analysis, and legal reasoning. Toulmin's model's versatility allows researchers to analyse and understand reasoning processes in a variety of settings, making it a valuable tool for interdisciplinary research (Tirri and Pehkonen 2002; Arzarello and Sabena 2010; Becker et al. 2013; Meyer et al. 2013; Khoirunisa and Indah 2022; Leclerc et al. 2022; Groth and Choi 2023). Third, Toulmin's reasoning theory aids in understanding the underlying structure and dynamics of arguments. Researchers can gain insight into the reasoning strategies employed by individuals or groups by examining the components of an idea and their relationships. This can help us gain a better understanding of how arguments are constructed, evaluated, and communicated, as well as assist in the development of effective teaching and learning strategies (Tirri and Pehkonen 2002; Arzarello and Sabena 2010;

Becker et al. 2013; Kulatunga et al. 2013; Groth and Choi 2023).

Furthermore, Toulmin's reasoning model emphasises the importance of evidence and warrants in proving claims. This emphasis on evidence-based reasoning aligns with critical thinking and scientific inquiry principles.

Toulmin's model contributes to the development of analytical and critical thinking abilities by encouraging the use of evidence and logical reasoning (Tirri and Pehkonen 2002; Becker et al. 2013; Kulatunga et al. 2013; Meyer et al. 2013; Charysma et al. 2018; Groth and Choi 2023). Overall, Toulmin's reasoning theory is critical because it provides a systematic framework for analysing and evaluating arguments, can be applied to many disciplines and domains, helps uncover the underlying structure of arguments, and encourages evidence-based reasoning and critical thinking. These features make Toulmin's model a valuable tool for researchers, educators, and practitioners in understanding and improving reasoning processes in various contexts.

Toulmin's reasoning theory can be used to explain social work decision-making by providing a framework for analysing and evaluating arguments in ethical dilemmas and complex situations. Social workers often encounter problems where they must make decisions involving ethical considerations, conflicting values, and multiple stakeholders (Banks et al. 2020; Segal and Gur 2023). Toulmin's reasoning model can help social workers identify and analyse the various components of arguments, such as claims, grounds, warrants, and backing, to assess the strength and validity of different perspectives and make informed decisions (Segal and Gur 2023). In social work, Toulmin's reasoning theory can be applied to analyse and evaluate the arguments and justifications for resolving ethical dilemmas. Social workers often face challenging ethical decisions that require careful consideration of the values and interests of clients, organisations, and other stakeholders. Using Toulmin's model, social workers can systematically analyse the reasoning behind their decisions and document the decision-making process, which is essential for accountability and transparency (Segal and Gur 2023). Furthermore, Toulmin's reasoning theory can be applied to understand and analyse the arguments and reasoning processes in team meetings and

collaborative decision-making in social work settings. Social workers often work in teams and regularly meet to discuss cases, share information, and make decisions (Skotte 2022). Toulmin's model can be used to examine the arguments and justifications presented in these meetings, identify the underlying assumptions and warrants, and assess the quality of the reasoning (Skotte, 2022). This can help social workers understand how informal social practices and worker collectively influence decision-making processes and contribute to action and commitment within the team (Skotte, 2022).

Benbenishty et al. (2003) analyse the rationales provided by professionals in child welfare to understand their structure and content in their study. The authors break down these rationales into separate parts using Toulmin's framework. The study uses structured questions based on Toulmin's six components to gather detailed responses. The questions aim to investigate how case characteristics influence decisions, the relationship between case data and intervention choice, and the potential impact on actions taken of changes in case descriptions. The findings show that most professionals present basic-level arguments, consisting of evidence and warrants, by offering relevant case facts and employing inference rules to justify their judgement. However, the study reveals a need for complementary argument levels, such as rebuttals and qualifiers, which were only provided when specifically requested. Given the inherent uncertainty in making such judgements, this omission is significant because it could improve judgement quality and strengthen arguments.

Overall, Toulmin's reasoning theory is relevant to social work decision-making as it provides a systematic framework for analysing and evaluating arguments, which is crucial in resolving ethical dilemmas and making informed decisions. By applying Toulmin's model, social workers can critically assess the reasoning behind their decisions, consider multiple perspectives, and engage in collaborative decision-making processes. This can enhance the quality of decision-making in social work practice and contribute to ethical and practical service delivery.

Toulmin's reasoning theory can be a valuable asset for social work, as it can be used to inform social work practice, policy decisions, and teaching and

learning strategies. By understanding the underlying structure and dynamics of arguments, social workers can better explain their decisions and understand their clients' perspectives, as well as evaluate the impact of policy decisions on clients, organisations, and other stakeholders. Additionally, they can develop effective teaching and learning strategies that encourage evidence-based reasoning and critical thinking. Ultimately, the use of Toulmin's reasoning theory can help create more effective collaboration between social workers and their clients and help develop trust between the two parties (Tirri and Pehkonen 2002; Arzarello and Sabena 2010; Becker et al. 2013; Kulatunga et al. 2013; Meyer et al. 2013; Charysma et al. 2018; Khoirunisa and Indah 2022; Leclerc et al. 2022; Groth and Choi 2023).

Toulmin's reasoning scheme can provide a valuable framework for studying the reasoning strategies used by social workers to make decisions in practice. Toulmin's Argument Pattern can be applied to analyse argumentation discourse and understand the structure and components of arguments (Erduran et al. 2004). Using Toulmin's scheme, this study can identify the claims made by social workers, the evidence they provide to support those claims, and the reasoning they use to connect the evidence to the claims.

In the context of studying reasoning strategies used by social workers, Toulmin's scheme can help to identify the different elements involved in decision-making. For example, social workers may make claims about the risk level of a child and provide evidence such as the child's characteristics or contextual factors (Erduran et al. 2004). Toulmin's scheme can help to analyse how social workers reason from the evidence to the claims and identify any gaps or inconsistencies in their reasoning.

Furthermore, Toulmin's scheme can be used to analyse the warrants or underlying assumptions social workers rely on in their decision-making process. For example, social workers may have certain beliefs or values that influence their assessment of risk factors (Nam and Chen 2017). Using Toulmin's scheme, researchers can examine the warrants used by social

workers and explore how these warrants may impact their reasoning and decision-making.

Additionally, Toulmin's scheme can help researchers analyse the backing or support for the evidence provided by social workers. That can involve examining the sources of information that social workers rely on and evaluating the credibility and reliability of those sources. Using Toulmin's scheme, researchers can assess the quality of the evidence used by social workers and determine if there is a need for better information or resources to support their decision-making (Erduran et al., 2004)

Overall, Toulmin's reasoning scheme provides a systematic and structured approach to analysing the reasoning strategies used by social workers in decision-making. It allows researchers to identify the different components of arguments, analyse the reasoning used to connect evidence to claims, and evaluate the warrants and backing behind the arguments. By applying Toulmin's scheme, this study can gain insights into the reasoning strategies employed by social workers and identify areas for improvement in their decision-making processes.

5 Methodology, Research Design and Analysis

This chapter sets out the methodological considerations for this study on social work decision-making. Using the previously discussed Decision-Making-Ecology as a theoretical concept, the following sections translate the factors influencing decision-making (case characteristics, decision maker characteristics, organisational context) into a workable research design.

First, this chapter establishes the methodological underpinning of this study, including:

- The introduction of the habitus (Bourdieu 1977, 1984, 1999) as a proxy model for cognitive strategies that appear to follow a rational logic whilst enabling decision makers to invent an infinite number of responses to new problems and
- A discussion of the difficulties of grasping cognitive strategies as an object that can be captured in this study,
- Thoughts about the importance of considering the context of decision making, namely the 'field' of social work.

Based on these methodological considerations, the second part of this chapter presents the research design to realise these considerations.

5.1 Capturing the internalised logic of practice

This study sees a person's decision-making practice as the interplay of the habitus, the social field in which the person acts, and the accumulated capital. Together, this results in a definition of practice consisting of three different elements that Bourdieu (1986, p. 101) represents in the formula " $[(habitus)(capital)] + field = practice$ " that the research design should be able to capture.

5.1.1 The Habitus

The basis for the idea to link thought processes with verbalised manifestations of internal thought processes is the premise that the practice of a person follows a logic that is the result of internalised experiences of a

person and that their Habitus represents this internalised logic of practice. This study uses this model as a proxy for the cognitive strategies of a person's decision-making practice.

According to Bourdieu, the Habitus is a

"system of durable, transposable dispositions, structured structures predisposed to function as structuring structures, that is, as principles which generate and organise practices and representations that can be objectively adapted to their outcomes without presupposing a conscious aiming at ends or an express mastery of the operations necessary in order to attain them" (Bourdieu 1999, p. 53).

The Habitus concept explains how a person can apply previous experiences and knowledge to new and different scenarios whilst maintaining a level of consistency in line with organisational, political, and socio-cultural expectations necessary to function within human culture. This embodied experience results in the internalised logic of practice that can be unearthed by exposing participants to new situations and observing their behaviour. It is important to emphasise that Habitus is a theoretical concept that Bourdieu developed to "*orient[...] our ways of constructing objects of study*" (Matton 2014, p. 49). In other words, a Habitus is an interpretive tool used to develop a model for the observation that people present social behaviour such as decision-making that follows regular patterns even though these behaviours are actions of people that are perceived to be free agents. As a "*product of history*" (Bourdieu 1999, p. 54), Habitus brings the social context of a person, the embodiment of a person's upbringing, education and past experiences and the appearance of the individual free will together (Bourdieu and Passeron 1990). It represents a person's attitudes and dispositions (Grenfell 2014) due to socialisation. It integrates the perception of an agent to make choices based on their free will with the structuring effect of these agents' attitudes and socio-cultural constraints.

This dichotomy between free will and a level of pre-determination of choices is essential for this study. In his research Bourdieu (Bourdieu 1988, 2008) observed the existence of social rules but recognised that agents did not always follow these rules or that the interpretation of these rules was flexible.

The concept of Habitus explains how people can act in what appears to be a predictable way in line with societal expectations without following explicit rules that would stifle an individual's ability to respond to different iterations of similar types of situations. An observer may misunderstand these regularities as the results of rules that agents follow knowingly or unknowingly even though these regularities may be the result of "*schemes enabling agents to generate an infinity of practices adapted to endlessly changing situations, without those schemes ever being constituted as explicit principles*" (Bourdieu 1977, p. 16). This "*art of inventing*" makes it possible "*to produce an infinite number of practices that are relatively unpredictable but also limited in their diversity*" (Bourdieu 1999, p. 55) within the context of these customary rules.

The concept of Habitus as a generative principle that creates new and consistent responses to a new situation makes Habitus a valuable construct for this study. It overcomes the perception that people appear to follow the rules when making decisions, as economic behaviour theorists have suggested (Thaler 2015). From the perspective suggested here, decisions are neither the result of free will or intuition nor are they solely socially or rationally determined. Instead, in the words of Grenfell (2014, p. 44), they are seen as a "*hybrid activity of socially shaped strategic, but individually constituted, personal practice, which then formed common trends*". This way of framing decisions makes Habitus an instrumental concept for studying decision-making as a choice of action in response to an unknown situation or scenario requiring similar flexibility whilst ensuring a sense of coherence.

Different authors have (re-)constructed Habitus in different ways. For example, Bourdieu, in one of his major works, *Distinction* (Bourdieu 1984), attempts to construct the Habitus of French citizens by analysing their taste in art. Dirksmeier (2009, 2012) explores urban Habitus by measuring the attitudes and behaviours of people in rural and urban Bavaria (Germany). This study uses a Human Value Scale to construct the Habitus of the study participants. The following section outlines values and why they can be used to construct a habitus.

5.1.2 Values as Habitus

"When I use a word," Humpty Dumpty said, in rather a scornful tone, "it means just what I choose it to mean—neither more nor less." "The question is," said Alice, "whether you can make words mean so many different things." "The question is," said Humpty Dumpty, "which is to be master—that's all." (Carroll 1934, p. 205)

Values are difficult to define because people have different ideas of what values are and what they represent. The word "value" may mean something very different depending on who uses it and in what context. Material goods have a monetary value but can, once acquired, also gain an unmeasurable emotional value. We 'value' inherent characteristics of people ("he really has a nice sense of humour") or things they have done concerning someone or something else ("she was really friendly to that person even though she did not have to be"). They are also at the core of what makes a person into the person they are, even though social norms may influence the relation between values and actions (Bardi and Schwartz 2003), who define values as follows:

"Values convey what is important to us in our lives. Each person holds numerous values with varying degrees of importance. A particular value may be very important to one person but unimportant to another. Values are a motivational construct. They represent broad goals that apply across contexts and time." (Bardi and Schwartz 2003, p. 1208)

Rokeach (1973) describes values as enduring beliefs belonging to two categories: terminal and instrumental. Terminal values refer to desirable ways of behaving like honesty, and instrumental values refer to desirable end-states like being respected. Schwartz (1992, 2012, 2019) agrees that values are beliefs related to desirable end states or behaviours. He adds that they are consistent across situations, guide choice and evaluation of behaviour and events, and are ordered by relative importance. They represent desirable goals people have that are not situation-specific and vary in importance (Schwartz 2006). They guide people in their lives by defining what each individual deems to be vital for them. Even though they are described as beliefs, values are closely linked to emotions, are a motivational construct and "*guide the selection or evaluation of actions, policies, people and events.*

That is, values serve as standards or criteria" (Schwartz 2019).

Researchers (Schwartz and Bilsky 1987; Rohan 2000; Lindeman and Verkasalo 2010; Beckett and Maynard 2013; Dwyer 2015) have emphasised the impact of values on thought, behavioural decisions and action. Values are universal reference points to characterise people and groups and "*influence the ways people select actions and evaluate events*" (Schwartz and Bilsky 1987, p. 550). More specifically, there is evidence of the effect of values and beliefs on how social workers act and make decisions. McLaughlin et al. (2010) found that social workers rely heavily on their values and beliefs when making decisions. Jent et al. (2011) established that personal beliefs about social workers' acceptability of corporal punishments influenced their decision-making. Howell (2007, p. 293) identified that decision-makers are willing to compromise policy standards "*when their values and child welfare policies conflicted in their desire to protect children*".

In summary, values seem to have a guiding effect on how a situation is assessed, what actions are acceptable and what is deemed to be a desirable end-state. That is very pronounced in professional social work as a value-based profession. This influence of values on practice makes it reasonable to draw on a person's values to construct a habitus, representing the internalised logic of practice and using this habitus as an interpretative tool to analyse decision-making. However, this is only one side of the coin. It is essential to see the context in which values are located.

5.1.3 The Field and Doxa

The Habitus of an agent is a system "*of dispositions they have acquired by internalizing a deterministic type of social and economic condition*" (Grenfell 2014, p. 221) or "*an acquired system of generative schemes objectively adjusted to the particular conditions in which it is constituted*" (Bourdieu 1977, p.95). These quotes highlight how Habitus and the social Field are intertwined. Therefore, these conditions need to be explored as well. Without such analysis of the social space in which phenomena occur, it is impossible to understand the phenomena (Bourdieu 2005). That includes decision-making because the way a person thinks about a decision problem is most

likely influenced by the social and economic conditions in which the Habitus develops. The *particular conditions* are the expectations of the Field in which social workers practice shape actions social workers take, which means that the Field and the Habitus are linked and cannot be seen in isolation. For this study, it is essential to explore the complexity of the Field of social work, where decisions are often unexpected, happen in emergent and turbulent contexts, lack clear alternatives and the criteria for choosing an option are ambiguous.

Matton (2014, p. 53) describes a field as comparable to a "*competitive game or 'field of struggles' in which actors strategically improvise in their quest to maximize their positions*". The Field is a construct that provides the "*objective structures within which [the game] is played out*" (Bourdieu and Passeron 1990, p. 66). What a player can or cannot do is dependent on their position in the Field, and the individual develops a "*feel for the game*" (Bourdieu and Wacquant 1992, p. 66) over a prolonged period. This feel for the game would enable the player to take a dynamic approach to decision-making rather than following set rules. It is particularly interesting for this study as an expression that frames the cognitive strategies social workers apply to make safeguarding decisions in relation to the participants' growing level of expertise.

The game metaphor is not the only way to understand the Field. Bourdieu (2005, p. 7) also uses the scholastic device of the Field to describe a social space as a "*separate universe governed by its own laws*" that can be objective and explicit (i.e. legislation) or implicit (i.e. organizational culture). These laws and, with them, the Field itself is constructed through the interactions of the agents (e.g. organizations or individuals) acting in this social space who appear to be able to behave naturally in the Field by relying on truths or Doxa (Deer 2014a) that are used without much reflection and challenge even though the existing laws or rules can be interpreted with a degree of flexibility. The Doxa represents the "*pre-reflexive intuitive knowledge shaped by experience, to unconscious inherited physical and relational pre-dispositions*" (Deer 2014a, p. 115). This knowledge reflects the fundamental beliefs that the actors share in a field without the need to

question them (Bourdieu 2000). The Doxa and their impact on social work decision-making need to be understood as part of this study, and therefore a way of taking a snapshot of these is required.

Like Habitus, the Field is a scholastic device with no material equivalent (Thomson 2014). It will be used in this study as another construct that helps to understand how social workers in an exceptionally heavily regulated social space are making decisions. This study uses Ofsted inspection reports (see the previous chapter) as a proxy to analyze the game's rules representing the structure of the Field of social work practice. That is done under the premise that as the regulator of social work practice, Ofsted is a powerful agent who has the power to influence the development of a Doxa characterizing the Field of social work practice. The last element to understand practice is Capital, or the resources that agents have at their disposal.

5.1.4 Capital or Tacit Knowledge

Capital determines the position of agents in the field. It represents the accumulated labour of a person going through socialisation, the educational system and work (Bourdieu 1983). The way Bourdieu uses this term goes beyond the idea of economic capital. It also includes social capital or the social networks (Halpern 2005) and cultural capital (Bourdieu 1983, 1988) representing dispositions, cultural goods like books and educational qualifications. Especially the cultural capital and its embodied state in the form of dispositions is of interest for this study. These dispositions result from a person's investment of time into gaining expertise and making this an integral part of themselves (Bourdieu 1983) in the form of what Polanyi (Polanyi 2009) calls tacit knowledge. In his book, *The Tacit Dimension*, Polanyi (2009, p. 4) declares that "*we know more than we can tell*," which means there is a form of knowledge that cannot be articulated. This notion contradicts the objectivist position that "*all knowledge can be fully articulated, or codified, in context independent terms*" (Gascoigne and Thornton 2014, p. 16). Polanyi (1998, chap. vii) also suggests that tacit knowledge is personal knowledge, the "*active comprehension of things known, an action that requires skill*". In other words, personal or tacit knowledge is practical

knowledge about how to do things based on acquired skills and abilities embodied through experience, which is difficult to share verbally. As such, the research design for this study will have to find other means than creating a purely verbal account of the way practitioners make decisions to capture their tacit knowledge and establish a way of capturing the level of expertise that represents the cultural capital of a participant and relate this to their practice of decision-making.

5.2 Methodology

The following sections about the methodology for this research provide the rationale for the mix of methods chosen to capture the fine distinctions in the way social workers make decisions. The premise is that there are similarities between the way social workers make decisions because the participants will have a common professional background or Doxa (Bourdieu and Wacquant 1992), which defines the taken-for-granted assumptions. This commonality assumes the existence of a somewhat similar value set and potentially some consistency in what can be described as the decision-makers' habitus. This premise means that a methodology must be sensitive to nuanced differences in decision-making. The main hurdle for capturing these differences, to be discussed first, is the difficulty of accessing the inner experiences of individuals when making decisions.

5.2.1 The difficulty of observing cognitive strategies

“The major pitfall is that most methods of exploring inner experience over the last thousands of years have been retrospective: the investigator would ask you to think back over the last day (or over the last week or over your entire lifetime) and describe what your inner experience is usually like. You’d probably scratch your head and do your best to answer that question, but it turns out your answer might not correspond with the truth – not because you were lying, but because many people don’t know the characteristics of their inner experience” (Hurlburt and Heavy 2006, p. 78).

The results of thinking become conscious, but most of the procedure of thinking remains unconscious and not even accessible to introspection” (Selten 2002, p. 16).

This research aims to identify the cognitive strategies underlying social workers' decisions concerning safeguarding children. Cognitive strategies are

a challenging research object. Cognitive functions are based on processes located in the brain, a complex structure that has yet to be fully understood (Borden et al. 2016). Whilst brain activity is observable with remarkable precision, cognitive processes and strategies are not. There is a fast development in cognitive neuroscience (Poldrack 2012) that makes it possible to map brain activity in great detail (Toga and Mazziotta 2002; Varoquaux et al. 2018; Allen Institute for Brain Science 2019) by using Neuro-imaging techniques like functional magnetic resonance imaging (fMRI). Despite these increasingly detailed maps, cognitive processes are challenging to observe directly as there is a lack of tools to assess internal thoughts (Chang et al. 2016). These difficulties arise out of the limitations in the transferability of the results of neuro-imaging studies to explain behaviours. Also, there is a lack of understanding of how the different brain areas active in response to triggers are linked and how brain activity translates into how a human experiences the world around them (Bamijoko-Okungbaye 2018). This difference between understanding the brain's structure and function (Morita et al. 2016) has not yet been bridged. For example, a particular area in the brain may be active in response to a threat when observed in an fMRI Scanner, but this does not mean that the subject experiences fear. That means that, with the current methods, the direct observation of thought processes is not feasible.

If that premise is correct, the research of cognitive processes has to rely on the insight of those who own the thought processes. The above quote from Hurlburt and Heavy indicates how this may be a problem. Participants cannot access internal thought processes without problems; when asked about their internal cognitive processes, people have to interpret their thoughts internally to express these verbally. This introspection requires the ability of the subjects to have sufficient insight and express what they think in sufficient detail to make the internal cognitive processes accessible to an observer. This communication of thought processes is challenging because of limitations to the individual's ability to express their past inner experiences without retrospectively rationalising decisions made, as Hurlburt and Heavy (2006) pointed out. These limitations to introspection (Hurlburt 2011) are a significant barrier. They preclude the possibility of directly asking participants

about their inner experiences as an alternative means to access cognitive strategies when faced with a decision task.

The absence of a tangible manifestation of cognitive processes and the limitations to introspection of the research subject and their ability to express their inner experiences leads to a methodological challenge. The idea is to construct a model of the internalised logic of practice based on a person's Habitus (Bourdieu 1977, 1999) to make deductions about the decision-making practice of participants in this study to overcome this challenge.

5.2.2 Objectivism or Constructivism: Mixed Methods

This study applies a mixed-methods approach (Bryman 2015; Watkins and Gioia 2015) in which data is collected through various tools to allow data triangulation to capture the research object. The central premise for selecting a mix of methods is that there is a dialectic between an objective structure that determines decision-making and the view that the practice of decision-making is the result of free will. Neither a quantitative nor a qualitative approach alone seems sufficient to capture this dialectic.

Bryman (2015) categorises research methods into the objectivistic (quantitative) or constructionist (qualitative) end of a continuum. At the end of *objectivism*, social phenomena represent objective structures that are tangible, change relatively little over time (Kuada 2012), and cannot be directly influenced (Bryman, 2015). From this positivist point of view, the phenomena one can experience in the social world exist independently of the people involved. This perspective postulates that a researcher can gain knowledge about a social phenomenon from measures that can be recorded, quantifiable and observed through the senses rather than basing knowledge on subjective understanding. As a positivistic researcher, one could observe this world objectively without being part of or influencing it (Matthews and Ross 2010). This approach usually builds on a hypothesis that is either verified or falsified in the research process. The hypothesis contains variables that can be changed in a controlled way and are derived from a theory tested empirically using a null hypothesis to be disproved as a basis for research (Popper 2002).

This Positivism is often linked to *quantitative methods* based on a deterministic worldview that aims to identify the link between cause and effect (Watkins and Gioia 2015). Quantitative methods can effectively generate an understanding of many people's opinions, attitudes, or experiences. The data collected is generally concise and can be analysed accordingly. Despite the strengths of quantitative methods, a specific weakness is that these methods do not always allow for sufficient depth to understand social phenomena. Quantitative approaches are most likely used in a deductive process that limits testing theories' usage. Decisions observed from this perspective could be viewed as the result of a decision-maker following policies and procedures or choosing a course of action based on a rational appraisal of objective evidence and the expected utility of each choice. Analysing decision-making from this perspective could be done, for example, by using document analysis (Santos et al. 2012) of policies, methods from experimental psychology (Healy et al. 2013) or surveys (Bryman 2015).

The perspective of *nominalism* or *constructionism* assumes that people's interactions construct a reality. Social phenomena result from social interactions in a constant state of flux (Bryman 2015). This phenomenological perspective assumes a relativistic social world in which social phenomena can only be understood from the perspectives of the social actors directly involved in the researched activities. It is about understanding how humans perceive the things in their world and exploring the meaning of human experiences. From this perspective, a researcher could ask if it is possible to generate objective knowledge about phenomena in the social world independent of the individuals' experience of social phenomena (Matthews and Ross 2010). As Martignani (2016, p. 517) points out, "*social phenomena are real because they are based on specific properties of the inter-subjective construction of social reality.*" These complex properties would be captured best through a qualitative approach using words or images instead of quantifiable data.

Compared to a quantitative approach, qualitative methods allow the investigation of social phenomena in greater depth by asking more open-ended questions like "why" or "how". These questions are more prone to an

inductive process to develop a theory and explore processes that help to explain a person's behaviour (Watkins and Gioia 2015). Whilst qualitative methods can generate data that allows for a deep understanding of specific social phenomena. This depth also means that the data cannot be as easily generalised as the data often refers to a small number of cases. Qualitative methods are also often very flexible as the data collection is interlinked with the data analysis. This flexibility is a strength and means a level of subjectivity that can become problematic if potential biases are not addressed. Through this lens, decisions would result from interactions between the involved agents and the individual's interpretation of information influenced by the individual's state of being. Through this lens, researchers could explore decision-making using, for example, narrative approaches (De Fina et al. 2015), structured or unstructured interviews (Bryman 2015), or ethnographic methods (Denzin 1996).

This antagonism between objectivism and phenomenology is not particularly helpful for this study. The study sees decision-making as the interplay between organisational context, decision-maker characteristics and case variables described in the decision-making ecology. Some of these variables may be objectively measurable, whilst others are more likely to be constructions. In line with Bourdieu (1977, 1999), the dichotomy between objectivism and subjectivism is questioned to overcome the differences between the two perspectives whilst acknowledging that both are important in producing knowledge and constituting a theory of practice (Grenfell, 2014). That is why this study applies a mixed methods approach.

5.2.3 Ethical Considerations

Ethical approval was sought and obtained from the University. Whilst this research has not raised major ethical concerns, some aspects must be highlighted as part of the BU Ethics Application process. First, there is the question if the participants are vulnerable. The second question is if the cooperation of gatekeepers is required. Lastly, there needs to be a consideration for discussing sensitive topics.

5.2.3.1 Vulnerability

The BU Ethics application form provides some examples of who could be deemed to be a vulnerable participant. This list includes "children, those with cognitive impairment, those in unequal relationships – such as your own students, prison inmates etc.". Regarding research, vulnerable participants are those who are especially prone to harm or exploitation (Lange et al. 2013) or susceptible to risks arising from their involvement (DeChesney 2019).

On the surface, the participants in this study do not fall into this definition of vulnerability apart from students who are listed as potentially vulnerable above. In order to avoid putting students in a vulnerable position, only students in their final placement were offered the opportunity to participate. At this stage of their degree, there would be no involvement of the researcher in assessing the student's work. There still may be the risk of the students wanting to please the researcher due to their position within the teaching team. This risk cannot be entirely eradicated in any situation involving active students but this risk was deemed minimal. Potential risks arising from the involvement in this research to the qualified social workers could only arise if there is a link between their "performance" in this research and an appraisal of their performance in their workplace. This issue could arise if gatekeepers, for example, their line managers, make the participation of social workers conditional on receiving feedback. It was clear from the outset that this would not be an option, and all data was anonymised from the outset.

5.2.3.2 Gatekeepers

Social work is highly demanding, and social workers often practice under significant time constraints. As such, their involvement in research can be challenging as the time invested in their participation is valuable and removes time from doing essential casework. It would have been possible to invite individual social workers to participate in the study outside their contracted hours. However, this approach would have constituted a breach of trust with the employers of social workers as these social workers would potentially reference their working practices. That is why it was essential to ensure permission from relevant gatekeepers who had the authority to agree to social work time being spent on participating in this research. Gatekeepers are

people within an organisation who control access to that organisation (Denny et al. 2015). In this case, the gatekeepers were workforce development leads in three Local Authorities in the Southwest of England. Seeking this permission also enabled the research to take place within social workers' offices, which helped reduce the time participants had to invest. That also allowed the participants to use supervision to reflect on their participation in this research and consider how to develop their decision-making further. Whilst seeking permission from gatekeepers can be complex, there is also the benefit of engaging with the professional community (Denny et al. 2015). The engagement carries significant opportunities as the process involves presenting the research idea to the gatekeepers and adapting the research process in line with their feedback. For example, in this study, the feedback from the workforce development leads resulted in a written confirmation of participation that social workers could include in the portfolio of continuous professional development that they need to maintain for their registration with Social Work England.

5.2.3.3 Sensitivity of the topic

The third point raised by the BU Ethics application is whether sensitive topics would be discussed in the research. In principle, this is the case. The subject of this research relates to making safeguarding decisions concerning children who experienced abuse or neglect. These are sensitive topics, and social workers regularly work with people who have had a history of trauma, which can be defined as exposure to abuse, neglect or other physical or psychological threats (Levenson 2017). As trauma workers, participants in this study are potentially affected by vicarious trauma, defined by McCann and Perlman (1990) as accumulative, negative and unique changes that affect practitioners who engage in an empathetic relationship with people who have been exposed to trauma. Vicarious trauma can have a significant impact on the health of practitioners (Dunkley and Whelan 2006; Michalopoulos and Aparicio 2012; Branson 2019) and therefore, there had to be a consideration for the effect the participation in this research could have on the participants even though they were not asked to talk about any of their cases. However, there is the chance that a presented case could trigger stress responses

through similarities with current or past cases a participant had worked with.

Three safeguards were implemented to mitigate these concerns:

1. The design of the vignettes, which was based on serious case reviews, used only cases with a positive outcome for the child even though they experienced significant harm, which triggered the serious case review. Also, participants were told that this was a hypothetical case.
2. A debrief at the end of the decision-making exercise allowed participants to reflect on their experiences.
3. The participants were advised to consider talking about their experience in supervision with their line manager.

5.2.4 Positionality

A vital aspect of the discussion about the habitus, field and capital is that these are all relational concepts. Knowledge about the practice of agents is deduced by comparing their actions, their position in the field and their habitus. It is also essential to consider the researcher's position, who is not simply a detached observer but an active participant in the research process. That requires a discussion about the "*social conditions of possibility*" (Bourdieu 2003, p. 282) determined by the role of the researcher as an active partner in dialogue and the context in which the research takes place. Such reflexivity allows exploring "*to what extent a research process allows the subject of knowledge to grasp the essential part of the object he/she has chosen to study*" (Deer 2014b, p. 196).

This consideration requires the research to focus on the research object and take the way research conceptualises its object into focus. It does not mean a description of a personal viewpoint or a reflective account of the researcher's professional socialisation. Instead, the research needs to consider that as a social worker and a researcher, "I" conceptualise the object of this research, decision-making, using specific lenses that emphasise particular aspects and ignore others and determine what is thinkable. As a social worker myself, it is difficult to claim that there are no preconceptions about the object of this research. These preconceptions mean there may be the potential to assume to know what the participants mean or apply personal assumptions or

concepts to what the participants do and say, thereby introducing a possible bias. To mitigate this risk, the research strategy needs to make the underlying "*unthought' categories, perceptions, theories and structures [...] of the social environment*" (Deer 2014b, p. 197) explicit. That can be achieved by analysing the field of social work. This analysis provides the context in which the participants and the author of this study are embedded. Also, the research design and the analytical framework need to use a menu of approaches to capture and analyse data that separate the perception and interpretation of the participants and the perception and interpretation of the researcher. As such, the exploration of decision-making strategies cannot rely on a single methodological approach to create a model of decision-making practice.

My habitus as a researcher is an essential factor that influences this research design development. That makes it necessary to make some of the internalised logic of practice explicit before discussing the research design. As a social worker, I experienced practice in an IT-heavy profession that depends heavily on Information Computing Technologies (ICT) to record activities and store information about cases. This view is confirmed by various authors (Garrett 2005; Hill and Shaw 2011; Chan and Holosko 2016) and is seen as critical by some because of the possible impact and possible reduction of professional autonomy in decision-making (Gillingham 2013, 2016, 2020; Devlieghere et al. 2017). Whilst there are undoubtedly valid points about concerns regarding the use of computers limiting or even replacing social workers making decisions, my curiosity is elsewhere. My experience in social work practice was affected by the lack of usability of ICT systems and their low efficiency in supporting decision-making. The focus appeared to be more on ensuring accountability and compliance, adding additional bureaucracy to social work practice rather than being user-friendly and aiding decision-making. Unmanageable paperwork is one of the reasons why social workers leave (UNISON 2019), alongside concerns about the low effectiveness of social work (Wermeling 2013). Both aspects reflect my practice experience. The interest in developing my own IT skills further grew out of frustrations when using systems that I perceived to be ineffective and

the feeling that somehow these systems could become better. The question I asked myself was how these systems could be "smarter" and support the tacit knowledge of social workers by presenting information in a way that reduces complexity so that "*standardisation, routinisation [...] and documentation function*" can work "*in concert to accomplish social work*" (Matarese and Caswell 2018, p. 714). With my interest in IT and programming, I wondered what would be required to go into such improved systems. In many ways, this can explain the approach that flows through this whole PhD Project that applies machine learning to the literature review and data analysis and uses a computer-based approach to capture this data. These are all attempts to develop skills and test possible ways of developing and using ICT systems to make professional practice for social workers easier.

5.3 Research Design

The previous methodological considerations inform the development of the research design for this study. As a pragmatic way to identify possible translations of these considerations into practice, existing studies identified in the literature review were mapped against the research methods applied (see below Table: Overview of research methods). This table also helps to illustrate the novelty of the methods applied in this study. A look at this table reveals that the most dominant method researchers used was interviewing to explore, for example, the use of decision-making tools (Gillingham et al. 2017), risk assessment tools (Maslen and Hamilton 2020) or the role of supervision in supporting decision-making (Saltiel 2017). Interviews are also used in combination with focus groups or observations to shed light on the role of emotions in decision making (Cook 2020), the effect of the case, organisational and external elements on threshold decisions (Keddell and Hyslop 2020), the impact of standard tools to improve decision making in Israeli child protection committees (Alfandari 2017b) or decision making in English child protection meetings (Nyathi 2018). Researchers also apply vignette-based surveys and ethnographic research combined with interviews to help understand how specific biases impact the assessment of risk for a child (Devaney et al. 2017; Enosh et al. 2019; Keddell and Hyslop 2019). Ethnographic research, in combination with interviews shows

- How structured decision-making tools are used in practice (Gillingham and Humphreys 2010),
- How dialogues between practitioners help social workers to make sense of incomplete, inconclusive and contested information (Helm 2016b, 2017) or
- To extract information about the psychological processes underpinning decision-making from interactions between practitioners in social work offices (Whittaker 2018).

Despite the wide use of interviews in decision-making research, they do not appear to be an efficient strategy due to the limitations to introspection discussed previously.

Ethnographic research in the form of observations as conducted, for example, by Helm (Helm 2016b, 2017), Saltiel (2016), Whittaker (2018) or Gillingham and Humphreys (2010), appears to be one way of overcoming the difficulties of introspection if one accepts the premise of Helm (2016b, p. 28) "*that what people do and say in the process of sense-making may reveal significant insight into the means by which professional judgment encompasses complexity, ambiguity and uncertainty*" or, in other words, that behaviour in a situation provides a more accurate insight into the internal thought processes than a retrospective account. Vignette-based (factorial) surveys offer a quasi-experimental approach to understanding the effects of cases (Stokes and Schmidt 2012; Enosh and Bayer-Topilsky 2015; Enosh et al. 2021) and social workers' characteristics (Enosh et al. 2019) on decision-making. These surveys re-create, at least to some extent, the complexity of a social work decision problem by using case vignettes that control variables of interest presented in the vignette (for a more in-depth discussion, see Taylor (2006)).

Some challenges prevent directly adapting these methods in this study. The main concern for ethnographic research is that observing social workers making safeguarding decisions to research the underlying cognitive processes requires consent from those involved. That is because the social workers would share information about the cases they make decisions about to a level that would make it difficult to maintain confidentiality. Also,

observations do not allow the control of case information and establish comparability between different decision-makers on the same or similar cases, making comparing practices between agents difficult. The possibility to control variables is a strength of vignette-based surveys that can test hypotheses by varying factors suspected of influencing decisions (Taylor 2006). Apart from avoiding previously discussed ethical challenges around confidentiality, vignette-based surveys also allow greater control over the study regarding content, external factors and focus. Even though this approach allows for identification of aspects within the decision-making and judgments, such as decision-maker characteristics, socio-economic status of the family or their ethnicity, a purely vignette-based factorial survey is only of limited use to shed light on how the information presented is processed and considered by decision-makers in itself. A vignette is a descriptive scenario that presents a situation or event for participants to evaluate, respond to, or make judgments about. The main goal of a vignette is to explore participants' perceptions, attitudes, or reactions to specific variables or factors. That means that the author of a vignette must have preconceptions of what may be relevant factors. Vignettes isolate specific factors or variables of interest, but real-world decisions and judgments are often influenced by a complex interplay of multiple factors. By simplifying and isolating variables, vignettes may overlook the interactive effects or contextual factors that shape participants' responses in real situations. Nonetheless, this is a good starting point for research design development using a vignette-based approach as a core and adding additional methods to get insight into how social workers make decisions.

A fascinating example of the possibilities of an approach is a study that aimed to capture barriers to knowledge acquisition, utilisation, and critical aspects of the cognitive processes underlying decision making by MacCafferty and Taylor (2020). They used a combination of different strategies, including a think-aloud protocol, interviews and a vignette-based survey. Such a mix of methods appears to be a promising way of investigating social work decision-making and reasoning. This mix allows the triangulation of data to create a model of the logic of the decision-making practice of the participants,

capturing the decision-makers characteristics, the context, and the case characteristics that influence decision-making.

The vignette based studies listed above are examples of approaches that inspired the design for this study into the way social workers make safeguarding decisions. Each study reviewed to inform this design contains attractive and viable ways to explore cognitive decision-making processes. However, there are limitations resulting from reliance on introspection and the narrow scope of pen and paper vignette-based surveys that limit the reality of function (Gredler 1994, 2003). Vignettes present hypothetical scenarios that may not fully capture the complexity and nuances of real-world situations. Vignettes primarily capture participants' responses or judgments about a situation, but they may not provide deep insights into the underlying cognitive processes, motivations, or emotions that drive those responses. Understanding the decision-making processes or the psychological mechanisms at play may require additional methods or measures. These limitations are why a more ambitious approach of simulating a typical choice problem in social work (making threshold decisions) is used in this study to collect the desired data.

To mitigate against these limitations, this study uses a decision-making exercise. A decision-making exercise is a task that requires participants to actively make choices or decisions based on given information or constraints. It typically involves presenting participants with a problem or a series of options and asking them to select the most appropriate course of action or make trade-offs between different alternatives. Decision-making exercises focus on exploring participants' actual decision-making processes and the factors that influence their choices. The emphasis is on understanding the decision-making strategies, reasoning, and preferences of individuals when faced with real or simulated scenarios.

While decision-making exercises can provide valuable insights into participants' decision-making processes, they also have limitations that must be acknowledged. One potential limitation of decision-making exercises is that they are often conducted in controlled and artificial settings, which may not fully capture the complexity and nuances of real-world decision-making

situations. Participants may approach the exercise differently than they would in actual practice, leading to potential discrepancies between their decision-making behaviour in the exercise and their behaviour in real-life scenarios. This limitation raises questions about the generalizability of findings from decision-making exercises to real-world decision-making contexts. Another potential area for improvement is that decision-making exercises typically involve hypothetical scenarios or simplified cases, which may not fully reflect the complexity and variability of the decision-making challenges faced by social workers in practice. Real-life decision-making in child protection involves multiple interacting factors, uncertainties, and ethical dilemmas that may need to be adequately captured in a decision-making exercise. As a result, the findings from decision-making exercises may need to fully represent the challenges and considerations that social workers encounter in their day-to-day work.

Furthermore, decision-making exercises may not fully capture the contextual and situational factors that influence decision-making in child protection. Various factors influence social workers' decision-making, including organizational policies, legal frameworks, available resources, and collaboration with other professionals and agencies. These contextual factors may need to be adequately incorporated into decision-making exercises, limiting the ecological validity of the findings. Additionally, decision-making exercises may only partially capture decision-making's subjective and intuitive aspects. Social workers often rely on their professional judgment, experience, and intuition when making decisions in child protection. These subjective elements may need to be more easily captured or measured in a decision-making exercise, potentially overlooking essential aspects of the decision-making process. These limitations have to be addressed in the research design.

This design's core is a Decision-Making Exercise (DME) based on case vignettes that control case factors. The simulation, or DME, recreates a fuzzy, information-rich environment to identify how the participants link different pieces of information and what pieces of information participants see as relevant. A questionnaire captures characteristics of the decision-maker that

provide the background for constructing the habitus of the participants. The context in which social work is set and analysis of the field of social work is done by reviewing Ofsted inspection reports. The questionnaire is the first element of the research design that the participants need to complete before doing the Decision-Making Exercise.

Study	Dominant research method(s)
(Davidson-Arad et al. 2008)	Child Welfare Attitudes Questionnaire, Vignette Based Survey
(Davidson-Arad and Benbenishty 2016)	Child Welfare Attitudes Questionnaire, Vignette Based Survey
(Keddell 2011)	Critical Incident Method
(Gillingham and Humphreys 2010)	Ethnographic Research
(Helm 2016b)	Ethnographic Research
(Helm 2017)	Ethnographic Research
(Saltiel 2017)	Ethnographic Research
(Stanley 2013)	Ethnographic Research
(Whittaker 2018)	Ethnographic Research, Interviews
(Hoybye-Mortensen 2015b)	Focus Groups
(Forkby and Höjer 2011)	Focus Groups, Interviews
(Holland 1999)	Interview, Observation, Case File Analysis
(Cowley et al. 2018)	Interviews
(Falconer and Shardlow 2018)	Interviews
(Gillingham et al. 2017)	Semi-Structured Interviews
(Hackett and Taylor 2014)	Documentary Analysis, Semi-Structured Interviews
(Hood et al. 2017)	Critical Incident Technique, Semi-Structured Interviews
(Hoybye-Mortensen 2015a)	Interviews
(Keddell 2012)	Interviews
(Kettle 2018)	Interviews
(Lamponen et al. 2019)	Interviews
(Maslen and Hamilton 2020)	Interviews
(Matthews et al. 2017)	Interviews
(McLaughlin et al. 2017)	Interviews
(Regehr et al. 2016)	Interviews
(Saltiel 2017)	Observations and Semi-Structured Interviews
(Sigad et al. 2019)	Interviews
(Wilkins 2015)	Interviews based on vignettes
(Cameron and Statham 2006)	Interviews
(Chateauneuf et al. 2021)	Interviews
(Christiansen and Anderssen 2010)	Interviews
(Davies and Gray 2017; Cook 2020)	Interviews, Focus Groups
(Davies and Gray 2017)	Interviews, Focus Groups
(Hultman et al. 2019)	Interviews, Focus Groups
(Robichaud et al. 2020)	Interviews, Focus Groups
(Nyathi 2018)	Interviews, Observations
(Alfandari 2017b)	Interviews, Observations, Document Analysis
(Erisman et al. 2020)	Interviews, Survey
(English and Graham n.d.)	Longitudinal Data Analysis
(Keddell 2017a)	Mixed Methods
(Hood et al. n.d.)	Qualitative Study
(Keddell 2016b)	Qualitative Study
(Leonard and O'Connor 2018)	Qualitative Study
(O'Connor and Leonard 2014)	Qualitative Study
(Roets et al. 2017)	Qualitative Study
(Davidson-Arad, Englechin-Segal, and Wozner 2003)	Quality of Life Questionnaire

(Davidson-Arad, Englechin-Segal, Wozner, et al. 2003a)	Questionnaire
(Dickens et al. 2017)	Questionnaire
(Machura 2016)	Questionnaire
(Macdonald et al. 2014)	Randomised Trial
(Drake et al. 2007)	Secondary Data Analysis
(Arbeiter and Toros 2017)	Semi-Structured Interviews
(LeBlanc et al. 2012)	Simulation, State-Trait Anxiety Inventory, Salivary Cortisol
(McCafferty and Taylor 2020)	Think-Aloud, Interviews, Vignette Based Survey
(Ashton 1999)	Vignette Based Survey
(Britner and Mossler 2002)	Vignette Based Survey
(Brunnberg and Pecnik 2007)	Vignette Based Survey
(Devaney et al. 2017)	Vignette Based Survey
(Enosh and Bayer-Topilsky 2015)	Vignette Based Survey
(Enosh et al. 2019)	Vignette Based Survey
(Hyun and Adams 2016)	Vignette Based Survey
(Stokes and Schmidt 2012)	Vignette Based Survey
(Keddell and Hyslop 2019)	Vignette Based Survey, Elicitation
(Spratt et al. 2015)	Vignette Based Survey, Questionnaire

Table 4: Research methods in studies on social work decision-making

5.3.1 The Decision-Making Exercise

As already stated, observing decision-making processes is a complex undertaking for ethical reasons and the limitations of introspection. This study uses a decision-making exercise to simulate front-line decision-making based on case vignettes where social workers review referrals to determine whether a child needs safeguarding interventions to overcome these difficulties.

In vignette-based studies, researchers generally use standardised cases where the researcher manipulates case characteristics to test a hypothesis about human judgment (Taylor 2006; Wallander 2009). The main benefit of this approach is that participants in a vignette-based study respond to information that is the same across all participants (Wallander 2009; Wallander and Blomqvist 2009) and therefore allow inter-personal comparisons. This information can be systematically structured and varied if required. For example, Pottick et al. (2003) presented three different vignettes to 250 social work students to measure the influence of contextual information about the case on judgments made about young people showing anti-social behaviour. The participants were able to attribute this information to mental health or conduct disorders. Using a Likert Scale, the participants rated whether or not the young person described has a mental disorder or a

conduct disorder. Despite the effectiveness of studying the effects of individual factors on decision-making, the presented information in vignette-based factorial surveys is often limited and does not reflect the complexity of decision-making in real-life situations. While both vignettes and decision-making exercises may involve hypothetical situations, vignettes are more focused on understanding perceptions, attitudes, and responses to scenarios, while decision-making exercises, as used in this study, are focused on the actual decision-making process and choices made by participants.

This study aims to simulate social work decision-making by developing a Decision-Making Exercise (DME) as described, for example, by Pliske et al. (2009). In a DME, participants face a problematic scenario or dilemma where they must decide which actions derive. These scenarios do generally not have a simple, single answer encouraging the participants to express their views rather than trying to arrive at the correct answer (Klein 2007). This level of complexity means that this vignette study has the potential to simulate a situation that occurs in intake teams in social work practice and allow the researcher to observe participants responding to referrals that contain a similar level of information that they may encounter in practice. DMEs "*can be surprisingly effective at capturing the essence of a tough decision*" because they are "*intended to provide simulated, domain-relevant experiences and to allow participants to practice their recognition decision-making skills*" (Pliske et al. 2009, p. 42).

In such a simulated situation, the participants immerse themselves into a form of alternative reality (Salas et al. 2009) that can be scaled in terms of closeness to reality and the complexity experienced by the participants aligned to their current level of expertise and cognitive load. Here, it is possible to simplify complex processes, thereby making them more manageable (Cook and Swift 2006) whilst maintaining the "*reality of function*" (Gredler 1994, p. 15). The latter is essential to allow participants to embrace the role they are expected to take on in the simulation. The DME must be familiar with key aspects to avoid the problem that the task is informative only regarding the artificial task. It must also "*possess ecological relevance, validity, and representativeness*" (Crandall et al. 2006, p. 91).

The framework for developing a DME for this study is adapted from Benbenishty et al. (2002). They aimed to find what information decision-makers use and how this information is used to undertake a risk assessment. In a paper-based exercise, respondents could choose information from a list of cues, review the information and continue to select further cues until they considered themselves to have enough information to decide the assessed level of risk and a possible category for intervention. In the DME for this study, participants undertake a time-limited decision-making exercise using a computer-based simulation based on a case vignette created using information taken from serious case reviews. The following paragraphs outline this novel strategy approach to observe the practice of decision-making in a controlled and replicable way.

5.3.2 Considerations for planning the DME

Setting up a computer based DME is a complex undertaking. Rehberger (2006) outlines four stages that are important to consider when planning such an exercise. The participants need to be prepared for the simulation. The roles they are expected to take on need to be clarified, and a way of establishing ways to record the participants' reactions and reflections need to be set up. In the preparation phase, the participants must gain essential knowledge and sufficient insight into using the tools provided to complete the task. Without such basic knowledge, participants cannot fully engage with the exercise and struggle to complete the task (Pagnotti and Russell 2015). For this study, participants could test the computer software in a practice environment to familiarise themselves with it and ask questions about the process.

Additionally, it is vital to understand the participants' level of skills and knowledge to balance the DMEs difficulty level (Dahlgren et al. 2016). DMEs that are too easy may lead to a loss of the reality of function (Gredler 1994) and a subsequent disengagement from the exercise. DMEs that are too hard potentially lead to disengagement due to frustration about unachievable tasks (Senninger 2000). In this case, lecturers of social work, students and practising social workers tested the vignettes. As a result of the initial tests,

the vignettes were changed to reduce their complexity and increase their usability.

Throughout the simulation in this study, it is essential to keep track of participants' reactions while in their roles. That is achieved through audio recordings and a log of the participants' choices in the simulation. It is also helpful that simulations can increase or slow down the experience of a situation's temporal and spatial dimension (Lane 1995), which is essential in this study as it is possible to limit the time for the actual simulation.

5.3.3 Creating the vignettes used in this DME

The study uses vignettes based on serious case reviews downloaded from the NSPCC Repository of Serious Case Reviews. That ensures that the vignettes are accurate, and representative of the scenarios being studied (Vestal et al. 2016). Basing the vignettes on real cases and including enough details helps to construct a brief and realistic vignette (Gricus and Wysiekierski 2021). This approach ensures that the vignettes are grounded in authentic experiences and are relevant to the research objectives. All Serious Case Reviews published in 2018 were reviewed. Cases were chosen where the child survived the abuse or injury they experienced, sufficient detailed information about the background was available, and where the level of abuse or neglect was not clear from the outset. The serious case reviews used for this research were coded in Nvivo12 against categories used in a referral form from the Royal Borough of Kensington Chelsea. This form was used as a template because of its simplicity compared to other referral forms reviewed for this study.⁴

Initially, the intention was to construct a full assessment of a child in need containing all information that would describe all domains outlined in the Framework for the Assessment of Children in Need (Department of Health and Department for Education and Employment 2000). This framework is well established in social work practice and thereby assists in achieving a reality of function for this simulation (Gredler 1994, 2003). Additionally, the idea was

⁴ The case vignettes can be found in the appendix 9.7.

to construct case vignettes that would represent some of the most common statistical features in respect of the information available at the point of referral and the identified needs at the end of the assessment, as published by the Department for Education (2017) as part of their Children in Need Statistics. The author tested these vignettes with volunteers from the BU qualifying social work team, students and practising social workers. A significant issue relating to the complexity of the information presented emerged at this stage. The initial tests highlighted that the DME would become too complicated and longwinded for the participants. The attempt to base the information purely on the information found in serious case reviews complicated this even more. Case-related information included in the used Serious Case Reviews varied significantly in detail. As a result, the case vignettes had significant gaps in the information useable for this exercise. On top of the previously mentioned issue of the complexity of the information, this version of the software was deemed unsuitable for the actual study as it would not have satisfied the need for a reality of function in this simulation where participants would have to make decisions based on information that would be sufficient to conclude different cases.

In response, new case vignettes were created representing referral information using a typical referral form as a template (Kensington & Chelsea, 2018). Using this approach improved the reality of function, reflecting a simplified yet standard situation where social workers make decisions based on referrals to the service. Instead of 20 different cues, participants can now select from only five cues, each representing a section of a referral form.

- Reasons for Referral
- Development of the referred child
- Background
- Involvement of other agencies
- Strengths and Protective Factors

In addition, a front sheet of a referral form was created containing information about the family composition, ethnicity, social networks and the concerns

raised by professionals. This front sheet represents the information usually presented in vignette-based factorial surveys.

19:21

Referrer details						
Name	Mark Cox	Role/Agency/Team/ Department	Early Help Team			
Child's details (Please complete Section 1b for further children) Please gather this information if not known.						
Name of Child	Megan Rowley	Religion	None Recorded	Ethnicity	White European	
Date of Birth	13.03.2003	Age	15	Gender	Female	
Education Provider/ Employer	The Ruth Gorse Academy	Does the Child have a disability?	No	State diagnosis if known and any SEN statement if known	N/A	
Own Agency reference number	S450210	Does the Child have an Education, Health and Care Plan?	No			
Siblings and other related children's details						
Child's full name	DoB or EDD	Gender	Relationship to child referred	Ethnic Origin	Mother's Full Name	Father's Full Name
Tom Rowley	28.5.2006	Male	Sibling		Karen Rowley	David Lambourne
Other significant adults details						
Adult's full name	DoB	Gender	Relationship to child referred?	Ethnic Origin	Comments	
Karen Rowley	24.4.1980	Female	Mother	White European		
David Lamborne	08.08.1981	Male	Father	White European	Not living in family home	
Gary Naquin	12.11.1970	Male	Father's Stepfather	Salvadorian	Living in family home	
Reasons for referral						
What are you and/or the family concerned about?	<p>Megan was admitted to the intensive care unit at hospital following a collapse at home. Megan was conveyed by ambulance in a state of peri-arrestiv to the resuscitation unit within the Emergency Department. Full cardiac arrest was prevented as she was put on a life support system. Megan has an extreme case of severe iron deficiency anaemia, which was life-threatening. At this time, her haemoglobin levels were 2.3 g/dl. Normal values for a girl of her age are 11.5 – 16.5 g/dl. It was difficult to establish the primary cause of Megan's medical condition. The Panel sought medical opinion regarding this and were advised that contributory factors could be heavy periods, chronic head lice or poor nutrition. Anyone with untreated iron deficiency anaemia are more susceptible to illness and infection, as a lack of iron in the body affects the immune system (the body's natural defence system).</p> <p>While in intensive care, it was evident that Megan's personal hygiene had been neglected as her body was dirty and she had head lice, which required intensive treatment. Megan was diagnosed with severe anaemia.</p>					

Referral

What is your assessment of risk?

None

● Stop

Figure 28: Screenshot of referral information

Once participants have assessed the initial information on the referral form, they can access further information, which is part of the constructed referral forms. The information from the serious case reviews was coded into the required categories to build these additional cues. The author only minimally edited these reports by changing the language from past to present tense, amending any dates that may confuse and deleting information that was irrelevant. Participants accessed this information by selecting one of the buttons on the main window's right-hand side using an external controller. Throughout this, they updated their risk assessment in response to the information they read on the screen.

11:46 **Involvement of other services**

In common with all children, Megan received universal services from General Practice and the community children's services from birth until she left school in 2015.

Targeted services were involved when there began to be concerns regarding the ability of the parents to provide adequate parenting capacity for Megan from very early childhood. Community nursing records show that the health visitor made monthly and on occasions bi-monthly contact with the family, predominantly with the mother, to support maternal health and parenting of Megan and later of her sibling.

There was considerable input from agencies to support the needs of the children. The records show that the agreed action was for support with parenting to be provided by the Local Authority, Bluebell Parenting Centre.

Catch 22, a Family Support Service closed the case as Karen (mother) was noted as taking on full responsibility and needing little support. We also know, from a note of a meeting between Megan and her adviser at Connexions that Megan was not happy on her course at college and only attended 20% of the sessions. During a home visit by her Connexions adviser in 14th November, she stayed in bed, as she felt ill.

School reported issues of the children's hygiene and impacted on their ability to make friends and being bullied.

Referral	Involvement of other services
Development of referred Child	Background
Parental Capacity	Strengths & Protective Factors

Does your assessment of risk change?

High

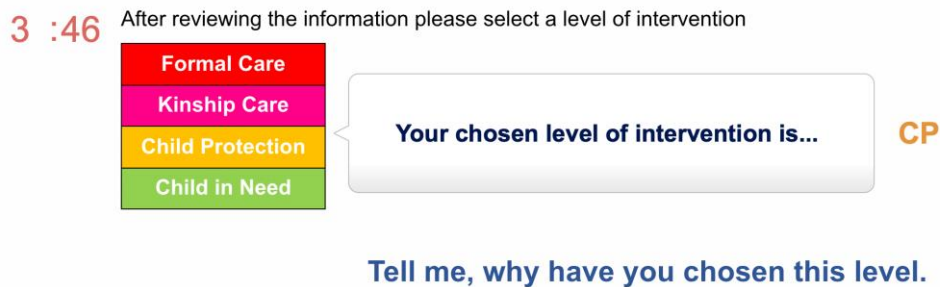
● ○ Stop

Figure 29: Screenshot of further information (Personal Collection 2024)

Once the participants read enough information to make a final judgment on this case, they could select to move on to the next stage, selecting possible service responses. This idea is based on the work of Stokes and Schmidt (2012), who also include a question about the potential service responses as part of their vignette study. The options listed below are aligned to the level of need included in the case vignettes for this study:

- Provide intensive family support services with Social Care case management (Child in Need).
- Trigger a Child Protection Investigation (Child Protection)
- Arrange a placement with a family support network (Kinship Care)
- Develop a formal out-of-home care arrangement (Formal Care)

To do so, the participants use the external controller.



When you are done, please press the green button to move to the next referral.

Figure 30: Screenshot of choosing intervention (Personal Collection 2024)

5.3.4 Thinking-Aloud

Think-aloud protocols can track cognitive processes (Ericsson and Simon 1998; Beach and Willows 2017) to study processes like problem-solving or usability. According to Krahmer and Ummelen (2004), thinking aloud protocols are used to:

- Find evidence for models and theories of cognitive processes
- Understand general patterns of behaviour when reviewing documents or interacting with applications
- Test and troubleshoot new forms or applications

In the "talking aloud" protocol, respondents complete a task and have to "say out loud whatever they are saying silently to themselves" (Ericsson and Simon 1993, p. 226). Thinking aloud protocols are different; they require participants to verbalise "*orally encoded information and other kinds of thoughts*" (ibid., p. 228). Supported by using functional magnetic resonance imaging (fMRI) of seventeen physicians, Dunning et al. (2013) suggest that thinking aloud is a measure of thinking. A strong point of this method is that it offers insights into how individuals make decisions and the underlying thinking processes in a way that makes the results available for analysis to understand mental processes, patterns, or decision-making pathways. It seems more efficient in understanding underlying concepts than interviewing (Priede and Farrall 2011). These verbalisations are recorded and analysed under the framework provided by the research question. In the Think-Aloud

Protocol, the researcher listens without influencing the mental processes of the respondent.

Ideally, this results in a single-direction communication where the respondent consistently verbalises their thoughts without the interference of the researcher. Ericson and Simon (1980) suggest that any verbalisation of the respondent resulting from an interaction with the researcher is unreliable. However, an issue may emerge if the respondent does not talk for a sustained period, which means that large parts of the cognitive process are not available for subsequent analysis. Ericson and Simon (1980) suggest using the phrase "Keep talking" as a short and non-intrusive intervention in these situations. This DME follows this advice.

5.3.4.1 Limitations of Thinking-Aloud

There is good evidence that thinking-aloud protocols are helpful in usability studies where this approach can provide insight into how participants think about using a particular system. Ericson and Simon (1993) state that a thinking-aloud protocol can show the participants' sequence of thoughts whilst completing a task. However, usability studies are relatively straightforward tasks, mainly because they are more concerned with identifying parts of a system that cause users' problems (Alhadreti and Mayhew 2017). The study discussed here is more complex, and the aim was to explore how social workers make safeguarding decisions. The focus is not on the way information is presented, instead, the focus is on what the participants do with the information. Given the complexity of the task and the expectation that participants focus on the task, it is likely that the verbal reports are incomplete and participants fail to report all thoughts, as observed by Ericson & Fox (2011) and Ericson & Simon (1993).

In addition to the challenge of incomplete data, Alhadreti and Mayhew (2017) point out that talking aloud may interfere with task performance. In this research, the respondents verbalise their thought processes concurrently to respond to the primary task. This concurrent activity means they are completing two interrelated functions at once. An alternative to concurrent verbalisation would be a retrospective approach where respondents complete the job and subsequently verbalise their thoughts. This approach has some

benefits, like freeing up cognitive resources despite the influence the ability to recall decisions has on the accuracy of a retrospective approach (Beach and Willows 2017). Nevertheless, it appears as if a concurrent process does not have a significant effect on task performance (Ericsson and Simon 1980, 1998; Ericsson and Fox 2011), even though this may come at the cost of an increase in the time it takes to complete the task (Fox et al. 2011).

A third limitation of the thinking aloud protocol that Alhadreti and Mayhew (2017) have identified is that thinking aloud is unusual and may make participants uncomfortable because it is a one-directional communication (participants speak to a computer screen). This experience may impact task performance and the verbalisation of thoughts. To overcome this issue, Boren and Ramey (2000) suggest an asymmetrical communication model where the researcher is an active listener responding to an agreement, sympathy or objections that the speaker would expect whilst the respondent, as the speaker, does most of the talking. In other words, the listener acknowledges that the participant is being heard and understood without asking questions or engaging in a conversation. According to Alhadreti and Mayhew (2017), this approach does not significantly impact task-solving accuracy or efficiency. This study takes the approach that the researcher sits in a way that allows face-to-face interaction without sitting directly in the line of sight behind the computer screen.

5.3.4.2 Applying a thinking-aloud protocol in this study

In this study, the respondents apply a concurrent think-aloud protocol whilst completing the decision-making exercise. This protocol means they speak aloud any words in their minds and comment liberally on their actions, intentions and thoughts as they complete the task. The researcher is present in the room to answer questions before or after the simulation and deal with technical problems. However, the researcher is not supposed to intervene in the simulation itself.

A challenge in using a Think-Aloud Protocol is to avoid the researcher influencing the verbalisation of a concurrent cognitive process. For example, asking the question, "Why did you select this option?" may trigger a shift from a concurrent verbalisation to a retrospective report. Here, participants may

respond by inferring or generating information based on the question rather than recalling information that could still be available in short-term memory (Ericson and Simon, 1993). For this reason, asking "Why" is avoided throughout the thinking-aloud protocol, with one exception that will be explained later.

To discourage explanations, Ericson and Simon (1993, p. 384) suggest the following instruction, which is used in this research in the form of a showcard which is put before the participants whilst doing the simulation:

"I don't want you to try to plan out what you say or try to explain to me what you are saying. Just act as if you are alone in the room speaking to yourself."

Throughout the simulation, the researcher keeps any interactions to a minimum to avoid distracting the participant from the task or triggering them to explain things rather than think aloud. As such, the software used for this must be reasonably straightforward. Once the participants have chosen to stop reviewing more information and decide on a course of action, the software explicitly asks them to explain their reasons for their choice. This step breaks with the think-aloud protocol that avoids triggers for participants to explain what is happening. The latter would take the focus away from the actual task at hand. At this stage, however, this is less likely to be an issue as participants are not reviewing any information, and the information reviewed previously is still in their short-term memory. The benefit of asking "why" at this stage is that there is a common point amongst all participants where they provide insight into their decisions. At this point, the question becomes a trigger to summarise previous thoughts. The thinking-aloud protocol, or the way the participants' utterances and actions are recorded, is embedded in the software used to run the proposed simulation as a decision-making exercise.

5.3.4.3 Limitations of thinking aloud in this study

As it is used here, the thinking-aloud protocol requires some words about limitations. In this study, the participants respond to a stimulus produced by the author and have to speak out their thoughts as they read the information provided. That includes participants reading out the information presented in

the vignettes. By definition, these are not utterances representing their thought processes alone but repeat the order and structure of the vignettes constructed by the author (even if the vignettes are based on serious case reviews). That can lead to a misrepresentation of whose thought processes the utterances represent. This potential makes it necessary to make clear a basic premise. When participants read out parts of the vignette, this study sees these utterances as evidence for internalised thought processes as the words that are being read out represent some meaning compared to words that are not read aloud. In this sense, the words being read represent pieces of information that have some value for the consideration of the participants in their task to decide about each vignette.

5.3.5 The Software used in this research

This section provides an overview of the software used for the simulation exclusively developed for this study by the author. The text defines the software's requirements and explains the software's development from the initial to the final version used for the study.

The overarching aim of using a computer-based approach for this vignette study was to create a sense of reality for social workers making a type of decision regularly occurring in practice without the requirement to have face-2-face interactions with a service user. Replicating or even using one of the Knowledge Management Systems used in practice (Care Works, Liquid Logic) was not feasible. That is due to the prohibitive licence costs and the fact that participants would have to be trained in using very complex software environments only for this study.

The software required for this study was designed to do the following:

- 1 present case vignettes in a random order,
- 2 present information based on the choices made by the participant (Cue Selection,
- 3 select Vignettes (Display Information),
- 4 give reminders to keep talking,
- 5 allow data input from the participants (Initial Risk Assessment,

- 6 Update Risk Assessment,
- 7 Choose Intervention and
- 8 log all activity on the screen synchronised with recording the participants' utterances.

Despite all these functions, the software needed to be simple enough to keep participants focused on the task. Hence, two external controllers (Roli Blocks) were used to streamline the manual input to undertake an initial and continuous risk assessment to avoid that attention is focused on inputting data rather than focusing on making decisions (External Controller Management). The value of avoiding two different input modes (via trackpad and controller) came to light in early software tests. Using two different devices led to a significant distraction from the task. It would have required pre-training to use the software. Such training was not feasible to minimise the time participants have to invest in increasing the chances of recruiting a wide range of professionals who usually experience significant pressure on their available time.

In summary, the software needed to be "real" enough to create a reality of function for the participants and be simple enough to be used with minimal training while capturing data from the participants. As no such software was available on the market, it was necessary to develop this software specifically for this study. The software, creatively titled "Safeguarding Simulation", is built in a visual programming environment called Max/MSP (Cycling 74, 2018), which is more commonly used for visual art and music production. Initially, a basic version of the software was developed as a proof of concept to show that using a simulation like this would produce data that can be analysed in a meaningful way. This basic version included the main window where case information was presented and 20 buttons to access additional information organised as defined in the Framework for the Assessment of Children in Need (Cox et al. 2009).

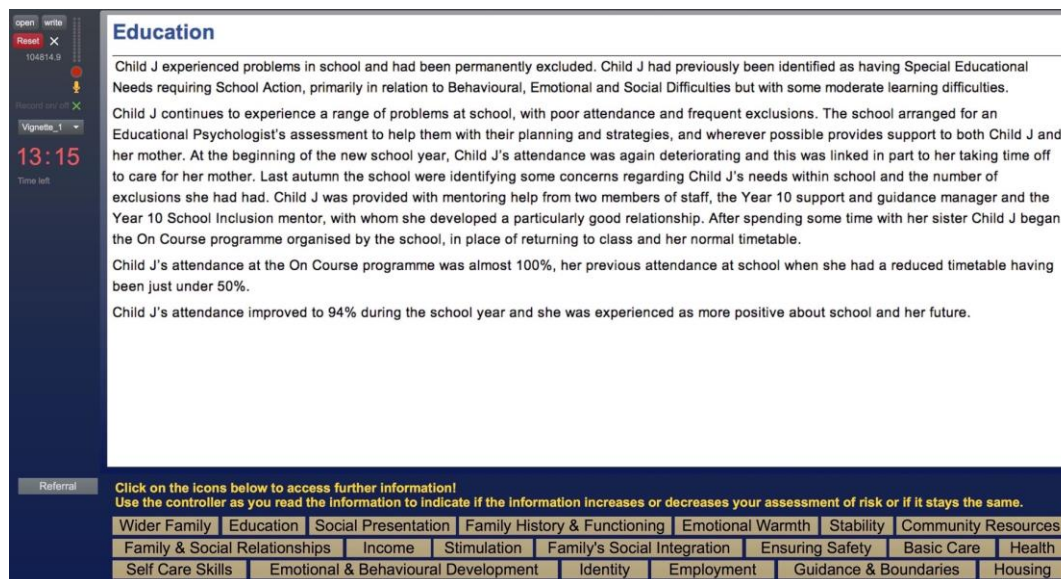


Figure 31: Screenshot of Version 1 (Personal Collection 2024)

Early testing showed that the amount of information included in this version was too complex for participants to use without the significant involvement of the researcher. Also, the information provided was too much for the participants to process in the time given. Therefore, a new version was developed to reduce the complexity of the information presented and simplify the use of the simulation. Otherwise, participants would not have been able to review many case vignettes to be compared in the analysis. The following version of the software was simplified by changing the layout. The screen was "decluttered" to help the participant focus on the information in the main window without being distracted by other elements on the screen. In addition, based on previous test feedback, a practice environment was set up to help the participants familiarise themselves with the software, the controller and the thinking aloud protocol.

The practice environment and the simulation software version were tested with five qualified social workers, each test run leading to incremental but significant changes. The testing phase was conducted under similar circumstances as it would be in the fieldwork phase. The only difference was that the focus was on usability testing rather than identifying decision-making strategies. The test included recording audio and activities to check if the subsequent process of transcribing and analysing the data would be working effectively. The key issues identified at this stage were:

- Difficulties of switching between using a trackpad to select additional information and using the external controller to input data
- Users not updating their assessment of risk
- Users struggling to see when they moved to a new referral
- Users are unaware of the time pressure hence trying to read all available information.

Introducing colour-coding, layout changes and prompts to do or update a risk assessment resolved these issues. The most significant change at this stage was to avoid using two different ways of inputting data by eradicating the need to use the trackpad to select additional information. Instead, two combined controllers showing colour-coded buttons corresponding to the cue categories presented on the screen now provide the only input source.



Figure 32: External controllers (Personal Collection 2024)

A further challenge was that the test candidates did not update the ongoing risk assessment when the prompt was located on the right side of the screen. The initial prompt was also worded differently, asking participants to indicate whether their risk assessment went up, down or stayed as is. Changing the wording to "Does your assessment of risk change?" and moving this question to the top of the displayed information makes it more likely that participants are indicating any changes based on the information they read.

Minor changes to processes running in the background were introduced to improve the sound quality of the recording and program stability alongside other minor layout changes (for example, changes to the colours of text and consistency of fonts). Once these changes were complete, the software was compiled into a standalone version that can run independently of the

programming environment to be used by other researchers interested in reproducing this study.

19:40

Referrer details					
Name	Mark Cox	Role/Agency/Team/ Department	Early Help Team		
Child's details (Please complete Section 1b for further children). Please gather this information if not known.					
Name of Child	Megan Rowley	Religion	None Recorded	Ethnicity	White European
Date of Birth	13.03.2003	Age	15	Gender	Female
Education Provider/ Employer	The Ruth Gorse Academy	Does the Child have a disability?	No	State diagnosis if known and any SEN statement if known	N/A
Own Agency reference number	S450210	Does the Child have an Education, Health and Care Plan?	No		
Siblings and other related children's details					
Child's full name	DoB or EDD	Gender	Relationship to child referred	Ethnic Origin	Mother's Full Name
Tom Rowley	28.5.2006	Male	Sibling		Karen Rowley
David Lamborne					David Lamborne
Other significant adults details					
Adult's full name	DoB	Gender	Relationship to child referred?	Ethnic Origin	Comments
Karen Rowley	24.4.1980	Female	Mother	White European	
David Lamborne	08.08.1981	Male	Father	White European	Not living in family home
Gary Naquin	12.11.1970	Male	Father's Stepfather	Salvadorian	Living in family home
Reasons for referral					
What are you and/or the family concerned about?	<p>Megan was admitted to the intensive care unit at hospital following a collapse at home. Megan was conveyed by ambulance in a state of peri-arrest to the resuscitation unit within the Emergency Department. Full cardiac arrest was prevented as she was put on a life support system. Megan has an extreme case of severe iron deficiency anaemia, which was life-threatening. At this time, her haemoglobin levels were 2.3 g/dl. Normal values for a girl of her age are 11.5 – 16.5 g/dl. It was difficult to establish the primary cause of Megan's medical condition. The Panel sought medical opinion regarding this and were advised that contributory factors could be heavy periods, chronic head lice or poor nutrition. Anyone with untreated iron deficiency anaemia are more susceptible to illness and infection, as a lack of iron in the body affects the immune system (the body's natural defence system).</p> <p>While in intensive care, it was evident that Megan's personal hygiene had been neglected as her body was dirty and she had head lice, which required intensive treatment. Megan was diagnosed with severe anaemia.</p>				

Referral

What is your assessment of risk?

Moderate

Stop

Figure 33: Screenshot of Version 2 (Personal Collection 2024)

Using the simulation creates a significant amount of data, including audio recordings and the choices made on the screen. This data needs to be combined with data from the questionnaires as part of the analytic framework. Final testing showed that the potential participants could use this software with only a minimal amount of preparation.

5.3.6 Capturing Decision Maker Characteristics

In addition to the data captured in the simulation, a questionnaire was used to capture data about the participants. The questionnaire consists of three sections,

- 1 demographics,
- 2 human values, and
- 3 good or bad decisions.

It provided the data to construct participants' habitus, a model of their psychological pre-dispositions and perception of the social world around them. The first two sections were self-administered online by the participants. The researcher administered the last section after the DME was complete.

The responses were imported into the statistical programming environment R to undertake a descriptive statistical analysis, which was later linked to the analysis of the transcripts using R.

5.3.6.1 Demographics

The demographic section of the questionnaire collected information about the current level of expertise and the roles and responsibilities of the participants. The gender of the participants was captured to present the participants with the version of the human value questionnaire that reflected the participants chosen gender. Only essential demographic data was collected to minimise the time required to complete this part of the study. The questionnaire measured the level of expertise by asking the number of years or months participants practised as social workers and identifying how autonomous participants were in their decision-making. These questions come from the European Social Survey (Anon. 2022), representing indicators of social status. In this study, these questions assess the degree to which participants perceive themselves to be autonomous decision-makers.

5.3.6.2 Human Values

A Human Values Questionnaire was included in this study to use the patterns of the participants' value responses to construct a Habitus. Values are often measured using methods like ranking made popular by Rokeach (1973), a rating used by Schwartz (2006) and pair comparisons as suggested by Thurstone and Jones (1957). The pros and cons of these approaches to measuring values are discussed in great detail by Leuty (2013). This article informed the decision to use a rating approach in this study because of the ease of use. The ease of use was vital for selecting a method to assess the participants' values. The time it takes to complete the questionnaire must be minimised to limit the burden on the participants and maximise the motivation to participate. Social workers completed the test alone when it suited their diary and within a short, clearly defined time. In addition to this, the method used needed to allow the comparison between individuals. This consideration left the rating method, which had a particular strength in the ease with which it could be completed independently by the participants, as discussed by McIntyre and Ryans (1977). Based on these considerations, this study used

the Schwartz Human Values Questionnaire adapted so that participants could complete the questionnaire independently.

The Human Values Questionnaire designed by Schwartz (1992, 2006) is based on the postulate that values derive from three universal requirements for human existence — biological needs, social interaction needs, and survival and welfare needs of groups. These universal requirements translate into ten fundamental values based on motivational goals depicted in the graph below (Schwartz 2019) .



Figure 34: Schwartz Human Values (2019)

Schwartz (1992, 2006) developed a survey using 21 value items to measure these values. This questionnaire was based on portraits, short descriptions of people presented to the participant who rates how similar they perceive themselves to this person on a Likert Scale. The Schwartz Value scale represents ten motivationally distinct values derived from universal human life requirements: Power, Achievement, Hedonism, Stimulation, Self-Direction, Universalism, Benevolence, Tradition, Conformity, and Security. The responses to the survey are translated into numerical scores and combined into ten indexes representing the above values. The relationships between the different scores can be visualised in two dimensions representing higher-order values. Even though there is a cost of losing important information, the benefit of this study is that it is easier to link these higher-order values to other variables. These higher-order values are (Schwartz, 2019):

- **"Openness to change: Pursuing whatever intellectual or emotional**

directions one wishes, however unpredictable or uncertain the outcomes.

- **Conservation:** *Preserving the status quo and the certainty it provides in relationships with close others, institutions, and traditions.*
- **Self-enhancement:** *Enhancing one's interests (even at the expense of others).*
- **Self-transcendence:** *Transcending one's selfish concerns and promoting the welfare of others, close and distant, and of nature."*

The two dimensions that bring together these higher-order values are, according to Schwartz (2019):

- **"Self-enhancement vs self-transcendence:** *On this dimension, power and achievement values oppose universalism and benevolence values. The first two emphasise the pursuit of self-interest, whereas the last two involve concern for the welfare and interests of others.*
- **Openness to change vs conservation:** *On this dimension, self-direction and stimulation values oppose security, conformity and tradition values. Both of the former emphasises independent action, thought and feeling and readiness for new experience, whereas all of the latter emphasises self-restriction, order and resistance to change. Hedonism shares elements of both openness and self-enhancement, but in most cases, hedonism is closer to openness."*

These last two dimensions help identify patterns concerning Human Values and potentially cluster participants to compare the results from the decision-making exercise participants. Another aspect that this study uses to construct the habitus of the participants is their views on what constitutes a "good" or a "bad" decision.

5.3.6.3 Good and Bad Decisions

This study does not claim to determine whether or not participants make good or bad decisions concerning the case vignette presented to them.

Nonetheless, it seems reasonable to argue that a measure of what participants believe are good or bad decisions would be helpful to provide

information that is used as a baseline when analysing the output from the decision-making exercise using case vignettes. The purpose of this part of the questionnaire is to understand

- what social workers and social work students think makes a decision good or bad,
- how much ownership each participant feels they have in respect of good or bad decisions and
- if the speed of decision-making and the quality or importance of the decision are correlated.

To ascertain an understanding of what participants rate as good or bad decisions, the questionnaire included questions that aimed to identify two good and two bad decisions that participants have made in the last 12 months. Based on the methodology used by Yates, Veinott and Patalano (2003), each decision is rated on scales of quality and importance whilst making relative to all the important decisions you have ever made. The data calculates an impact score (multiplying importance and quality ratings). Then, the social workers provide more information about the two decisions (one good, one bad) with the highest impact scores. In particular, they clarify why they classified a decision as bad or good, when and how they realised that they had to make this decision, and how long it took them to make it. The data captured within the above questionnaires provided the basis to describe their characteristics as decision-makers. These characteristics provide another element to evaluating the results of a decision-making exercise and understanding the decision-making strategies of the participants.

5.3.7 Sampling Strategy

This project aimed to work with child and family social workers and social work students who are actively involved in making judgements about the risk of significant harm as defined in the Children Act 1989. According to the Office of National Statistics (2022) in 2021 there were 32502 child and family social workers at a time that has seen the highest rate of child and family social workers leaving within the preceding five years. Overall, there were

6522 vacancies. This data is relevant to highlight the difficulties in recruiting social workers as participants to research due to the high workloads and work pressures that result from this difficult situation. For this reason, it was necessary to use different approaches including a convenient sample of social workers known to the author of the study, snowballing and adverts through emails to recruit participants for this study.

The main group of interest in this study were practising social workers with an active role in decision-making and the capacity and experience to make decisions, a requirement proposed by Crandall et al. (2006). The focus of this study was on making safeguarding decisions in respect of children.

Therefore, the participants in this study are social workers working predominantly with children. Some social workers working predominantly with adults were also invited to participate to allow for the opportunity to make a case comparison when analysing the data. Within the Children's Social Work Workforce, various roles represent the organisational structure that needs to be considered, even though this is a self-selecting sample. In addition to this, the workforce represents different levels of expertise, which is of interest as there is evidence to suggest that experience influences decision-making skills.

Dreyfuss & Dreyfuss (1986) offer a helpful description of the progression from being a novice to becoming an expert that is being used here. Students on their final (statutory) placement and newly qualified social workers who have been employed as social workers for less than 12 months represent the group of novices and advanced beginners who are just entering the field. According to Dreyfuss & Dreyfuss (1986, p.21), novices are learners who learn "*to recognise various objective facts and features relevant to the skill and acquire[...] rules for determining actions based upon those facts and features*". The advanced beginners have had "*considerable experience in coping with real situation*" (ibid., p. 22). Newly qualified social workers are deemed to have achieved a level of the competence described by Dreyfuss & Dreyfuss (1986, p. 24) as following a "*hierarchical procedure of decision making*" and seeing "*a situation as a set of facts*". These are registered social workers who have been in post for more than 12 months, the point in time

when they have completed their Assessed and Supported Year in Practice which is a requirement for social workers after their initial registration.

The next group are proficient and experienced practitioners. Proficiency means that the person makes “conscious choices of both goals and decisions after reflection upon various alternatives” (ibid., p. 28). Experienced practitioners are, according to Dreyfuss & Dreyfuss (1986, p.30), people who “generally know[...] what to do based on mature and practised understanding”. For this study, this is specified using Ericsson et al.’s (1993) suggestions. Experts are seen as qualified social workers with a minimum of five years of experience in social work, with at least two years in child protection. The graph below summarises the sampling strategy to illustrate how the different dimensions used to select participants come together.

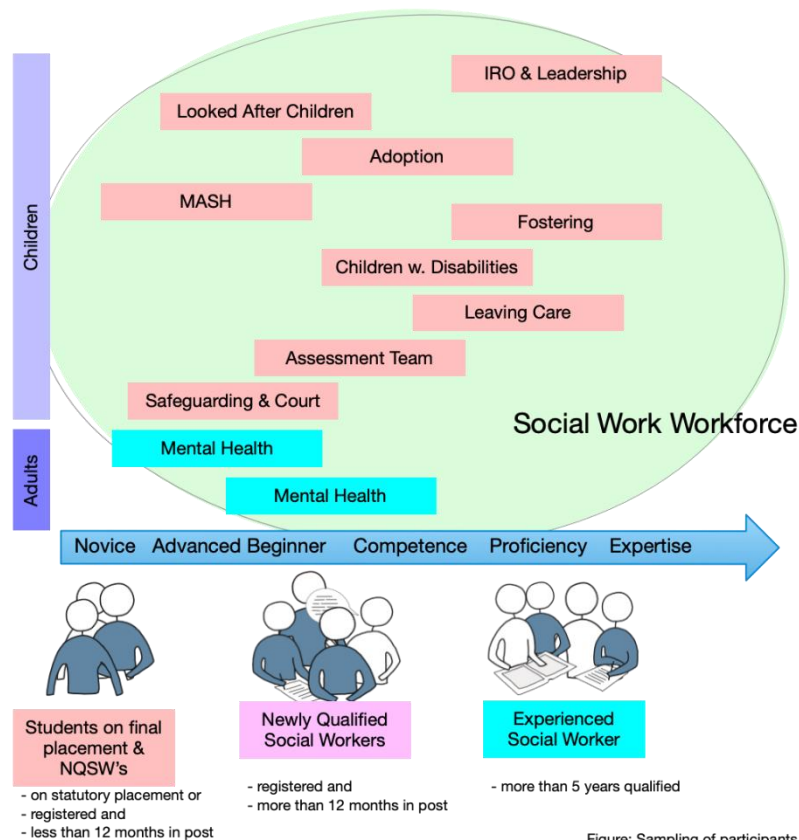


Figure: Sampling of participants

Figure 35: Sampling of participants

Respondents for this study were recruited through the Local Authorities supporting this project, and the Teaching Partnership between Bournemouth University, Dorset County Council, BCP Council and Wiltshire County Council. Invites to participate in this study were sent through the workforce

development teams. In addition, current Bournemouth University students on Post-qualifying Programmes who are registered social workers have been contacted via their student email through the unit leaders of the respective units. Those interested in this research could contact the researcher to express their interest in participation via email or phone. Once a respondent registered an interest, they received further information about the project. The aim was to invite a sample of respondents at different stages of the development of their expertise, ranging from being a student, novice (Newly Qualified Social Worker), and competent (experienced Social Worker) to being an expert (Social Work Manager). There were initially fifty-two responses to these invites. Only thirty-eight of these agreed to participate in the study after receiving more information. Of these thirteen participants had to cancel the meeting to participate in the decision-making exercise due to work pressures. Twenty-five participants completed the questionnaire and the decision-making exercise. One participant was excluded from the analysis subsequently since this participant mostly read out the full text presented in the text without following the task of thinking-aloud. This would have potentially skewed the analysis.

5.4 Data Analysis

This study used a mixed methods approach that collected data with a questionnaire and captured the internal thought processes with a thinking-aloud protocol. In addition, the simulation software logged all participants' activities in this decision-making exercise. The two tables at the end of this section provide an overview of the variables available for this analysis. They are indicative of the complexity of the data analysis because of the significantly high number of possible perspectives to take when analysing the data.

This mix of data sources created a challenge for data analysis. Generally, qualitative data analysis differs from quantitative data analysis (Bryman, 2015). The strategy for this study was to bridge the arbitrary gap between qualitative and quantitative by using techniques that analyse unstructured data using text mining alongside quantitative data from the questionnaires using scripts in the statistical programming environment R (R Core Team, 2022). A benefit of this scripted approach is that this reduces the impact that my persuasions and attitudes may have on the analysis.

The following section outlines the steps to process and combine the data. This step is arguably a critical part of analysing multi-dimensional data as the data needs to be prepared to ensure that the process does not skew the analysis by errors introduced in earlier stages of research (Lopez et al. 2020). The use of scripts throughout the analysis improves consistency in preparing the data and allows any interested reader to repeat the analytical steps. All these scripts depend on libraries, reusable pieces of code to read the transcripts (Ooms 2021), clean (Wickham 2019; Wickham et al. 2019; Dowle and Srinivasan 2021) and mine the data (Feinerer et al. 2008; Silge and Robinson 2016; Feinerer and Hornik 2020; Jones 2021). There are also tools to assist the preparation of the data for interpretation (Ooms 2018; Müller and Wickham 2021) and to present the data (Xie 2014; Ren and Russell 2021) or give visual feedback on the processing of data (Solymos and Zawadzki 2020). The primary tool for processing and analysing the data is the statistical programming environment R (R Core Team 2022). The analysis uses an R-

Script to import, clean and join the data from the questionnaires, the keylogs and the transcripts. A second R script supports the overall analysis of the combined data by generating the visual representations and the tables shown throughout the analysis. A third script provides a web-based application, based on the Web Application Framework Shiny (Chang et al. 2021), that is used to investigate the data further and create individual profiles of core data available for each participant. The last script analyses the areas in the transcripts that appear to include reasoning steps. The following sections provide a summary of the preparatory steps for the analysis.

x	Variable	Source	Type
1	Age	Q4	Int
2	Gender	Q5	Factor
3	Experience	Q6	Int
4	Job Role	Q7	Text
5	Responsibilities	Q8	Text
6	Time in role	Q9	Int
7	Autonomy_work	Q10	Factor
8	Influence_org	Q11	Factor
9	Security	HVQ	Factor
10	Conformity	HVQ	Factor
11	Tradition	HVQ	Factor
12	Benevolence	HVQ	Factor
13	Universalism	HVQ	Factor
14	Self-Direction	HVQ	Factor
15	Stimulation	HVQ	Factor
16	Hedonism	HVQ	Factor
17	Achievement	HVQ	Factor
18	Power	HVQ	Factor
19	Good Decision 1 & 2	Q17 + 18	Text

20	Quality of Decision 1 & 2	Q17a + 18a	Factor
21	Importance of Decision 1 & 2	Q17b + 18b	Factor
22	Impact Score Good 1&2	Calculated	Int
23	Bad Decision 1 & 2	Q19 + 20	Factor
24	Quality of Decision 1 & 2	Q19a + 20a	Factor
25	Importance of Decision 1 & 2	Q19b + 20b	Factor
26	Impact Score Bad 1 & 2	Calculated	Int
27	Reasons_classification_good		Text
28	Making_of_decision_good		Text
29	Time_for_decision_good		Text
30	Reasons_classification_bad		Text
31	Making_of_decision_bad		Text
32	Time for decision bad		Text

Table 5: Data captured in the questionnaire

Y	Variable	Source	Type
1	Rationales for decisions	Think Aloud	Text
3	Order of Cues	Log	Factor
4	Assessed Level of Risk	Log	Factor
5	Time taken for decisions	Log	Time

Table 6: Information collected through the simulation

5.4.1 Preparing the Thinking Aloud transcripts

The audio recordings from the thinking-aloud protocol as part of the simulation and the responses to the questions about good and bad decisions were transformed into the mp3 format compatible with Nvivo 12. These were imported into Nvivo and transcribed using the Nvivo transcription service that provides a transcript file with timestamps for each utterance. The timestamps were essential to code the transcript with references to the case vignettes, the level of risks assigned by the participants and the information reviewed recorded in the key logs that store the participant's inputs throughout the simulation. Doing so allowed comparison of how participants rated the various

pieces of information accessed in the simulation. The transcript files produced by the automated transcription service of Nvivo were reviewed to ensure that the transcripts accurately reflected the audio recordings. Reviewing the transcripts is vital to get acquainted with the data (Bryman 2015). Once this was done, the transcript data was exported from Nvivo and imported into R to transform the data into a standardised format that allows computer-based analysis using a text mining workflow. This workflow includes cleaning the text by removing stop words, setting all words to a lower key and removing numbers and punctuation.

The audio recordings are the core of the analysis as these are the most direct information about the decision-making process. Each transcript is saved as an individual table containing each utterance's start and end time and the transcribed text. These tables are imported into the statistical programming environment R (R Core Team 2022). After reading all transcript files, the script deletes entries assigned to the researcher and those after the simulation ends, as they do not refer to the analysis of the simulation. The script also transforms the timestamps into the same format as the key log data.

5.4.2 Preparing the questionnaire data

It is crucial to emphasise that statistical analysis is not the intention of this study. Such an analysis would not be feasible due to the low number of participants. Instead, the variables provide the foundation to construct a way to use the individual dispositions of participants as a backdrop to analyse the internal thought processes of the participants. This analysis uses the variables to generate categorical data that allows for the exploration of similar dispositions between different individuals to help make sense of patterns identified in the transcript data.

The questionnaire data was downloaded as a Coma Separated Value (CSV) file from [OnlineSurvey.co.uk](https://www.online-survey.co.uk) and imported into R. Here, the data was reorganised so that it could be analysed. The reorganisation includes

- renaming the columns,

- translating categorial responses into numeric values,
- calculating ten fundamental values based on the 21 questions, and
- considering individual differences in the scales used.

The latter was achieved by calculating an individual mean score that is used to show the relative importance of each value against this individual mean score. Additionally, as suggested by Schwartz, the higher order values openness to change, conservation, self-transcendence and self-enhancement (2012, 2019). Even though the latter calculation results in a loss of information, it is a practical step to compare the value patterns of the different participants. Following Schwartz (2019), the script calculates the row means of the value items that construct these four higher-order values. These four higher-order values are summarised further to create a two-dimensional value scale showing the tension between Self-Enhancement versus Self-Transcendence and Openness to Change and Conservation. This two-dimensional value scale will form the basis for constructing the participants' habitus in the analysis.

This data from the questionnaires were used to establish categorial values about each participant that can be added to the transcript data to make a possible comparison between the participants. In this step, the length of experience is translated into a label that describes the participants either as a novice (0-1 year), competent (1 year to 5 years) or an expert (more than five years). The responses to the questions about autonomy at work and influence in the organisation were similarly used to organise the responses into three groups for each question (low, medium and high for each question).

5.4.3 Preparing the keylog data

Throughout the simulation, the participants chose what information they reviewed and any changes to their risk assessment using the external controller. The simulation software stored this data in a text file. This file contains the button pressed and the time when this is done relative to the point the participants start the simulation. An R Script processes these text files to clean the data and create a table linked to the transcript data. This

data is used to code the transcripts with the activity of the participants in the simulation. This coding should allow the comparison of the transcripts and the way participants assigned different risk levels as mentioned above. The output from this data indicates how much time participants spent before deciding and the patterns of making changes to the assessed risks.

5.4.4 Identifying Toulmin's Reasoning

The covid 19 pandemic impacted the availability of participants in this study. Social Workers who agreed to participate had to withdraw their agreement as their focus had to be on maintaining a functioning service for children and their families. The reduced number of participants resulted in fewer available transcripts to automatically code text segments using existing machine learning classification models. In place of the initial plan, I manually coded these transcripts to identify the parts of the codes where participants used reasoning.

In their study, Benbenishty et al. 2003 suggest using the reasoning scheme developed by Toulmin (2003) and Toulmin et al. (1984). This reasoning model appears to be helpful for this particular study because of the clear delineation between the different elements of reasoning suggested by Toulmin. This reasoning scheme involves six categories for coding the transcripts in Nvivo 12. Toulmin et al. (1984), Toulmin (2003) and Benbenishty et al. (2003) explain that a reasoning chain contains a claim or conclusion, evidence to support this claim, a warrant or justification to back up the claim with some common knowledge as fundamental building blocks. In addition, there are complementary blocks. First, a backup or justification using available data or a body of experience, a qualification expressing the degrees of confidence in the claim and a rebuttal that states under which circumstances the claim may be valid or not.

In this study, I manually applied these elements of reasoning as a coding scheme for the transcripts after the R scripts processed the data. This step was helpful for a detailed analysis of the internalised logic of practice. The codes assigned in Nvivo allowed filtering utterances where participants just repeated information (evidence, data, grounds) from their internal reasoning

process from the vignette. The quotations linked to each participant's reasoning (Claim, Warrant, Backup, Qualify, Rebuttal) were queried in Nvivo. The results were saved as text documents to focus the analysis on the reasoning processes. These documents were re-imported into R. Here, a script links these documents with the information about each participant to allow detailed analysis, using the habitus of participants as the backdrop for understanding their decision-making.

5.5 Three key analytical tools

The analysis of the data used a variety of different analytical techniques. However, the following extraction of information from the data relied heavily on three strategies that require some explanation. For this reason, the following paragraphs introduce correspondence analysis, sentiment analysis and co-occurrence maps.

5.5.1 Correspondence Analysis

The following parts of the analysis rely on correspondence analysis, a technique to reduce complexity in data and show relative associations even for low sample sizes, as in this study. Therefore, it is essential to provide a short overview. A Correspondence Analysis reduces a multi-dimensional space represented through multiple variables (Clausen 1998; Le Roux and Rouanet 2010; Beh and Lombardo 2014). The mathematical process of doing the calculations required for a correspondence analysis is discussed in great detail by Greenacre (2015) and Beh and Lombardo (2014). This chapter will not repeat this discussion. Potentially, the work of Pierre Bourdieu offers the most widely known use of Correspondence Analysis. Bourdieu used this tool extensively to illustrate the distinctions between groups in society (see, for example, Bourdieu (1984, 1988, 2008).

The graphical output of correspondence analysis is an efficient way of visualising the associations between multiple variables contained in a contingency table. However, there are a few aspects that research needs to consider when reading the graphical output of this type of analysis. Bock (2020) explains these aspects, and this section summarises this explanation to help review the correspondence analysis plots in this part of the study:

- 1 The distance between the origin (where the x and the y-axes meet) and the labels indicates how much this variable discriminates compared to other variables. That means that any labels close to the origin are less discriminating. Those labels that are further away from the origin are more discriminating than those closer to the origin.
- 2 The level of variance explained by the correspondence analysis is an indicator of the explanatory value of the plot. A high percentage of variance across all dimensions represented in the plot suggests a good representation of all variables in the plot.
- 3 The proximity of row labels or column labels with each other is an indicator of similarity, whilst the proximity between row and column labels does not carry an explanatory value. Instead of looking at the distances between row labels (blue) and column labels (red), the relative association can be determined through imaginary lines connecting row and column labels with the origin and establishing the sharpness of the angle between these lines.
- 4 A narrow angle between lines drawn from the origin to the label signifies an association between a row label and a column label.
- 5 The further the row and column labels are away from the point of origin, the stronger their association is.

5.5.2 Sentiment Analysis

Emotions affect decision-making (Bechara et al. 2000b; Damasio 2001b) as emotions and cognitions are closely interlinked (Bazerman et al. 2013). For example, according to Gino (2013), if decision maker experiences anger, they may ignore additional information and only focus on their own opinions. In this study, the participants' words are used indirectly to measure their emotional state. As participants read the information in the vignette, it is possible to "*use our understanding of the emotional intent of words*" (Silge and Robinson 2017) and explore if the participants perceive a part of the presented information as positive, negative or another "*more nuanced emotion like surprise or disgust*" (ibid.).

This analysis uses a sentiment analysis based on the work by Jockers (2015) and the NRC sentiment dictionary developed by Mohammad and Turney (Mohammad and Turney 2010, 2013; Mohammad 2018, 2021) to find words associated with eight different emotions. The visuals below result from assigning a sentiment to each word in the transcripts. Even though this approach provides a very reliable process to identify sentiments in a text, the problem that each sentiment is taken out of context emerges from viewing each word individually. This constraint still allows comparisons between vignettes, but for a more detailed analysis, it is essential to explore observations from these comparisons in the context of a word. It is important to emphasise that, even though the NRC dictionary was compiled with appropriate academic rigour (Mohammad 2018, 2021), some observations in the dataset in this study raise questions. For example, the words "maternal" or "mother" are classified as positive and negative, whilst the word "father" is only associated with "trust", and the word "paternal" is not included in the dictionary at all. That seems inconsistent and somewhat patriarchal, a word rated as positive in this dictionary. Even though this possible critique is not explicitly addressed by the authors of the NRC sentiment dictionary, Mohammed and Turney (2010) provide some insight that may explain this inconsistency. According to them, this dictionary was produced based on a taxonomy of emotions applicable across different cultures using crowdsourcing, resulting in a reliable set of word-emotion associations. This premise would mean that the identified associations reflect a social status quo with patriarchic dominance. Given that this dictionary is more than a decade old, it would be essential to update it to reflect the current situation.

The sentiment analysis in this study has limitations in that the words used by the participants are, to a varying degree, introduced to them through the vignettes. Even though the participants also state their thinking, they tend to read the information presented differently. For the analysis, each utterance indicates that these words are essential to the participant. This assumption is the basis for applying a sentiment analysis. However, this assumption has limited validity as there are possible moments when participants read out information without much consideration. From this basis, the sentiment

analysis used in the following analysis should be seen as contextual information where the case may trigger some sentiments more than others rather than assuming that the participants feel the underlying emotions.

5.5.3 Co-Occurrence Maps

According to Chen and Lin (2021), co-occurrence networks are valuable tools to explore the relationships between different entities, in this case, words. In this study, they are used to visualise the relationships between frequently used words. The nodes in a map signify the words selected for the analysis. In this case, the focus is on nouns, verbs and adjectives as they are most likely to contain relevant content for the analysis. The edge between nodes and their thickness indicates the strength of the co-occurrence. These maps visually represent the main themes and topics in the transcripts. Nvivo was used to create textiles containing all quotes from different participant groups and the vignettes. These textiles were imported into R, where they were processed for use in the software written to visualise the data.

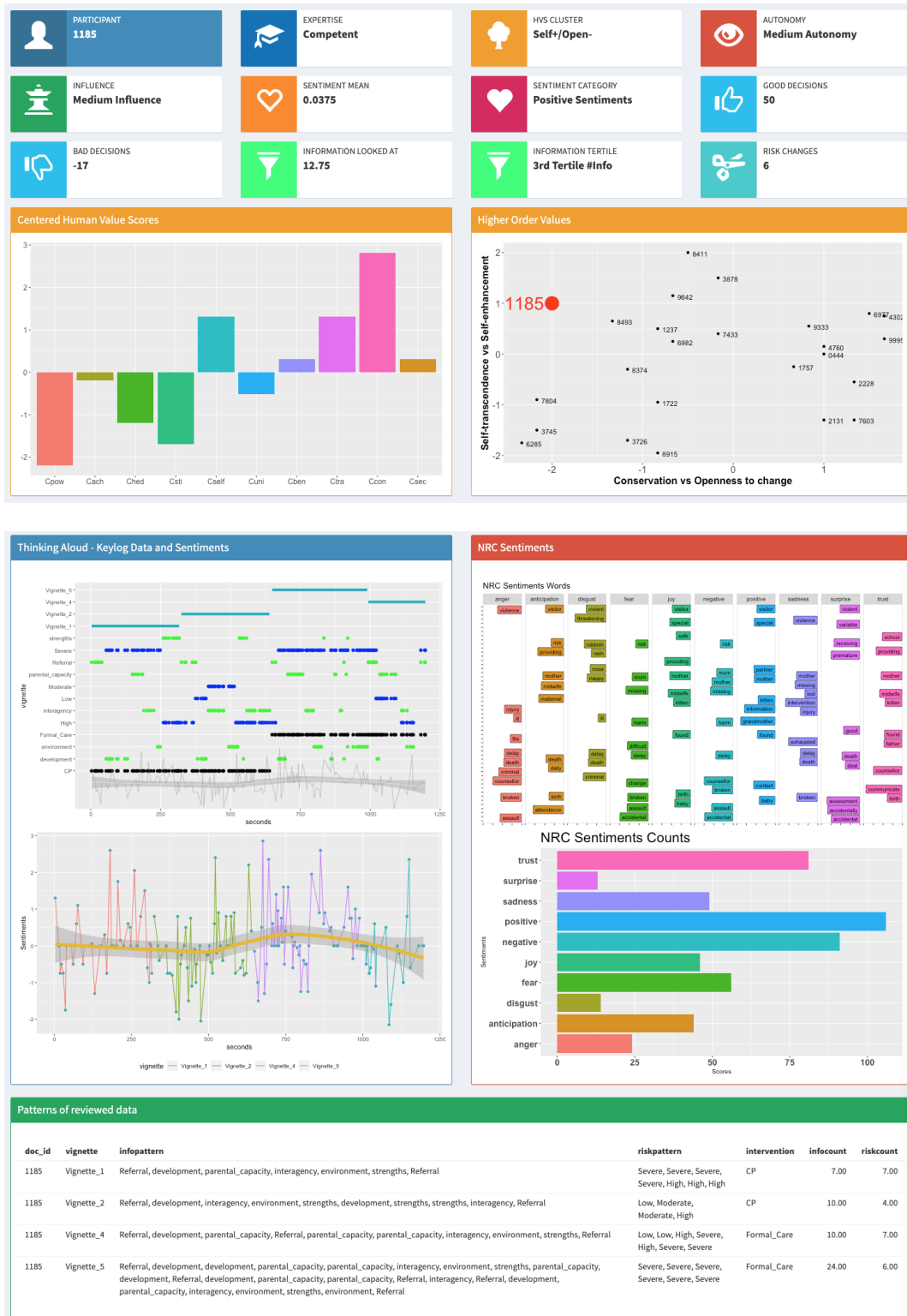
5.6 Visualisation of Data

The data from the questionnaire, transcripts and keylogs provide the basis for constructing the participants' habitus. For this purpose, a Shiny App, a web-based application for the programming language R, was developed to visualise the available data for each participant and vignette interactively. The app contains three sections. One is to visualise the data available to describe each participant. A second one creates visuals to explore the characteristics of each case. The third one focuses on analysing the reasoning of each participant. Next, examples of each section are provided.

5.6.1 Participant Information

Using this app, a visual profile for each participant was created as the basis for further analysis. This includes basic profile data about each participant, like their expertise, their assigned value cluster, the mean of their expressed sentiments and the means of their ratings of good and bad decisions. Next, this section includes a visualisation of the keylog data and the expressed sentiments over the duration of the simulation and provides information about

their responses to the value questionnaire. Each profile also shows the pattern of their interactions with the simulation and a sentiment analysis and the most used words and a co-occurrence map.



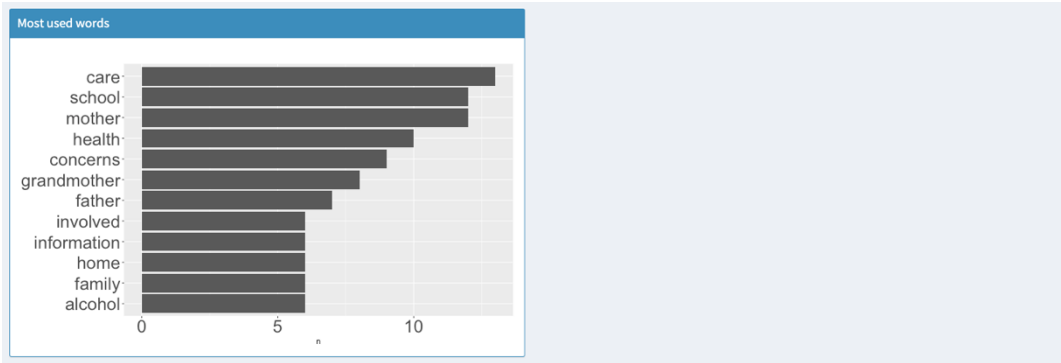
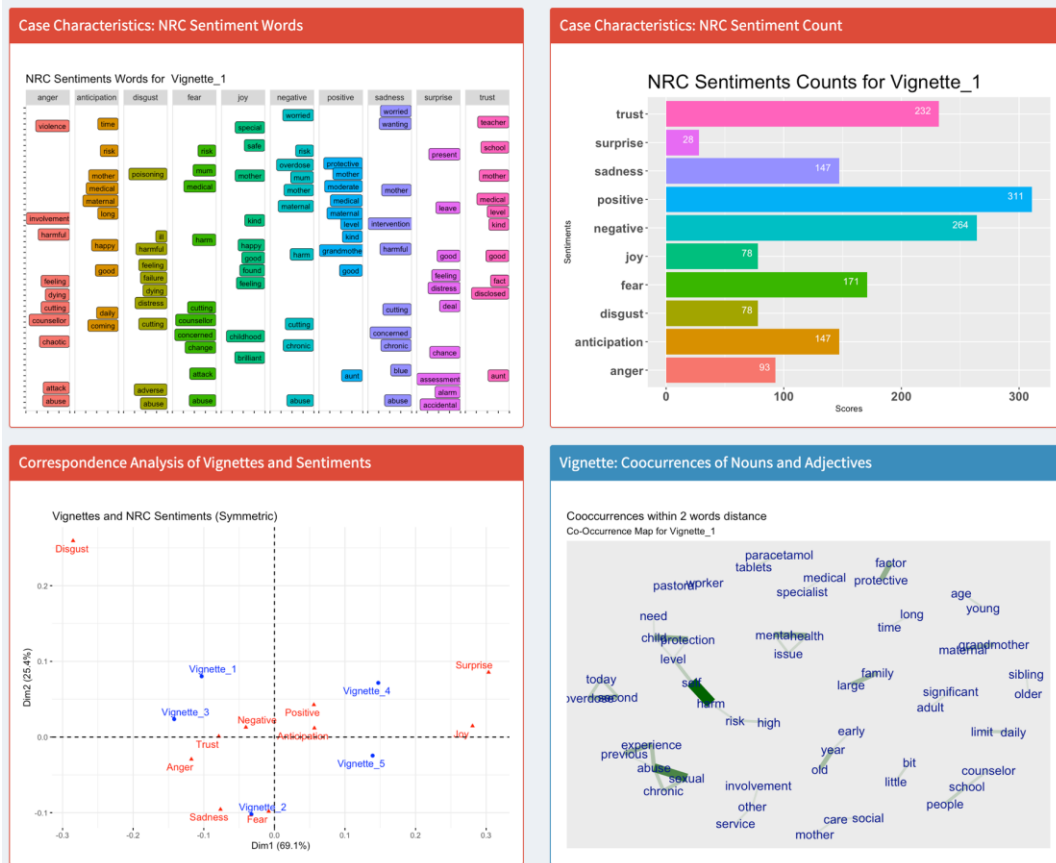


Figure 36: The Shiny App - Decision-Maker Characteristics

5.6.2 Case Characteristics

This part of the app contains two sets of information derived from the coded transcripts. First a sentiment analysis based on the NRC dictionary, discussed in the previous section. Second, the R script uses the coded transcript data to a new annotated data frame based on a natural language processing toolkit (Wijffels 2022) that tags parts of speech (nouns, adjectives, pronouns). This annotated data frame is the basis for creating co-occurrence maps below that show how often a term occurs together with other terms.



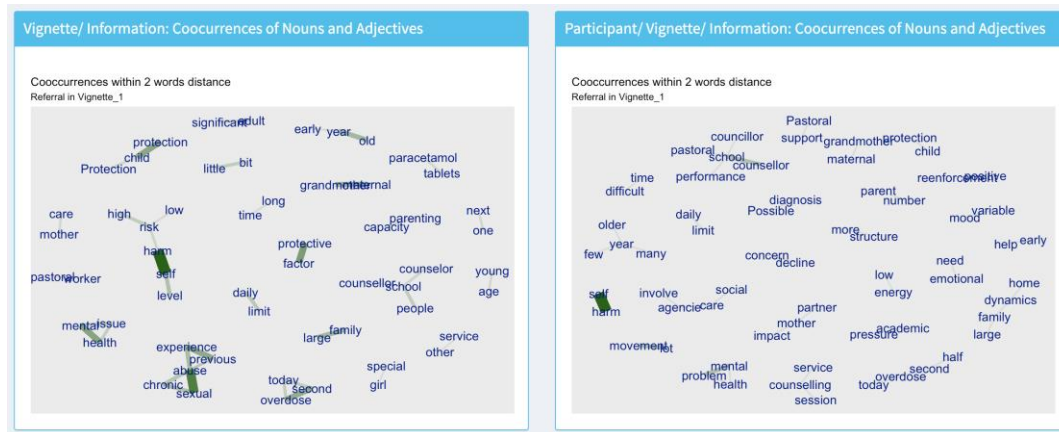
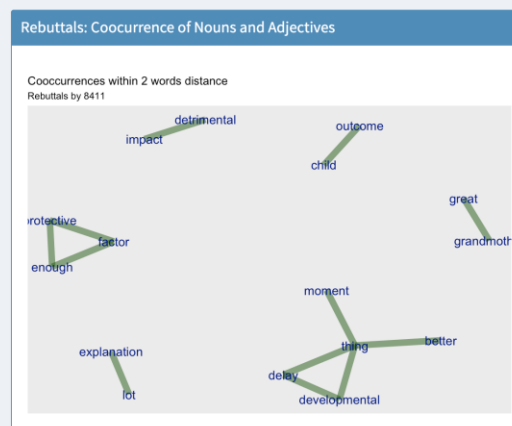
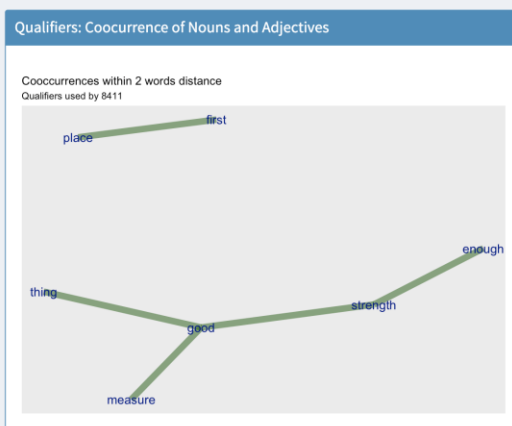
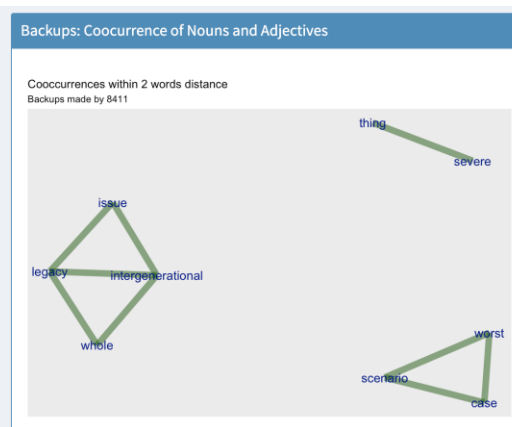
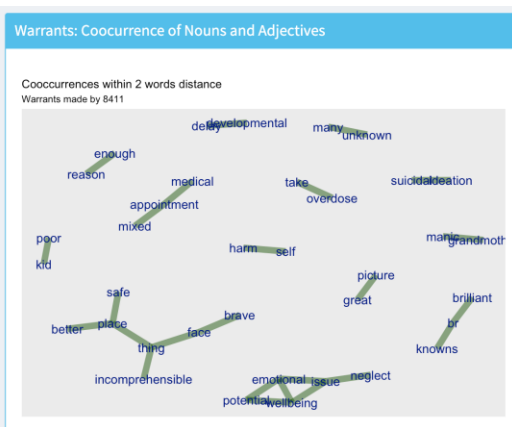
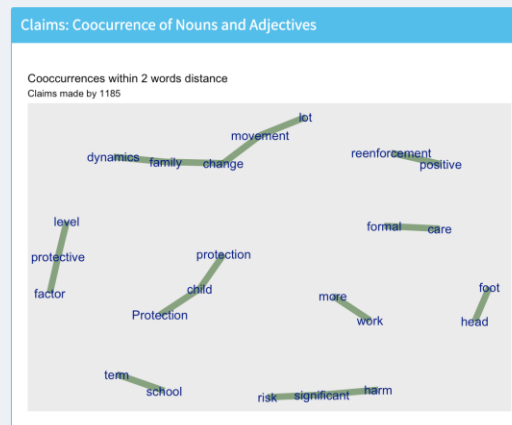
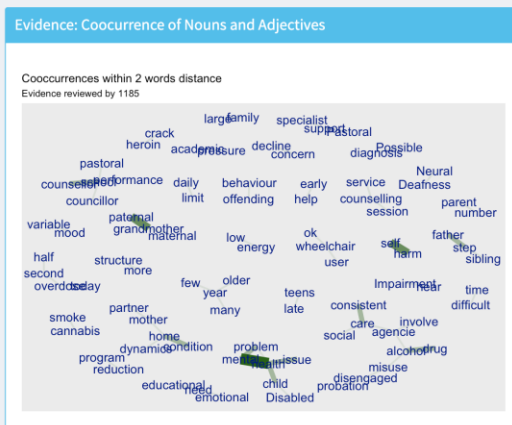
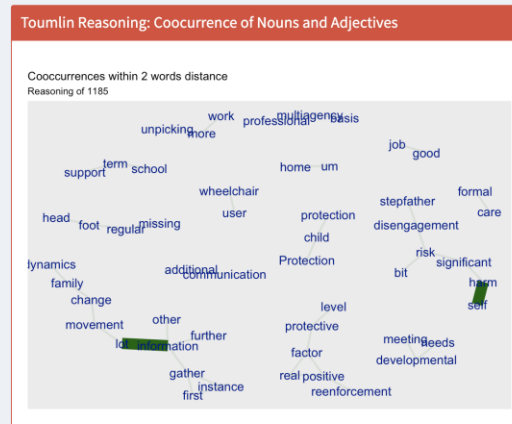
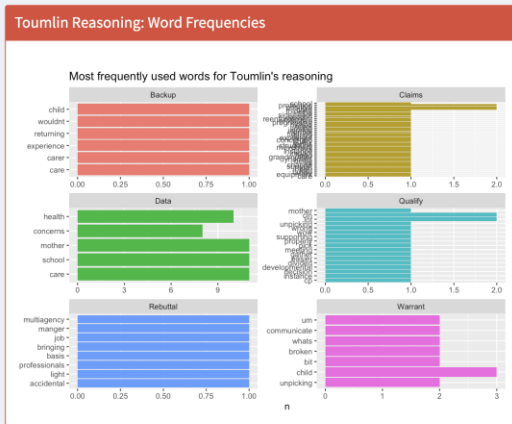


Figure 37: The Shiny App - Case Characteristics

The first three graphs visualise what all participants said for each vignette. The last co-occurrence maps allow a deeper dive into what the participants said when looking at the different parts of the information.

5.6.3 Toulmin Reasoning

This last section of the app analyses the reasoning patterns of individual participants or different groups of participants. First, the most frequently used words and the co-occurrence map of all quotations that are part of the Toulmin reasoning scheme are shown. The following maps show each reasoning block for each participant. Last, the sentiment score throughout the simulation is presented.



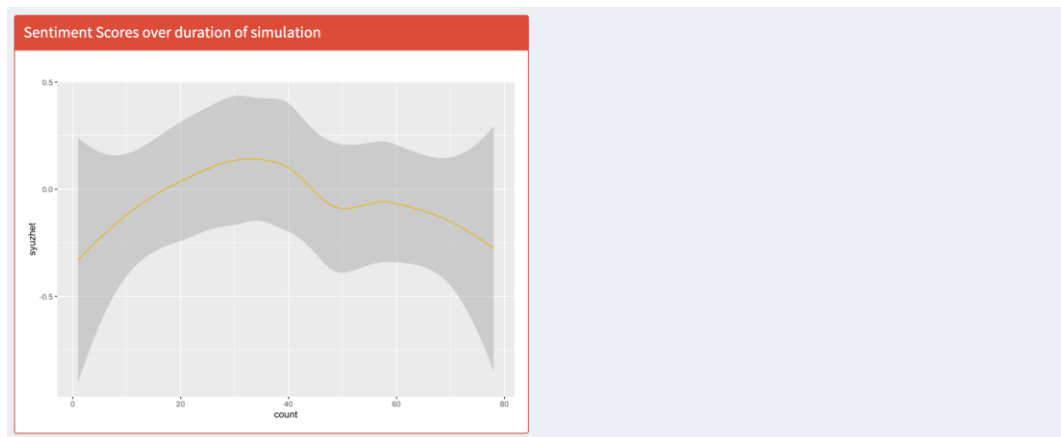


Figure 38: The Shiny App - Toulmin's Reasoning

This summary of the strategy to analyse the data captured through the questionnaires and the simulation software is a limited representation of the complexity of this analysis. The full details of the analysis are available in the appendix, which contains the annotated R-Scripts and the different approaches tested to extract meaning from the collected data. This process involved a high level of trial and error which cannot be discussed here in full detail. However, the resulting software tools designed for this study are an important output of this study. In this case, they provided the opportunity to explore the data in a structured way but without potential preconceptions about what the data should be. The visual representation of the transcript data, alongside the information about sentiments, timings and actions taken by the participants, proved to be a valuable way of finding starting points to explore what turned out to be fragile indicators for possible internal reasoning sequences. These are discussed in the next chapter.

6 Empirical Results and Findings

The following analysis of the data collected for this study aims to give insight into decision-maker characteristics and how case characteristics may affect decisions made. This chapter aims to identify how social workers use and manage information to make decisions. In line with the decision-making ecology introduced previously, the following sections focus first on the case and decision-maker characteristics to set the backdrop for presenting results from analysing the reasoning patterns.

6.1 Case Characteristics

In this simulated decision-making environment, the participants only had access to limited information. In practice, social workers could, in principle, access much more detailed data by talking to other professionals or the family, accessing files from other agencies and constructing more information by undertaking more specialist assessments. Nonetheless, the available evidence in the vignettes provided a high level of complexity. This complexity means that the participants had to choose the information they accessed rather than attempting to read all information. Therefore, it is reasonable to assume that the utterances made by the participants when thinking aloud have some relevance to the individual's decision-making process and are not just random snippets of information the participants read out.

Based on this assumption, the evidence that the participants reviewed provides the basis for exploring the impact of case characteristics on decision-making. The following sections outline the critical case characteristics that the participants in this study emphasised by thinking aloud. This part of the analysis uses the visualisations of data in the software written for this analysis, particularly the maps of cooccurrences of nouns and adjectives and the sentiments presented within the case vignettes. The data from the keylogs of changes to risk assessments provide another backdrop for a review of the case characteristics. Sankey diagrams, a form of flow charts, visualise the keylog data. On the left side, each diagram shows the initial assessment of risk after the participants read the referral information.

On the right side, the last level of risk was chosen before participants decided on a course of action. The connections show the risk assessment change between reading the referral and processing the additional information.

Generally, there are important commonalities between the vignettes that these graphs highlight. It seems that across all vignettes, the level of risk increases after participants read more information. Most participants were reluctant to lower their risk score even when they reviewed or identified protective information. This behaviour could be interpreted as a cumulative strategy where risk factors add up over time instead of a strategy where participants evaluate each piece of information.

In Vignette 5, the evaluation of risks between the point of reading the referral and before choosing a course of action is the most consistent. The risk assessments stay at a high level. This high risk is also reflected in the chosen courses of intervention which is the only one where no participant chose a Child in Need level of intervention. It is also the case with the highest proportion of out-of-home care. Compared to vignette five, the other vignettes start with a high proportion of low to moderate risk assessments, increasing over time with varying degrees. Vignettes 1, 2 and 3 show a high proportion of initial low or moderate levels of concern which the participants step up until the point of the final risk assessment. Vignette 2 stands out because this case maintains a relatively high proportion of low or moderate concerns at the final risk assessment point and a high proportion of decisions to choose the lowest level of intervention. Vignette 4 shows the most significant increase in the level of risk between the initial and final risk assessment. Similar to Vignette 5, this vignette has a high proportion of out-of-home care decisions even though several participants choose a Child in Need Intervention.

Sankey Diagrams of changes in risk assessments for vignettes



Figure 39: Sankey Diagrams of changes in risk assessments

Based on the changes to the risk assessment, it is possible to group the vignettes to establish any patterns in the case characteristics that may influence decisions in line with the decision-making ecology. Reviewing the data from different perspectives and sentiments reveals the same groupings. Vignettes 1 and 3 are more likely to be associated with the sentiment of disgust, and vignettes 4 and 5 are relatively more linked to the sentiments of surprise and joy. In contrast, vignette two is closer to the sentiments of sadness and fear. The correspondence analysis of the sentiments shows the sentiments of the information presented to the participants. The observation that the emerging groupings from this perspective align with the changes to the risk assessments and the chosen interventions suggests that the

presented information influences the judgments and decisions made.

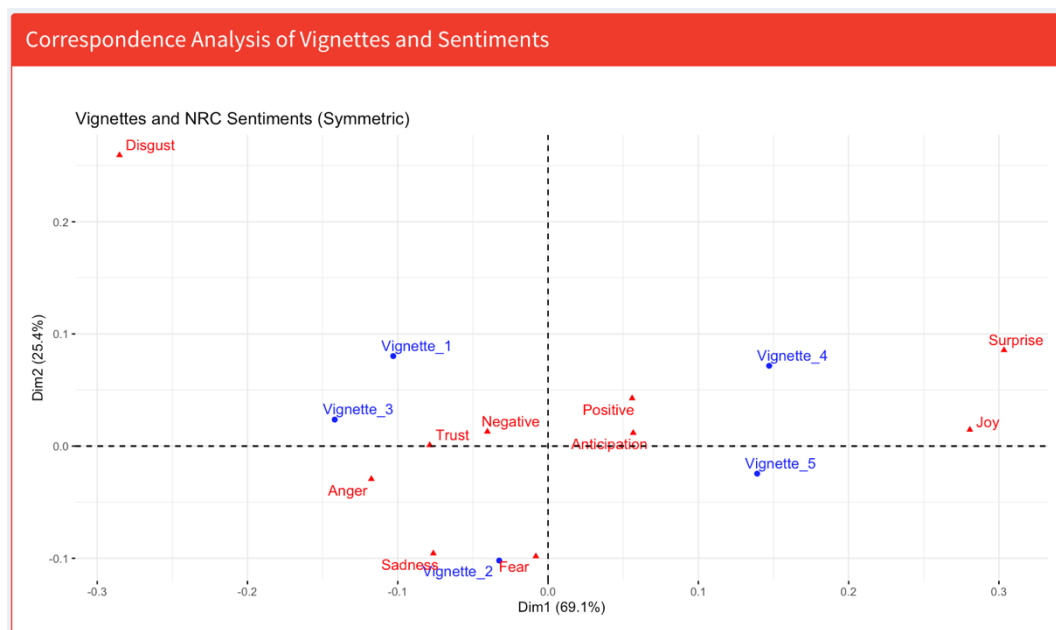


Figure 40: Correspondence Analysis of Vignettes and Sentiments

A third perspective, the most used two-word combinations in each vignette, adds some details that reveal the differences and commonalities in the presented information. The graph below shows the bigrams, two-letter word combinations the participants most commonly used in their considerations of each case. Each word cluster shows the participants' core information most frequently picked up from the vignettes. The words link the different clusters' points towards some common themes that cases share with each other.

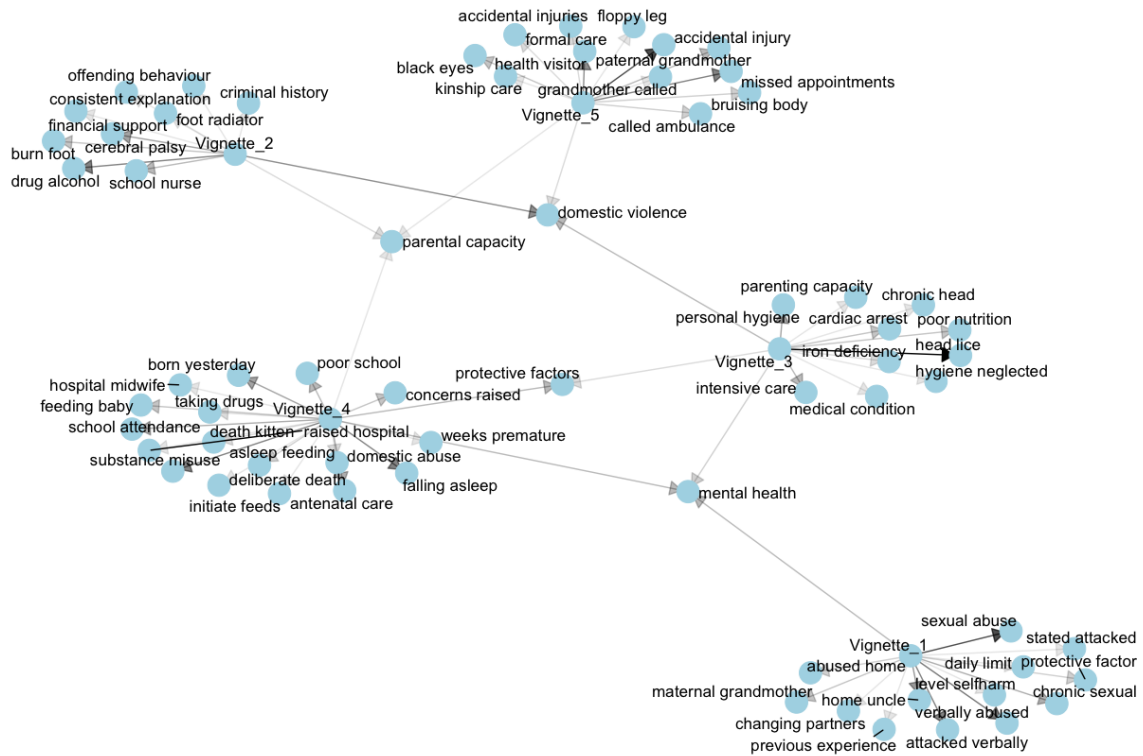


Figure 41: Bigrams in Vignettes

The map shows four common word combinations, "*parental capacity*", "*domestic violence*", "*mental health*", and "*protective factors*", that the participants regularly emphasise across different vignettes. These words represent the commonalities between the vignettes from the participants' perspectives and signify potential high-level categories of information that participants consider when making decisions in different cases. These categories also contribute to identifying similarities in the case vignettes that appeared to be necessary for the decision-makers.

6.1.1 Group 1 - Two babies

The first group of cases share a significant characteristic. Both relate to very young children, one who received a non-accidental injury and one who appears to experience neglect. In their study about factors that social workers and midwives identify as indicators for risk concerning unborn babies, McElhinney et al. (2021) identify seven significant risk factors. These are drug use, alcohol use, age, antenatal care attendance, mental wellbeing, domestic violence and the pregnant woman's childhood experiences. Most of these factors, apart from the pregnant woman's childhood experiences and age,

feature in these vignettes. Despite many similarities in the broad case characteristics of this case, there are some differences in how the study participants approach these cases. Vignette 5 triggers a high level of risk assessed by the decision makers due to the inclusion of information about a non-accidental injury, whilst the limited information in the second vignette does not raise similar concerns despite the vulnerability of both children in these vignettes.



Figure 42: Common words between Vignette 4 and Vignette 5

The pyramid plot of the most common words between these two vignettes highlights the commonalities that the concerns originated from medical professionals in the hospital but also points towards the importance of the mother’s role in vignette five and the concerns about the non-accidental injury in vignette five and the abuse in vignette 4. Participants use the words “*risk*” and “*abuse*” more often in vignette four which has a much higher proportion of participants who choose a non-statutory intervention (CIN) compared to the use of “*accidental*” and “*injury*” in vignette 5, which is a defined diagnosis made by health professionals. That suggests that “*risk of abuse*” has less weighting when determining risks than the fact of a non-accidental injury. The following paragraphs explore each case against this backdrop in more detail.

6.1.1.1 Baby with injuries (Vignette 5)

Vignette five is the case of a one-year-old baby with non-accidental injuries. A review of the transcripts relating to vignette 5 indicated that the non-accidental injury is the key factor that immediately raises the concerns of most participants to severe. When reading the initial referral, participants emphasise key phrases that relate to the non-accidental injury, like multiple bruising, a floppy leg or the transverse fracture the child has received. After participants receive this initial information, the focus appears to be on the other factors and the non-accidental injury is not considered further in more detail.

After the first initial risk assessment, which tends to be high or severe, the participants identify factors like the developmental of the child's sister, an incident where the mother claimed to have received two black eyes from the baby, domestic violence and concerns about parental capacity. All these seem, unsurprisingly, to confirm the initial views of the participants that this is a case that involves high or severe risks. That can explain the consistency between the decision makers' initial evaluation and the final assessment of risk. It seems that combining a young baby and a non-accidental injury, leaves only child protection or removal into out-of-home care as viable choices.

The transcripts include a high proportion of words associated with the sentiments of joy like *smiling, engaging or baby* than in the other cases. In this case, a phrase that includes the joy sentiment word *smiling* highlights the contradiction between the expectation of a happy and protected early childhood and reality. One participant states, "*the health visitor recorded that Naina was **not** smiling, **not** happy or content*". The next part of the quote emphasises the contradiction between the expectation of a happy childhood and the reality for this child: "*so that is distressing in itself*". The regular use of the word *baby* highlights the child's vulnerability in this case and the urgency of taking action: "*serious injuries in a non-mobile baby would suggest formal care proceedings immediately*" or "*my concerns are going up at this stage to severe really because you know, we have got a baby with unexplained injuries and bruising*". Altogether, the more frequent use of

positive sentiment words indicates a strong emotional response to this case and vignette four because the subject of these vignettes is very young children.

The participants also highlighted the information about parental capacity, which seems to affirm the high level of the assessed risk in this case. Even though participants consider that the grandmother is actively looking after the baby (alongside their siblings), this does not appear to reassure the participants and reduce their concerns about this case. The unwillingness to see the grandmother's involvement as sufficient to keep the assessed risk low appears to be due to the information indicating a lack of parental capacity, evidenced in the unwillingness of the parents to engage with the professional support offered. The frequency in which the participants emphasise parental non-engagement suggests that this is a vital aspect of this case that influences their judgement about risks. The lack of parental capacity confirms the high-risk assessment level and suggests a sense of urgency to remove this child from out-of-home care.

In this case, it appears that the non-accidental injury reported in the referral acts as a red flag, making most participants choose a high or severe level at the start. In practice, a non-accidental injury is relatively rare but a clear warning sign. Any information the participants receive after this acts as information to confirm the initial risk assessment.

6.1.1.2 Baby and neglect (Vignette 4)

Vignette four also relates to a baby, but in this case, the concerns raised relate to neglect. When reading the referral, which contains very little information, the participants tend to focus initially on the fact that the mother has just given birth and the concerns raised by the midwife. Some participants initially did not understand why concerns were raised. Examples of this lack of understanding are statements like, "*probably, the poor woman is probably knackered*" or "*she has got to be exhausted*". Consequently, the participants initially tend to rate the risk in this case as low. This assessment of risk changes quickly when participants pick up information about alcohol and substance misuse, previous involvement of child protection services in the family, poor home conditions, a lack of engagement and the deliberate

death of a kitten. The information about a deliberate death of a kitten appears to be triggering a response that raises the risk without making explicit links to the actual case but using this information as a generic warning sign. One participant explains, "*Whenever you see a dead animal, that's always a slight indicator, isn't it*". Nonetheless, this case does not reach the same level of concern as the previous vignette.

The Sankey diagram shows that this is a case with the most significant distance travelled in risk assessments, which could indicate increased deliberation. In this case, the dominant initial assessment of risk is low even though this changes to a significantly higher level of concern after the participants read the case information, with a substantial proportion of decision makers suggesting out-of-home care after reading the available information, not too dissimilar from vignette five. The most considerable change in risk assessments comes from those who initially considered the case a low risk and then changed their assessment to high or severe after reading further information.

Similar to vignette 5, the sentiments of surprise and joy are dominant in the description of this case. That results from the information containing words like *baby* or *birth* representing the expression of joy often associated with the birth of a new baby. The surprise words like *violent*, *premature* or *incident* highlight that this case contains information that contradict the expectation that a new baby triggers positive sentiments. It could be, that this stronger emphasis of joy on one side and surprise on the other in this and the previous case contributes to the observation that the decision-makers have individual positive associations with early childhood and that surprises like the *death of a kitten*, *an incident of domestic abuse* or *poor home conditions*, all features of this case, highlight the high vulnerability of children in their early years leading to a significant change in the assessed level of risk and a high proportion of out-of-home care.

Vignettes 4 and 5 relate to young children who depend highly on their carers. Especially the age of these children seems to affect the decisions made by the participants. Therefore, it is not surprising to see that these two cases receive the highest proportion of high or severe risks and recommendations

for out-of-home care once the participants read additional information. As suggested above, this could be related not only to the knowledge of child development and the vulnerabilities in this phase generally but also to the positive sentiments babies can instil in those working with them. That may mean that any information that suggests something is wrong could be emphasised more than this would be the case where children who are developmentally less vulnerable are involved. Interestingly, these two cases share risk factors with the following cases: a child with a disability who suffers from an injury and a teenager who experiences neglect.

6.1.2 A single case - Domestic Abuse, Child with disability (Vignette 2)

The following vignette to be discussed here stands apart from the other vignettes, even though the potential injury and concerns about neglect would make it feasible to draw connections to vignettes 1 and 4. Vignette two, a case of an eight-year-old child with a disability, lies on the other end of the continuum regarding levels of risk and severity of intervention. That is despite similarities between this and vignettes 4 and 5 regarding the child's vulnerability and the dependency on the carers. In this case, a child with limited mobility and high dependency on his carers received an injury to his foot. Compared with the other vignettes, the participants expressed more words associated with sadness (*worried, violence, delay*) or fear (*injury, hospital, assault*). In terms of the risk assessment, the participants rate this case initially as low or moderate. After reading additional information, many participants continue to rate this case as a moderate risk. Decision makers spend the most time (6.3 minutes) on this case which suggests that participants invested their limited time into their deliberation of this relatively complex case.

When participants review the initial information, the main focus is on the diagnosis of cerebral palsy, and the participants appear to use this condition as a way to consolidate the information that a child suffered from a burn to their foot by touching a radiator: "*I don't understand how cerebral palsy in his case affects his movement. And I don't understand how someone can burn themselves on a radiator.*" It looks like the participants put the disability at the

centre of their consideration: "There's *mum possibly struggling to manage as he has got older, struggling to manage his disability. And perhaps she's just doing things like putting him near a radiator in his wheelchair when she shouldn't because she's busy, and she's thinking, right, OK, I'll just leave him there while I do this kind of thing.*" Here, the participant hypothesises and constructs a story about ways to explain the injury using information not included in the case vignette. Thereby, the participant constructs a narrative in which the injury is accidental instead of non-accidental due to neglect. The delineation between an accidental and a non-accidental injury appears to be an important consideration when assessing the risk in this case based on the referral information. For example, one participant implied that burning on a foot is no reason to be "*overly concerned, it's just a burning on a foot*", suggesting that this is merely an accident. Another participant states that "*Although it's concerning, we don't think this is a non-accidental injury*" by adding, "*We are just worried about the delay*", the focus moves away from consideration of an injury to the lesser ("*just worried*") concern of parents not responding in the required pace. That, and the information the child receives the required medical care, aligns well with the relatively low-risk level assessed after reading the referral information.

As in the other cases, reading additional information triggers movements in the risk assessment. Whilst reading additional information, the participants seem to emphasise concerns about domestic abuse, the offending behaviour and substance use of the stepfather, which is seen as affecting parental capacity. Even though the overall risk assessment goes up after reading the case information, the most significant change is the move from an initial low-risk assessment to a moderate and a change from low to high or severe. Many participants change their assessment from low to moderate, thereby increasing the number of moderate ratings. That reflects the observation that $n=8$ participants chose the lowest level of intervention (CIN), with only $n=2$ participants choosing out-of-home care. This relatively low-risk assessment at the end of reading the additional information is somewhat surprising, given that participants appear to be raising concerns about the domestic violence of the stepfather. He is involved in the child's care.

In this case, the participants notice the history DA but see the more recent positive changes as arguments for not increasing the risk assessments. Despite one participant highlighting that this is a case of a "Toxic Trio", these concerns are reduced because the stepfather is currently not using Class A drugs and engages with professionals. That is somewhat different to Vignette 5, with the main differences being the child's age and lack of engagement. What is interesting is, that there is not much deliberation about the fact that this child has a disability and therefore could be more vulnerable than other non-disabled children. The only consideration given to this fact is a concern about the mother not able to cope with the care for this child as a result of this disability. It also appears as if the risk of domestic abuse is seen differently, less significant, than in vignette 5 and vignette 3 which is one of the next two cases.

6.1.3 Group 2 - Two teenagers

The two vignettes in this group refer to 15-year-old girls, one who experiences a life-threatening health problem due to neglect and the other who self-harms from chronic abuse throughout her childhood. As stated, there are similarities between these vignettes in terms of the sentiments expressed in the transcripts and the initially low level of risks associated with the information portrayed in the referral. Vignette 1 has a higher proportion of decision-makers suggesting a low-level child in need of intervention, whilst vignette 3 stands out because it is the only case where kinship care is not an option for the decision-makers in this study.

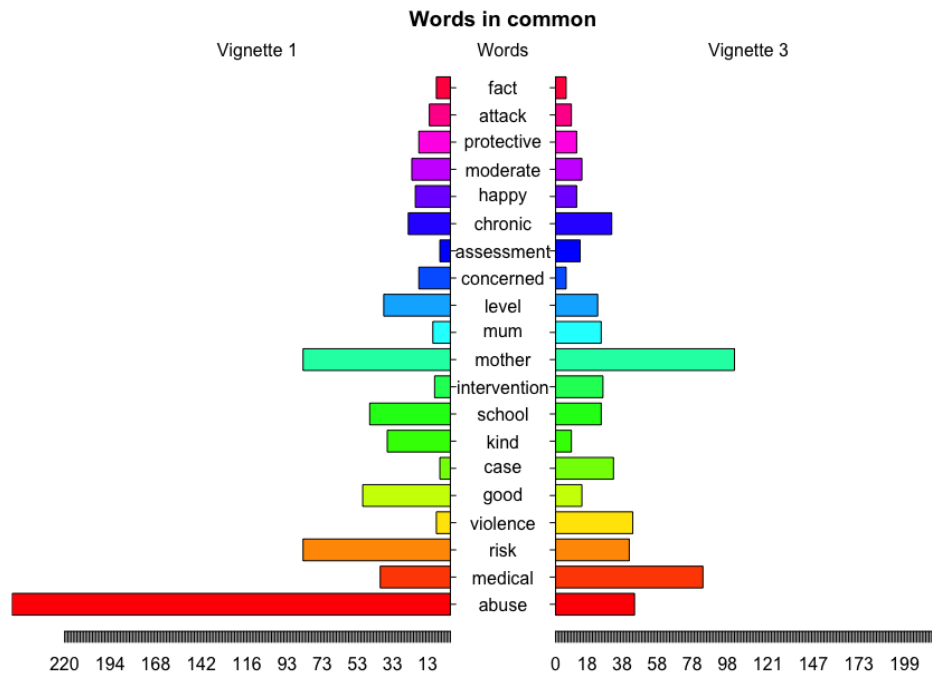


Figure 43: Common words between Vignette 1 and Vignette 3

The pyramid plot shows that vignette 1 has a much greater emphasis on the risk of abuse. In contrast, vignette three focuses more on the medical aspects of the information presented and the violence described in this case. Both vignettes are connected through frequent references to *mental health*.

6.1.3.1 Teenager and self-harm (Vignette 1)

Vignette one, the case of a 15-year-old teenager who presents with self-harming behaviour, is initially rated by most participants as a low or moderate risk which changes to a majority of participants rating this case as high or severe risk just before choosing a course of action. The thinking-aloud transcripts for this case vignette contain a relatively higher proportion of negative sentiment words than the other vignettes and words that express disgust like *poisoning, failure, distress, dying, cutting or abuse*. This observation provides an interesting context for the noticeable change from a relatively high proportion of low initial risk ratings to a much higher level of risk at the end.

When reading the referral, the participants initially focused on the paracetamol the child used to self-harm and the fact that she sought help from professionals in her school and that medical professionals have been

involved. This information appears to provide a reason to start with a low-risk assessment. At this stage, participants say words associated with positive sentiments and trust like *teacher, medical or protective*. For example, when participants say a "*couple of low-level overdoses, but telling people about those*" or "*it looks like it is superficial if it is on eight paracetamol tablets*", it appears as if the available information does not trigger concerns about the case. That could be the result of the consideration that there are "*significant adults are looking at all of that*", meaning that there does initially not appear to be a role for social workers as these other professionals already respond to the child's needs. If this is the case, it means that the low-risk assessment is not signifying the actual risk to the child but whether or not there is a role for social workers.

This observation could help to understand why the participants pick up on the information that the child experiences verbal abuse by her uncle but do initially not see this as a reason to increase the level of concern which is low at the start. However, in this case, the abuse becomes a much stronger focus when participants realise that this child has experienced chronic sexual abuse by her two brothers and is linked to the reported self-harm. One participant reasoned that "*we are looking at adverse childhood experiences, you have got a mother with domestic abuse, chronic sexual abuse*", which triggers an increase in the assessment of risk. At this stage, the participants use more words linked to the sentiments of disgust mentioned above. Mainly the participants who initially rated the case as a moderate risk increased their assessment to high.

Another characteristic the participants reviewing this case picked up is related to the mother's mental health problems, who shows "*depression, suicidal ideation, thoughts of dying*" and "*variable moods. Periods of low energy. Possible diagnosis.*" It is interesting to note that this information does not add to the accumulation of risk but that there are indicators that the mental health problems provide an explanatory backdrop for the reasons for the potential neglect. One participant says that the mother's mental health issues could mean that the mother "*might be a bit preoccupied and not always emotionally available for the kids*". One interpretation could be that this means there is

either neglect or mental health, which excludes the idea that neglect can occur together or because of parental mental health. In the words of Ross et al. (2009), this suggests that the response to the identified needs is split between the requirement to improve parenting and meet the child's needs.

6.1.3.2 Teenager and neglect (Vignette 3)

Vignette three is about a 15-year-old teenager, where the referral raises concerns about severe physical neglect leading to life-threatening health impairments. Critical features that this case shares with other vignettes are Mental Health (shared with Vignette 1 and 4), Domestic Abuse (shared with Vignette 2) and the consideration of protective factors (shared with Vignette 4).

Similar to vignette 1, the sentiments expressed concerning this vignette are strongly associated with words expressing disgust like *threatening*, *neglected*, *dirty*, *delay* or *abuse*. A vital aspect of this case is that the child experiences "*life threatening anaemia*" and that the mother was "*diagnosed with a life threatening health issue*". That happens against the backdrop of information about the child's concerning personal hygiene. This child "*is being chronically neglected all her life,*" and the "*child is dirty*".

In this case, the proportion of decision-makers who rate the risk initially as low or moderate is greater than in vignette one. This case also relates to a 15-year-old teenager; even though the presenting health conditions are more acutely life-threatening, as one participant pointed out by saying, "*she still ended up in hospital almost dead*". Nonetheless, the focus of the consideration when participants read the referral information lies on the medical terms used like *poor nutrition*, *iron deficiency*, *intensive care* or *cardiac arrest*. This observation may help to explain why the initial risk assessment is low despite the seriousness of the presenting situation. The participants identified this referral initially as a medical problem that did not constitute a risk from a social work perspective.

Nonetheless, when they read more information, they change their mind. At the point of the final risk assessment, a greater number of decision-makers suggest taking the most severe course of action and removing this child into

formal out-of-home care. This observation relates to a group of participants who change their initially moderate risk assessment to high or severe.

The transcripts show that Mental Health is an essential feature of this case. One participant (1237) considered whether the child was neglected or if the emerging condition results from poor mental health. This participant is very explicit in stating that the assumed "*mental health, potentially an eating disorder*" is the reason for "*not looking at removal or anything like that for the time being*". In this case, the consideration of mental health leads this participant to consider that some of the child's behaviours (poor hygiene, eating) may constitute "*an element of control*" of the child, which would affect the parental capacity to make necessary changes. Another participant (6285) considered that the child's mental health has limited the success of what the parents may have tried to support the child, who "*at 15 should be able to manage some of that herself*". In both cases, the participants see the child's mental health as a complicating factor separate from the outcome of what one participant (1237) described as a "*rocky ride*" as a paraphrase for chronic neglect. Another participant highlighted this separation between the issue of neglect and mental health problems. This participant sees mental health as an alternative interpretation of the child's experiences. In this case, neglect and mental health are not complementary but different interpretations of the observed situation: "*Maybe she wasn't actually neglected, but actually it is a mental health issue*".

This case also features domestic abuse, which is picked up from the information about the parental capacity concerning the birth father who has left the family. This information seems to feed into the overall picture of the case participants construct in their minds. One participant lists domestic violence as one feature amongst others as a summary when considering the level of risk: "*Chronic neglect, domestic violence, housing, eviction, family needing financial support*". When the participants noted this information, it seemed to have increased the risk assessment, not because of current concerns but because participants considered children witnessing domestic abuse a risk factor, even if these are historical concerns. One participant linked this to the theoretical concept of Adverse Childhood Experiences

(Felitti et al. 1998; Center for Disease Control and Prevention 2016) and the effect these have on children in the long term. In this particular case, the participants often looked for protective factors to find information that balances against the high level of adversity that the participants noted in this case. However, the participants stated that they could not identify protective factors in the family, which could explain why a significant group of participants identified a severe risk at the final risk assessment.

The cases in this study have very different features with different ages of the child, their background, the reasons for the referral and the potential risks. Nonetheless, they are all based on serious case reviews and as such, all cases meet the same threshold defined in Section 16 of the Children Act 2004. According to this threshold, a child has been abused or neglected and has been seriously harmed due to this abuse or neglect. Therefore, the theoretical expectation would be that all cases should result at least in an intervention at the level of Child Protection or a higher initial risk assessment. Even though child protection is the preferred course of action in all cases but the second vignette, there are noticeable differences between the cases' initial and final risk assessments and the chosen course of action between the vignettes. The above observations highlight variations in the initial judgments and final decision-making. These are somewhat out of line with the outcomes expected in decisions about cases that have all met the same risk threshold. This threshold is that they are subject to a serious case review. In this study, the participants tended to be more concerned about information concerning very young children either from the start or while accessing additional information. The two cases involving teenagers initially showed a lower concern, but the participants increased their risk assessment after reading additional information. These observations suggest a level of noise (Kahneman 2022) in the judgments and decisions made by the participants. The question now is how much these variations result from the interplay between the case characteristics and the characteristics of the decision-makers.

6.2 Decision Maker Characteristics

The following part of this analysis uses the human values, levels of expertise, the experience of autonomy, perception of influence and good and bad decisions to explore the characteristics of the participants as decision-makers. In line with the decision-making ecology, which provides the framework for this analysis, the decision-maker characteristics are relevant to offer the backdrop of the analysis of the reasoning done by the participants in this study. They point towards individual dispositions, thought and behaviour patterns that structure the perception of the social environment (Bourdieu 1977, 1993). Therefore, considering the decision-maker characteristics provides the backdrop for analysing reasoning strategies.



Figure 44: Wordcloud of role descriptions

This study relies on a small sample of n=24 social workers covering a wide range of roles within social work practice, visualised in the word cloud in Figure 47. The sample includes.

- n=6 social workers in Child in Need and Child Protection Teams,
- n=3 social workers with a mixed role between practice and workforce development,
- n=3 social workers in assessment teams,
- n=2 social work students,
- n=2 social workers from a Looked After Children's Team,
- n=2 social workers from an Adoption Team
- n=2 social worker from a team specialising in working with Child Sexual Exploitation
- n=1 social worker in a team focussing on court work
- n=1 social worker working with Children with disabilities
- n=1 social worker with a specialist role to work with perpetrators of sexual violence
- n=1 Independent Reviewing Officer

The sample consists predominantly of social workers from three Local Authorities who are white-British or white-European and state that they are female (n=20), with only n=4 male social workers. Neither, the gender, nor ethnicity was included in the analysis of the data.

As such, the participants in this study represent a good range of different social work decision-making experiences. This range is helpful for exploring different ways social workers make decisions, even though the small sample size means that it is impossible to use the different roles to compare different cases with each other to identify possible patterns.

The word cloud provides a snapshot of the range of responsibilities that the participants in this sample cover. A key feature is the dominance of direct work, case management and strategy discussions. Within the smaller print of

the cloud assessment, work is a reoccurring feature, as are references to risks such as abuse and neglect. These role descriptors indicate that the participants in this study share professional experiences relevant to this study.

The following sections first consider the responses to the Human Value Questionnaire, the measures around experience, autonomy and influence and the participant's responses to the questions about good and bad decisions. This part is followed by a review of the decisions about courses of action the decision-makers made. The last part of this section summarises the results of the attempt to bring the above characteristics together.

6.2.1 Human Values

For this study, the Human Value Questionnaire provided the basis for constructing a habitus of the participants. The graph below shows the mean ratings for each of the ten human value scales on the left and the means of person-centred scores on the right. The latter represents the participants' answer patterns concerning the overall mean of each person's responses completing this questionnaire. In other words, it shows the relative importance of each value. The right graph highlights the relative importance of achievement, conservation, security, tradition, and self-direction relative to power, stimulation and universalism for the participants in this study.

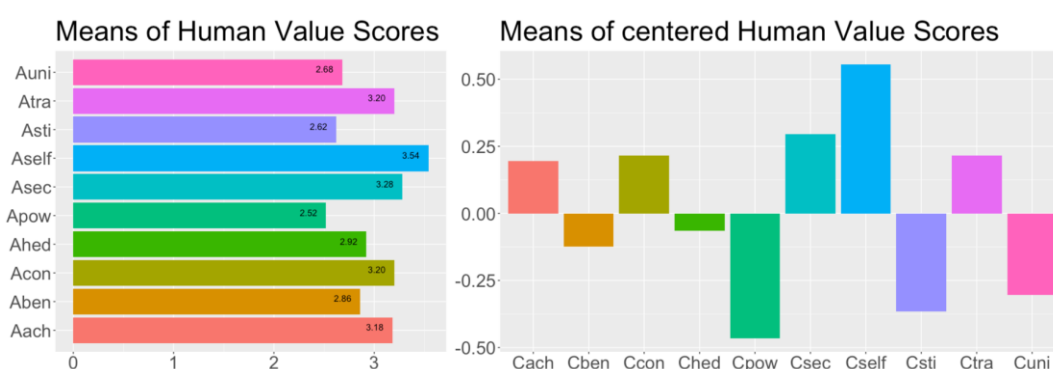


Figure 45: Human Value Scores

The focus (relative to other values) on self-direction indicates a desire for independent thought and action and creativity and exploration (see Schwartz 2012). Security signifies an interest in society's safety, harmony, stability, relationships, and self-enhancement. The relative rejection of power shows

that social status and prestige, control or dominance over people and resources are less important. The low rating of stimulation and (to a lesser extent) hedonism suggests that novelty, excitement and challenges in life, and self-gratification are less relevant drivers for the participants' actions.

Based on the premise that human values influence the way a person makes decisions and judgments, as discussed previously, the descriptors of the participants in this study indicate that as part of their decision-making, they would consider the welfare of others, safety, and safety stability of society and relationships. This assumption would mean that there should be evidence that participants apply independent thinking in their decision-making rather than trying to find standard responses to presenting problems.

This analysis uses the above responses to calculate higher-order values suggested by Schwartz (2019) and discussed above. As already stated, the generation of higher-order values comes at the cost of losing informational value but allows for more effective identification of similarities in participants' dispositions. The R-Script uses a K-means algorithm to identify these similarities. This algorithm iteratively organises the data by minimising the distance between participants established through the means of variables used for clustering (Žižka et al. 2019). In this case, the clustering variables are the two higher-order values (selfdim and opendim).

The plot in figure 49 shows the distribution of the participants on the dimension between self-enhancement (Self+) vs self-transcendence (Self-) and openness to change (Open+) vs conservation (Open-). The first dimension represents the conflict between actions taken out of self-interest vs actions taken for the welfare of others. The second dimension shows the tension between independent action and the interest in new experiences on the one hand and self-restriction on the other. This study assumes that these higher-order values can represent, if only in a very abstract sense, dispositions that affect the way agents make decisions. It is essential to highlight that the presented values are relative and not absolute. That means that a person represented here high on the dimension of self-interest may be seen as being focussed on their interest. That is not the case. Instead, this shows that a person on this scale sees relatively higher importance in self-

interest than others. In this spirit, the different clusters can be compared depending on their location in these two dimensions.

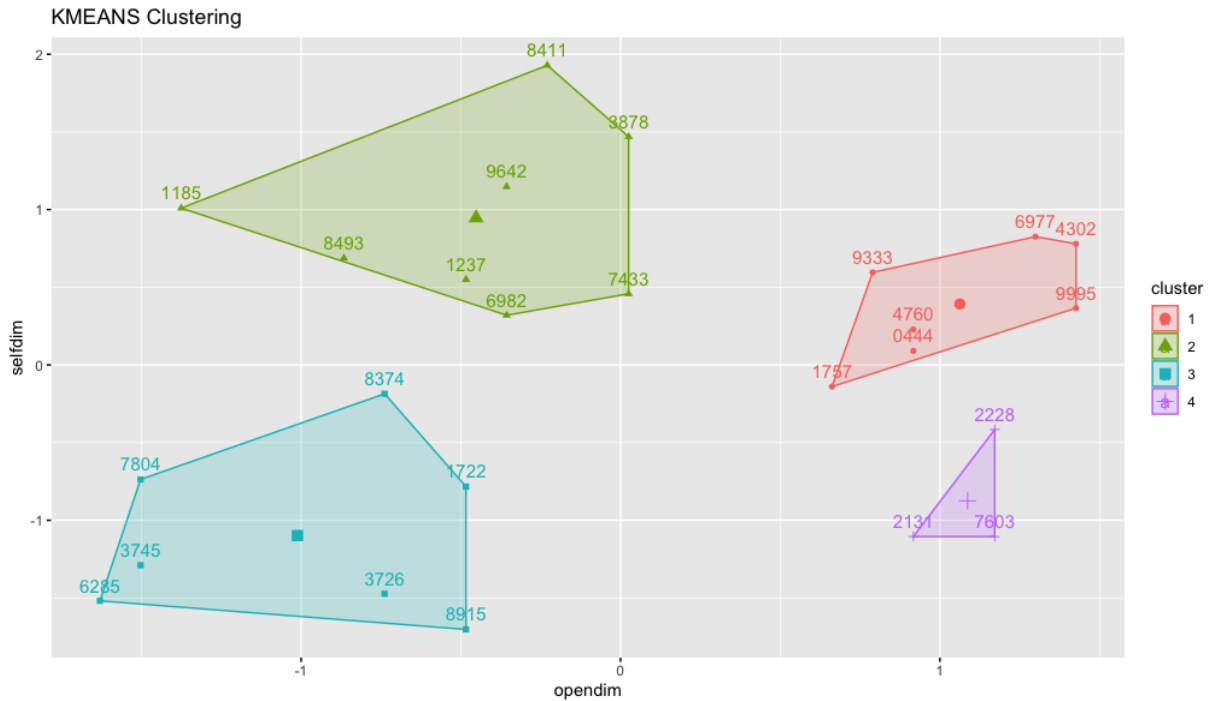


Figure 46: Human Value Clusters

The graph in figure 50 shows the relative distribution of the underlying values in each cluster identified above. The differences between the value patterns potentially indicate differences in the internalised logic of practice.

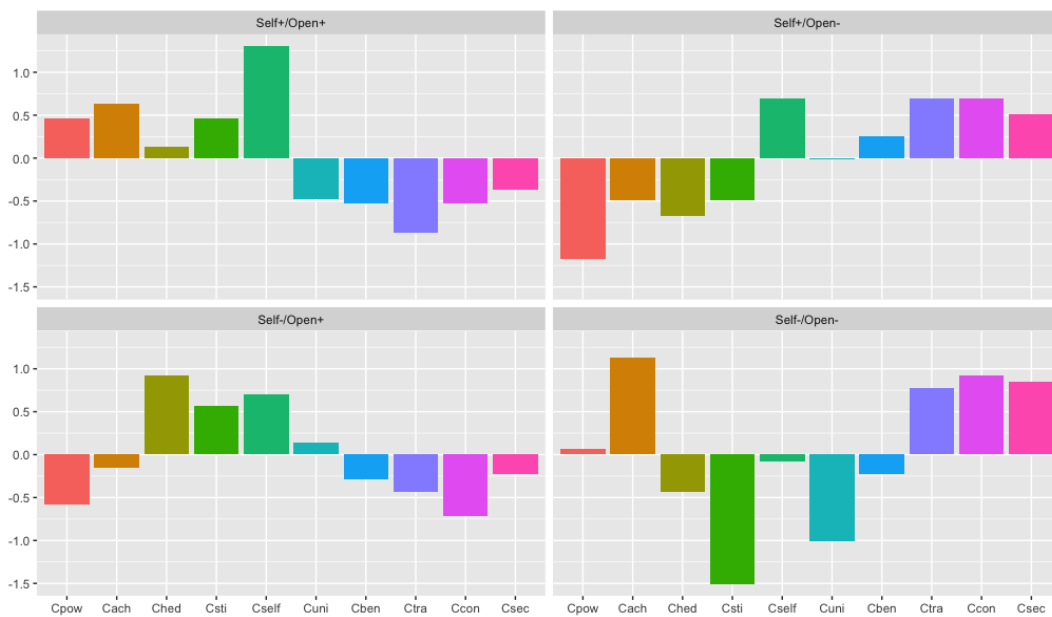


Figure 47: Value Patterns of each cluster

The pattern of the responses in the bottom left cluster (Self-/ Open+) presents

as a mirror image of the central values scores of the top right cluster. In this group, the openness for change is defined by a stronger focus on self-direction, stimulation and hedonism and a minor emphasis on tradition, conservation and security in one dimension (Open+). On the other dimension, a stronger desire for achievement indicates a stronger motivation for self-enhancement (Self-).

The difference between the other two clusters (Self+/ Open+ vs Self-/ Open-) is visually less pronounced even though the opposing nature of the values, according to Schwartz's value theory, is still evident. Those participants located in the top right cluster (Self+/ Open+) in the graph above share a preference for values that suggest the transcendence of one's concerns and the promotion of the welfare of others (self-transcendence), and the desire for independent action, thought and feelings as well as the readiness for new experiences.

The last observation is evident in the relatively strong focus on self-direction and a higher willingness to break conformity, risk the violation of social expectations or norms, and avoid control or dominance over people (power). The judgments made by participants in the bottom right corner (Self-/ Open-) may show some evidence of the desire to demonstrate competence according to social standards, a commitment to existing customs, avoid violating social expectations or norms and maintain stability.

This descriptive analysis of the data is very much based on the assumption that human values influence decision-making and can be used as a basis to construct a habitus that describes the internalised logic of practice. These initial analytical steps present the different clusters of participants and their values as possible motivators for action (Schwartz 2006, 2019) concerning each other. These descriptors' relative distance are taken into the next analytical steps. Before this is considered, the responses about experience, autonomy and influence add to the consideration of decision-maker characteristics.

6.2.2 Experience, Autonomy and Influence in the Organisation

The graphs in figure 51 show the distribution of experience, perceived

autonomy, and participants' perceived influence. The mean of the experience of this group is relatively high (6.7 years). This number does not represent that most participants have less than five years of experience. The median of this sample is 2, which is more representative of the level of experience in this group. A few participants have significantly more years in practice, which skews the overall mean significantly. Nonetheless, given that the average working life of social workers is just seven and a half years (Baginsky 2013), the experience of participants in this sample appears to reasonably reflect the reality of practice.

The level of perceived autonomy to decide how participants organise their daily work and the level of influence on policy decisions captured in the questionnaire are used in this study to measure the freedom to make decisions. Interestingly, the participants appear to have a sense of autonomy, with a mean of 5.3 on a scale between zero and ten, yet seem to experience less opportunity to influence policy decisions about the organisation's activities (mean = 4).

For this analysis, the R-script transformed the variables experience, autonomy at work and influences in the organisation into categorical variables. The bar plot below shows the result of this grouping into novices (0-1 year experience), competent social workers (2-5 years experience) and experts (more than five years). The grouping into low, medium and high influence and autonomy represents the terciles of the responses. Most participants are classed as competent, having medium influence and experiencing a sense of low autonomy.

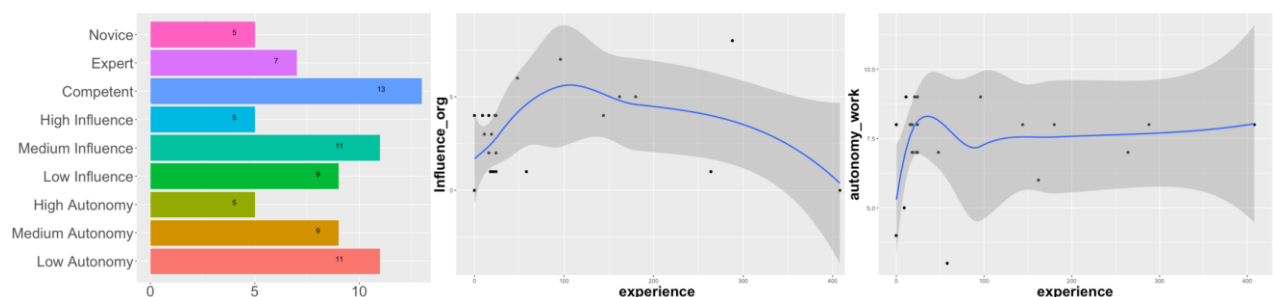


Figure 48: Experience, Autonomy and Influence

This sample's autonomy experience goes up after leaving the novice stage and gaining competency. This increase indicates that the level of expertise

could be a factor in the freedom to make decisions that give them more opportunities to make decisions after the initial phase of their professional career. The correspondence analysis below adds detail about the links between expertise, autonomy and influence. This plot shows that experts in this sample consider themselves to have significant influence even though there is also a weaker association with having medium autonomy. Even though the difference between novices and competent participants in terms of their influence is hardly distinguishable, novices are more likely to class themselves as having low influence than those who are competent. Autonomy is the most distinguishing characteristic between novices and those who are competent.

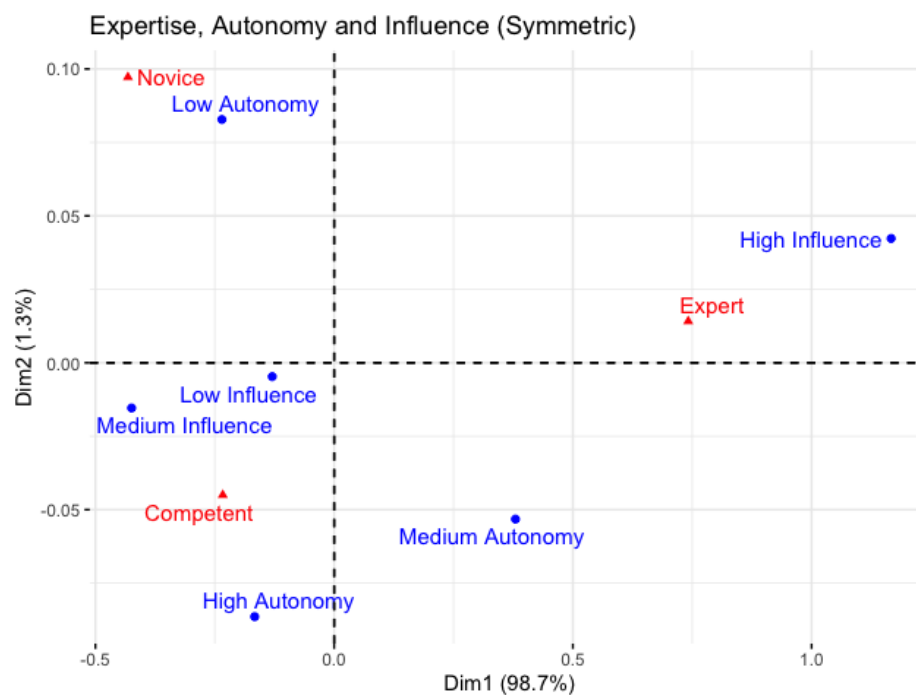


Figure 49: Correspondence Analysis of Expertise, Autonomy and Influence

It would be worthwhile exploring on a larger scale if the experienced autonomy stays stable, as this could indicate limitations to the decision-making abilities of even the most experienced practitioners. In light of the findings from the review of the Ofsted reports, this could be an indicator of the limiting effect that a highly regulated field of social work practice has on decision making. This observation also highlights the importance of ensuring that novices can practice decision-making early on, especially if there is an implicit expectation to make decisions at a similar level of autonomy as an

expert.

6.2.3 Good and Bad Decisions

As part of this study, participants had to choose two good and two bad decisions they had made in the past. The participants rated each decision on two scales, how good or bad a decision was (-5 to +5) and how important that decision was (0-10). These two variables were multiplied to determine a weighted rating of each decision. The weighted rating provided a baseline for what the participants deemed a good or a bad decision, represented in the graphs below. The barplot in figure 53 shows the distribution of the means of all good and bad decisions rated by the participants. The plot in figure 54 shows the means of the ratings for good and bad decisions.

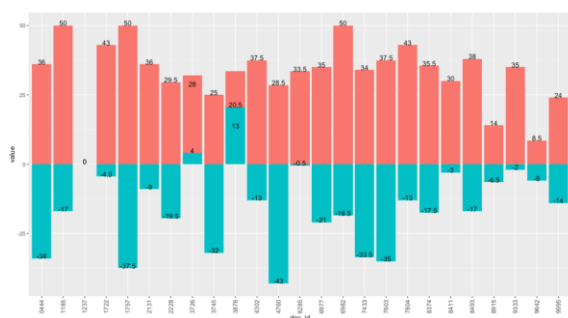


Figure 50: Means of Good and Bad Decisions

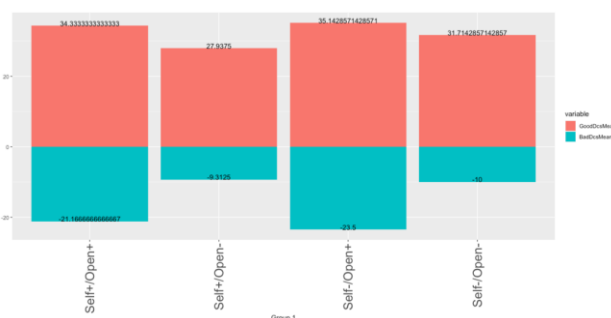


Figure 51: Good and Bad Decisions

What becomes apparent is that participants rate good decisions better than bad decisions. In other words, there appears to be a tendency to minimise the effect of bad decisions and enhance the effect of good decisions. This observed effect replicates the results from the original study by Yates, Veinott and Patalano (2003). The correspondence analysis below emphasises this observation. Experts who prefer value patterns suggesting openness for change (Self+/ Open+, Self-/ Open+) are more likely to rate good and bad decisions more equally compared to novices and competent practitioners who share values that prefer conservation (Self-/Open-, Self+/ Open-). The observation that it is the experts who rate good and bad decisions more balanced and are more open to change could suggest that they have used their long experience in practice to be more confident in acknowledging bad decisions and are more willing to use bad decisions to learn ways of

improving their practice.

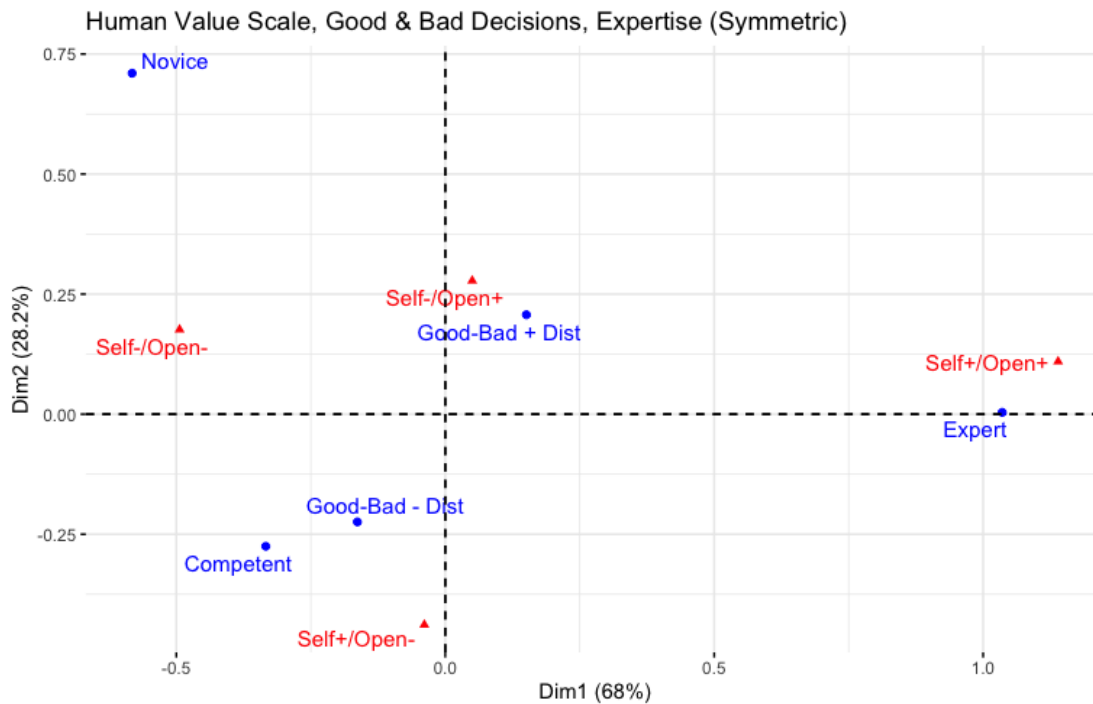


Figure 52: Correspondence Analysis of Human Values and Good and Bad Decisions

This observation points towards a particular problem in learning from social work decisions linked to the wicked learning environment that social work practice represents. It represents a reinforcement loop where perceived good outcomes lead to a more pronounced learning effect whilst learning from mistakes is potentially impaired as bad decisions are somewhat minimised. This loop could represent a response to a blame culture discussed previously, where bad decisions are sanctioned and not seen as an opportunity for learning but as something that needs to be hidden or minimised. The tendency to rate good decisions as better and bad ones as less bad could be a bias in decision-making that avoids losses like the reputational impact of making a wrong decision. Suppose this is the case, then this would have implications for how a social worker makes decisions and learns from these decisions after the fact.

6.2.4 What decisions did participants make?

The data from logging the choices participants made regarding levels of risk and interventions provide another layer of information to construct a model of the decision-maker characteristics. In this case, the question is how expertise

and human values relate to the participants' risk assessments and chosen interventions. Throughout the decision-making exercise, participants had to update their risk assessments whilst reading additional information after making a first initial risk assessment in response to the referral for each vignette. It is essential to highlight that some participants did not change their risk assessments regularly. Often there was a discrepancy between their verbal risk assessments and the risks chosen using the controller. Therefore, the data about risk is potentially not reliable. Nonetheless, this section appraises this information even though this information will be considered in the following analysis steps.

Based on this data, the participants were categorised using the means of their responses. The R-script transformed the categorical data (Low, Moderate, High, Severe) into numeric values (1, 2, 3, 4) and used these to calculate the means across all vignettes. This variable represents the overall preferences for risks and interventions. In practice, this variable divides the participants into two groups, those with a preference for lower vs higher risks and interventions. This separation represents the choice between in-home vs out-of-home care. The first two interventions represent child in need and child protection, both of which would aim to keep the child in the family. The second two options (Kinship Care and Formal Care) suggest that support in the current home is not feasible. The correspondence analysis locates the participants who are more likely to choose out-of-home care level interventions (Kinship and Formal Care) on the left and those who tend to choose children in need or child protection on the right side.

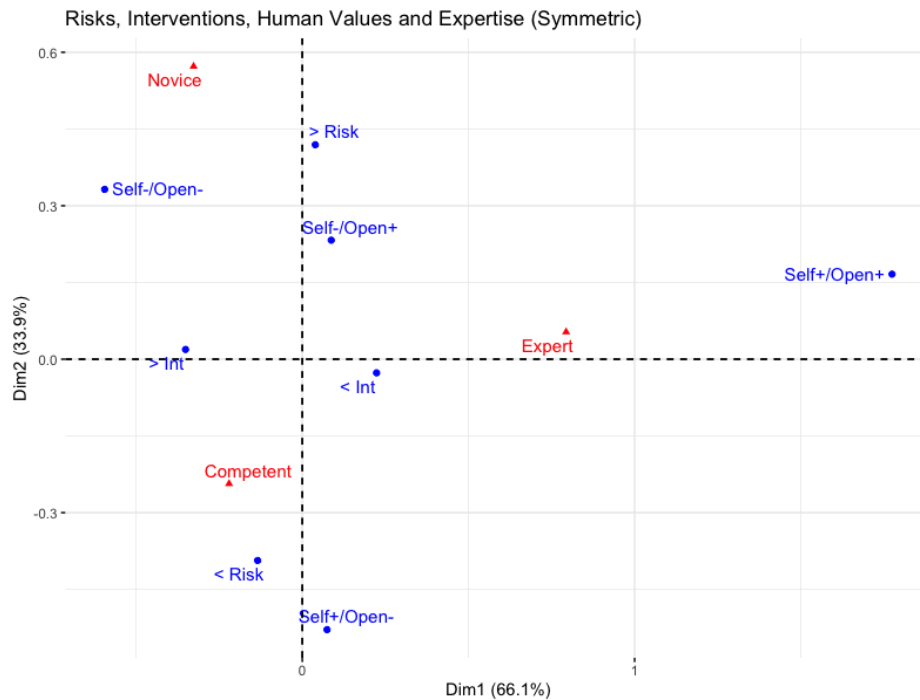


Figure 53: Correspondence Analysis of Risks, Interventions, Human Values and Expertise

There appears to be a delineation between novices and competent practitioners on the left and experts on the right. The differences between these groups are in the choice of interventions and how this relates to the assessed risk. The competent participants and the novices seem to prefer out-of-home care interventions (kinship care and formal care). The experts have a preference for keeping the child in the family home. Novices seem to rate risks relatively more often as high, whilst those who are competent tend to assess risks lower.

A limited association exists between being an expert and the tendency to rate risks as high. That contradicts the observation that experts also tend to choose interventions where the child would remain in the family. Overall, the pattern of assessing risk as high but taking the more risky decision to keep the child in the family could indicate a level of confidence for such a choice. However, the numbers are too low to suggest confidence in this association. Alternatively, this may indicate a sense of realism based on expertise. Getting an agreement for out-of-home care is challenging due to financial constraints and the bureaucratic complexity involved. Experts may suggest child in need and child protection more often despite identifying a high or severe risk.

The value pattern of this group adds to this model of the internalised logic of

practice. Experts in this study are more likely to have a value pattern dominated by an openness for change, unlike novices and competent participants, who are more likely to be motivated by conservation values. This preference for openness to change could be interpreted as an internalised logic of practice that permits the possibility for change within the family. The choices novices make support this hypothesis. Compared to the experts, the novices seem more aligned to a risk-averse pattern of assessing risk as high and choosing interventions accordingly than the experts in the sample. This risk aversion and preference for conservation values could indicate that novices are less confident about the possibility of change in the family.

The graph shows another visual delineation. There is a difference between competent participants on the lower end and novices at the top of the graph. Novices, who are more likely to value self-transcendence, appear to be more likely to rate the risks higher than those who are competent, who tend to be in the group of participants with lower risk ratings and those who show a relative preference for self-enhancement. Both groups seem equally likely to choose interventions related to out-of-home care decisions whilst preferring values relating to conservation. For a hypothetical model of their reasoning, this could mean that they are less likely to rate the chances of change in the family as high and therefore tend to prefer out-of-home care. For novices, assessing risks as high and choosing higher-level interventions hint at some aversion to risk.

The review of the participants' choices finishes the appraisal of the decision-maker characteristics and attempts to combine these characteristics with the choices participants made in the simulation. The following section combines the different characteristics to provide the backdrop for analysing the participant's reasoning. From the discussion, there seem to be two characteristics that appear to be decisive, the level of expertise and openness to change versus conservation.

6.2.5 Joining these characteristics

Combining all the data from the questionnaire, reviewed individually in the section before, helps create a basic model of the participant's dispositions

that are, as assumed in this study, connected to their internalised logic of practice. Below are the results of a correspondence analysis using the previously identified locations of each participant on two higher-order dimensions (Self-Enhancement vs Self-Transcendence and Openness to change vs conservation) as columns (red labels) and the other variables (Autonomy, Expertise, Influence, chosen intervention, Good and Bad decisions) discussed here so far as rows (blue labels).

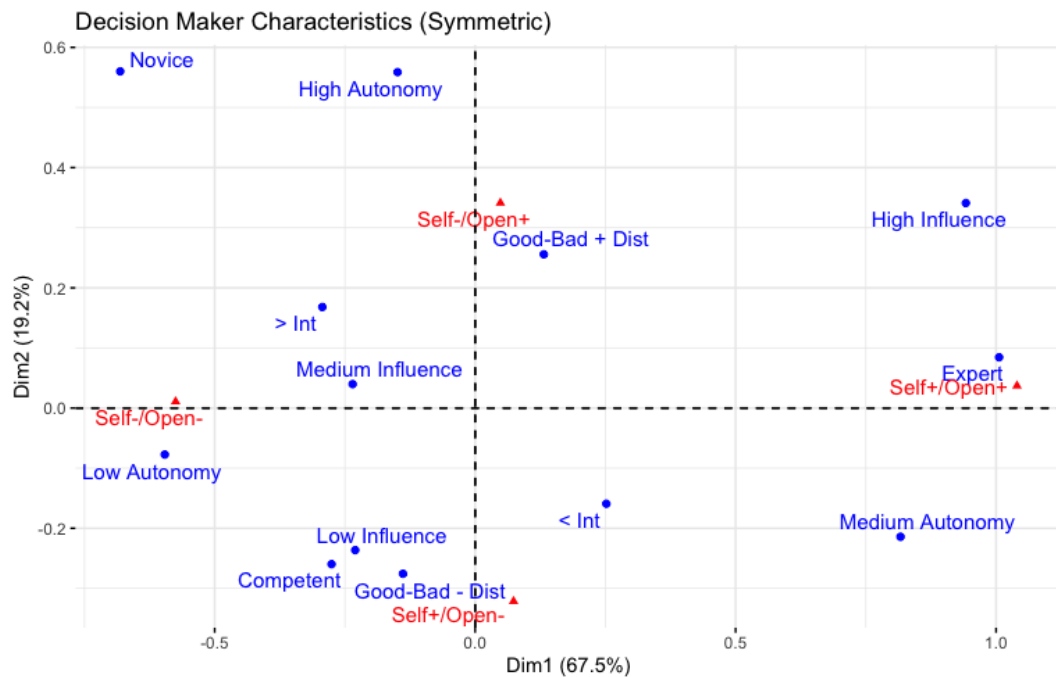


Figure 54: Correspondence Analysis of Decision Maker Characteristics

The plot shows an opposition between the human value group with a dominance of values representing self-transcendence (Self-) and conservation (Open-) on the left side of the plot and the value pattern where self-enhancement (Self+) and openness to change (Open+) on the right side of the plot dominates. The value groups with a focus on Self-enhancement (Self+) and conservation (Open-) on the lower end of the second dimension and self-transcendence (Self-) and openness to change (Open+) on the upper end define this second dimension. The distribution of the row labels indicates that this correspondence analysis represents distinctive features between participants. Novices and those rated as competent are located on the left side of the plot. On the opposite side are those rated as experts. The same applies to those who rated themselves as having low or medium influence

and are on the side of novices and competent participants compared to those with high influence on the side of the experts. The participants with low and medium autonomy are located on the lower side of the plot, whilst those with higher autonomy are placed on the top end of the plot. The different distances between the rating of good and bad decisions are diagonally opposed.

The location of the column labels representing the value patterns suggests that these variables have a distinguishing value that still needs to be determined. There is an opposition between the locations of those participants with a value pattern that show a relative preference for conservation (Open -) and those who have a relative preference for openness to change (Open +). Similarly, there appear to be apparent differences in respect of the participants' expertise, with experts on the right side and novices as well as competent practitioners on the left side. This correspondence analysis provides the backdrop for creating a picture of the participant's dispositions using the value patterns and the expertise as the reference point for considering the overall characteristics of the decision-makers in this study.

6.2.6 Problems in constructing a habitus

This step was the point in the study where it became apparent that the low number of participants, mainly a result of the Covid-19 pandemic discussed above, caused a significant challenge for the initial strategy to use the above characteristics as a way of constructing a habitus of the participants as a model of their internalised logic of practice. Instead of the anticipated $n=40$ participants, only $n=24$ participants contributed to this study. This reduction in the sample size resulted in meagre numbers in the respective groups. These low numbers made it difficult to use innovative methods from data science to explore the data and identify patterns within the responses and the thinking-aloud protocol. The R-Scripts in the appendix show the different approaches to identifying such patterns.

One of the more successful strategies in this study was using multivariate clustering analysis as a relatively simple way of organising data and identifying patterns. Multivariate cluster analysis refers to methods to analyse

data when there is more than one variable under consideration and identify patterns. This analysis was applied to the decision maker characteristics and their choices discussed above. This analysis used the characteristics that captured the higher-level value dimensions, expertise, the difference between good and bad decisions, and the preferred risk and intervention categories to measure the distance between participants based on their characteristics. Due to the limited number of participants, this proved challenging. However, after some attempts to identify the number of clusters that fit the data best, commonalities between the three groups of participants emerged.

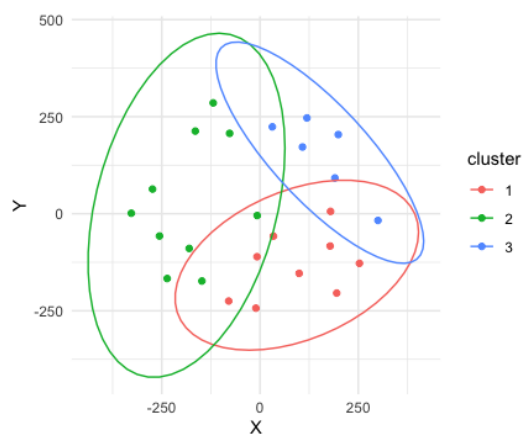


Figure 55: Clustering by Decision-Maker Characteristics

The table below shows the characteristics of the participants in each of these clusters.

Characteristic	Cluster 1	Cluster 2	Cluster 3
Self+/ Open+	2	1	0
Self+/ Open-	2	2	4
Self-/ Open+	5	2	0
Self-/ Open-	0	5	2
Competent	1	7	5
Expert	6	1	0
Novice	2	2	1
Good-Bad: High Distance	9	2	2
Good-Bad: Low Distance	0	8	4
< Risk (Low or Moderate)	3	3	6
> Risk (High or Severe)	4	7	0
< Int (CIN or CP)	5	1	6
> Int (Kinship or Formal Care)	2	9	0

Table 7: Characteristics describing different clusters

There are some noticeable differences between these groups, especially concerning the values, the ratings of good and bad decisions and expertise. For the analysis, the transcripts of the thinking-aloud protocol were reviewed

against this backdrop to identify differences in the way they used different reasoning blocks. Unfortunately, attempts to analyse the transcripts against these characteristics did not reveal any discernible patterns. This observation made a change in approaching the analysis of the transcripts necessary. Instead of continuing to focus on text mining as the primary analytical tool, the work done so far to identify patterns within the commentary of the participants in the simulation provided the backdrop for identifying starting points for a more manual approach to explore the transcripts and see if any links to the characteristics of the decision makers could be made.

6.3 Reasoning Patterns

The following section explores how participants managed and processed the available information from the case vignettes to arrive at a judgment about risks and a course of action. The first section of this analysis provides a broad overview of the reasoning given by the participants when thinking aloud. Initially, an overview of the most used words provides an idea about general patterns in how participants make decisions. Second, the chapter analyses the reasoning blocks, outlined by Toulmin et al. 1984 and Toulmin (2003), that the participants expressed whilst thinking aloud. As already emphasised previously, the Covid-19 Pandemic significantly impacted achieving the initially desired number of participants. This limitation means it was impossible to follow this original plan of using more sophisticated machine learning tools like Naive Bayes to explore the data against the backdrop of the decision-makers characteristics. Instead, the analysis is based firmly on the direct interpretation of the transcripts, focusing on patterns that emerged when reviewing the data using the software developed for this project. This approach resulted in a highly explorative nature of the following parts of the analysis.

6.3.1 High level view - Word frequencies

After an initial review of the transcripts in Nvivo and an overview of what the transcripts may contain, essential text-mining tools were used. The graph below shows the participants' most frequent words and bigrams when they applied any element of Tomlin's reasoning scheme apart from the evidence

they referred to. The word frequencies below represent keywords used in the participant's reasoning and provide some overarching insight into reasoning strategies.

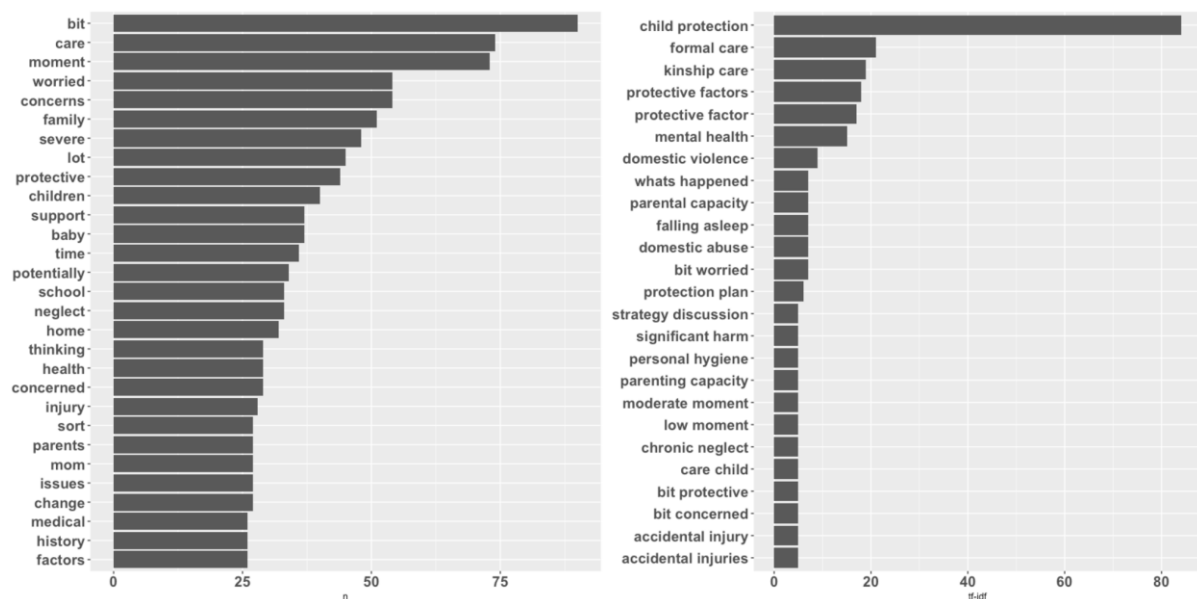


Figure 56: Most frequent reasoning words and bigrams

Three groups of frequently used words and word combinations are worth highlighting. Firstly, some words potentially refer to pieces of information available to the participants in the vignettes (i.e. injury, medical history, school, health, personal hygiene, mental health). These words highlight key case factors that seem to trigger a response by the participants. They appear to be significant enough to be uttered when thinking aloud. As such, I assume that they influence the decision-making process. Secondly, there are words and word combinations that participants refer to frequently, like chronic neglect, accidental injury or domestic abuse represent professional terms that categorise important information and incidents mentioned in the vignettes. These categorisations point towards an internalised checklist of common risk factors relevant to social workers who share a professional language where these overarching terms represent commonly accepted risk indicators. Lastly, the frequent use of the terms "*strategy discussion*" and "*significant harm*" indicates that social work decision-making is embedded in well-defined policies and procedures that use the list of risk indicators to inform judgments at pre-defined decision points. The frequent use of these terms can indicate that these procedures are, to some degree, internalised within the reasoning

processes. Linking these three groups with each other provides a first hypothetical draft of an internal reasoning process. The available information is reviewed, and any critical information is identified. Significant information is translated into abstract professional terms, which feed into procedural decision points.

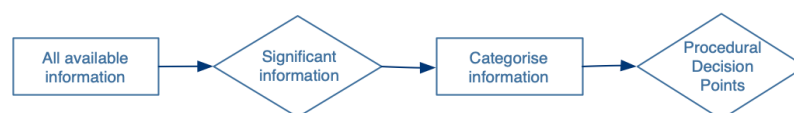


Figure 57: A simple model of managing information

Apart from these three categories of frequently used words, other word combinations add detail to the reasoning processes. This observation applies to the most frequently used single word, “*bit*”. Participants often use this inconspicuous word to indicate that they want “*a bit more information*” (3726, 8915, 1722, 1755, 3878) or when they interpret previous information and guess what it could mean. For example, they say things like, “*It could be a bit of a cry for help*” (9333), “*Sounds like this is a bit of a chronic ongoing issue*” (3726) or “*I think, at this point I have quite a bit of risk of disengagement*” (1185). The participants also use this term frequently to suggest that they are a “*bit worried*” or a “*bit concerned*”, which appears to signify a moment in their thought processes where the information they reviewed crosses a threshold.

Overall, the participants use the word “*bit*” to indicate moments of careful consideration when they try to make sense of the limited information available. The participants may be careful in considering the available information because they cannot check other sources (i.e. making phone calls). They seem to use this word in moments when in practice, they may want to access additional sources to get more details or check their assumptions. Another frequently used word, “*potentially*”, also points toward similar moments of careful consideration when participants contemplate different ways of interpreting the information indicating possible decision points. The frequency in which participants use these words indicates that these moments regularly happen when establishing what a piece of information means, how it can be categorised or when choosing a course of action.

Participants also use phrases that include the word “*moment*” regularly. This word points to fluidity in reasoning as it indicates a holding position. For example, one participant (1444) says, “*I am not seeing risk at the moment*”, another (8493) concludes to stick “*with my category of severe at the moment*”, the following (3726) states that the available information “*does not change my assessment of the situation at the moment*”. Here, they all indicate that there is a possibility to change their judgment depending on new information being available. This ability to change one’s mind and make decisions within the context of currently available information or seek more information when necessary is crucial to social work decision-making. In the model below, this flexibility is represented by the arrows signifying moments where the validity of information is considered when the participants return to the pool of available information and aim to add information or double-check if they missed any relevant information.

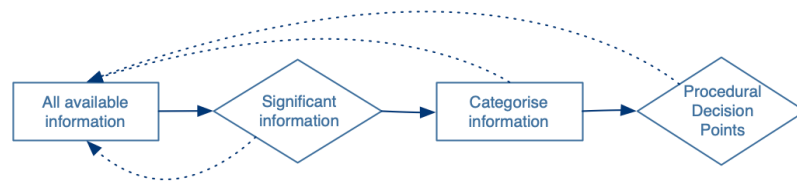


Figure 58: An extended model of managing information

A third observation relevant to this discussion is the possible existence of a default position within reasoning. The right plot of the most frequent bigrams shows, not surprisingly, a high level of using the words "child" and "protection" together. This plot indicates that "*child protection*" (CP) is a dominant threshold for the participants. The number of times the participants used the phrase "Child Protection" could indicate that this forms the default decision point (CP or not) and that they are checking whether or not the information in the case vignette validates this course of action.

Participants expressed different degrees of confidence in this respect, ranging from "it is *certainly not heading to child protection for me*" (P:2228), "*I am thinking child protection*" (P:1185), "*I need more information, but possibly child protection*" (P:8915) and "*I am stuck between Child in Need and Child Protection*" (P:1722). The way participants refer to CP as a course of action indicates that they only go for another course of action if the information

available does not confirm this default. This behaviour could be because the level of risk has not reached the required threshold yet ("*not sure you'd had enough for child protection*" (P:1237), "*and I do not think it is child protection, because I think it is child in need with the possibility for it to go up a level*" (P:1757)). Alternatively, this could be because choosing a lower level initially gives room for escalation in situations when interventions at a lower level are not sufficient to achieve the necessary change. One example is the statement: "*And then whether we need to put any support in for the family and that further assessment might escalate than to Child Protection*" (P:9642). Also, CP seems to be the course of action if there is doubt about a lower level of intervention. Participants choose CP in order to be safe. As P:6977 states, "*I do not know if it would be child in need or child protection, but I would air on the side of caution and make it child protection*".

It is interesting to observe that the participants appeared to be more particular about choosing child protection than they are about choosing kinship or formal care, using qualifying words like "*obviously*" (P:1237), "*definitely*" (P:4760) or "*certainly*" (P:2228) before using the phrase "child protection". When talking about formal care, the participants appear to be far more cautious and less confident by saying things like "*so I would probably looking at maybe a formal care application*" (P:3878), "*maybe formal care*" (P:7804) or "*I don't have enough information to know that you would get a care order*" (P:4302). This hesitation could reflect the significant and long-term impact of this particular course of action, emphasising the role of child protection as the default course where participants balance the information. Suppose the available information does not meet the threshold for CP. In that case, decision-makers in this study may locate more information to find if they are missing something or use CP as a safety net to provide more information highlighting risks that become available.

6.3.2 The building blocks of an argument

The participants in this study face a difficult task. They must decide on up to five cases within a limited time. Even though this simulation does not have real-life consequences, there is pressure to reach the correct conclusions

about a case. This task requires several steps of translating the available information into a decision. In this study, this translation process is assumed to be the construction of an argument. This part of the analysis aims to deconstruct this argument to understand how different participants' reason. Chatfield (2022) explains a common way to analyse the structure of an argument by using the standard form of an argument. This form of an argument has two building blocks, a premise and a conclusion. Several linked premises form the reasoning chain that supports the conclusion. Each premise represents a single proposition and can be a single piece of information or another conclusion with its chain of premises. In other words, a conclusion can translate into a premise that informs the following reasoning sequence.

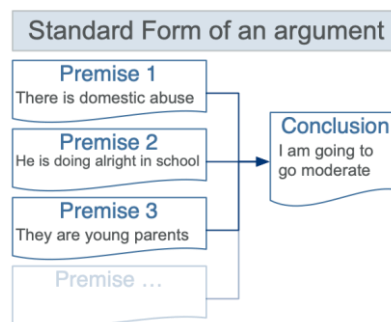


Figure 59: The Standard Form of an argument

Even though this form of argument benefits from a level of simplicity, the fact that there are only two building blocks limits the usefulness of this study which aims for a finer-grained view of the reasoning of decision makers. Toulmin (2003) and Toulmin et al. (1984) provide a theoretical lens to break down arguments into different building blocks. They introduce three fundamental building blocks of an argument (claims, evidence and warrants) and add complementary blocks (backups, qualifiers and rebuttals).

6.3.2.1 Fundamental building blocks of an argument

The data, evidence, or grounds refer to the pieces of information the decision-makers find when reading the case vignettes to support a claim. These facts provide the foundation for the claim (Toulmin, 2003). For example, P:9333 reads in the case vignette, “*domestic abuse. Ok. Both Young Parents. [...] He’s doing all right at school. [...] he has got disabilities*”. These pieces of

information feed into the conclusion the participant draws from this evidence.

A claim or a conclusion is what the decision maker discovers when they review the data to find an answer to a problem. “*They begin with problems, and their arguments lead them to discoveries*” (Toulmin et al. 1984, p.7). In this case, the problem the participants are facing is that they have to make judgments and decide about a course of action under time constraints. For example, after reviewing information, one participant arrives at a conclusion and states, “*So, I think at this stage I am going to go moderate*” (P:9333) and follows this claim immediately with a warrant to justify the claim made, “*I just feel a bit concerned....*”

Warrants are justifications for establishing a link between the evidence and a claim once a decision maker establishes such a link. Ideally, this would include a reference to a “*rule of inference which establishes that the evidence does apply in this particular case*” (Benbenishty et al. 2003, p. 139). These rules of inference originate, for example, from common knowledge, research or practice experience. In this way, a warrant legitimates the claim. Following the above example, P:9333 states, “*I just feel a bit concerned that dad is around; there is a history of domestic abuse*”.

The graph below shows how one of the participants uses the fundamental blocks of arguments to construct an argument. It is worthwhile to point out that a review of the transcripts shows that this is an idealised working model. In most cases, evidence is just uttered aloud without directly resulting in any claim. If the evidence is linked directly to a claim, there is not always an expressed worry. This observation could have at least two reasons. First, more internalised reasoning is likely happening that is not expressed verbally. Second, there could be unfinished thought processes where reading information is only acknowledged by uttering the words, or the train of thought is interrupted by other information that is not linked with prior information. Nonetheless, this analysis uses this reasoning model as an approximation to an internal reasoning model as there is at least some evidence that the participants use these fundamental building blocks of an argument.

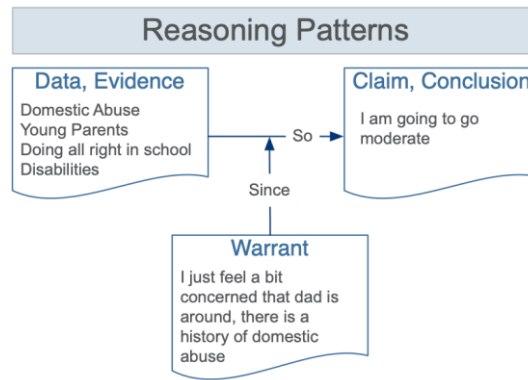


Figure 60: Fundamental building blocks of an argument

6.3.2.2 Complementary building blocks of an argument

Complementary building blocks strengthen the arguments and build on the fundamental blocks. These blocks are backups, qualifiers and rebuttals. In this study, the participants used fewer complementary reasoning blocks than the fundamental ones. It is interesting to note that overall, there is no case in the sample of this study where one of the participants uses a complete set of argument blocks to justify a single decision or choice for a course of action. For this reason, the examples for the following three complementary blocks come from different participants. They are used here as a composite to provide an example of what a whole argument could be.

Backups are the first of what Benbenishty et al. (2003) describe as complementary arguments. Decision makers back up a warrant by moving away from the individual case and broadening the argument to a generalised statement. Backups can refer to general facts, practice experience or research supporting a warrant (Toulmin 2003). For example, participant P:9642 states, "*the greatest indicator of current risk we have is past risk*". Even though this statement does not reference the actual source of the knowledge, the expression "we have" indicates the use of either a shared body of practice knowledge or a reference to research knowledge.

When decision-makers make statements like "I *am not sure*", "*probably*", or "*certainly*", they qualify a claim by expressing their level of confidence in what they are saying. Qualifiers provide the opportunity to include an expression of a degree of certainty into a claim. For example, absolutes like "*certainly*", "*never*", or "*always*" express a degree of confidence. Qualifiers like "*maybe*",

"possibly", "sometimes", or "rarely" implicate a degree of uncertainty. Similar to a study by Yang (2022), participants in this study often included qualifiers in word form added to a claim or as a sentence following a claim. For example, P:1237 uses qualifiers in words, saying, "*So, I would probably say low,*" and emphasises the uncertainty by stating the certainty in needing to know more by saying, "*but I definitely want to know more*". Another participant (P:1757) qualifies a claim in a sentence that explains the limitations to their knowledge relating to a claim: "*I don't understand what a transverse fracture is.*"

In a rebuttal, decision-makers consider alternative versions of reality where new information may change the claim. Rebuttals define the condition under which the decision maker would change their mind. Participants in this study use rebuttals rarely, but one example would be the statement "*unless there was serious evidence that there was a risk of significant harm*" (P:3745).

The review of the transcripts did not show evidence that a participant explicitly used all reasoning blocks to build an argument. This observation is not surprising because this is a theoretical model of reasoning. Nonetheless, it is noteworthy that despite the significance of the decisions simulated in this study, arguments presented to support a decision are often not well developed when expressed through the thinking-aloud protocol. As before, one can argue that this may result from the participants simply not expressing their internal reasoning fully. However, even when asked "why" they made a particular choice about a course of action, the complexity of the arguments did not go beyond using the fundamental building blocks of an argument.

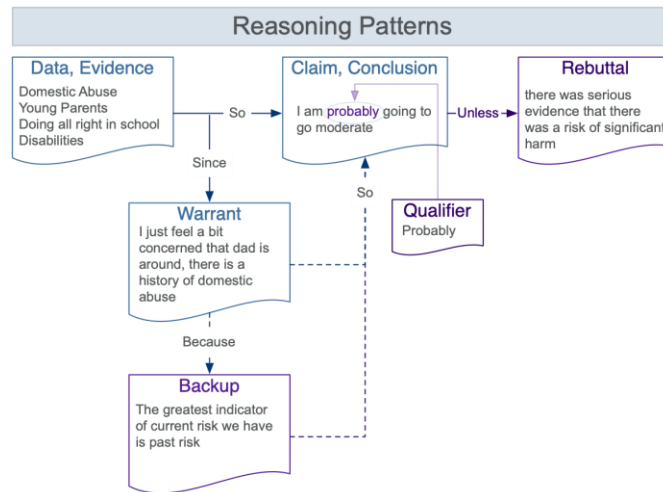


Figure 61: Complementary building blocks of an argument

The following section's first part provides an overview of the usage of these reasoning blocks before focusing on each separately but within the context of the other blocks, as suggested in the above model.

6.3.3 Reasoning blocks in reasoning sequences

The table below shows the number of codes representing the blocks of an argument assigned in Nvivo. Overall, the codes for Evidence, Data or grounds (n=2138) are most dominant, followed by claims (n=831) and warrants (n=480). Whilst the participants still make qualifying statements relatively often, they use other complementary blocks, qualifiers (n=152), rebuttals (n=85) and backups (n=39) rarely compared to the fundamental building blocks. This lack of complementary reasoning blocks suggests that participants do not invest the effort to strengthen their arguments, which is the function of this block type (Benbenishty et al. 2003). In future research, it would be interesting to see how decision-makers who are not under time constraints, as in this study, construct their argument patterns.

A : 1. Claim or conclusion	B : 2. Evidence, Data or Grounds	C : 3. Warrant or Justification	D : 4. Back up, justification or ..	E : 5. Qualify a claim (degrees ..	F : 6. Rebuttal
831	2,138	480	39	152	85

Table 8: Nvivo Codes of reasoning blocks

The comparison cloud shows the words with the highest term frequency-inverse document frequency (tf-idf) values for each reasoning group. This weighted word frequency count identifies unique words for each group. These words are good starting points to explore how the participants use these

to construct a story. If it is a good story, it becomes a person's view of reality. Kahneman (2013) points out the paradoxical observation that "*it is easier to construct a coherent story, when you know little*". This observation means that it is vital to nudge decision-makers who make high stake decisions under uncertainty to challenge the story they construct and actively seek information that challenges their internal narrative. This suggestion appears to apply to all participants in this study regardless of their expertise. Nonetheless, slight differences exist in the frequency participants use these building blocks.

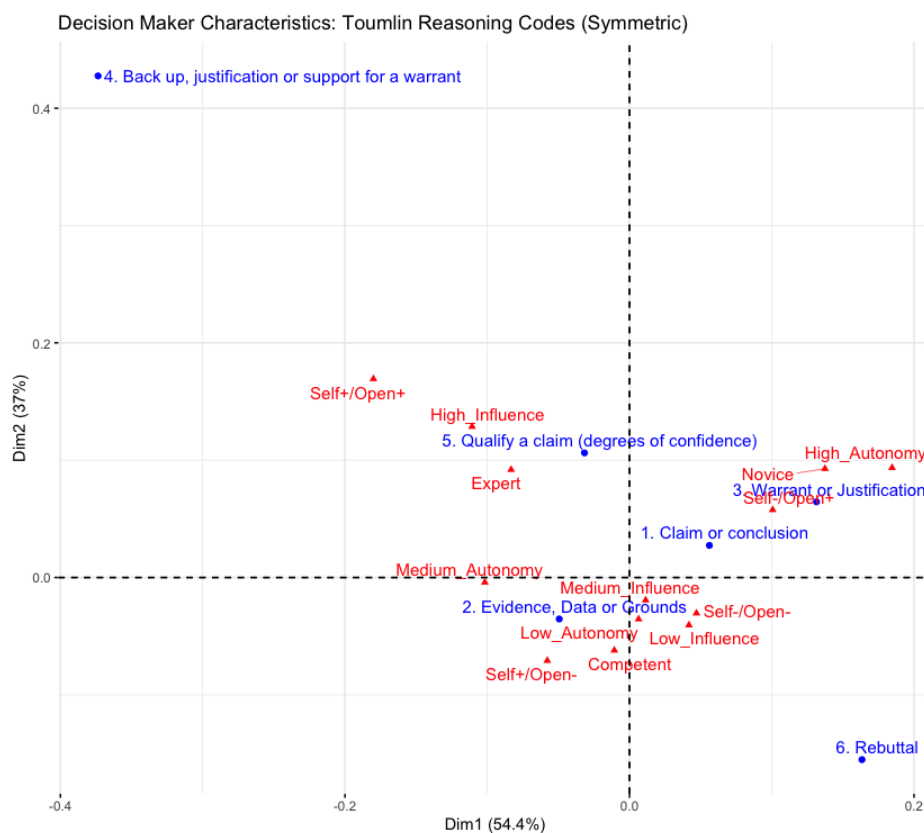


Figure 63: Correspondence Analysis of decision maker characteristics and reasoning blocks

The correspondence analysis above shows the differences between the participant's characteristics and the patterns of using fundamentals and complementary blocks of an argument. There are a few patterns that emerge from this graph. The first, horizontal dimension explaining 54.4% of the inertia, seems to describe the level of expertise with experts on the left upper side, competent practitioners in the lower left towards the centre and novices at the right upper end of the horizontal dimension. There is also a delineation

between the decision makers where values linked to self-enhancement are dominant (Self+) on the left and those where self-transcendence is dominant (Self-). The second dimension covers 37% of inertia. Here, the dividing line appears to be the differences between those who are open to change above the central line and those who are more conservative located below that line. This comment adds to the previous observations that expertise and values, particularly the dimension of openness to change and conservation, correspond to the reasoning of decision-making in this study.

Regarding the reasoning blocks, the fundamental blocks (Evidence, Claims and Warrants) are located close to the central horizontal line highlighting the high frequency in which all participants use these blocks. Evidence, data or grounds are more frequently used by competent participants and more likely to value self-enhancement and share conservative value patterns. These decision-makers are less likely to make and justify these claims than novices. Despite the low numbers, it is interesting that novices in this study are more likely to use warrants to justify their claims. Novices also seem to make relatively more claims than competent practitioners or experts. This observation may result from less confidence in practice knowledge based on experience. That may mean that these participants are more used to justify their decisions. The underlying thought processes include more straight points where the information processed is summarised as a claim.

The complementary building blocks (Backups, Qualifiers and Rebuttals) are further away from this graph's centre point, which suggests that they are more discriminating than the fundamental blocks. That is likely because of the low number of times the participants have used them. Backups appear to be more associated with being an expert, high influence, self-enhancement and openness to change. Rebuttals are relatively more frequently used by those who value self-transcendence and conservation and have low influence. Qualifiers, like rebuttals, are located on the right side of the graph, which covers the sphere of a preference for self-transcendence and lower levels of expertise.

A particular challenge in this analysis so far remains that the numbers of participants in this study are meagre. This fact means that small changes in

the answers could quickly lead to different distributions. In other words, these patterns do not suggest a connection between using reasoning blocks and identifying decision-maker characteristics. Nonetheless, these observations provide the backdrop for the next steps that explore the usage of the different building blocks based on comparing individual reasoning patterns and considering if there are actual patterns that distinguish the different usages of reasoning blocks and the decision-maker characteristics.

The following sections consider each reasoning block individually to investigate this. The basis for the next step of the analysis is text files that were generated using a matrix coding query in Nvivo that identified the quotations coded against the reasoning blocks on one side and the expertise and the value patterns of the participants on the other side.

	A : Competent	B : Expert	C : Novice	D : Self+--Open+	E : Self+--Open-	F : Self--Open+	G : Self--Open-
1. Claim or conclusion	481	189	170	88	257	226	269
2. Evidence, Data or Grounds	1320	475	330	240	767	485	633
3. Warrant or Justification	269	102	114	47	137	152	149
4. Back up, justification or support for a warrant	17	15	8	13	11	9	7
5. Qualify a claim (degrees of confidence)	86	42	33	23	54	39	45
6. Rebuttal	61	5	20	2	33	21	30

Table 9: Expertise, Human Values and reasoning blocks

The above table shows the result of this query. The quotations of each cell from this table were imported into R. An R script processed them to be analysed using the visualisations generated in the software written for this analysis. Here, the intention was that co-occurrence maps highlight potentially essential concepts within the reasoning process and that a sentiment analysis provides the basis to explore possible emotive triggers from the presented information that affect cognition, as discussed previously.

The results of this analysis were unfortunately not as precise as anticipated. The co-occurrence maps generally show minor differences but highlight commonalities between the different groups. There are two possible interpretations of this. Either the influence of values or expertise is less pronounced as hypothesised, or there is a methodological problem concerning the thinking-aloud protocol. Many participants read the information presented by the vignettes instead of verbalising their thought processes. As a result, there are not a sufficient number of quotations that are unique expressions of reasoning. The commonalities result from the fact

that all participants had the same source materials, which limits the opportunities to establish differences in the reasoning patterns through the visualisation of co-occurring words or sentiments. Despite this, especially the co-occurrence maps proved to be helpful. They allowed a simple way to establish common themes and identify slight differences to explore in more detail. The co-occurrence maps became the foundation for looking for interesting points that could guide the analysis closer to the transcripts than intended. Where possible, the analysis is based on reasoning sequences which are unique blocks leading to a claim or a course of action. These sequences potentially start with a claim, end with a claim, and include the different reasoning blocks. Despite looking for a sequence of events, the different reasoning blocks can occur in any order, and most of the reasoning sequences in the transcripts are incomplete. The following section provides an example of such a reasoning sequence to illustrate how one participant uses the different reasoning blocks. After that example, each reasoning block is considered individually.

6.3.3.1 One example of a full reasoning process

This participant (1185) is a competent practitioner who experiences medium autonomy and influence in their organisation. Concerning the value responses, they are relatively less focused on valuing power, hedonism and stimulation instead valuing conservation, tradition and self-enhancement. This decision-maker is more confident in their excellent decisions than they consider the bad decisions bad.

In the simulation, this participant chose the most severe course of action in the two vignettes relating to the two babies (Vignettes 4 and 5). For Vignette 4, the journey started with a low-risk assessment (as the majority of participants), and this changed halfway through reading the case information to high and just before deciding to increase the risk to severe. As most of the participants, they identified a severe level of risk immediately after reading the referral information for Vignette 5 and stayed at this level throughout reading additional information. Vignette 5 took the most deliberation despite the risk assessment's consistency. There is a much higher level of looking at different pieces of information than in the other vignettes (n=24 switches

between pages), apparently double-checking and connecting the dots. Why is there so much deliberation in vignette 5, which, from reviewing the case characteristics, appeared to be the most straightforward case? In this vignette, most participants choose a severe level of risk at the start and maintain this level consistently until deciding on a course of action. This participant considered this case the longest of all, even though they did not talk much throughout this time. In this case, the decision-maker jumps back and forth between the pages containing information more than twice as often as in the other cases. That explains why more quotations are coded in Nvivo as Evidence, Data or Grounds. This case is also the only one where this participant uses all of Toumlin's building blocks. The map of the cooccurrences of nouns, verbs and adjectives provides the starting point to understanding the underlying thought processes.

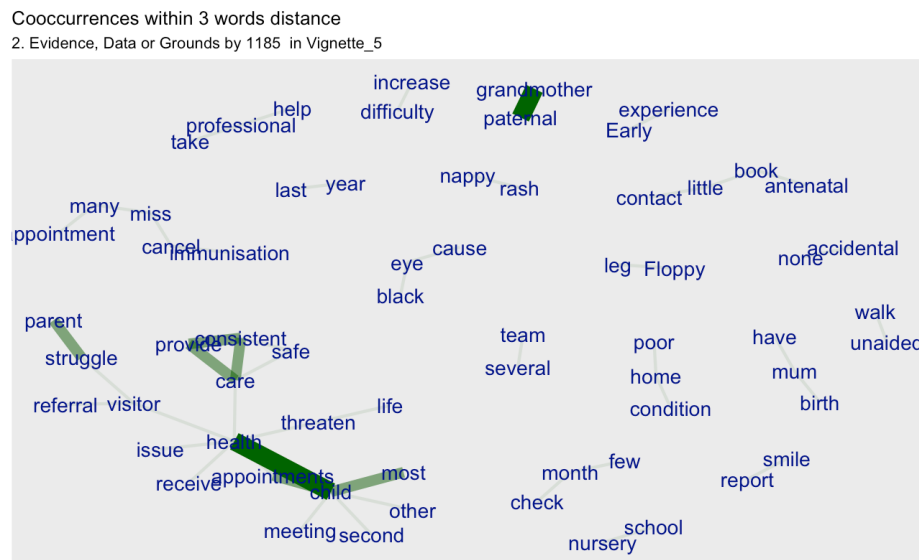


Figure 64: Cooccurrence Map of evidence in vignette 5

This plot highlights that the focus is not the information about the non-accidental injury. Instead, it is about the overall concerns about the child's health with a particular focus on the paternal grandmother's possible role in providing consistent care and the parental struggle that prevents them from providing the required consistent care. The non-accidental injury is not part of the overall consideration, even though this is the stated reason for choosing proper care as the course of action. After stating the facts from the referral,

"Bruising to her body, fracture of her left. Says it has been non-

accidental. Floppy leg" (L:94)

this injury is not mentioned until providing the reason for the chosen course of action, where this fact is used to warrant the conclusion to pick formal care:

"I picked formal care in this instance only because we are dealing with a non-accidental injury". (L:139)

After mentioning the injury, this participant initially explores the available information systematically. They start with the information about Child Development, followed by parental capacity, interagency, environment and strengths. Only after the participant reviewed all data there is a phase of jumping back and forth between the different pages containing information. The point where this decision-maker is switching back and forth between different pieces of information coincides with a qualifying statement highlighting the amount of information available in this vignette:

"Wow, there's a lot of information in here" (L:128)

This indicates the uncertainty deriving from the complexity of the information despite this seemingly being a straightforward case. This behaviour could be an indicator of a more deliberate reasoning process. This process seems to rule out an alternative course of action (kinship care) to formal care, which, in line with the fact that the non-accidental injury is quoted as the reason for formal care, would potentially have been the default position at the point of reading the referral.

The deliberation, in this case, appears to be following these cornerstones. The Child Development highlights the difficulties of the child's journey:

"Early experiences have been difficult, and at times they [the parents] have not provided consistent safe care". (L:96)

The parental capacity section starts with identifying the paternal grandmother as a possible source of support,

"children are living with paternal grandmother" (L:102).

Furthermore, the section highlights additional complicating factors:

"mother did not engage much in professional help" (L:104)

"diagnosed with life threatening health issue" (L:107)

as well as potential sources of support

"Father attended the antenatal booking". (L:112)

The interagency information seems to confirm concerns about the complicating factors:

"did not engage, did not respond and missed many appointments". (L:117).

This is where 1185 makes the first claim, *"That is high"*, potentially referring to the concerns about this case.

Referral →	Child Development →	Parental Capacity →	Interagency →	Claim
"we are dealing with a non-accidental injury"	"Early experiences have been difficult"	"Children live with paternal grandmother" "Mother did not engage in professional help" "Mother diagnosed with life-threatening health issue"	"Did not engage"	"That is high"

Table 10: A reasoning sequence

Information about the background then adds further detail to the narrative of a precarious situation. The review of the strengths appears to trigger the consideration of the paternal grandmother as a possible alternative solution to proper care. At this moment in time, the decision-maker revisits previously read information. It highlights what appears to be a key criterion for any choice by stating *"providing consistent care"* (L:129) and considering the grandmother's ability to provide this level of care by making a claim *"so, grandmother is trying her best"* (L:130) but rebutting this thought by saying *"but she is really struggling"*.

This participant makes only a few claims, three of which are at the point of providing reasons for the choice made and close to warrants, a qualifier and a rebuttal.

Claim >	Warrant >	Claim >	Evidence >	Qualifier >	Backup >	Rebuttal >	Claim
"I picked up formal care in this instance"	"Only because we are dealing with a non-accidental injury"	"We have got some strengths"	"Grandmother has been assessed to care as an SGO"	"It could actually be there needs to be some more work around that to look at what support	"From experience, I wouldn't see that child returning to the care of that carer"	"There could be other information that has yet come to light"	"So do your section 47"

Table 11: Example of full reasoning sequence

It appears as if the story constructed from this participant's quotes translates into the highest available risk assessment. The lack of claims suggests this is a reasonably straightforward case for this participant. This assumption is supported by the consistency between the initial and final risk assessment and the chosen intervention. However, the above reasoning chain suggests that this is the only moment this participant challenges the assumed confidence in the judgment that this is a high-risk case when they consider if the grandmother could be an option to maintain the family as a unit. The qualifier in this chain highlights that this participant accepts the possibility that there is unknown information that could change the course of action. In this chain, the decision-maker clarifies what the decisive piece of information leads to out-of-family care. This is "**only because we are dealing with a non-accidental injury**". In other words, without this injury, the other pieces of information would not have breached the threshold for this participant to seek formal care. However, this participant also sets the lower threshold of what is feasible in this case. The backup emphasises that "*from experience*", this child would not return to the mother's care. In other words, the only option available at the end is the one between kinship care and formal care and the rebuttal "*there could be other information that has yet come to light*" sounds almost hopeful. The claim to "*do your section 47*" process, which includes an in-depth assessment of the situation, is the exit strategy for this case, leaving the door open to maintain the child in the family. In other words, this participant leaves a door open and avoids making a definite and final choice at the end of this vignette.

6.3.3.2 Evidence

The first reasoning block to consider is the foundation for any reasoning process. The evidence or data represents the information from the case vignette that participants can use to form a picture of the case and develop a line of enquiry. Most quotes from the transcripts are coded as data and used by all participants in somewhat similar high frequencies. The participants mostly read out these quotations directly from the information presented on the screen, which is evidenced through a comparison between the most frequent words in the case vignettes and the most frequent words from the transcripts of the thinking-aloud protocol.

Cooccurrences within 2 words distance
Nouns & Adjective Phrases: Evidence

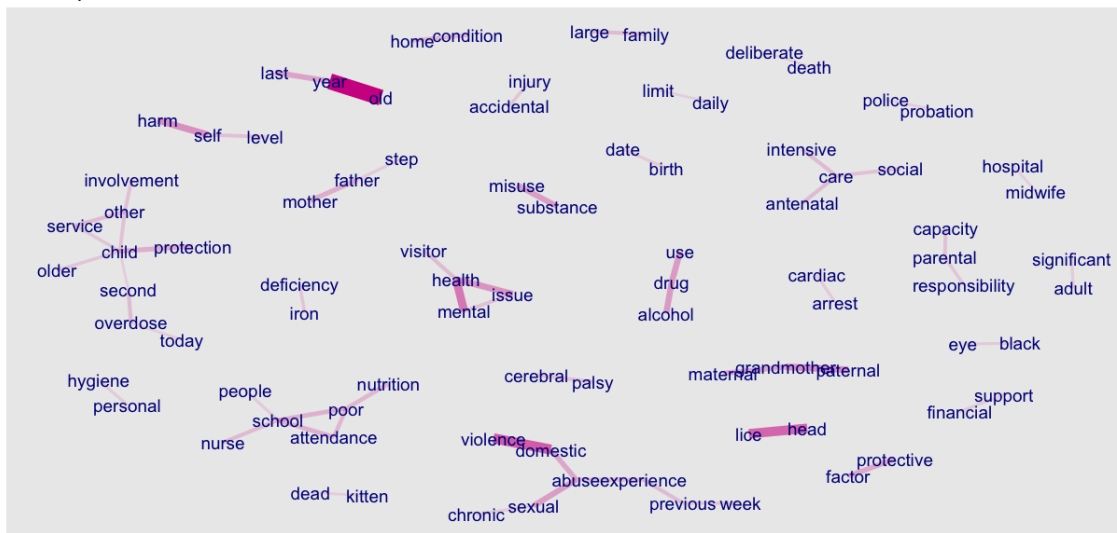


Figure 65: Cooccurrence Map of Evidence

The above map of words frequently occurring together shows critical evidence that the participants seemed interested. Unsurprisingly, this reflects vital aspects of the case characteristics discussed previously. For example, the participants emphasise the evidence of different forms of abuse like *domestic violence* and *chronic sexual abuse* when they are mentioned in the vignettes. The second category of information the participants pick up frequently refers to the family system like *a large family*, *paternal grandmother*, *mother-father*, and *parental - responsibility*. The latter reflects the observation that participants often invest the time to consider the key people in a family when reading the referral information. The third group of information are complicating factors like *substance misuse*, *alcohol and drug*

use and home conditions. A fourth group refers to information that are signifiers for different categories of concern like *personal hygiene, second overdose, self-harm* and *[non]-accidental injury*. The last group covers other professionals like *hospital midwives, police probation or school nurses*. These categories could form a basic framework of information that decision-makers look for when processing and organising information to make a decision.

To review the evidence considered by the participants, the cooccurrence maps of participants with similar value patterns and participants with similar levels of expertise were compared. This visual comparison showed significant similarities between all groups. However, some details between participants who are more open to change and those who are relatively more conservative are worth highlighting. These differences are most pronounced in the maps below.

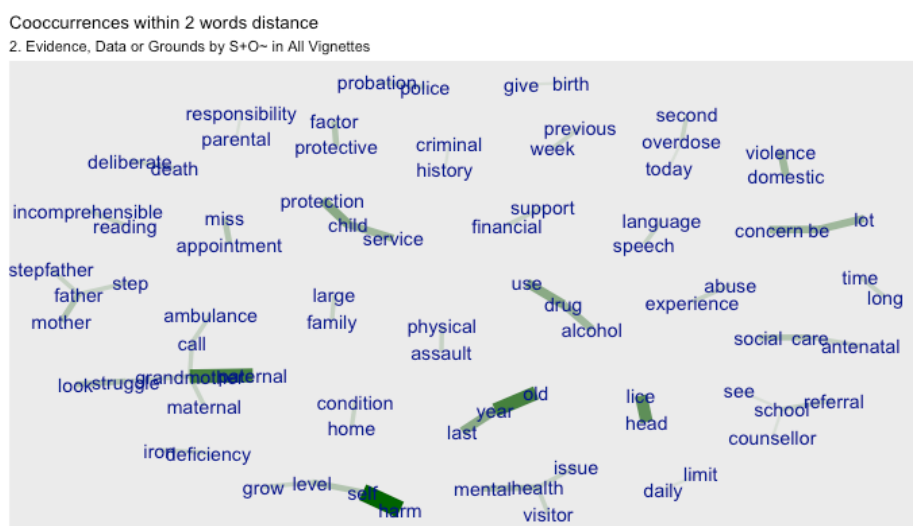


Figure 66: Cooccurrences of Evidence, Data or Grounds by S+ / O- in all vignettes

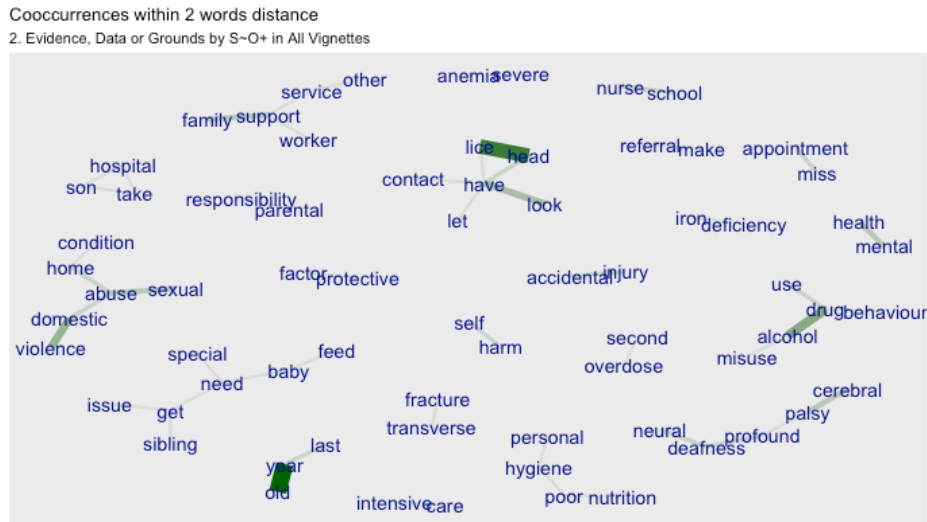


Figure 67: Cooccurrences of Evidence, Data or Grounds by S-/ O+ in all vignettes

For example, in their considerations of the available evidence, participants who share the value pattern Self+/Open- emphasise information about the family system. A common cooccurrence of words in this group includes word combinations like “*paternal grandmother*”, “*large family*”, or “*mother - father*”. These word combinations suggest a focus on the family system and relationships when reviewing the available information. Participants in this group seem to focus repeatedly on the relationships and dynamics between stakeholders in the different vignettes:

Change of family dynamics. Needs to live with grandmother. Uncle a few years older. Theresa’s parents number of separations. Lots of movement. Unrestful within the home dynamics. Tensions between mother and mothers partner. Nearly two decades of relations with DV. (L:9-25)

Who is in the family? The paternal grandmother called the ambulance. Worry about DV. Concerned that this child is with mom. Early in their relationship. The protector is the grandmother. (L:3475-3528)

Is it child of stepfather? Do they all live together? I am just thinking if they are all living together, there is a lot of family members there and four children. She asked father to take him as he arrived at school. Dad provides financial support. Mother, stepfather, first child was born, second child. Mother was welcoming. (L:3550-3615)

Compared to this, participants who share the value patterns Self-/Open+ put less emphasis on word combinations that can be linked to considering the family system, even though the transcripts show that most participants start with understanding who the most relevant family members are. However, for

participants in this group, the focus is more on word combinations describing complicating factors. These are word combinations like “*domestic abuse*”, “*special need*”, “*drug [and] alcohol misuse*”, the involvement of professionals like “*family support worker*” or “*school nurse*”, or the clarification of procedural aspects like “*making [a] referral*” or considering who has “*parental responsibility*”. One possible interpretation is that the decision-makers in this group appear to be more focused on understanding the details of the risk factors and the actions already taken to give clear arguments on how they arrived at their judgment.

School are very, very concerned. They phoned NHS Direct. She has suffered chronic sexual abuse. Not a great deal of input from CAMHS. She is cutting herself all over her body. (L:2858-2892)

This child has got chronic anaemia. She had head lice, she was dirty. We have got domestic violence. No heating or hot water. (L:2914-2923)

Bit of concern from the agencies about the family. Concerns about drug use. Concerns about children being hungry, poor school attendance, lack of engagement. (L:994-1004)

When reading the information, the emphasis on the family system of those who present more conservation values (open -) link loosely to the observation of Schwartz (2012). According to Schwartz, people who show more conservative value patterns are motivated by the idea of “*preserving existing social arrangements that give certainty to life*”, “*protection of order and harmony in relations*”, and “*avoiding or overcoming threats by controlling relationships and resources*” (ibid. p.10). This premise could mean that decision-makers in this group who may be motivated by conservation values may focus their consideration of the available evidence on the most relevant information for the underlying motivation to preserve family and strengthen relations.

On the other end of the continuum considered in this section are the participants who share values that suggest an openness to change. According to Schwartz (2012), these participants would be motivated by an “*intrinsic interest in novelty and mastery*” and “*the reliance upon one's own judgment*” (ibid. p.10). This assumption could help explain why the participants in this group focus their search for evidence more on the pieces

of information that allow the construction of a rationale for their judgment.

Apart from this observation, there were no other patterns that are noteworthy.

The participants in this study seem to look specifically for data

- concerning different forms of abuse,
- that helps to understand the family system and
- that identifies complicating factors.

In addition, the information highlighted by the participants showed the efforts to understand the raised concerns in detail and consider what other professionals are involved. The participants that presented more values relating to conservation appeared to put more emphasis on understanding the family system. Those more open to change appeared to focus more on exploring the types of abuse and the complicating factors.

6.3.3.3 Claims

The data from the participant's review is the foundation for discoveries of links between the different pieces of evidence that form patterns, allowing participants to make a claim about the meaning of the presented information. Together with the evidence, claims form the most basic model of a reasoning process, explaining why claims are the second most frequently used reasoning block by the decision-makers in this study. From a high-level view, claims are, together with warrants, most likely used by novices and the participants with the value patterns Self-/ Open+. However, the visual comparison of cooccurrence maps and sentiment analysis of participants with different value patterns or levels of expertise did not show any noticeable differences. As such, this analysis section uses simple word frequencies (n) and weighted word frequencies (tf-idf) as the starting point for the claims analysis.

The graph below shows the most frequent words, highlighting that the claims mainly consist of participants making their judgments (*child protection, severe, moderate, low, kinship and formal care*). A word that is featured in claims regularly is *worried*, which will be explored here in more detail. These words seem to be used by most participants regularly, which can be read as a

sign that there are no glaring differences between individuals with different characteristics that could form the basis for a more detailed analysis.

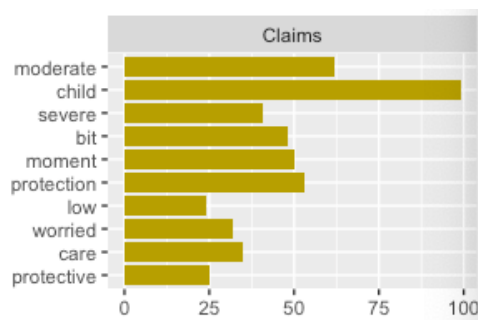


Figure 68: Most frequent words in claims

The word cloud in the previous section, depicting the most frequent unique words for each reasoning block, shows that the words characterising claims overall are *low*, *moderate*, *protection*, *moment*, *stick* and *keeping*. This weighted count shows that most claims are responses to the task for the participants to assess risks or choose a course of action. The last three words of this list highlight that the participants seem to use claims to mark points throughout the simulation, where they sum up a section of their process to digest the presented information. These can be holding statements that present as claims with degrees of uncertainty like "*probably moderate at the moment*" (4302), "*I think this is at the moment child in need*" (2228) or "*I am not seeing risk at the moment*" (1444). Here, the participants appear to state an interim judgment based on previously read information but with the acknowledgement that this is just a temporary and not final judgment because more information may change these judgments. From this perspective, these claims are a bridge to start a new phase of investigating more information. For example:

"We don't know at the moment who has caused this injury to this child. And that needs investigating" (L:1225).

The analysis needs to consider the words in their context to further explore the claims' content. The map below shows the claims or discoveries from the evidence the participants reviewed in this study.

- “Issues for quite a long time”* (L:1245)
- + *“social issues as well”* (L:1251)
- + *“home conditions have been poor”* (L:1254)
- = *chronic neglect* (L:1255, 1259).

In other words, participants appear to use claims to hold a thought and direct their search into different avenues. Common word combinations highlighted in all maps show that participants *want* or *need* to *get more information*. A review of the transcripts shows that these statements mark decisions to seek new pieces of information or revisit information that was already seen.

For example, one participant (P:7433) initially reads through available information without making a claim until arriving at information about strengths and protective factors. At this stage, a claim is made:

“So, there is no information about strengths and protective factors. I’d want to know more about that” (L:2773).

At this moment, the keylog data for this participant shows that this participant starts to look at parental capacity (*“Was there a pre-birth [assessment]”* (L:2777), the child’s development (*“well supported by school staff”* L:2781)), and the referral (*“How do I find out if the children are still in the family home”* (L:2783)). The decision-maker verbalises this by saying, *“and looking into it”* (L:2774). After this phase of revising the available information, the participant changes the risk assessment from moderate to high and chooses to end the phase of reviewing information to decide the course of action (*“probably a CP [plan]”*).

This sequence of events shows how interrelated claims and evidence are. They appear to follow a circular process where the presented information is processed, leading to a moment of saturation marked by making a claim. This claim either represents the conclusion that more searching for information is necessary or that there is enough information to decide a course of action.

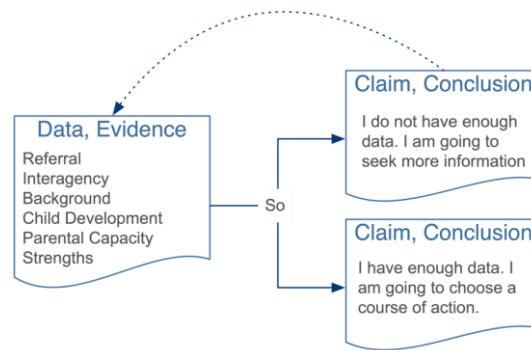


Figure 70: Fundamental Building Blocks of an argument

Another word frequently used by most individuals at least once is “worry”, or words with the same word stem-like worries or worried. Borkovec et al. (1983) describe worries as a feeling of anticipation in the face of relatively uncontrollable uncertainty and where outcomes tend to be considered harmful. This definition suggests that the expression of worries signifies moments in the reasoning process that give insight into internal reasoning processes.

One novice (P:6977), in particular, expresses worries regularly. For example, this decision maker acknowledges that the referral information in Vignette 4 is minimal and initially assesses the risk as moderate. When reviewing interagency information, a history of parental drug use comes to light which

“makes me put a different spin on her [the mother] falling asleep (L:2403).

That leads to the statement that this *“makes me more worried”* (L:2404). Next, this participant generalises this worry by saying, *“And all those referrals always make me worried”* (L:2405). This statement can be interpreted as a tendency to generalise from the individual case to a broader category of possible risks and associate these generic categories of risk with a high degree of anticipation about the uncertainty in these cases. In other words, in this case, the frequent use of the word worry could be an indicator of a lack of confidence in making decisions. The few experts who use the terms *worrying*, *worried* or *worries* use the words differently. Here, they appear as a fact (*“there is historical worries about Angelos”*, L:638) and are used to share personal views about a situation (*“I’d be worried about a child being born into that situation”*, L:1061) or to express a degree of risk (*“That is really, really*

worrying", L:765) without associating this with a personal feeling like "*That makes me worried*". Interestingly, the novice expressed their worries from a personal perspective with a sense of uncertainty, while the two experts expressed worries more concerning the case characteristics. This difference may be worthwhile to explore with a larger group of participants.

Because of the way some participants expressed their worries, which is quite an emotive word, the claims are also subjected to a more focused review of the sentiments used in the transcripts. Sentiments or emotions expressed through words affect, as previously stated, decision-making (Damasio 2001, Bechara et al. 2000), and according to Bazerman et al. (2013), emotions and cognitions are closely interlinked. Claims appear to be moments in time when the participants in this study conclude a phase of information processing. It is interesting to consider the sentiments expressed at these moments in time, especially as the claims do not simply repeat the information presented in the case vignettes but are more likely to represent the internal thoughts of the decision-maker.

On the surface, there appear to be slight differences in the expressed sentiments visualised in the correspondence analysis of the core decision maker characteristics and the sentiments for claims established using the NRC Sentiment lexicon (Mohammad and Turney 2010, 2013). The identified differences are illustrated by the plot below. Upon the first review of the results of this correspondence analysis, the results looked promising, and the transcripts were reviewed for occurrences of the respective sentiment words. Of particular interest appears to be the close association between Self-/Open- with the sentiment of fear and the opposition between novices and experts.

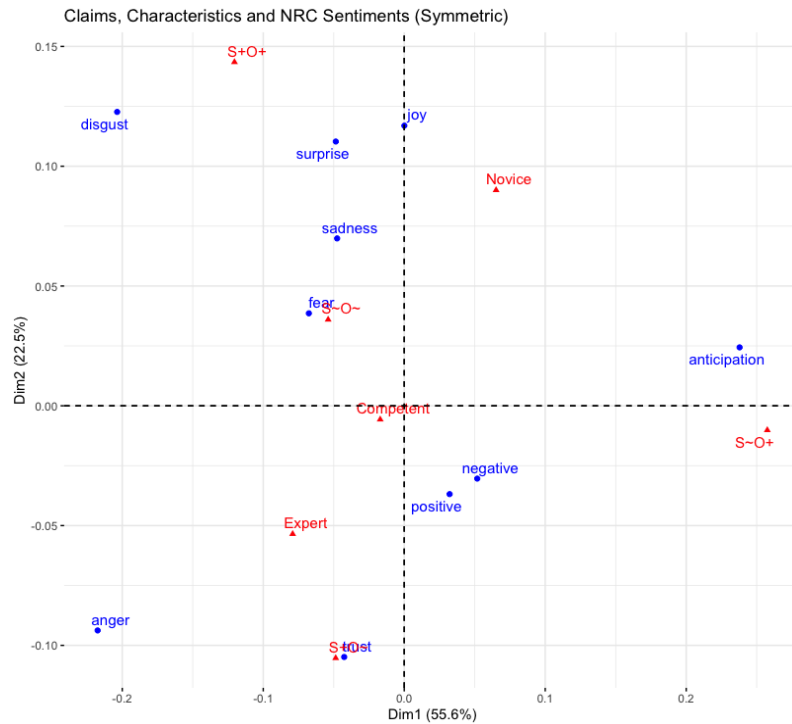


Figure 71: Correspondence Analysis of Claims, Characteristics and NRC Sentiments

Novices appear to be more closely associated with anticipation, whilst experts express the sentiments of anger and trust proportionally more. This review, especially of the visual association between Self-/ Open - and the sentiment of fear, did not translate into valuable findings. Once read in their context, most of the sentiment words did not reveal insight into the participants' thought processes because the occurrences of words relate only to individual participants who seem to use these words very frequently. One example is the word "*worried*" discussed above. This word is frequently used by one participant who happened to be a novice which skews this correspondence analysis. Nonetheless, one particular observation emerged through analysing the data through this lens.

The exploration of the link between experts and the sentiment of anger led to the discovery of another exciting detail in how experts make claims. The experts, and to a lesser degree, the competent, use sentiment words associated with anger like *violent*, *threatening*, *perpetrator*, *outburst*, *neglected*, *miserable*, *escalate*, *challenge*, *attack* or *abuse*. Novices do not seem to be using words regularly apart from the words: *violence*, *neglected* and *bad*.

A review of the relevant quotes from the transcripts shows that these words signify moments when these participants seem to be identifying the most meaningful information for further processing. For example, one participant (P:7603) sums up the information from Vignette 1 in the following words:

*"And she is now 15. She had 13 years of living in a **miserable** life environment" (L:2930)*

concluding with

"and there needs to be a child care, child protection plan".

Another expert (2131) sums up the information about the uncle in vignette 1:

"Ok, so now the uncle is potentially a perpetrator of sexual abuse" (L:957).

They then state that the potential target of the abuse lives with the grandmother and emphasises that this is the "*grandmother who is also the mother of the perpetrator of sexual abuse on her granddaughter*" (L:968), leading to question how protective the grandmother can be in this scenario. In other words, these moments identified through the sentiment words associated with anger appear to signify when experts point out the most significant factors in a case. This observation is far less pronounced in the transcripts of novices or competent practitioners.

In summary, most of this study's claims relate to the actual task given to the participants. Most claims express a level of assessed risk or the chosen course of action. Some of the claims suggest that participants use claims to hold information or mark moments in time where a temporary judgment has been made that could still change when more information is considered. In this category of claims, there are moments when the decision-maker appears to use a checklist of available information. When the checklist is complete, the decision-makers translate the information into a professional term that summarises the processed information. From here one, either a final decision about the course of action is made, or further information is sought to complete the narrative required to choose a course of action. Participants also conclude the review of information often with the claim that they are worried, which could be an expression of uncertainty which needs to be

explored further. Emotive language, especially the expression of anger, appeared to be indicators for moments where experts highlight a particularly significant case characteristic.

6.3.3.4 Warrants

Warrants link evidence and claims and therefore they are a crucial element in understanding the reasoning patterns of decision makers. According to the plot of the correspondence analysis above, novices and those decision-makers in the cluster Self-/ Open+ appear to use warrants relatively more than other participants, which could suggest differences in how the participants in these groups use warrants to justify claims. However, as with claims, the visual comparison of the respective cooccurrence maps did not reveal any interesting differences that would support this observation. Instead, a review of the maps highlighted many similarities again. That suggests no significant differences in the use of warrants between different groups of participants. Novices, competent practitioners and experts frequently use the terms *child protection*, *domestic violence*, *[non]accidental injury* or *substance, and drug and alcohol misuse*.

One small difference is that Novices used word combinations that include the words *investigating*, *know a bit more* and *at the moment* more frequently than other groups. This observation suggests that novices use warrants more often because they tend to justify their conclusion that they require additional information more frequently. In place of analysing observable differences between groups, the warrants were reviewed in their entirety to see if any patterns were emerging from individual words in their context.

[non]accidental injury or substance [drug and alcohol] misuse regularly found in the cooccurrence maps indicate that these are essential case characteristics that participants use to justify their decisions. This observation highlights that these case factors seem to trigger internal reasoning processes because these represent prevalent risk factors in practice. The following sections explore warrants in more detail by highlighting three observations from reviewing some of the word combinations identified in the above map.

"And the injuries are non-accidental"

A non-accidental injury is a reasonably straightforward way to justify out-of-home care decisions. As discussed in the case characteristics of vignette 5, the issue of a non-accidental injury, especially in the case of a non-mobile baby, results in a straightforward response that sees risks as severe and directs practitioners in the course of action that removes the child from the care of the family. That comes across in the observation that many of the warrants that refer to the non-accidental injury are relatively short and do not indicate much deliberation. They appear to be a factor whose presence results in a clear decision about a course of action. For example:

"Given that she's only a year, considered to be non-accidental, so that's confirmed" (7804, Vignette 5)

"And the injuries are non-accidental" (6285, Vignette 5)

"Ok, so we need to sort of go in here because if she's presenting with the non-accidental injury, that is really serious" (1757, Vignette 5)

In one warrant regarding vignette 2, it seems like the question of whether or not there is a non-accidental injury is used to check if there should be increased concerns. In this case, one could argue that the injury, in this case, is non-accidental (as a result of neglect). However, the decision-maker categorises the injury as non-accidental. Once the choice is made that this is "only" an accidental injury, the concerns reduce.

"Although it's concerning, we don't think this is a non-accidental injury. We are just worried about the delay. (3726, Vignette 2)

This example could indicate that injuries trigger specific risk assessments depending on whether or not they are accidental or non-accidental.

The possibility of a non-accidental injury seems to trigger quite a straightforward response from practitioners. That is evident in the way the decision-makers are very consistent when choosing a course of action that results in the child's out-of-home (and family) care. Part of this fast decision-making may be that the words broken [leg], injury and accidental trigger the sentiment of anger, sadness, surprise and fear.

There is a simple logic that an accidental injury like a broken leg in a non-mobile child must be **non**-accidental. A fracture in a long bone as the femur in a child who is not walking yet (as in case Vignette 5) is a warning sign of physical abuse (Weber 2015), but there are potentially other (rare) causes of femur fractures (Boston Children's Hospital 2022). Also, the case of child W (Re W (A Child) (No 2) [2017] EWHC 917 (Fam)) shows that the initial concern is that an injury in a non-mobile child can not automatically be considered a non-accidental injury. In other words, the decision-maker, in this case, takes a shortcut by focussing their justification for the final course of action mainly on the non-accidental injury. It is potentially worthwhile to explore further if a non-accidental injury may indicate a category of warrants that seem to trigger the end of further deliberation as the underlying evidence is strongly associated with prescribed courses of action.

"We've got domestic violence"

Compared to the simplicity in which participants use the existence of a non-accidental injury to warrant a more severe course of action, how participants, especially experts, use the term domestic violence to warrant a claim or a course of action is more complex. Domestic abuse is a significant problem for social workers given the high incidence rate, visualised in the dot density map in the first chapter about social work. That means the presence of domestic abuse in a case scenario does not automatically lend itself to a simple justification of a course of action. In practice, cases, where domestic abuse is a characteristic would not automatically be considered a case for a statutory intervention by Children's Social Care instead requiring Early Help support as evidenced in examples of Children's Services threshold documents which outline the level of risk at which point Children's Services get involved (Gloucestershire County Council 2022; Oxfordshire County Council 2022;

Suffolk County Council 2022). In these situations, some more deliberation appears to be necessary. Participants do not appear to use domestic abuse as a justification for a claim alone without seeing domestic abuse in the context of other risk factors.

“So she's you know, this is, again, when we're looking at adverse childhood experiences, you've got a mother with domestic abuse, chronic sexual abuse suffered from her two older male siblings. (1237 Vignette 1)

And there's a long history of parental discord and disharmony and domestic abuse and developmental delays for the child. Missed health appointments, a lot of poor attachment (9642, Vignette 5)

We've got physical disability, we've got substance misuse. We've got potential when we've got domestic violence. (8374, Vignette 2)

The same observation applies to how participants use terms relating to substance misuse. This case characteristic does not in itself trigger a specific response. When participants refer to substance misuse as a warrant, this usually happens in the context of other risk factors:

“The fact that they're not engaging very well and that there was potential substance misuse and potential violence as well, and then also with the whole killing thing that might be copied behaviour”

“We have got physical disability, we've got substance misuse. We've got potential when we've got domestic violence”

“So, given the alcohol, drugs, historical DV, mental health”

It seems that different risk factors that in themselves are potentially “worrying” but would not be sufficient to make a claim or choose a course of action are combined as a new claim (“*we are looking at adverse childhood experiences*” (1237), “*we've got toxic trio again*”) which participants then use to warrant further claims. In other words, evidence describing complicating factors or different categories of abuse does not appear to be a strong enough warrant for claims about a specific course of action. Individually, these factors seem to justify changes in the risk assessments, but the participants appear to combine these different factors to justify a course of action. Participants in this study seem to combine evidence to strengthen their warrants.

"we might then escalate to child protection"

The frequent use of the word combination *child protection* concerning

warrants is fascinating as it shows a difference in how participants justify decisions. Participants use the words child protection in a warrant to claim that the right course of action is child protection. Where participants refer to child protection when making a warrant, it is possible to identify differences in how participants use this threshold to justify decisions. Two novices seem to use the threshold as a binary choice. They use warrants to decide which category of need is appropriate, whilst two experts seem to justify their conclusion in a more detailed way as part of a broader plan that allows changing the course of action later.

Two novices make references to this threshold as a binary choice. Here, they appear to use the question if significant harm has already occurred or is likely to happen to justify their decisions about their course of action. In the first quote, this threshold is reached:

“I am going child protection, because I don’t think this child is at risk of harm [...] but she has shown an intention for harming herself. [...] I think there’s lots of areas there which are leaving her at risk of harm and vulnerable” (L:2020).

In the second quote, the decision maker uses the fact that the child already sees a professional as an argument that there is no imminent risk of harm:

“Although I am worried, I don’t think the risk are quite high, but I don’t think that I would feel the need for it to be child protection, because I think the child is seeing somebody from CAHMS already” (L:2434).

Two experts seem to use child protection differently. Rather than applying the threshold as a binary question, there appears to be a more strategic use. When social workers decide on a child in need as their course of action, participants use child protection as a justification to take a potentially riskier route. Here, these two experts use the opportunity to escalate to child protection as a backup plan should information arise that child in need is not sufficient to manage risks. For example, 1757 arrives at the conclusion that vignette 2 is “*child in need, with the possibility for it to go up a level*” (L:653), highlights different explanations for the reason why the child suffered a burn to the foot (“*there is mum possibly struggling to manage his disability*”) and states that there is a lot that needs exploring. At this moment, there is the justification for the claim that this is a child in need case that one “*could*

escalate then to a child protection level” (L:657). In Vignette 4, this participant decides that this is a child-in-need case because there is a need for more investigative work. Again, child protection seems to be a safety net if this “unpicking” reveals more concerns.

I think it would be child in, I think child in need, with the poss with again, with the possibility to go to child protection because I think it needs further unpicking (L:748-749).

Similarly, one participant (P:9642) justifies the initial decision for a child in need level of intervention with the possibility of undertaking an assessment that could escalate to child protection.

And then whether we need to put any support in for the family and that further assessment might then escalate to child protection. (L:4261)

When participants make a warrant, these two ways of referring to child protection show two different ways of using warrants. In one version, the participants apply warrants to justify a relatively simple binary decision, like arguing whether or not the case has reached a threshold. In the other version, participants use warrants to justify a more complex strategy that allows the decision-maker to change their mind later.

Participants often seem to reuse some evidence as a warrant to justify a claim they made. That is especially the case when the available pieces of evidence in the vignettes are combined as a checklist and summed up in a professional term as a claim (for example: “This is neglect”). This claim and the underlying evidence warrant another claim, especially when the participants choose a course of action. The participants use some professional terms frequently as warrants. A non-accidental injury seems to justify a straightforward decision-making approach without much deliberation. More complex issues like domestic abuse alone do not appear to justify decisions about a course of action. Here, the participants combine different risk factors in more significant theoretical concepts (for example, Toxic Trio), which suggests that they require further deliberation. Participants often use the term child protection within warrants in two different ways. One way is to warrant a decision by confirming whether the risk meets the legal threshold of significant harm. Another way is to use a lower level of intervention like Child

backups. Participants make references to their personal experiences and professional knowledge and establish loose associations with theories. The review of the instances where participants made warrants with references to their own experiences triggered a somewhat creative process of interpretation.

"My kids get this all the time"

Reference to personal experience to back up a decision include the consideration of one's own experience as a parent. Concerning the "*serious head lice*" mentioned in vignette 3, this participant (P:9333) offers a backup for the warrant ("*chronic neglect, domestic abuse, okay*") that justifies the claim that this is a low-risk child in need case:

"my kids get this all the time" (L:4211).

Interestingly, this participant appears to separate the issue of head lice from the overall question of personal hygiene as a sign of chronic neglect, which is a significant factor in this case. First, this participant considers two possibilities: "*I am just wondering if she's got some sort of medical condition that nobody has picked up*" (L:4216). This option suggests that head lice may not result from parental neglect, which could question the decision-makers' perception of being a parent. The possibility that this may be a medical condition could consolidate the personal experience of the participants' children getting head lice "*all the time*" with the idea that having head lice "*all the time*" could be a sign of parental neglect. Following on from this, the participant considers an alternative interpretation of the head lice issue that considers the possibility that the head lice could be a symptom of neglect:

"or the head lice is quite worrying as well" (L:4216).

The question, "*but why has she got such poor personal hygiene?*" (L:4217) that follows could be read as the verbalisation of discounting the first of these two options. The poor level of personal hygiene does not fit into the possibility of the head lice being just a medical condition evident in the warrant "*chronic neglect, domestic abuse*" (L:4224) that justifies the claim that this is a child in need case. This hypothetical interpretation of this warrant could be an example of how personal experience shapes a reasoning process requiring

more exploration. However, the evidence base for this interpretation is weak. There is another example of a participant (P:2131) who explicitly references "*having children myself*" whilst considering vignette 4. After reading the concerns in the referral about the mother of a newborn baby falling asleep whilst feeding her newborn baby, this decision-maker says [...] *that probably happens to most parents*" (P:2131, L:861 - 864). At this stage, the risk assessment is low (as for most other participants), and it changes to high after the participant reads information that does not align with personal experience: "*concerns rise because mum is using drugs*" (L:866). Concerning personal experience of non-attendance at school similar to the child in vignette 1, one participant highlights that they "*can relate to that on a personal level*" (L:340). At that moment, the participant looks at information about strengths and decides to maintain the same moderate risk level and choose child protection as the course of action. As in the previous two examples, it would be interesting to explore in more detail if using personal experience as a warrant in the reasoning process affects the assessment of risks. The same applies to the way decision-makers make reference to theoretical concepts.

"the deliberate death of a kitten raises my concerns"

In three other examples where participants use backups, they make somewhat vague references to theories or professional concepts to back up their claims even though there is no explicit reference. One participant (P:9642) speaks of the notion that "*the greatest indicator of current risk we have is past risk*" (L:4332) after reading about historical concerns without going into detail. Two participants (P:1237, P:9462) make general references to what they present as common knowledge

"whenever you see a dead animal, that's always a slight indicator, isn't it" (L:4089).

One of these two occurrences presents an interesting reasoning sequence. This sequence starts with a low-risk assessment after reading the referral information in Vignette 4. The decision-maker (P:1237) then reads information about *separation, domestic abuse* and *physical assault* (L: 198) and concludes that "*that's something I have to keep into*

consideration" (L:199). Despite the severity of this information (domestic abuse and physical assault), the risk assessment does not change, potentially because of the high prevalence of both risk factors in social work practice. As the discussion about warrants shows, these risk factors alone do not seem sufficient to trigger a decision about a course of action. Next, this decision-maker seems to read about the deliberate death of a kitten. This information becomes the justification for the conclusion to raise the concerns:

"the deliberate death of a kitten raises my concerns" (L:200)

The following phrase,

"with the links that we know about physical harm to animals and that that can either lead into or whether a child themselves is being abused physically or sexually" (L:200),

is backing this claim up regarding what this participant presents as common professional knowledge (*"the links that we know about"*). After this, they raise the risk one level to moderate. Interestingly, the information about domestic abuse and physical assault does not trigger a change in the risk assessment, whilst this piece of information does.

The reference to what *"we know about physical harm to animals"* and the implications for current or future risk suggests that this participant identifies this information as exceptional, which seems to heighten the concerns. A threshold that the domestic abuse and physical assault do not seem to have breached in this instance. That could be because finding the information about the deliberate death of a kitten comes as a surprise. The sentiment analysis of the quotes at this point supports this premise. The words used when this decision-maker mentions the deliberate death of a kitten express the sentiments of anger, anticipation, disgust and fear, similar to the moment when the participant mentions domestic abuse and neglect. The difference is that the moment the participant mentions the death of a kitten is also associated with the sentiment of surprise, leading to a lower sentiment score at this point.

"Oh yeah, that's classic"

Another example of using warrants referencing a vague theoretical concept seems to relate to disguised compliance. This reasoning sequence covers the

phrase

"oh yeah, well, that's classic" (L: 1492)

after the participant identifies

"patterns of no sustained improvements" (L: 1491)

before coming to the conclusion

"Okay, that is bad" (L:1491).

This lack of sustained improvements is likely to refer to the professional term disguised compliance (Nicols 2016; Leigh et al. 2020).

This particular reasoning sequence starts with the claim

"so, we've got conflicting information" (L:1486).

At this stage, the participant reads various pieces of information that question the parental capacity to look after their children and raise concerns about parental engagement with professionals. This decision-maker picks up on the one piece of information that does not conform with the presented picture:

"Megan's mother would take reasonable action" (L:1488),

then agrees,

"Yeah, I'd agree with that." (L:1490)

before stating what they agree with:

"This has been identified patterns of no sustained improvement" (L:1491).

The quote

"oh yeah, well, that's classic" (L:1492)

backs this up by suggesting that this is something that happens regularly. This sequence indicates how this participant tries to make sense of conflicting information and can consolidate this conflict when they find information that confirms the initial perception of this case. The utterance *"Yeah"* comes across as a statement of satisfaction about the discovery of information that, in the eyes of this decision-maker, resolves the conflicting information that was the starting point of this reasoning sequence. After this moment, the

participant quickly moves through different sections of available information and reads out information in a way that appears to be more of a tick list that confirms that the initial conflict is resolved:

Child protection —> concerns about the home environment —> very unhygienic —> School is fine (L:1497-1501).

After this sequence, they make a claim,

"So, we've got historic neglect" (L:1502)

and decide on a course of action

"I have to go with child in need" (L:1511).

At this point, this reasoning sequence ends when the participant reaches a level of informational saturation that seems to fit into an internalised narrative that this participant perceives as a classic characteristic. That suggests that this participant compares the presented case with knowledge about other cases to make a decision.

"We can't have a drug and alcohol using mum looking after a newborn"

Another reasoning sequence seemed to be interesting when reviewing the quotes representing warrants. This sequence relates to Vignette 4. This decision maker (P: 7804) starts, like many, with a low-risk assessment after reading the referral information about the mother falling asleep whilst feeding her newborn baby. This risk assessment does not change even after the interagency information reveals

"drug use during her second pregnancy" (L:3027).

At this stage, the presented information is vague and only refers to concerns about the mother's drug use by professionals rather than facts. Next, this decision-maker reviews the background information, which contains the statement that the mother said she was **not** taking drugs. This piece of information contradicts the previous information about the concerns regarding drug use. This moment is where this particular reasoning sequence starts.

The participant reads the background information and makes a claim,

"so, there's issues with the children and their behaviour and their presentation at school" (L:3032).

The decision-maker seems to use this information now to help to resolve the conflicting pieces of information and answer the question if the mother is using drugs or not. The presentation and the behaviour of the children at school now become possible evidence that supports the possibility that the mother is using drugs.

"Which would possibly be consistent with Mum using drugs" (L:3032).

The word "possibly" suggests that this decision-maker remains uncertain. The next phase is a qualifier which confirms that this participant is still uncertain about the parental drug use:

"I don't know whether we know that she's using, [has] been using drugs" (L:3033).

This decision-maker appears to be actively looking for information as they often change between different pages presenting it. At this stage, they look at information about child development and pick up that *"there's concerns that alcohol and substance use is thought to be affecting the health of the baby"* (L:3034). This evidence is no factual information, and the decision-maker remains uncertain, as the following claim indicates:

*"So it **seems like** that's confirmed that she is using alcohol and drugs" (L:3035)*

Despite expressing some uncertainty (*"it seems like"*, *"moderate or high?"* (L:3042)), the following claim suggests that the decision-maker has made up their mind about the drug use. Instead of asking if there has been drug use, the question now is what support was put in place to stop the mother from using drugs whilst being pregnant and if the baby suffered from withdrawal symptoms:

"And I'd be wondering what was being put in to try and help her not to use that while she was pregnant" (L:3036)

"So, we have possibly got a premature baby who is withdrawing" (L:3036)

At this point, they change the risk assessment to high. However, some uncertainty remains, and the question is how to manage this situation. There seems to be an internal dialogue between the options to give the mother a

chance or not: *"Do I? I don't know if I do."* (L:3045-3046). The decisive point is the warrant that the mother seems to be a single parent:

"Because I don't think there's any other adult in that home" (L:3047).

They back up the following choice of child protection as the course of action with the general statement that suggests a reference to standard unwritten professional rules:

"We can't have a have a drug using an alcohol, using mum, looking after a newborn baby, let alone the other two" (L:3048).

By saying "we", this participant ends the uncertainty they tried to resolve in this sequence by suggesting a general agreement within the professional community about situations like this. This backup constructs a level of certainty that helps to reach a point where they can decide on a course of action.

Participants use backups very sparsely. When they do, it appears as if there is a remaining level of uncertainty or a conflict that the participants need to resolve. One way to make sense of information seems to use personal experiences, allowing the simulation participants to identify or highlight concerns outside their personal experiences. Another response to uncertainty seems to be to back up a decision with references to what participants refer to as common professional knowledge. This kind of knowledge suggests a general agreement that creates a form of certainty sufficient to make a decision.

6.3.3.6 Qualifiers

The starting point to find themes within qualifiers that can be used to analyse each group is the respective cooccurrence maps. These maps of qualifiers maps, and the results of the sentiment analysis, show interesting differences between participants. The sentiment analysis shows that novices use a higher frequency of sentiment words expressing fear and anger. Competent practitioners seem to use more positive words and sentiment words that express trust. Experts also use more positive sentiment words and a high proportion of words associated with fear.

Empirical Results and Findings

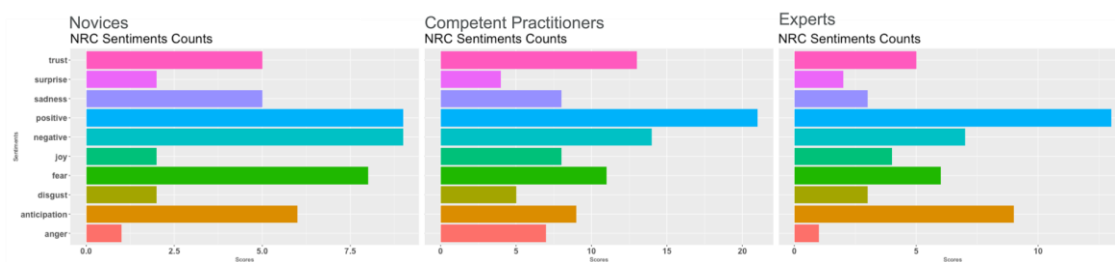


Figure 74: NRC Sentiment Words for Novices, Competent Practitioners and Experts

The associated sentiment words overlap with the themes identified through the cooccurrence maps. This observation suggests that it is feasible to explore qualifiers by comparing quotes from participants with different levels of expertise. The cooccurrence map below highlights one particular group of qualifiers related to a feature identified in the review of qualifiers by novices.

Cooccurrences within 2 words distance
Nouns & Adjective Phrases: Qualifiers

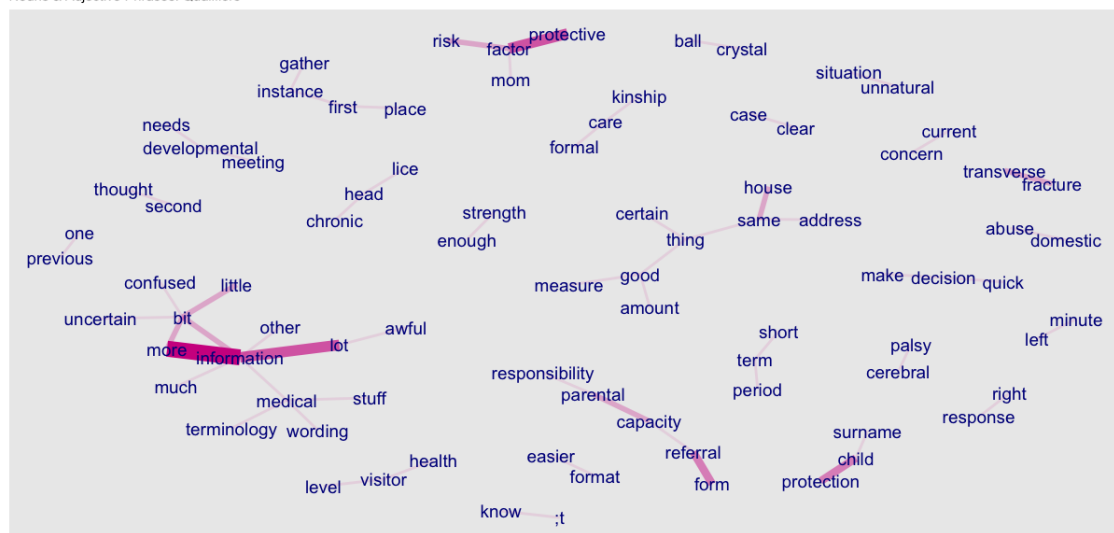


Figure 75: Cooccurrence Map of Qualifiers

On the one hand, the bottom left of the maps shows word combinations that seem to express uncertainty like *a second thought*, *confused*, *uncertain*, *a little bit* or *more information*. On the other hand, some combinations express certainty like *a good amount*, *a certain thing* or *a good measure*. This delineation reflects a difference between novices and participants who are either competent or experts identified in the sentiment analysis of qualifiers.

Novice: "Potentially, perhaps on second thoughts"

Novices appear to be using words associated with the sentiments of anticipation and fear relatively often. The map below highlights the

way that seems to express or manage uncertainty. In this case, the participant uses qualifying words like obviously, potentially, probably or perhaps. The first quote obviously uses the word after reading about the mother in vignette 4 taking drugs during pregnancy and failing to take up antenatal care.

“I am thinking, obviously, the risk assessment is severe” (L:3119-3120)

In this situation, the information appears to be clear enough that an alternative interpretation does not appear to be possible. The phrase *“I am thinking”* could suggest that there still are some internal uncertainties and that the word *“obviously”* seems to be used to convince this decision-maker that others would come to the same conclusion.

The second quote refers to a change of mind. In vignette four, this participant evaluates the information from the referral as low risk and changes this to severe shortly after reading only a few more information. This sequence starts when the participant claims to

“go for child protection so that the situation is monitored closely and regularly” (L:3132).

However, soon after this, they raise doubts. Within three seconds, this participant adds,

“we don’t know why” (L:3133)

concerning the suggestion of doing more checks. This quote does not appear to refer to any new information as they looked at the strength section, which contains no information for 1:22 minutes. That indicates that this participant is deliberating previously read information. This deliberation considers that

“there would have been a lot more investigation into this case” (L:3135).

This possibility triggers a change of mind of changing the course of action from child protection to out-of-home care, potentially because the decision-maker imagined what the information could look like after this investigation.

“Potentially, perhaps on second thoughts, given the history and the suspected drug use during pregnancy, there could possibly be grounds for preferably kinship care” (L:3136).

This change of mind is initially worded as a very uncertain option (*potentially,*

perhaps, on second thoughts). This decision-maker never makes a solid verbal statement about the course of action but keeps wording this as a possibility.

"Perhaps, the risk is sufficiently high to do that" (L:3137)

"I am starting to think it's probably going to be going for care" (L:3140)

It is only at the end of what this decision-maker describes as a *convoluted* (L:3141) thought process that a feeling of certainty creeps in:

"I think I would go for kinship care if that was possible. I'd go for care. Yeah. So I'm going to change it" (L:3140)

This participant works a lot with hypothetical statements, which could be read in a way that some internal reasoning processes imagine this case in a real-world scenario as opposed to the simulation. That could suggest a reasoning pattern that takes the examples of other cases as a template for decision-making in the case that is currently considered.

Competent Practitioners: "because I am a bit uncertain about certain things"

Participants who are classed as competent use qualifiers more often than novices. As the map below shows, most of these qualifiers refer to the level of information provided. Apart from one case where the participants point out that the case vignette contains much information, these references mostly point out the requirement for more information to make decisions.

Cooccurrences within 2 words distance
5. Qualify a claim by Competent in All Vignettes

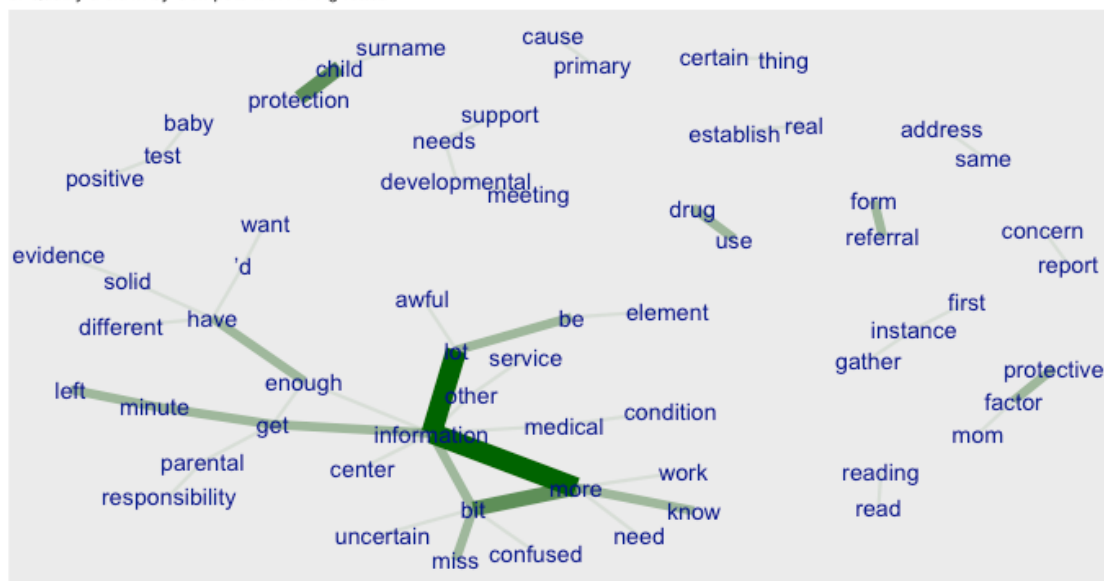


Figure 77: Cooccurrence Map of Qualifiers used by Competent Practitioners

However, it appears that the qualifiers in the context of requiring more information may be markers for moments when the participants clarify what information they need to improve the quality of their decisions. One example of a reasoning sequence starts with the question

"I wonder why his mum didn't take him" (L:414).

Whilst the participant (P:1722) reads the referral information in Vignette 2. At this point, they pick up that the triage nurse assessed the burn injury to the foot and warrants this information with the fact that this is an expert's opinion (L:418). Next, the decision-maker concludes that this is a moderate risk (L:420) but follows this up immediately with the following qualifier:

"Because I am a bit uncertain about certain things" (L:420) and "I am not sure" (L:421)

The next step in this sequence makes the list of things that are uncertain explicit as the participant asks two questions which guide the following considerations:

"I mean, why would he be? Why has he burned himself on the radiator anyway? [...] How long was he against the radiator?" (L:422)

After that, they express their confusion about the names whilst trying to establish who the key members of the family are. Once this confusion seems

to be resolved, the thought process returns to the previously asked questions. However, whilst initially, the subject of the question was the child ("why has **he** burnt **himself**?), the focus is not on the role of others in this situation:

"Wondering why they why he's burnt himself even at all on a radiator, how long was he left there" (L428) "Why Mum didn't go? Why, was she working or?" (L:428-429)

All this happened whilst this decision-maker reviewed the referral information, which suggests a deliberate attempt to make the most use of the available but limited information in this part of the vignette. The above sequence seems to create a mental list of things that this decision-maker wants to establish to make a decision. The qualifiers, in this case, seem to trigger a deliberate attempt to reconsider new or already reviewed information.

Experts: "Because I have a crystal ball"

Relative to the number of experts in this sample, experts use qualifiers most frequently. Like novices and competent practitioners, experts use qualifiers often concerning the need for more information and, like competent practitioners, to determine what "*we don't know*", "*what we need to know*", and what we know. For example, one expert states that they "*don't enjoy medical wording*" and that they "*don't understand what a transverse fracture is*" (L:664). However, they compensate for this lack of understanding by stating what they know. "*I know what a femur is*" and use this to establish a working theory which enables them to move on: "*So, I am assuming it's a fracture in the leg*" (L:664).

Empirical Results and Findings

Cooccurrences within 2 words distance
5. Qualify a claim by Expert in All Vignettes

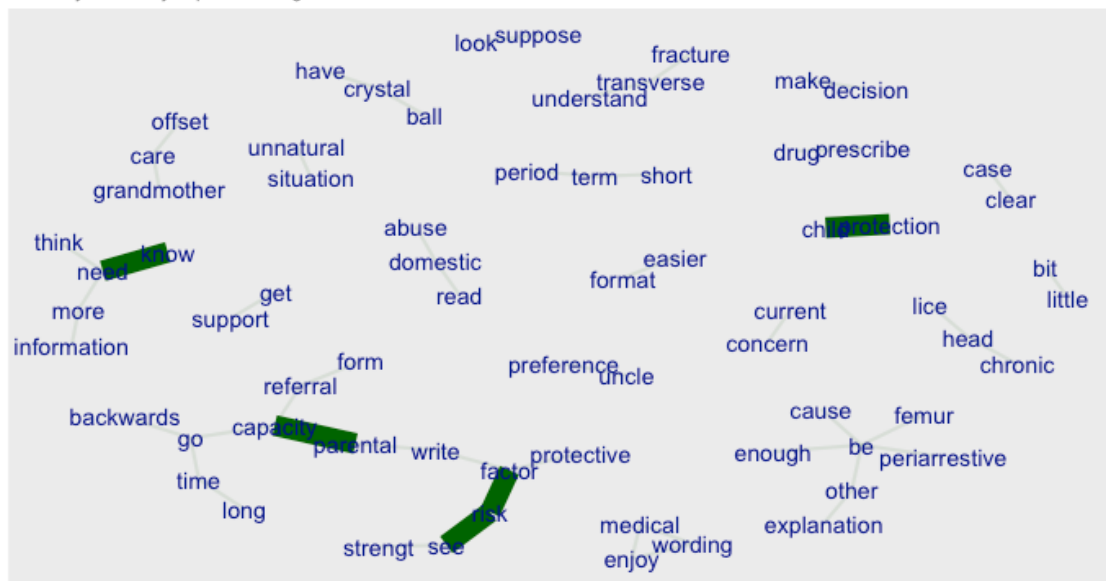


Figure 78: Cooccurrence Map of Qualifiers used by Experts

Another expert states the lack of knowledge about medical terminology by saying, “*I don’t know what peri-arrestive is*” (L:4308), sums up the referral information in the words “*It’s an interesting one*” (L:4309) and then works out that peri-arrestive relates to a cardiac arrest which they translate into a more familiar term,

“*Well, she has had a heart attack, that’s cardiac arrest*” (L:4313).

These two sequences are short, but compelling examples of ways these decision-makers compensate for lack of knowledge by linking pieces of information they know about together. That could happen in a sequence like this:

- Unknown: transverse fracture.
- Common knowledge: fracture = broken bone.
- Personal knowledge: femur = long bone in the leg
- Hypothesis: transverse fracture = broken leg

This last hypothetical sequence would be worthwhile to explore further with more examples as it could give more insight into how decision-makers construct a story that then provides the basis for their decision-making.

Another interesting reasoning sequence relates to vignette 5. Here, it appears

that the decision-maker (P:2131) uses a qualifier to express satisfaction that a previous claim has been confirmed by factual information. This sequence starts with the claim that there

“appears to be some potential DV” (L:831)

which is an assumption made only on the basis that

“babies don’t give moms two black eyes” (L:833).

The word *“appears”* suggests that this decision-maker considers this initial claim a working hypothesis. This participant continues to look through the available information referring to engagement with health professionals, developmental delay and under-stimulation and health issues for the sibling of the child in question. This process of going through further information goes on for a relatively long time (1:50 Minutes) until the background information is reviewed, which points towards historical experiences of the mother being subjected to domestic violence. Even though this does not confirm that there is currently domestic violence, this information appears to be sufficient for this decision-maker to qualify the initial claim with the statement:

“Well, because I have a crystal ball, I read the domestic abuse in that scenario right” (L: 846)

This wording referring to a crystal ball could either be the expression of surprise that the initial hypothesis was correct or an expression of trust in their intuitive skills or reading a situation right even though there is limited information available.

Qualifiers appear to be used differently by novices compared to those with more experience. Novices rely on qualifiers most frequently, and their use is often read as expressions of uncertainty. Another application of qualifiers from a competent practitioner suggests a strategy where a decision-maker would identify deficits in the available knowledge and deliberately looks to review available information again or search for new evidence.

6.3.3.7 Rebuttals

The manual coding of the transcripts to identify the different reasoning blocks identified n=86 coded quotations as rebuttals, n=60 of which were made by

competent practitioners, n=5 by experts and n=20 by novices. Overall, these low numbers again mean that comparing different groups in respect of expertise is problematic. Across the different value clusters, the use is more balanced even though there is only one participant in the value cluster Self+/Open+ who makes two rebuttals. As such, again, it does not seem promising to use the expertise or values to compare individual reasoning patterns that use rebuttals.

Cooccurrences within 2 words distance
Nouns & Adjective Phrases: Rebuttals

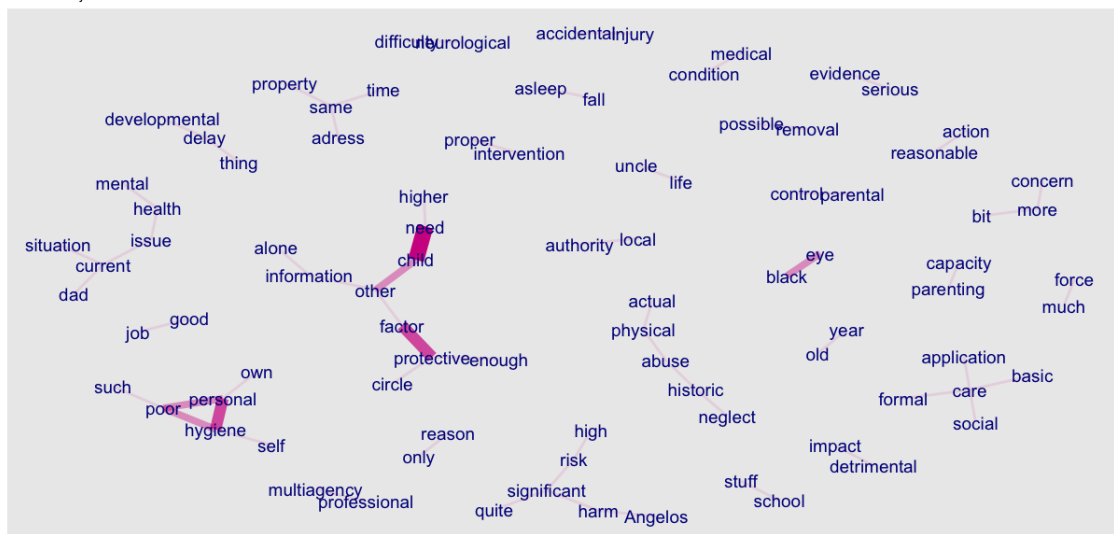


Figure 79: Cooccurrence Map of Rebuttals

The co-occurrence map of rebuttals points to a few patterns reviewed for this analysis. This review highlighted in this map underlined the hypothesis that rebuttals show the complexity of interpreting and balancing different information. That was most pronounced in the examples where participants used word combinations containing the word *significant*, a legally defined threshold criteria (Significant Harm) and the word combination *protective factor*.

In the two quotes where the word significant appears as part of a rebuttal, the decision-makers consider this threshold whilst deliberating which course of action to follow. In the first example, the decision-maker appears to have doubts about choosing formal care as the preferred course of action as there is no evidence that the baby in vignette four has been affected by drug use.

“It doesn’t say anything. I don’t think it said that the baby tested positive for anything” (L:2321)

This doubt means that the decision-maker (P:6285) potentially questions if the threshold required under s.31 of the Children Act 1989, significant harm, is met. The rebuttal seems to reaffirm that the threshold is met:

“But if Mom is falling asleep and Mom is not doing basic care in hospital, I think the baby would be at risk. Quite significant risk of harm” (L:2322).

The second use of the word significant also refers to this threshold. Here, the decision-maker (P:3745) seems to consider the possibility that more information could come to light after a more in-depth assessment. The rebuttal here sets the condition under which the chosen course of action, Child in Need, would be maintained:

“so I would I would say with a child in need unless there was serious evidence that there was a risk of significant harm” (L:1405).

Using the combination *protective factors* as a rebuttal highlights the balancing exercise that appears to happen in the decision-making process. One participant (P:8411) describes themselves as a person who *“always thinks the worst case scenario and then works down from that”* (L:3472). On this basis, they explicitly refer to a balancing exercise:

“There weren’t enough strengths and good things for me to counterbalance.”

This decision-maker balances the dangers presented in the case vignette with protective factors. They state that there were not enough to choose a less severe course of action than formal care. However, this is not where the consideration stops. The quote acknowledges that many explanations could shift the balance in a different direction again.

“The dangers were there, but there weren’t enough protective factors and those for me to even consider knocking it down to a severe. But there could have been lots of explanations as to why some of the things were happening.” (L:3472)

This short example from the small number of quotes containing a rebuttal highlights the difficulties of social work decision-making. Even a binary threshold decision is complicated because many factors must be balanced against each other. That makes it important for practitioners to consider the information from different perspectives, hypothesise more about the possible

meaning of information and consider what information may change an assessment of risk or the course of action.

6.3.4 Summary

The presentation of the results showed that risk assessments increase as participants review more information, indicating a cumulative strategy. The different case vignettes showed varying levels of risk assessments and choices of intervention, with common themes such as "parental capacity," "domestic violence," "mental health," and "protective factors" emerging. The chapter also identified differences in value patterns among participants, with some emphasising self-direction and security while others focused on competence and stability. Novices tended to prefer out-of-home care interventions, while experts leaned towards keeping the child in the family home. The analysis revealed that participants primarily relied on fundamental building blocks of reasoning such as evidence, claims, warrants, backups, qualifiers, and rebuttals. Novices and competent practitioners used contracts more frequently, while experts used evidence. Decision-makers considered various types of information, including evidence from the case vignette, factors related to abuse, family dynamics, and complicating factors. Claims were crucial in decision-making, often signifying risk assessment and the chosen course of action. Decision-makers used warrants to justify their decisions and often reused evidence as a warrant. Backups were used sparingly but provided additional assurance and helped shape the reasoning process. The use of qualifiers varied based on expertise level, with novices expressing uncertainty, competent practitioners indicating the need for more information, and experts compensating for their lack of knowledge. The study highlighted the complexity and subjectivity involved in child protection decisions and the importance of considering all relevant factors. It also emphasised the influence of human values on decision-making and the need for novices to develop autonomy early in their practice.

7 Discussion

7.1 Research Questions

This study aimed to understand the reasoning strategies used by social workers when making high-stakes decisions under uncertainty, specifically in safeguarding children. That includes identifying the type of information social workers use, how they weigh it, and how they process it to make decisions regarding safeguarding procedures for children. The research is motivated by the need for more efficient decision strategies in social work to improve the quality and consistency of decision-making. The findings of this study could inform the development of decision-support tools, contribute to discussions about their value in social work practice, and improve critical thinking skills in social work education.

The research questions focus on understanding the reasoning strategies and cues used by social workers in threshold decisions related to the Children Act 1989, as well as the factors that influence decision-making:

- What reasoning strategies are social workers using to make threshold decisions regarding s47 of the Children Act 1989?
- What cues are social workers using to decide if a child is at high risk of immediate significant harm?
- How are decision-making strategies moderated by the individuals' dispositions, resources and abilities?

The anticipated outcomes include a better understanding of reasoning strategies, the development of a program to strengthen decision-making skills, and outlining a new decision-support system using text-mining and machine-learning techniques.

7.2 Summary of findings

In the decision-making exercises, participants faced a complex set of information that required them to choose which data to access within the given time constraints. The analysis revealed that risk assessments tended to increase as participants reviewed more information, suggesting a cumulative

strategy rather than evaluating each piece of information individually. Different case vignettes showed varying levels of risk assessments and choices of intervention, with common themes such as “parental capacity,” “domestic violence,” “mental health,” and “protective factors” emerging from the most frequently used two-word combinations that indicate core themes in the participant’s risk assessments. The findings emphasised the influence of case characteristics, sentiments expressed in the information, and specific information categories on decision-making. Significant risk factors for babies, such as drug use, alcohol use, antenatal care attendance, mental well-being and domestic violence, played an important role in participants’ decision-making. The analysis of the case characteristics also revealed that participants’ initial risk assessments varied and could be influenced by developmental concerns, domestic violence, parental capacity, and positive sentiments towards babies. Overall, the analysis of the case characteristics highlighted the complexity and subjectivity involved in child protection decisions and emphasises the importance of thorough evaluation and consideration of all relevant factors.

Regarding the characteristics of the decision-makers, the participants emphasised self-direction and security as important values, while power, stimulation, and hedonism were less critical. Differences in value patterns were observed among different clusters of participants, suggesting variations in their internalised logic of practice. The level of perceived autonomy was moderately high, but participants reported having less opportunity to influence policy decisions. Novices tended to rate good decisions more positively and downplay bad decisions, while experts were more open to acknowledging and learning from bad decisions.

The study also examined participants’ risk assessments and intervention choices, revealing differences among novices, competent practitioners, and experts. Novices and qualified participants preferred out-of-home care interventions, while experts leaned towards keeping the child in the family home. Novices tended to rate risks relatively higher, while competent participants assessed risks lower. The study highlighted the importance of expertise and openness to change versus conservation as decisive factors in

decision-making. The analysis identified two higher-order dimensions related to participants' dispositions: self-enhancement vs. self-transcendence and openness to change vs. conservation.

In making decisions related to social work, participants tended to rely on crucial case factors that trigger a response, professional terms used to categorise important information and incidents, and established protocols like "strategy discussion" and "significant harm." Participants often used the word "bit" to indicate moments of careful consideration and desire for more information, and the word "potentially" points to moments of cautious interpretation of the information.

The default position of "child protection" was a dominant threshold for participants, with them usually checking if the information in the case vignette confirms this default decision point. The findings point to the importance of carefully considering available information, categorising it, following established procedures, and being open to changing judgments based on new information.

The study examined participants' decision-making process by analysing their arguments' structure. The building blocks of an argument, such as claims, evidence, warrants, backups, qualifiers, and rebuttals, were identified as the components used by the participants. The study found that those making decisions primarily relied on fundamental building blocks like evidence and claims, using complementary blocks less frequently. That may be due to limitations in expressing internal reasoning. However, it suggests a need for more effort on behalf of the decision-makers in strengthening arguments by using complementary building blocks.

Additionally, the analysis found that participants often repeated information without adding elements of the knowledge base they acquired throughout their careers. The study also looked at the patterns between participants' characteristics and their use of reasoning blocks, finding that competent practitioners and experts were more likely to focus on the provided information as evidence. At the same time, novices relied on warrants to justify claims.

Decision-makers considered a variety of information when processing evidence and making decisions. This variety included evidence from the case vignette and factors related to abuse, family system dynamics, and complicating factors. The study also found that decision-makers with different value patterns focus on different types of information. Those focusing on preserving existing arrangements prioritise understanding the family system, while those open to change were more likely to explore abuse and complicating factors. All in all, decision-makers considered data related to abuse, family dynamics, complicating factors, and the involvement of other professionals when making decisions.

Claims played an essential role in the reasoning process observed in this study. Claims, along with evidence, formed the basis of decision-making, and analysis of claims revealed that they were used more frequently by novices and those with Self-/ Open+ value patterns. Claims often served as holding statements and interim judgments, indicating that more information may change the decision. Sentiment analysis showed slight differences between novices and experts, with novices associated with anticipation and experts with anger and trust. Overall, claims related to risk assessment and the chosen course of action, and they often signified the completion of information processing or the need for further information.

The analysis of warrants revealed the complexity of decision-making processes. In this study, it has been observed that warrants are used more frequently by novices and those in the Self-/Open+ cluster. Furthermore, warrants were often related to child protection, domestic violence, non-accidental injury, and substance misuse. Participants used warrants to justify their need for additional information and combine risk factors to warrant a course of action. Moreover, evidence was reused as a warrant to explain claims and professional terms are used in warrants. Overall, analysing warrants highlighted the importance of understanding the decision-making process.

It appears that the decision-makers used backups sparingly, often when there is uncertainty or a need to resolve conflicts. Backups included referencing personal experiences and professional knowledge, establishing loose

associations with theories, and vague references to common knowledge. These backups can give decision-makers additional assurance and help shape the reasoning process and risk assessment. Such references to personal experiences, theories, and shared understanding can help decision-makers reach a more informed and confident conclusion.

The use of qualifiers varied greatly between novices, competent practitioners, and experts. Novices were likelier to use qualifiers that express uncertainty, while competent practitioners used qualifiers to indicate the need for more information. On the other hand, experts use qualifiers to compensate for their lack of knowledge and connect pieces of information they know. Furthermore, sentiment analysis revealed that novices tend to use fear and anger-related sentiment words, while competent practitioners and experts use more positive words and sentiment words expressing trust. Overall, using qualifiers was a critical factor in decision-making, and its use varied depending on the expertise level.

Social work decision-making is an intricate process, even in binary threshold decisions. The low number of rebuttals made by practitioners of various levels of expertise showed the difficulty in comparing reasoning patterns. Co-occurrence maps of rebuttals revealed complex patterns, with the words “significant” and “protective factors” indicating practitioners’ consideration of legally defined thresholds for harm and balancing dangers and protective factors in decision-making. That highlights the need to consider information from multiple perspectives to make informed decisions.

- Decision-making process is complex and subjective.
 - Risk assessments increase with more information.
 - Core themes emerge from two-word combinations.
 - Significant risk factors for babies influence decision-making.
- Characteristics of decision-makers:
 - Self-direction and security are important values.
 - Power, stimulation, and hedonism are less critical.
 - Variations in value patterns observed.
 - Perceived autonomy is moderately high.
- Risk assessments and intervention choices differ between novices, competent practitioners, and experts.
 - Novices and qualified participants prefer out-of-home care interventions.
 - Experts lean towards keeping the child in the family home.
 - Novices tend to rate risks relatively higher.
- Participants rely on crucial case factors, professional terms, and established protocols.
- Default position of “child protection” is a dominant threshold.

<ul style="list-style-type: none"> • Building blocks of an argument (claims, evidence, warrants, backups, qualifiers, rebuttals) used by participants. <ul style="list-style-type: none"> ○ Novices and those with Self-/Open+ value patterns use claims more frequently. ○ Competent practitioners and experts focus on the provided information as evidence. ○ Novices rely on warrants to justify claims. • Variety of information considered when processing evidence and making decisions. <ul style="list-style-type: none"> ○ Different types of information prioritised by different value patterns. • Claims play an essential role in the reasoning process. • Warrants used more frequently by novices and those in the Self-/Open+ cluster. • Backups used when there is uncertainty or a need to resolve conflicts. • Qualifiers vary greatly between novices, competent practitioners, and experts. • Rebuttals made by practitioners of various levels of expertise. • Co-occurrence maps of rebuttals reveal complex patterns.
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Table 12 Overview of findings

7.3 Interpretation of Findings

Social workers are tasked with the difficult job of making decisions that can have life-altering consequences (Keddell 2017a; Abbotts and Norman 2022). Unfortunately, the nature of social work often presents practitioners with situations that are unpredictable and unclear. Therefore, it is essential that social workers have the skills and knowledge to assess risks and make decisions based on the information available to them at any given time (Juhasz and Skivenes 2018; Robichaud et al. 2020). Different theories of decision-making have shown that there is no one-size-fits-all approach to the process. Instead, social workers must be prepared to use a combination of methods, from careful deliberation to quick instinctual decisions, depending on the situation to make a “good” decision.

The findings from this study highlight the intricate balance social work professionals must strike between relying on known risk factors and ensuring a holistic, well-informed approach to decision-making (Kettle 2017, 2018). This study of social work professionals' decision-making process revealed several interesting observations that can inform practice as there is a sufficient degree of the so-called reality of function (Gredler 1994, 2003) in relation to the complexity of decision-making in the decision-making exercises. Whilst the participants only had limited information about the cases in the decision-making exercise, the information was rich enough to require a complex internal decision-making process. It is intriguing that even with limited information, participants engaged in a complex internal decision-making process. That observations suggests an inherent responsibility social

workers feel in their roles even when participating in a decision-making exercise. Such a sense for responsibility is evident especially in the literature around making out-of-home care decisions (Christiansen and Anderssen 2010; Berrick et al. 2018; Poso et al. 2018; Hoikkala and Poso 2020). However, faced with this complexity, decision-makers may resort to prioritising information that confirms existing beliefs or assumptions (confirmation bias) which is supported by the findings of Spratt et al. (2015). This can result in professionals overlooking data that might contradict or moderate their initial risk assessment.

The findings show the importance of the case characteristics in shaping the decision-making process, which seems to be an important feature in existing research (Arad-Davidzon and Benbenishty 2008; Davidson-Arad et al. 2008; Enosh and Bayer-Topilsky 2015; Keddell and Hyslop 2019). The findings from this study reveal that risk factors that are common in social work such as drug use, alcohol use, antenatal care attendance, mental well-being, and domestic violence significantly impacted the decisions participants made whilst other factors like family relationships seem to influence decision-making less. Additionally, cases involving young children and domestic abuse had a higher risk assessment and protective factors and mental health issues for both children and parents were actively considered.

Whilst relying on common risk factors that are a feature of many cases in social work may be an important heuristic, social workers must review more information to make an informed decision. Considering a holistic view of the situation is crucial when making safeguarding decisions in social work or child welfare as suggested by Ejrnæs and Moesby-Jensen (2021). Making decisions based on case characteristics alone can be problematic. Doing so can lead to incomplete or skewed understandings, misjudgements, cultural insensitivity, over-reliance on checklists, neglect of resilience and strengths, bias and stereotyping, reduced client trust, potential for harm, missed opportunities for prevention, and a lack of comprehensive support. Ultimately, decisions should consider the broader context, including family history, cultural context, and environmental factors, to provide adequate risk assessments (Wilkins 2015) and appropriate interventions that can lead to

positive change for the individual or family. Safeguarding decisions prioritising a holistic understanding of individuals and families are more likely to be effective, compassionate, and appropriate. Case characteristics are undoubtedly crucial but should be part of a broader assessment strategy that includes environmental, cultural, historical, and personal factors. Other factors such as personal experience, context, and external feedback should also be considered, as they can provide a more comprehensive view of the situation and help guide the decision-making process (Pecnik and Bezensek-Lalic 2011b; Arruabarrena et al. 2017; Gregoire-Labrecque et al. 2020).

7.3.1 The use of common themes as heuristics

The empirical results revealed some common word combinations used by the participants. The most prominent of these were "parental capacity", "domestic violence", "mental health", and "protective factors". The participants often used these phrases as labels to categorise case information and inform decision-making. That suggests that certain risk factors serve as heuristics or mental shortcuts. While they streamline decision-making, they can also be hindering good decision-making if over-relied upon. It's crucial for professionals to be aware of these cognitive biases and continually reassess their thinking patterns as suggested also by Taylor (2017) and Whittaker (2018).

The relevance of these terms is situated in the context of assessing risk within child protection. In practice, it is essential to assess the parental capacity of a household and the presence of domestic violence, as both can significantly impact a child's well-being. The mental health of both the parent and the child can also be a concern, as any mental health issues can impede the parent's ability to provide the necessary care and support. Additionally, understanding the protective factors of a family or community, such as strong family bonds, positive school environments, and access to mental health services, can help professionals gauge the resilience and strengths of a household. In assessing a child's well-being, these topics are highly relevant. They offer a comprehensive perspective on potential risks and strengths within a household. When child welfare professionals are aware of and can

assess these factors, they are better equipped to make informed decisions about interventions, supports, and in some cases, out-of-home care especially if these factors act as an anchoring point as suggested by Ejrnæs and Moesby-Jensen(2021).

From this perspective, searching for these themes in a complex set of information could be seen as an effective heuristic to reduce the cognitive load of evaluating all available information. The literature review confirmed the complexity that social workers face when trying to make sense (Helm 2016b, 2017) of the vast amount of available information and “non-linear interactions” (Helm et al. 2017, p. 1361) within the tensions between identifying and meeting needs, reducing risk, protecting people, balancing benefits and harms, considering available resources and priorities, and navigating conflicts between stakeholders (Taylor 2006). In other words, social workers have to navigate a “minefield [...] of conflicting demands” (Fargion 2014, p.24). In his work Helm (2016b) has found that social workers make sense of information through dialogues with their colleagues and that these dialogues often start with an opening statement that acts as a starting point for a roadmap of a discussion. The common themes that this study identified could be interpreted as such starting points. The framing of these common themes as methods to construct risk aligns with the understanding that social work often involves negotiating interpretations of risk.

The way risk is constructed has implications for the decisions made and the interventions provided. From this perspective, social workers may search the available information for a set of common themes that contain a shared meaning across professionals and therefore could set a shared understanding of a case. This shared understanding could be seen as a point of departure for a conversation between two or more professionals where potentially only one person has an in-depth knowledge about the individual case. That would mean that decision-makers may use these themes as a way of constructing a shared meaning. This construction of risk is highlighted in the existing research as rationalising risks through negotiations between agents with different interests (D’Cruz 2002) to reduce the complexity social workers face. These themes could fill the gap of "*objective conditions*

(physical or interpersonal) that are unanimously recognised as constituting maltreatment or abuse" (Benbenishty et al. 2013, p. 138). That aligns with the findings of Osmo and Benbenishty (2004) and Skives et al. (2014) that indicate how decision-makers use specific case characteristics to construct a risk to the child that may replace more complex reasoning strategies. The notion that social workers use these common themes ("parental capacity", "domestic violence", "mental health", and "protective factors") to reduce cognitive load does make sense. Given the immense information they often need to process, these heuristics can quickly direct attention to primary areas of concern.

This approach, while efficient, can be problematic if these heuristics become the sole focus. If practitioners use these terms only as labels, it can have serious consequences for social work practice. This shallow approach can be likened to "checking boxes" without genuinely engaging with the complexity of each case discussed for example by Gillingham (2011). These consequences include missed interventions, misunderstandings and misjudgements, damage to trust, reinforcing stereotypes, ineffective support plans, ethical concerns, and potential harm to clients. For social work professionals, genuine engagement with these concepts in decision-making is essential to ensure the best outcomes for their clients. The findings underscore the need for training programs to address the tendency to rely heavily on certain risk factors. Encouraging critical thinking as suggested by Abbotts et al. (2022), promoting cultural sensitivity (Meysen and Kelly 2018), and emphasising the importance of a comprehensive assessment (Broadhurst et al. 2010) can help future social workers navigate these challenges. Training programs for social workers must focus on deepening the understanding of these heuristic themes. While they serve as essential starting points, social workers need to be trained to delve deeper into each case and not rely solely on these heuristic markers. The role of heuristic themes in social work decision-making serves as both a tool and a potential pitfall. While they streamline decision-making and provide a shared understanding among professionals, they can also lead to oversimplified decisions if not used carefully. This balance between efficiency and depth is a constant challenge in social work, and

these findings provide valuable insights into this complex dynamic. The emphasis should be on an informed, comprehensive, and genuine engagement with each case and in consideration of the decision-making ecology (Bauman et al. 2014) to ensure the best outcomes for service users.

7.3.2 Cumulative Risk Assessment Strategy

Participants in this study had to decide which data to prioritise in a limited time frame. The study found that the more information participants reviewed, the higher the risk was assessed. That suggests a cumulative strategy which was also identified by Kettle (2017). This strategy may result from time constraints that can make it challenging to review all information and consider all data points in relation to each other. Participants may not have considered the overall weight and interconnectedness of the available information when making risk assessments but rather a subset of the available information. It may be that information that supports a lower risk assessment than previous information is not processed, similar to the take-the-best heuristic.

A cumulative strategy in risk assessment, especially in contexts like child welfare or social work, involves considering the accumulation of multiple risk factors rather than focusing on isolated risks and making connections between them. A cumulative risk strategy can be effective in certain situations, especially when there's a multitude of potential hazards. By examining all of these together, professionals can get a sense of the broader risk landscape. However, this can sometimes lead to an overemphasis on negatives, potentially overshadowing strengths, resilience factors, or mitigating circumstances. The cumulative approach to risk assessment can be helpful, but it is essential to be mindful of the potential pitfalls that come along with it. Overemphasising risks or having confirmation bias as identified by Spratt et al. (2015) can lead to an overly negative or inaccurate assessment of a situation while feeling overwhelmed or uncertain about where to begin can lead to paralysis. Additionally, focusing on the accumulation of risks can lead to stigmatisation, generalisation, oversimplification, missing the root cause, and increasing reactivity rather than proactivity. If professionals habitually use cumulative risk strategies

without nuance, they may inadvertently pigeonhole service users into broad categories without recognising their unique circumstances. Lastly, there is a risk of losing individualised care if too much emphasis is placed on cumulative risks, resulting in recommendations or interventions that may not be suitable for the individual or family's specific needs.

It is essential to note that while there are challenges associated with a cumulative strategy, it does not mean the approach is inherently flawed. Instead, these challenges highlight the need for professionals to apply such strategies with nuance, considering both the cumulative risks and the individual context. Balancing this with understanding protective factors and strengths can lead to a more holistic and effective risk assessment, that emphasises that a holistic view is paramount. Human lives are multi-dimensional and intertwining (McCormack et al. 2020; Meindl and Wilkins 2022; Botha 2023). Every individual exists within a complex web of relationships, histories, cultures, and environments. A comprehensive assessment is essential for a more accurate and nuanced understanding (Platt and Turney 2014b; Whittaker 2018). Given the increasing role of technology for social work practice, decision support tools can be designed to guide social workers (Gillingham 2013, 2016, 2020; Keddell 2015). Such tools can ensure a comprehensive review of factors and reduce over-reliance on particular risk indicators. Given the time constraints, introducing decision support tools that help streamline information and highlight both risks and protective factors can be useful. Such tools can assist social workers in quickly identifying patterns without necessarily skewing the assessment towards only risks. They can also provide a platform for feedback and continuous learning. The discussion on the cumulative risk assessment strategy introduces an essential aspect of decision-making in time-constrained and high-stakes environments like social work. The tendency to pile on the risk factors, without necessarily considering the broader, interconnected picture, is an understandable human reaction, especially when professionals are tasked with making quick judgments on complex matters. There might be a need for enhanced training that emphasises the importance of viewing data points in relation to one another and resisting the urge to take

shortcuts in risk assessments. Simulation-based training or decision-making exercises could be especially beneficial, helping professionals recognise when they might be defaulting to cumulative strategies and guiding them toward more nuanced assessments. While a cumulative risk assessment strategy is a logical response to the deluge of information and time pressures professionals face, it's essential for social workers and decision-makers to recognise its limitations. Achieving a balanced, nuanced understanding of each situation will always be the gold standard in professions that deal with the complexities of human lives.

7.3.3 Characteristics of decision-makers

This research focuses on the decision-making behaviours of social workers, exploring factors such as human values, expertise, autonomy, and influence. The study includes a sample of 24 social workers, consisting mainly of white-British or white-European females. The data analysis of the participants' risk assessments and decision preferences reveals important patterns related to their expertise level and value orientation. Novices tend to rate risks higher and lean towards out-of-home care interventions, whereas competent participants and experts favour self-enhancement values and in-home care. This adds to the findings of Newman et al. (2022) who found that novices potentially lack confidence and are more likely to express worries about making mistakes. Expertise and value orientation towards change or conservation are important factors in influencing decision patterns, a finding that is adding a new dimension to existing research about characteristics of the decision maker. The differentiation in decision-making between novices and experts underscores the importance of experiential learning in the field of social work. It's evident that with experience, professionals can draw from a more extensive repertoire of past cases and solutions, guiding their judgments. However, it's worth noting that this differentiation also highlights the need for diverse teams, where the fresh perspective of novices can complement the tacit knowledge of more experienced professionals (Alfandari et al. 2022).

This study explored the values of decision-makers in order to gain insight into

how they make decisions. That adds to the findings of Grégoire-Labrecque et al. (2020) who identified that personal values influence decision-making or findings from Davidson-Arad et al. (2016) who established how welfare attitudes influence decision-making. Two fundamental values that emerged were self-direction and security. Interestingly, there were differences between different clusters of participants, indicating that their decision-making processes vary. This variation suggests that there may be different value patterns among different groups of decision-makers. The values of self-direction and security are fundamental in social work decision-making for various reasons. Social work is centred around empowering individuals and respecting their right to self-direction. This concept emphasises the importance of individual autonomy and individuals' inherent strength and capacity to direct their own lives. Security is also an important part of social work and involves ensuring the safety and well-being of all individuals, especially those who are vulnerable or at risk. That requires looking at the entire well-being of the client and considering physical, emotional, psychological, and financial safety. Both self-direction and security are grounded in the ethical principles of social work, and valuing self-direction also allows social workers to incorporate clients' cultural, religious, and personal values into decision-making. Ultimately, social workers can build stronger trust and rapport by respecting self-direction and involving clients in decision-making, leading to more sustainable and positive outcomes. Self-direction and security play a central role in ensuring that social work decisions are ethical, effective, respectful, and geared towards individuals' overall well-being and empowerment. Incorporating these values ensures that the social work practice remains person-centred and holistic. The centrality of values like self-direction and security in guiding decisions is interesting and could be explored in more depth in future research. Social work, at its core, is about empowering individuals while ensuring their safety. Balancing these values can sometimes be challenging, especially when they seem to be at odds. However, your research suggests that a nuanced understanding and application of these values can lead to more effective and compassionate outcomes.

The findings of this study suggest that the level of perceived autonomy among participants was moderately high. Additionally, the level of autonomy reported was influenced by the amount of experience that the social worker had. Specifically, more experienced social workers reported a higher level of autonomy than those with less experience. Having more experience can lead to a greater sense of autonomy in the field of social work. The study observed different patterns of risk assessment and intervention choices among social workers of various levels of expertise, with experienced social workers appearing to be more autonomous in their decision-making. Novice and expert decision-makers tend to differ in their approach to decision-making. Novices tend to be more optimistic and focus more on the positive outcomes of decisions, while experts are more open to acknowledging and learning from mistakes and bad decisions. Furthermore, their preferences for interventions and risk assessments also vary. That highlights the importance of recognising the differences between novice and expert decision-makers and adapting their approaches accordingly. The link between autonomy and experience is intuitive. This study suggests that as social workers gather more experience, they're better equipped to make independent decisions. This autonomy, coupled with expertise, allows for more informed and effective interventions. However, it's crucial to ensure that this autonomy doesn't lead to isolation or is not corroborated by the more recent tendency for remote working as a result of the Covid pandemic. Collaboration, supervision, peer reviews, and team discussions remain essential, irrespective of one's experience.

Social work decision-making is a complex process that relies heavily on professional autonomy and experience. Autonomy allows social workers to use their judgment and expertise to make decisions without external interference. At the same time, experience appears to offer an informed intuition based on past cases, confidence in handling complex situations, and improved relationship-building skills. With experience, social workers can also strategise to avoid common pitfalls and offer mentorship and collaboration to less experienced colleagues. New professionals can benefit immensely from the experiences and insights of their seasoned peers. However, it is also vital

to ensure that novices are not merely mimicking decisions but are understanding the rationale behind them. Structured mentorship programs, where novices can shadow experts, might be beneficial in this regard. Autonomy and experience appear to be important for effective decision-making in social work, as they ensure that clients receive the best possible service and that decisions are rooted in professional expertise. Regularly reflecting on one's own decision-making processes and biases can be beneficial. This can be fostered through supervisions, peer reviews, and ongoing professional development. Helm's work highlights the importance of collaborative dialogue in navigating the complexities of social work decision-making. This reinforces the idea that social work is not only about individual decisions but also about collective understandings. The shared meaning through common themes provides a structured way to initiate conversations and reach a consensus.

Despite offering an interesting insight, it is essential to recognise the challenges posed by the limited diversity of the sample. Decision-making could be influenced by cultural, socioeconomic, and other personal factors. Future research could delve deeper into these aspects to understand how diverse backgrounds influence decision-making in social work. The nuanced interplay of values, expertise, and autonomy appears to shape the outcomes for clients. Emphasising continual learning, person-centred approaches, and collaboration will ensure that social workers make the best decisions for those under their care.

7.3.4 Argument Structure

The use of Tomlin's reasoning scheme in this study highlighted the components of the argumentative structure that play a pivotal role in social workers' decision-making process. The use of evidence, claims, warrants, backups, and qualifiers are distinct blocks to construct arguments suggests that decision-making in social work is not just about intuiting an outcome. Instead, it's a structured process where each component plays a role in forming a holistic decision. Participants in the case study approached decisions from a child protection baseline, using evidence and claims to

support their decisions. Novices were found to repeat information provided in the vignettes, suggesting a need for more reliance on their knowledge base. This could have been due to their attempt to learn and consolidate the information in the case vignettes. Analysis of arguments revealed a strong focus on evidence and claims, with less emphasis on warrants. This indicates that key case factors, professional terms and established protocols were important decision considerations. It was observed that most participants mainly focused on the fundamental components, such as evidence and claims, while others utilised a more comprehensive range of blocks to make their arguments. That suggests that there is a variety of strategies used to make decisions. The use of claims, warrants, and qualifiers in information processing varied depending on the individual's experience level. Novices often rely more heavily on claims to signify the end of information processing or to indicate more information is needed. However, experienced professionals may use claims to signify the beginning of information processing or to indicate that more information is needed. The differentiation between novices, competent practitioners, and experts in their usage of these components underscores the evolving nature of decision-making with experience. For instance, novices' emphasis on claims indicates a need for consolidation, while experts' nuanced use of qualifiers reflects a depth of understanding.

7.3.4.1 Evidence

The available evidence is at the heart of any decision-making process. The analysis suggests that participants with different value patterns use the available evidence differently, focusing on aspects such as the family system, complicating factors, categories of concern, and the involvement of other professionals. While those with more conservative values prioritise understanding the family system, those with an openness to change value patterns focus more on exploring types of abuse and complicating factors. This observation offers insight into how value patterns influence the interpretation of evidence and the subsequent focus of participants.

7.3.4.2 Claims

In this study, participants made many claims in their decision-making

processes. The analysis of claims gives insight into participants' thought processes and value patterns. Claims often express uncertainty and interim judgments, with participants using phrases like "probably moderate at the moment" or "I am not seeing risk at the moment." The emotive language used by some participants, like expressions of worry or anger, provides valuable information about the participant's level of confidence and the importance they attach to specific case characteristics. Ultimately, the interplay between claims and evidence is fundamental to reasoning and decision-making. The emotive language used in claims provides insight into the human aspect of decision-making. Social workers are not detached entities; their emotional responses and value systems inevitably seep into their decisions. Recognising and understanding these emotional cues can provide more profound insights into the decision-making process.

7.3.4.3 Warrants

Warrants are often used to provide evidence and support for decisions but may only sometimes be necessary as other means of evidence and support may be available. The analysis of the use of warrants helps to understand decision-making reasoning patterns. The analysis reveals that different participants use warrants differently, though the frequency of use of warrants is relatively consistent across different groups. It also highlights the circular nature of reasoning patterns, as participants often reuse information from the vignettes as warrants to support their claims. Additionally, warrants often involve references to specific case characteristics and professional terminology, which can trigger internal reasoning processes among participants. Overall, warrants serve as the reasoning foundation that links evidence and claims, allowing participants to explain their conclusions based on the available information.

7.3.4.4 Backups

Backups, such as referencing personal experiences, are used sparingly but can be used more frequently depending on the situation and context. Despite their limited usage, with only 30 instances identified across the entire sample, backups provide supporting arguments and create a level of certainty. References to historical concerns as indicators of current risk show how

participants rely on personal experience, vague theoretical concepts, and common professional knowledge to support their claims. That demonstrates the essential role backups can play in resolving internal conflicts and uncertainties in decision-making. Even though backups like personal experiences are used sparingly, they highlight the importance of experiential knowledge in decision-making. Tapping into past experiences can sometimes offer valuable insights, especially in complex situations where professional knowledge might not provide clear answers.

7.3.4.5 Qualifiers

Decision-makers typically use qualifiers to convey varying levels of certainty and knowledge, but they may only sometimes use these as other forms of communication can serve the same purpose. The analysis of qualifiers in decision-making processes shows how participants of varying expertise levels express uncertainty, seek clarification, and leverage existing knowledge. Novices often express their uncertainty and lack of confidence through the use of qualifiers like "potentially," "perhaps," and "on second thoughts." Competent practitioners use qualifiers to refine their understanding and actively seek information to clarify uncertainties. On the other hand, experts use qualifiers to bridge gaps in their understanding by creating working theories and, in some instances, even expressing a sense of intuition. Qualifiers offer insights into the decision-maker's thought processes, highlighting the role of experience and confidence in shaping their decision-making approaches.

7.3.4.6 Rebuttals

Analysing rebuttals in decision-making processes reveals the complexity of social work decision-making. Eighty-six coded quotations were identified as rebuttals, among which competent practitioners contributed 60, experts contributed 5, and novices contributed 20. The results indicate specific patterns that suggest the need to interpret and balance different pieces of information. Examples include a decision-maker considering the threshold of "significant harm" in a case involving a baby and using "significant harm" as a condition for maintaining a chosen course of action. These examples emphasise that decision-makers need to consider information from different

angles, hypothesise about potential meanings, and recognise the impact of additional information on assessing risk or determining the appropriate course of action. Therefore, it is clear that rebuttals in decision-making processes reflect the intricate process of weighing various factors and information to make informed choices. The analysis of rebuttals emphasises the dynamic nature of social work decision-making. It's not a linear process; social workers constantly weigh and balance different pieces of information, hypothesising potential meanings and outcomes. The ability to entertain counterarguments and adjust the course of action based on new information is crucial.

When making decisions in their social work practice, social workers would benefit from using the various components of an argument, such as evidence, claims, warrants, backups, and qualifiers, to improve their decision-making. The interplay between evidence, claims, and warrants creates a comprehensive picture of a case, ensuring that each decision is backed by a solid foundation. Combining this with backups and qualifiers, which bring in experiential knowledge and contextual understanding, makes for a robust decision-making process. Additionally, they must consider the case context, including the backgrounds and needs of the individuals and families involved, as well as the local and national policies and regulations that apply. Moreover, social workers must be aware of their own biases and values that may influence their decisions and also consider the potential consequences of their decisions. Therefore, it is essential that social workers actively seek out new information and perspectives to inform their decision-making. While the structured process suggested by Tomlin and used in this study helps ensure objectivity, every decision-maker brings their own set of biases and perspectives. Recognising and addressing these biases is essential to ensure fairness and equity in decision-making.

Social work decision-making is a complex process that requires understanding the various components involved. Evidence, claims, warrants, backups, and qualifiers are all crucial elements in the decision-making process, and understanding how they come together can help social workers make the best decisions for their clients. Case characteristics, such as

parental capacity, domestic violence, mental health, and protective factors, are all considered when assessing child protection risk. Additionally, verbalised thoughts, risk assessments, and emotive language are used to inform decision-making, and the analysis of qualifiers can help understand how different participants express uncertainty and seek clarification. Ultimately, social work professionals must be aware of the complexities of decision-making to ensure the best outcome for those they serve. There is an ongoing need for social workers to seek new information and perspectives. In a constantly evolving field like social work, where new research, policies, and best practices are continuously emerging, professionals must stay updated to make informed decisions.

7.3.5 Some further thoughts

What becomes apparent in the interpretation of the results is that no single pattern could be identified across different groups of decision-makers in this study. They underscore the significance of methodical, evidence-based decision-making in social work, along with the intricate nuances of social work. The findings show the multifaceted nature of decision-making in social work, shaped by evidence, experience, personal biases, and collaboration. That may be the result of the small sample size. However, this could also be interpreted as an indicator that social work decision-making results from a highly individualised internal logic of practice that shows delicate nuances that could only be understood by analysing a much larger sample. If the decision strategies are highly individual, it is important to focus on decision-makers habits, particularly in a profession as intricate and impactful as social work. These habits play a crucial role in the outcomes of their decisions. This observation highlights that decision-making result from a highly individualised internal logic highlights the uniqueness of each practitioner's reasoning process. Such individuality underscores the necessity for continuous training, mentorship, and reflection to refine these internal logics to achieve the best outcomes.

Social work professionals must ensure that decisions are based on evidence and facts rather than assumptions. To do this, they must formulate claims

based on direct observations and evidence and then test them critically. That helps to ensure that decisions are carefully considered and not based on incomplete information or unfounded assumptions. This type of critical thinking is an essential part of being an effective decision-maker in social work.

When making claims, it is important always to ask "Why?" and look for a valid justification or warrant for the claim. If the warrant needs to be solid, looking for a backup or secondary line of reasoning is essential to support the claim. That ensures that the claim is well-informed and based on more than one line of reasoning, making it more reliable. Advocating for the habit of always questioning the "Why?" behind claims ensures that decisions are not made impulsively or without substantial backing. This continuous probing into the reasoning is key for responsible and accountable decision-making.

When making decisions, it is important to be aware of the nuances and complexities of the situation. As a result, it is wise to use qualifiers to express any uncertainties or conditions around the decision being made. Doing this acknowledges multiple perspectives and avoids making assumptions or broad generalisations. This habit is essential for responsible decision-making and can help achieve the best outcome.

Verbalising thoughts and using emotive language are important elements of effective decision-making. By talking through their thought process, decision-makers can better analyse and evaluate their choices. Being mindful of the language used when discussing decisions is important, as emotions can easily sway them. The right balance between emotion and rationality is critical to making sound decisions. It is pivotal to strike a balance to ensure decisions are not emotionally charged but are rational and evidence-based.

Social workers must prioritise the safety and well-being of their clients at all times. This consistency is why regular risk assessments are essential to effectively address potential risks associated with any decisions. By evaluating the risks associated with different decisions, social workers can ensure that their clients are protected and that their interests are always considered.

Continuous learning is essential for decision-makers in the field of social work. Professional development and peer interactions are excellent ways to stay informed and up-to-date on the latest developments in the field. Additionally, self-directed study can ensure that decision-makers are well-informed and knowledgeable about the field. By committing to continuous learning, social work decision-makers can be better equipped to make informed and effective decisions.

Self-awareness and reflexivity are vital aspects of a social worker's practice. By recognising one's biases, values, and emotional responses, social workers can make decisions more objectively and accurately. This practice of self-reflection can help social workers navigate challenging situations without allowing personal biases to influence the outcome. Social workers need to develop a habit of self-reflection to remain accountable and effective in their work.

Collaborative decision-making is integral to successful teamwork and should be utilised whenever possible. By seeking input from others, decision-makers can gain a more comprehensive understanding of the situation and make more inclusive decisions from everyone's perspectives. That can be done by engaging colleagues, team members, and even clients in decision-making to ensure that all voices are heard and considered. Doing so will ensure everyone feels heard and respected, ultimately leading to more effective and successful outcomes.

The habits social workers develop in their decision-making processes can profoundly influence the outcomes for their clients. By understanding the components of an argument and being aware of the nuances and complexities of each case, social workers can enhance their decision-making skills to ensure they provide the best possible support and interventions for those they serve.

7.4 Links with other research

Child protection decision-making in social work is an incredibly complex process, as also suggested in the research considered in the literature review (Helm, Roesch-Marsh, Taylor and Saltiel). The complexity of decision-making

in child protection within social work is a product of social construction (D'Cruz, 2002) rather than objective measures. The literature review has highlighted the intricate nature of the decision-making process and social workers' strategies to make sense of the information (Helm). Theoretical perspectives such as the ecology of judgement and grounded projection judgement provide insight into the complexity of social work decision-making. Social workers must also navigate the challenges posed by policy orientations, work culture, financial pressures, and racial considerations (Fargion). To handle this complexity, social workers rely on sense-making, dialogues with colleagues (Helm 2016b), and intuition (Helm, Saltiel), which aligns well with the interpretation of the findings from this study that emphasise the importance of collaboration to improve decision-making.

Social work decision-making is a tricky balancing act between protecting children and supporting families. Threshold decisions, triggered by external and internal factors, can often be complex and challenging. Keddell and Hyslop (2020) highlight the various factors that go into these decisions, such as the child's age, abuse severity, family history, and family compliance. Stanley (2013) suggests that social workers often use heuristics to manage this complexity, but effective decision-making relies on collaboration, professional discussions, and ongoing supervision. Ultimately, social workers must understand the unique situation of each family in order to make the best decisions for child protection (Keddell and Hyslop 2020). Keddell's research has highlighted the tension between the legal tasks of family maintenance and ensuring child safety, which can be attributed to broader social policy shifts and social workers' desire to build therapeutic relationships with their clients. Careful and balanced judgement is vital in child protection, as the narratives that social workers construct around cases can significantly impact the outcome. This learning can be juxtaposed with the observation in this study that the value patterns of the decision-makers may influence how much importance they assign to fully understanding the family system. That emphasises the importance of using opportunities like collaboration or supervision to challenge one's baseline for making a decision.

Risk assessment in child protection is a process influenced by various

factors, including social worker attitudes, family socioeconomic status, and ethnicity. Roets et al. (2017) have questioned if risk is framed using truth-telling or story-telling, as the complexity of human behaviour makes it challenging to rely on objective evidence. Studies have also shown that social worker attitudes towards child removal and family participation in decisions play an important role. In contrast, families with lower socioeconomic status are more likely to be recommended for out-of-home care. Furthermore, professionals may also be influenced by a desire to cooperate or connect with those with similar backgrounds or values. A balance must be struck in child protection between hard data sensory cues and intuition. It is important to remember that oversimplifying decision processes may misrepresent the intricacies and be counterproductive. Therefore, a holistic approach must consider all the complexities from both the service user's and the professional's sides. In-group bias is also a potential issue, as social workers may have different attitudes towards families from different backgrounds. It is, therefore, essential to consider all these factors when assessing risk in child protection and to ensure that decisions are made objectively and justly. This study has added to this knowledge base by considering value patterns that influence decision-making. That adds another dimension that could contribute to social workers basing their decisions not fully on objective evidence but on a mix of different decision-maker characteristics that are potentially interlinked. The finding from this study that decision-makers tend to focus on basic reasoning blocks highlights the importance of strengthening reasoning strategies by using complementary reasoning blocks to explore the complex information in a case from different angles. Future research could explore the interactions between these factors in more detail.

Studies and findings from this study suggest that decision-makers often rely on internal arguments, evaluations, and case characteristics without exploring alternative scenarios (Osimo and Benbenishty). To counter potential biases, involving multiple professionals may help, but it has challenges. Team-based decisions can capture diverse information but may compromise timeliness. Using independent experts in decision-making can enhance child-focused decisions but may merely confirm the initial decision. Group decision-making

has become an integral part of child protection social work, as it involves complex judgements that require collective expertise. Alfandari et al. (2022a) highlight the need for a comprehensive framework that goes beyond traditional group decision-making, while Alfandari et al. (2022b) point to the influence of social biases on professional judgements. Other authors have also suggested that collaborative decision-making could offer better outcomes, and Meysen and Kelly (2018) have explored the potential impact of cultural and historical factors. To enhance the efficacy of group decision-making, professionals must be equipped with the skills to work collaboratively in multi-professional settings and be mindful of social biases. Furthermore, robust review mechanisms must be implemented to ensure that decisions are regularly evaluated and refined. By recognising and addressing the challenges associated with group decision-making, the field can aspire to more accurate, comprehensive, and child-centric outcomes.

Supervision in social work plays a vital role in developing and honing decision-making skills (Saltiel 2017; Wilkins et al. 2017; Newman and Littlechild 2022). Nevertheless, the dynamics of the supervisory relationship significantly impact the quality and effectiveness of the decisions made. Unilateral vs. shared decision-making, experience dictating decision-making style, emotional labour and detachment, and applying formal knowledge are all considerations for supervisors and the need for evolved supervision. Developing practice wisdom by combining academic knowledge with real-world experience is essential, and supervisors should strive to cater to the varied needs of practitioners across the experience spectrum to ensure that decisions are informed and effective.

Social work decision-making is a complex interaction between intuition and deliberation (Berrick et al. 2016; Saltiel 2016; Whittaker 2018), and it is essential to recognise the importance of synergising both processes to ensure quality decisions. Employers can support social workers by creating frameworks that allow them to reflect on their intuitive judgments and provide training on cognitive biases. Creating an inclusive environment that encourages social workers to share their intuitions, discuss uncertainties, and seek feedback is also essential. Finally, understanding the external factors

that influence the balance between intuition and deliberation can provide insight into the decision-making process. Ultimately, the goal should be to design practices, tools, and environments that harmonise both processes, allowing for informed and immediate decisions.

In many ways, introducing decision support tools may help improve social work decision-making, but this would significantly impact discretion practitioners can use in practice. Research around introducing these tools has shown that practitioners are reserved about decision-making tools as they impact their professional discretion (Poso and Laakso 2016; Alfandari 2017c, 2017b). To ensure that decision support tools are embraced rather than viewed as restrictive, the narrative must be reframed to highlight their role as supportive aids that enhance professional discretion. Human-centric decision-making must be prioritised, and tools should be designed to be flexible and adaptable to individual cases. Training for social workers should emphasise the effective use of these tools, and feedback mechanisms should be established to facilitate their continuous improvement. The cultural and systemic context must be considered when designing and implementing decision-making tools, as what works in one context may be ineffective in another. Ultimately, the aim should be to balance structured tools and professional discretion that uphold the best interests of those at the heart of social work practice.

Another critical aspect of improving social work decision-making is the ability of social workers to predict risks as explored by Wilkins et al (2021) and Meindl et al. (2022) . The accuracy of predicting risks in child welfare and protection is a challenging task that requires a combination of professional experience, knowledge, personal characteristics, and decision-making frameworks. Standardised training and universally accepted assessment frameworks that integrate theoretical knowledge and practical skills should be employed to reduce inconsistencies in risk assessments. Additionally, involving different stakeholders (Archard and Skivenes 2009; Gallagher et al. 2011) in decision-making can offer a more holistic view and better-informed decisions. Furthermore, developing platforms to mentor and guide less experienced professionals can help improve intuitive skills (Hogarth 2001). In

addition, addressing external challenges such as bureaucratic hurdles and local government systems can enable social workers to focus more on the children's well-being and less on procedural impediments. Finally, embracing novel interventions may lead to improved accuracy in risk prediction (Wilkins and Meindl 2021). All of these strategies should be employed to improve social work decision-making. The exploration of reasoning strategies in this study may offer an additional avenue to do so. If social workers deliberately use not only basic reasoning blocks but complementary ones, there could be more opportunities for them to identify how the prediction accuracy would improve. Significantly, a more consistent use of qualifiers would help practitioners identify those elements that may be a starting point for further information exploration to increase the confidence levels of decisions or to identify when a decision-maker is overconfident in a decision.

The outcomes of this investigation and the discoveries from previous studies both emphasise the intricate and complex nature of decision-making in social work. The reviewed research has brought attention to the fact that social work decisions are not made in isolation but rather are influenced by a broader context of academic discourse, cultural sensitivities, and organisational pressures. This study has demonstrated how various external, systemic, values and individual factors can impact the internal thought processes involved in decision-making. This is closely related to the concept of decision-making ecology in research. The existing research and this study both emphasise the significance of striking a balance between intuitive decision-making and evidence-based decision-making that is more deliberate. They highlight the importance of adopting a hybrid approach that respects the social worker's instincts while grounding them in empirical evidence and collaborative discussions. The paramount importance of conducting a comprehensive and holistic risk assessment is a recurring theme. While this study acknowledges the risks associated with relying too heavily on singular case characteristics and emphasises the need for a comprehensive understanding, the literature review expands on this by presenting specific studies that underscore the challenges of achieving truly objective risk evaluation.

The present study and the literature reviewed both emphasise that decision-making in social work is not limited to the interaction between the client and the worker. Various external elements, such as policy, work environment, financial constraints, technology, and socio-political circumstances, inevitably influence these decisions, thereby intensifying the complexity of the process. To summarise, the overarching themes identified in the reviewed literature and the findings from this study underscore the intricate nature of decision-making in child protection and social work. Given the multifaceted character of this decision-making process, continuous research, dialogue, and reflection are imperative to ensure optimal outcomes for the individuals and communities being served.

7.5 Limitations

This study has limitations that could affect how the results are interpreted and applied. These are:

- a possible sampling bias and the low number of participants
- case vignettes presenting hypothetical scenarios that are different from real life decision-making
- the potential for subjectivity in the analysis
- a potential response bias
- a limited scope of the examined factors
- over-reliance on self-report and introspection
- too narrow scope of analysing the reasoning blocks
- temporal limitations and
- challenges of value classifications.

These limitations need to be considered when evaluating the results of this study and their implications.

The low sample size of this study limits the scope of the results. Additionally, the participants are employed only by a few local authorities which results in a narrow geographical focus with organisations that have some similarities in

their approaches to safeguarding children. That makes it difficult to draw conclusions relevant for the wider context of social work.

Even though the case vignettes are based on real cases, the decision-making exercises may be seen by the participants as hypothetical scenarios. In real-life situations, participants will likely follow different decision-making strategies than in a simulated environment. In real life situations there are higher stakes, significant resource implications, the impact of a blame culture and high workloads.

The decision-making exercise (DME) simulates the real-life experience of making quick and crucial decisions for a frontline intake team. It replicates some of my practice experience as a duty manager who often had to make threshold decisions with limited information and under time constraints. The exercise condenses the information available, similar to the limited information that duty managers receive, but it does not involve direct contact with service users or any other opportunity to seek more information. It is therefore important to note that this exercise only represents a small snapshot of social work decision-making, as many other factors and complexities are involved in the decision-making process. Therefore, while the DME provides a valuable opportunity to practice decision-making skills, it should not be seen as a comprehensive representation of real-life situations.

In addition to the information presented in this decision-making exercise, it is essential to acknowledge that other sensory inputs not included in this DME, such as audio, visual, and smell cues, can impact a decision-maker's perception. These cues add complexity to real-life situations and may influence a decision-maker consciously or subconsciously. To fully understand the impact of these sensory inputs, conducting a similar exercise in a 360 virtual environment, with added background noise or audio stress would be beneficial. This approach would provide a more comprehensive understanding of the decision-making process and the factors that contribute to it.

Another limitation is linked to the fact that participants were aware that

they participated in a simulated exercise. The results of this study could be skewed due to the Hawthorne effect, which is when participants alter their behaviour due to knowing they are being studied. Some of the comments made by the participants after the simulation indicated that some did not want to get it wrong even though this was a simulation. Additionally, the simulation itself may have influenced the data captured. That might be the case if participants were overwhelmed by completing multiple tasks simultaneously (e.g. reviewing information, making decisions, thinking aloud, and using a controller). If participants were overloaded with tasks, they might not have updated their risk assessments with the controller, leading to a deviation from the thinking-aloud protocol. This could have implications for the analysis of the data as the input from the controllers was used to code quotes within the transcripts.

In addition to the challenges of potentially miscoded quotes, which was addressed through a manual review of the transcript data there is the potential for introducing subjectivity of author into the data analysis. This study attempted to reduce the subjectivity inherent in the analysis of interviews by using text mining in R. While this approach had its advantages, it also presented some challenges. The use of a reusable script for mining text has the potential to introduce minor errors, which could have significant implications. These implications highlight the importance of careful analysis and interpretation of the results, regardless of the method used.

The study also faced some challenges while researching participants thinking aloud simultaneously using a computer-based simulation. Many participants were found to read out the information presented, which made it difficult to discern if they were doing so to comply with the requirement to think aloud or if they were emphasising certain words. Despite this, the analysis took the latter into account, although this could have resulted in biased information from the study's author being included in the analysis.

This study captured several factors influencing decisions like autonomy, professional experience or value patterns to construct the habitus of participants. However, other essential variables may have yet to be considered. For example, cultural beliefs, child welfare attitudes and personal

experiences could impact decision-making. Future research may benefit from using a much broader range of variables with a larger sample size to identify more decision-maker characteristics that could influence decision-making as a result of their internalised logic of practice.

7.5.1 Over-reliance on Self-report

Self-report is valuable for gaining insight into participants' values, autonomy, and decision-making processes. However, it is important to be aware of the potential limitations of relying too heavily on introspection. To reduce the risk of inaccurate self-report data, researchers should consider supplementing self-report with observations in real-life scenarios or interviews that explore hypothetical scenarios and link observed behaviour with value patterns. By taking these extra steps, researchers can gain a more complete and accurate picture of participants' attitudes and beliefs.

7.5.2 Analysis of Argumentation

When analysing argumentation, it is essential to consider the overall narrative or context in which decisions are made rather than just focusing on the specific building blocks of arguments. It would be beneficial to revisit decisions made after the simulation has finished and use tools like cognitive task analysis to explore them further to understand better the decisions being made. By doing this, a more complete picture of the decision-making process can be obtained.

7.5.3 Temporal Limitations

The findings of this study provide valuable insight into practitioners' decision-making strategies and values during a specific period. However, it is essential to note that these strategies and values may evolve. That means the findings may only apply in the present, especially after significant policy changes or societal beliefs. Therefore, it is important to consider revisiting these decision-making strategies and values over time to understand how they develop with increasing expertise.

7.5.4 Dichotomy of Expertise Levels

The notion of a dichotomy between novices, competent practitioners, and experts in any field might need to be more complex. Other factors could affect the level of expertise that needs to be considered. For instance, a person's previous life experience or other transferable skills could shape their understanding of the subject, leading to a greater level of internalised logic when it comes to practice. Thus, it is crucial to recognise that expertise can come in various forms and may not necessarily fit into the traditional three-level model.

7.5.5 Value Classification

Value classification is a helpful tool for understanding how people make decisions and their internalised logic of practice. However, it may not accurately capture the complexity of individual values and how they interact in decision-making contexts. Values are a very abstract concept, and the segmentation of participants based on values like Self-/Open+ may be too limited to capture the multifaceted nature of values. Therefore, more research is needed to explore further the complexities of how values affect decision-making.

The number of participants and the number of decisions they made is very limited in this study. Therefore one has to be careful not to over-interpret the results. Even small changes in the frequencies of responses would quickly change the picture. However, the observation that practitioners in this study who are deemed competent seem to be relatively more likely to assess the cases as lower risk than novices suggests that experience influences decision-making, potentially because these practitioners have a wider pool of cases that they can use to compare the presenting case with. Against the backdrop of other cases, competent practitioners may be more likely to assess the risks of a case not on the individual merits of the case alone but also against the question if a case would meet the threshold for intervention or not. This hypothesis needs to be explored further in future research.

The influence of decision-makers' characteristics also emerged in the analysis of reasoning patterns, for example, when participants used vague

references to shared professional knowledge or personal experiences. The few snippets that gave insight into the individual's reasoning showed the highly individual nature of approaching and evaluating the information in the vignettes. The fact that the review of concurrence maps, sentiment analysis and other text mining tools did hardly show any discernible patterns between the different habits of the participants emphasised the uniquely individual approaches to processing information.

Last, it is important to highlight my preconceptions and biases, discussed in the chapter on positionality. These may have impacted this research on decision-making. As a social worker and researcher, my personal and professional habitus, shaped by experiences in a different European culture and an IT-intensive social work environment in the UK, may influence the research design. The decision-making exercise used my own practice experience as a social work manager in an intake team, assuming it was a reasonable representation of a generic experience.

The methodology for this study was specifically designed to minimize the impact of my own experiences on the research. In order to fully assess the success of the strategies used, it may be beneficial to incorporate a wider range of scenarios that are more familiar to the participants. That would allow for a comparison of results and to see if similar effects are observed as those presented in the study's findings. By incorporating a diverse range of scenarios, the validity and generalizability of the research findings can be strengthened.

7.6 Implications

According to the findings, case characteristics, sentiments, and information categories influence decision-making. When making decisions, risk factors such as drug and alcohol use, antenatal care attendance, mental well-being, domestic violence, and childhood experiences should be taken into account. Various levels of risk assessments and interventions are revealed in the analysis of multiple vignettes, highlighting the influence of human values on decision-making. Decision-makers rely primarily on fundamental building

blocks like evidence and claims, while complementary blocks are used less frequently, implying the need for stronger arguments. Competent practitioners and experts rely on evidence, while novices rely on warrants to support claims. The study emphasises the importance of allowing novices to practise decision-making early on and consider information from multiple perspectives. It also reveals the tendency to rate good decisions more positively and downplay bad ones, which is influenced by a blame culture that discourages learning from mistakes. All relevant factors, family dynamics, mental health, and protective factors must be considered according to the implications for social work practice. Decision-makers should be aware of their values and how they influence decisions. Additional blocks are also recommended for strengthening arguments.

Social work decision-making is highly complex, particularly in scenarios involving child protection. This study has revealed the multiple layers of reasoning and argumentation used by social workers at varying levels of expertise. This insight is critical to improving decision-making and understanding the rationale behind these decisions. By understanding the multifaceted nature of decision-making in social work, we can better equip professionals to make informed and appropriate decisions.

The fact that decisions vary even within specific case characteristics highlights the considerable amount of subjectivity involved in social work decisions. This emphasises the importance of having effective training and monitoring systems in place to ensure that social workers are applying the best practices in a consistent manner. By doing this, it will help to ensure that the best outcomes are achieved.

As social workers progress in their careers and gain more experience, they learn how to make decisions independently and with greater confidence. This may shift the approach from a more conservative perspective to a more balanced approach is an important part of a social worker's growth. To ensure that social workers have the skills and knowledge they need to succeed, training programs should consider the different experience levels of their students and create modules to meet their needs.

To increase the quality of decisions and their justifications, it is important to emphasise the importance of constructing well-structured and comprehensive arguments when making decisions. Training can help ensure that all arguments are composed of complementary building blocks, which is a key factor that is often overlooked. By focusing on this area of improvement, decision-making can become more effective and persuasive.

For social workers, it is important to be aware of how values inform practice. Regular self-assessment and reflection can help to understand how our values shape the decisions we make, and how social workers can best use them to support service users and their communities. By engaging a reflective process about the internalised logic of practice, practitioners can ensure that decisions are driven by an internalised logic of practice that social workers understand and not by biases.

Decision-makers often have a default position when making decisions, particularly when it comes to child protection. This default position is referred to as a "child protection" threshold, and suggests that decision-makers may seek out information to confirm their pre-existing beliefs. Training should be implemented to help address any confirmation bias and encourage a more holistic and impartial evaluation of cases. This shift in mentality will help to ensure that decisions are made based on comprehensive evidence and not simply on preconceived notions.

Claims can be an important part of the decision-making process, but it's important to remember that they are only interim judgments. As new information becomes available, it's important to go back and review the decision and potentially make adjustments. This is why it's important to consider all the factors of a case when making a decision and to remain open to revisiting the decision if necessary.

Qualifiers and backups are an important part of building an argument for decisions in complex situations. By using these components, social workers can learn to express uncertainty and actively compensate for a lack of knowledge. This can help especially novices to become more confident and capable decision makers, even in difficult situations.

These implications from the interpretation of the findings link to the following recommendations.

7.7 Recommendations

To strengthen social work decision-making, five recommendations are proposed: firstly, the deployment of decision-making simulation training modules; secondly, the initiation of mentorship programs; thirdly, the mandatory incorporation of reflection exercises; fourthly, a thorough reassessment of current decision support tools; and lastly, the consistent application of peer review in professional practice.

The first recommendation responds to the finding that participants relied mostly on basic reasoning blocks, with evidence and claims central to the decision-making process. Decision-makers used backups, qualifiers, and rebuttals to a lesser extent, with their frequency based on expertise level. It aims at training modules that focus on decision-making to strengthen the use of the building blocks of an argument and highlight the variety of information that need to be considered when processing evidence and making decisions. Simulations can help build comprehensive arguments and recognise the influence of personal values. These simulations can be used in training to help employees develop the skills needed to make informed decisions and understand the potential consequences of their actions. Such simulations can also help employees better understand how their own values may affect their decisions, enabling them to make more informed, rational choices.

The second recommendation is the introduction of mentorship programs to mitigate the differences in risk assessments and intervention choices between novices, competent practitioners and experts. Mentorship programs can be a great way to help novices gain a better understanding of the decisions they need to make. Working closely with experienced professionals can help provide valuable insight into the complexities of decision-making. Mentorship programs can also be beneficial for the mentor, as it can be a great opportunity to share their expertise and help the next generation of decision-makers. This recommendation is a potential strategy to use the finding that there are differences between novices and competent practitioners or

experts. The latter groups are more critical and open to errors in decisions they make, work towards maintaining the family and use the available evidence differently. I want to emphasise that this recommendation does not suggest that any differences in this study mean that experts are “better” than novices. Instead, the difference in expertise offers a chance for a mutual exchange about the reasoning behind decisions that can benefit both.

Thirdly, to address the differences in the way values seem to influence decision-making as suggested in this study, reflection exercises can be a powerful tool for social workers to gain insight into their biases and influences to address the observation that any decision-making process in social work is complex and subjective. Such exercises can help social workers to become aware of any unconscious biases they may have as a result of their unique value set, and to develop a better understanding of how such biases and their values can impact the way they serve their clients. By making these exercises mandatory, social workers can become empowered to recognise and address any issues they may have with their biases and influences. This can ultimately lead to improved services for clients.

The fourth recommendation is to review existing decision support tools that can help to process the complex information that informs decision-making and nudge decision-makers to consider more information than what may be seen as crucial case factors that may hinder a more holistic view of a case. Creating effective arguments is a key component of making sound decisions. To help decision-makers, it is important to develop tools that emphasise the value of constructing comprehensive and well-thought-out arguments. Such tools should encourage the use of backup, evidence, qualifiers, and other building blocks to strengthen the argument and make it more convincing. This can lead to more informed and effective decisions and compensate the effect found in this study that decision-makers seem to rely mostly on the fundamental building blocks when constructing their argument.

The fifth and last recommendation is the introduction of peer review as a standing feature in practice to help decision-makers navigate the complex and multi-dimensional learning environment in which they work. This is a response to the finding in this study that the participants use evidence from

the case vignettes to construct a story without challenging their own story. Peer review is an essential part of the social work profession, as it helps ensure the robustness and accuracy of decisions made by social workers. This involves having social workers review each other's decisions and provide feedback to ensure that they are fair and well-reasoned. Implementing a peer review system can help social workers make better decisions and ensure that they are working in the best interest of the people they serve.

The findings of this study provide a valuable understanding of the thought processes and complexities involved in decision-making in child protection cases. This research could be used to inform and improve training programs, and ultimately help to ensure the safety and well-being of children in such cases. With this new knowledge, interventions can be tailored to better aid decision-making and provide the necessary support for those involved.

7.8 Addressing the research questions

At this point, it makes sense to review the questions guiding the research interest in this study. There are three questions of which the first one is the most relevant question.

What reasoning strategies are social workers using to make threshold decisions regarding s47 of the Children Act 1989?

The findings of the study demonstrated that participants mainly rely on evidence and claims when constructing their arguments, while other building blocks are used less frequently. This suggests that the primary reasoning strategy used is to evaluate the available information, categorize it, and then follow established protocols and procedures. Crucial case factors, professional terms, and categorizing important information were all identified as playing a role in triggering a response. However, a key reasoning strategy appears to be to accumulate information that adds to the social workers risk assessment and leads to a decision with the threshold of child protection as a baseline. It is evident that participants make use of these elements in order to create their arguments. This links to the second question.

What cues are social workers using to decide if a child is at high risk of immediate significant harm?

This study identified several cues that can influence risk assessments, such as parental capacity, domestic violence, mental health, protective factors, drug use, alcohol use, antenatal care attendance, and others. All of these cues were derived from common themes that emerged from the risk assessments. With this information, professionals can more accurately assess risks and put in place the necessary measures to ensure the safety and stability of the family. However, the study did not identify clear patterns that suggest that certain cues or combinations of cues are more important than others. Overall, it seems as if internal reasoning is highly individual which is potentially a logical outcome of the idea that an internalised logic of practice is the result of the individuals multi-faceted experiences.

How are decision-making strategies moderated by the individuals' dispositions, resources, and abilities?

The findings of this study revealed interesting differences in decision-making among novices, competent practitioners, and experts. It was found that social workers' autonomy in decision-making increased as they gained more experience. Additionally, the decision-making process and its building blocks of reasoning varied among different expertise levels, with novices relying more on warrants and experts more on evidence. Further, personal values and internalized logic played a role in the decision-making process, as variations in decisions could be attributed to values such as self-enhancement vs. self-transcendence and openness to change vs. conservation.

The study found hints for the importance of values such as self-direction and security in prioritizing the welfare of children. Autonomy and safety were identified as crucial values for social workers to consider in their decision-making. The study found that values like power, stimulation, and hedonism were less influential in decision-making. However, value patterns varied among participants, suggesting that social workers' values evolve as they gain experience. The study also revealed that different value patterns influenced the type of decisions made. Those valuing family preservation focused on understanding family dynamics, while those open to change prioritized identifying abuse and complicating factors. Novices and those with

specific value patterns tended to rate risks higher in their decision-making. Individual value systems play a significant role in decision-making and reasoning processes. Two higher-order dimensions, self-enhancement vs. self-transcendence and openness to change vs. conservation, were identified as influential in decision-making. The emotional undertones of decision-making were also explored, with novices showing anticipation and excitement, while experienced social workers demonstrated anger and trust. Values act as frameworks that shape and guide social workers' decision-making strategies, providing a lens through which they assess situations and determine the best course of action for safeguarding children.

Overall, the study addressed the research questions by examining the decision-making processes of social workers, understanding the cues they rely on in high-risk scenarios, and evaluating how personal dispositions, resources, and abilities moderate their decisions. However, to fully appreciate the depth of the answers, one must consider the aforementioned findings in tandem with the limitations of the study. Future research can delve deeper into unexplored nuances, ensuring a holistic understanding of social workers' decision-making in safeguarding children.

7.9 Contribution to knowledge

My research has discovered that values and expertise influence people's reasoning strategies. Individuals with more expertise tend to have a different approach to decision-making, as they can identify and use more cues in their reasoning. People in this study tend to rely on essential information and construct a believable story with this information when making decisions. With more experience, their ability to use more complex reasoning develops. Additionally, the accumulation of risk also plays a role in people's reasoning, as they may become more cautious or risk-averse over time. These findings suggest that both values and expertise have a significant impact on the way people reason and make decisions. Further research could provide valuable insights into how individuals can improve their decision-making skills.

The study examines the intricate decision-making processes of social workers in child protection, exploring the cues, reasoning strategies, and emotional

responses that shape their assessments and actions. It uncovers that social workers rely on fundamental reasoning blocks like evidence and claims, evaluating them against child protection thresholds to construct their arguments. The research also underscores the influence of experience and personal values on decision-making, with more seasoned social workers demonstrating increased autonomy and a focus on evidence, while values such as self-direction and security are prioritized for child welfare. These findings offer a detailed understanding of the complex and demanding nature of social workers' role in safeguarding children, though further research is necessary to reveal more subtleties in this domain.

This study contributes to knowledge by understanding how social workers in child protection make decisions. It reveals the influence of values and experience on their reasoning strategies and emotional responses, providing insight into the complexity of their work. The research highlights the importance of evidence and personal values in constructing arguments and the impact of experience on decision-making. However, further research is needed to uncover more nuances in this area.

7.10 Future research

Based on the previous recommendations, there are several potential areas of research that could be pursued. These areas include:

1. Training modules for decision-making simulations: Further research could be conducted to develop and evaluate training modules that focus on decision-making simulations. This research could explore the effectiveness of different simulation techniques and their impact on building comprehensive arguments and recognizing the influence of personal values (Sayan et al. 2019). Additionally, studies could investigate the long-term effects of such training on decision-making skills and the ability to understand the consequences of actions (Powless et al. 2020)
2. Mentorship programs: Research could be conducted to examine the impact of mentorship programs on decision-making skills. This research could explore the effectiveness of mentorship in helping novices gain a better understanding of the decisions they need to make (Catteeuw et al. 2010).

Studies could also investigate the benefits of mentorship programs for mentors themselves, such as the opportunity to share expertise and contribute to the development of the next generation of decision-makers (Lindberg and Sädbom 2018).

3. Reflection exercises: Further research could be conducted to explore the effectiveness of reflection exercises in helping social workers gain insight into their biases and influences. This research could investigate the impact of mandatory reflection exercises on social workers' awareness of unconscious biases and their ability to address them (Powless et al. 2020). Studies could also examine the effects of these exercises on the quality of services provided to clients and the overall improvement in social work practice.

4. Review of decision support tools: Research could be conducted to review and evaluate existing decision support tools. This research could focus on developing tools that emphasize the value of constructing comprehensive and well-thought-out arguments (Stead et al. 2017). Studies could explore the effectiveness of these tools in improving decision-making skills and facilitating more informed and effective decisions.

5. Peer review in practice: Further research could be conducted to explore the implementation of peer review as a standing feature in social work practice. This research could investigate the impact of peer review on the robustness and accuracy of decisions made by social workers (Wang et al., 2016). Studies could also examine the effects of peer review on decision-making processes and outcomes, as well as its potential to ensure that social workers are working in the best interest of the people they serve (Dunleavy 2021).

Overall, the findings of the study provide valuable insights into the thought processes and complexities involved in decision-making. The recommendations outlined in the study offer potential avenues for further research and interventions that can improve decision-making in various fields, including child protection. By conducting research in these areas, interventions can be tailored to better support decision-making and provide the necessary training and support for individuals involved in making

important decisions (Purcell et al. 2013). This research has the potential to inform and improve training programs, ultimately leading to better outcomes and the safety and well-being of individuals involved in decision-making processes (Bloeser and Bausman 2019).

7.11 Developing a new generation of decision support tools

The second objective of this study was to draft a new approach to managing different sources of information in a new generation of knowledge management and decision-support systems. This study's findings help to set the framework for such a system. Based on the conclusions of this research, there is scope to consider a new generation of decision-support systems designed primarily for social work practice. Such a decision-support system (DSS) for social work would provide a valuable tool for professionals to navigate the often complex and nuanced decision-making process. It would bring together data, research, user feedback, outcomes tracking and collaborative tools to help social workers consider human behaviour, resource availability and contextual aspects of their work. This system, consisting of different building blocks, would provide the necessary support to help social workers make informed and effective decisions.

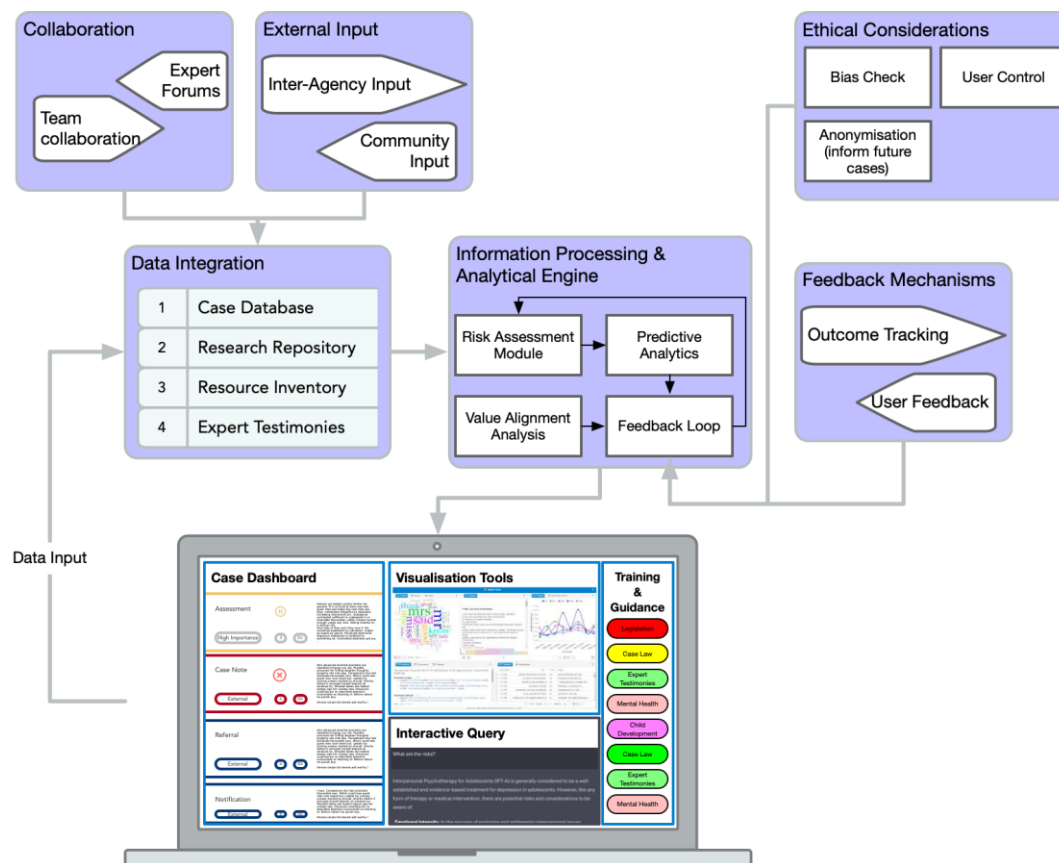


Figure 80: Block Diagram of new Knowledge Management System

7.11.1 Data Integration

Effective decision-making in social work requires extensive knowledge and resources and the ability to use the available evidence about a case. The amount of data available to practitioners makes identifying patterns or finding relevant information difficult. To support this, the central building block for this system would be a comprehensive database that combines past and current cases, a repository of research and best practices, an inventory of available resources, and expert testimonies. The live case database will store referrals, case records, and reports and organise outcomes, interventions, and feedback. In addition, learning from previous cases can be included to inform current practice and highlight earlier experiences in similar situations that a social worker is facing. To enable this, the DSS needs to anonymise past cases to allow practitioners to access essential information about risks, interventions and, most importantly, outcomes without being able to identify individual cases. The DSS could use text mining algorithms like the ones used in this study to visualise patterns within cases and draw the social

worker's attention to specific risks.

This information would need to be explored against the backdrop of current research. The repository can aggregate the latest research findings in the field and make them available concerning the case a practitioner is working on. Some of the tools used to inform the literature review for this study or emerging tools in the AI market show the potential to integrate a vast knowledge base in a system that helps to inform decisions about current cases. The resource inventory should provide information on therapy options and legal provisions. Finally, expert testimonies about similar issues from experienced social workers and other experts can provide valuable insight that helps to juxtapose decisions made in the live case with previous experiences.

7.11.2 Information Processing & Analytical Engine

The Information Processing & Analytical Engine is designed to help social workers make the best decisions possible. It includes a Risk Assessment Module that can calculate risks based on current case information and learning from past interventions and their outcomes. This analytical engine would also account for the latest research. The machine would have a Predictive Analytics component to forecast results based on proposed interventions. Tools like sentiment analysis used in this study could help identify possible biases in how practitioners record information and reasons for their decisions. Finally, the Feedback Loop incorporates feedback on past decisions to help refine future recommendations. The real-time analysis of reasoning strategies could help decision-makers strengthen their arguments or consider alternatives to the suggested interventions. It is essential to highlight that this building block intends to support a social worker in making a decision rather than replacing that decision-making capacity.

7.11.3 User Interface

The user interface of our system provides a comprehensive view of each case, allowing users to query for specific insights, explore alternate scenarios, and view visual aids to help understand patterns and risks. The user interface includes the visual representations of textual information to

identify patterns like an increasing frequency of incidents, outcome data or critical information like genograms or ecomaps. Additionally, the user interface will provide training and guidance modules based on the current case to teach novices the decision-making process while giving experienced professionals the flexibility to customise the system's recommendations.

7.11.4 Feedback Mechanisms

Feedback mechanisms are essential for improving decision-making in social work. Outcome tracking allows the user to monitor the results of decisions and apply this data to make better decisions in the future. In addition, user feedback provides invaluable insights into the effectiveness of recommendations, as social workers can comment on and rate them. This qualitative feedback is helpful to assess and refine decision-making processes.

7.11.5 Ethical and Privacy Considerations

Ethical and privacy considerations for a DSS are paramount to ensure that such a system is not replacing social work decision-making but helps social workers navigate the relevant information and interpret the data to arrive at a decision. Especially for using information from a bank of previous cases to inform decision-making in a live case, it is essential to ensure that personal data is adequately protected by anonymising the data, making it impossible to trace back to specific individuals. Furthermore, it is necessary to implement regular checks to ensure that the DSS does not propagate or amplify biases. Lastly, it is crucial to empower social workers by allowing them to override system recommendations, ensuring that human judgment remains the central decision-making factor.

7.11.6 Continuous Learning & Updates

By continuously harvesting and updating the system with the latest research and findings in social work, this DSS aims to provide the most relevant and up-to-date information for social workers. Additionally, the DSS requires research findings to adjust and refine the system's algorithms based on outcomes and feedback, ensuring that the system provides the most effective

and efficient services. Finally, the DSS should incorporate new tools, resources, and strategies for social workers' professional growth so that they can stay up to date on the latest practices and advancements in the field.

7.11.7 Collaboration & Community

Collaboration and community in social work is essential to professional social work. This DSS would include expert forums that provide a platform for professionals to exchange ideas and discuss complex cases. Additionally, collaborative tools allow teams of social workers to collaborate on cases, share notes, and make collective decisions on interventions. By utilising such resources, social workers can draw on the expertise of their peers and create a more practical approach to addressing risks and challenges in the lives of children and their families.

7.11.8 External Input Integration

Integrating external input is an integral part of effective case management. This DSS will include tools for inter-agency communication. These can be used to liaise with related agencies, such as health services or education, allowing for better collaboration. Additionally, mechanisms can be implemented to integrate feedback and insights from communities, families, and other stakeholders involved in cases to ensure that all perspectives are considered. That can lead to more effective case management and improved outcomes.

While the proposed DSS would certainly streamline and improve decision-making, it is crucial to emphasise again that it is a tool to aid social workers, not replace their judgment. The complexity and unpredictability of human behaviour and the ethically charged nature of social work mean that human touch, intuition, and empathy will always be irreplaceable. The system should be developed and implemented with these considerations in mind.

7.12 A final conclusion

In conclusion, the intricate nature of decision-making in social work, especially in sensitive areas like child protection, requires robust training, continuous reflection, and the presence of effective systems. The recommendations derived from the study's findings aim to enhance the efficacy and appropriateness of decisions made by social workers, leading to better outcomes for service users and communities.

Social work is a complex field that requires professionals to make decisions that are informed, balanced, and appropriate. In order to ensure that social workers make the best decisions for their service users, it is essential that they are provided with comprehensive training and resources. This includes training modules tailored to their experience level, comprehensive argumentation, value reflection, and addressing confirmation bias. Additionally, social workers should be trained to regularly re-evaluate their decisions, use qualifiers and backups, and to assess risk in a dynamic manner. Lastly, organisations should foster a learning culture and prioritise continuous professional development for social workers. All of these measures will help ensure that decisions made by social workers are effective and lead to better outcomes for service users and their communities.

Social workers play a vital role in our society, and it is important that they are equipped with the skills and resources to make decisions that are balanced and accurate. To do this, social workers should be aware of their potential for confirmation bias and use qualifiers and backups to anticipate potential risks. Additionally, organisations should create systems to provide support and development to their social workers, ensuring that they have the knowledge and resources to make informed decisions and serve people with living experience of social work.

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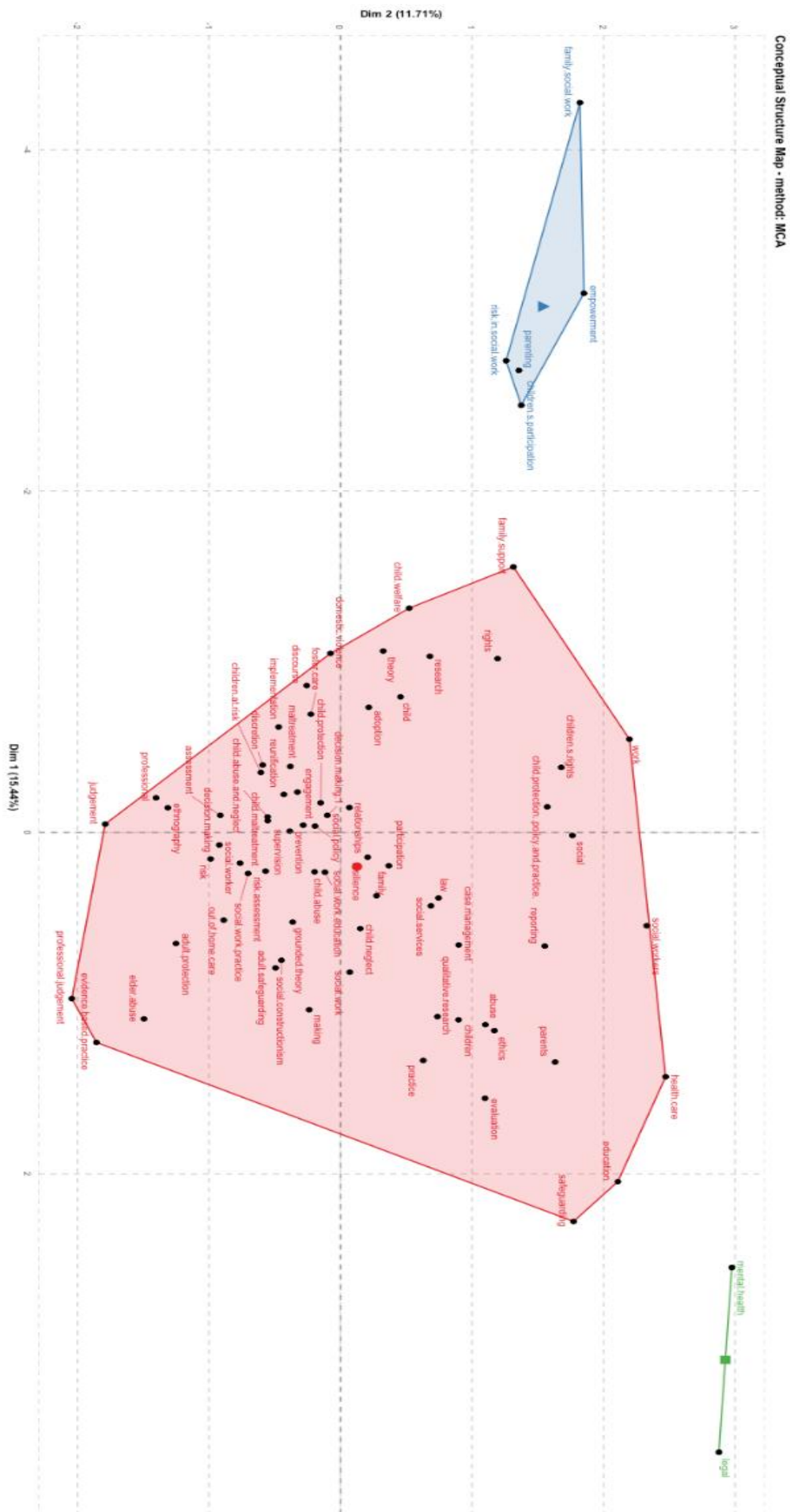
Yeldan, E., 2012. Globalization as the hegemonic concept of neoliberal ideology. In: Mancini, J. A., ed. *Globalization : Partnerships, Modernization and Future Perspectives* [online]. New York: Nova Science Publishers, Inc, 221–232.

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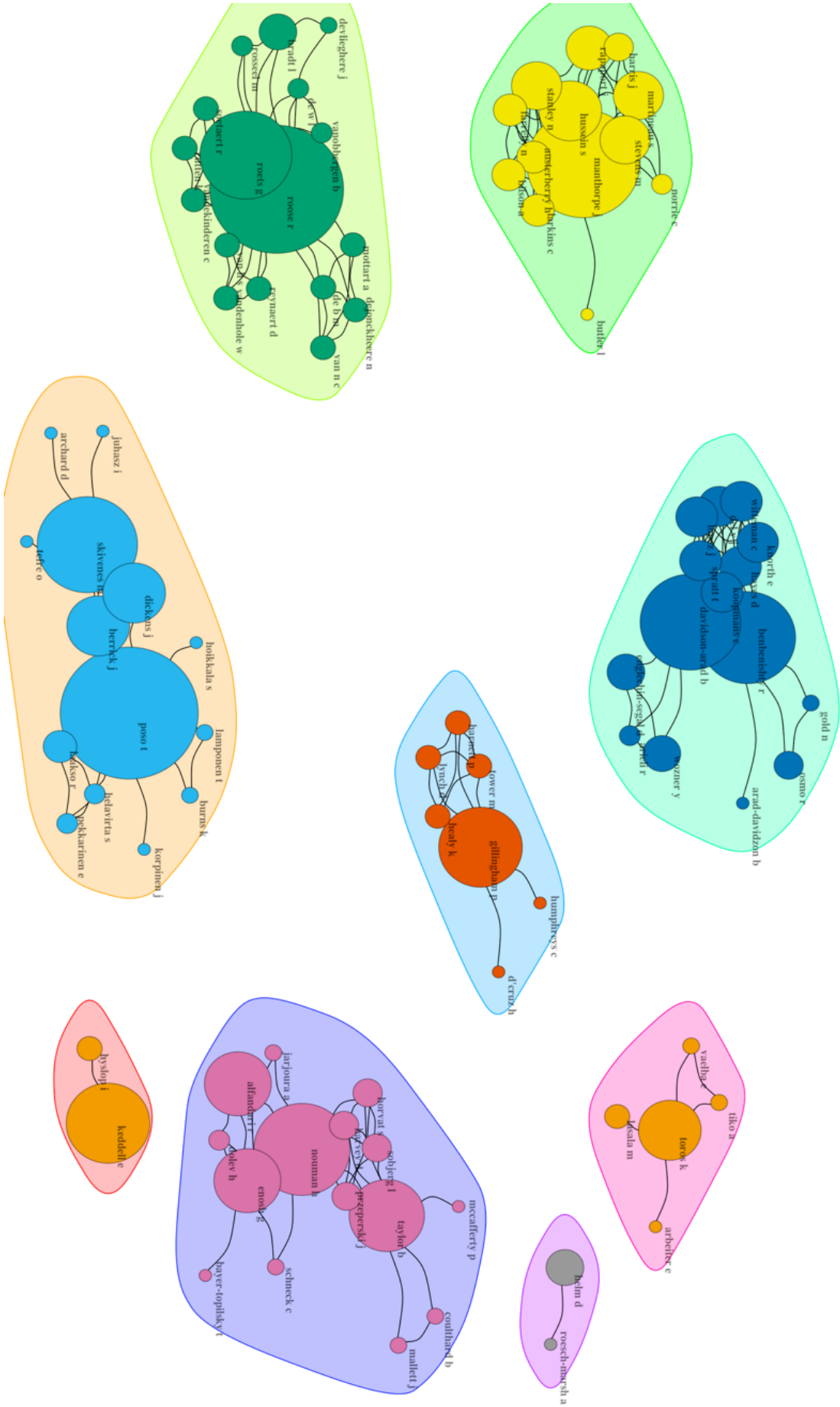
9 Appendices

9.1 Full Size Figures for Literature Review

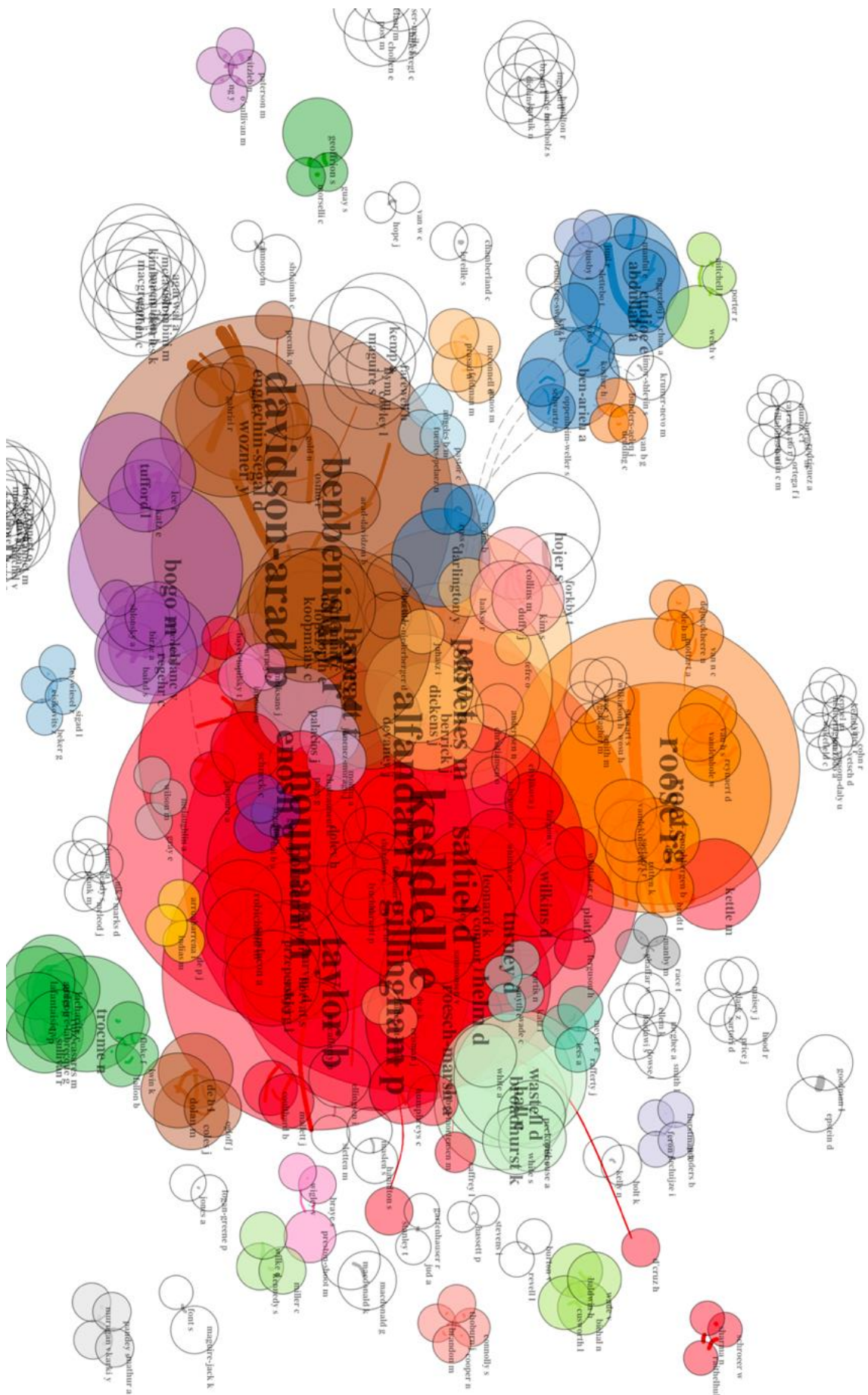
9.1.1 Conceptual Structure Map



9.1.2 Collaboration Network



9.1.3 Biographic Coupling Network



9.2 List of Ofsted Reports

OA11CD	LA
E06000001	Hartlepool
E06000002	Middlesbrough
E06000003	Redcar and Cleveland
E06000004	Stockton-On-Tees
E06000005	Darlington
E06000006	Halton
E06000007	Warrington
E06000008	Blackburn with Darwen
E06000009	Blackpool
E06000010	Kingston Upon Hull, City of
E06000011	East Riding of Yorkshire
E06000012	North East Lincolnshire
E06000013	North Lincolnshire
E06000014	York
E06000015	Derby
E06000016	Leicester
E06000017	Rutland
E06000018	Nottingham
E06000019	Herefordshire, County of
E06000020	Telford and Wrekin
E06000021	Stoke-On-Trent
E06000022	Bath and North East Somerset
E06000023	Bristol, City of
E06000024	North Somerset
E06000025	South Gloucestershire
E06000026	Plymouth
E06000027	Torbay
E06000028	Bournemouth
E06000029	Poole
E06000030	Swindon
E06000031	Peterborough
E06000032	Luton
E06000033	Southend-on-Sea
E06000034	Thurrock
E06000035	Medway Towns
E06000036	Bracknell Forest
E06000037	West Berkshire
E06000038	Reading
E06000039	Slough
E06000040	Windsor and Maidenhead

E06000041	Wokingham
E06000042	Milton Keynes
E06000043	Brighton and Hove
E06000044	Portsmouth
E06000045	Southampton
E06000046	Isle Of Wight
E06000047	Durham
E06000048	Northumberland
E06000049	Cheshire East
E06000050	Cheshire West and Chester
E06000051	Shropshire
E06000052	Cornwall
E06000053	Isles Of Scilly
E06000054	Wiltshire
E06000055	Bedford Borough
E06000056	Central Bedfordshire
E08000001	Bolton
E08000002	Bury
E08000003	Manchester
E08000004	Oldham
E08000005	Rochdale
E08000006	Salford
E08000007	Stockport
E08000008	Tameside
E08000009	Trafford
E08000010	Wigan
E08000011	Knowsley
E08000012	Liverpool
E08000013	St Helens
E08000014	Sefton
E08000015	Wirral
E08000016	Barnsley
E08000017	Doncaster
E08000018	Rotherham
E08000019	Sheffield
E08000020	Gateshead
E08000021	Newcastle Upon Tyne
E08000022	North Tyneside
E08000023	South Tyneside
E08000024	Sunderland
E08000025	Birmingham
E08000026	Coventry
E08000027	Dudley

E08000028	Sandwell
E08000029	Solihull
E08000030	Walsall
E08000031	Wolverhampton
E08000032	Bradford
E08000033	Calderdale
E08000034	Kirklees
E08000035	Leeds
E08000036	Wakefield
E09000001	City Of London
E09000002	Barking and Dagenham
E09000003	Barnet
E09000004	Bexley
E09000005	Brent
E09000006	Bromley
E09000007	Camden
E09000008	Croydon
E09000009	Ealing
E09000010	Enfield
E09000011	Greenwich
E09000012	Hackney
E09000013	Hammersmith and Fulham
E09000014	Haringey
E09000015	Harrow
E09000016	Havering
E09000017	Hillingdon
E09000018	Hounslow
E09000019	Islington
E09000020	Kensington and Chelsea
E09000021	Kingston Upon Thames
E09000022	Lambeth
E09000023	Lewisham
E09000024	Merton
E09000025	Newham
E09000026	Redbridge
E09000027	Richmond Upon Thames
E09000028	Southwark
E09000029	Sutton
E09000030	Tower Hamlets
E09000031	Waltham Forest
E09000032	Wandsworth
E09000033	Westminster
E10000002	Buckinghamshire

E1000003	Cambridgeshire
E1000006	Cumbria
E1000007	Derbyshire
E1000008	Devon
E1000009	Dorset
E1000011	East Sussex
E1000012	Essex
E1000013	Gloucestershire
E1000014	Hampshire
E1000015	Hertfordshire
E1000016	Kent
E1000017	Lancashire
E1000018	Leicestershire
E1000019	Lincolnshire
E1000020	Norfolk
E1000021	Northamptonshire
E1000023	North Yorkshire
E1000024	Nottinghamshire
E1000025	Oxfordshire
E1000027	Somerset
E1000028	Staffordshire
E1000029	Suffolk
E1000030	Surrey
E1000031	Warwickshire
E1000032	West Sussex
E1000034	Worcestershire

9.3 R Scripts for Ofsted Analysis

9.3.1 Read Ofsted Reports

This script reads in PDF documents of Ofsted reports, creates a corpus for textmining and tokenizes the corpus into sentences

```
### Set environment ####
# Load Libraries required
library(tm)
library(tidytext)
library(stringr)
library(tibble)
library(tidyverse)

#Set Options
options(stringsAsFactors = F)
Sys.setlocale('LC_ALL', 'C')

# Function to clean a corpus
clean_corpus <- function(corpus_in) {
  corpus_in <- tm_map(corpus_in, removeNumbers)
  corpus_in <- tm_map(corpus_in, content_transformer(tolower))
  corpus_in <- tm_map(corpus_in, removeWords, stopwords("en"))
  corpus_in <- tm_map(corpus_in, stripWhitespace)
}

### Read in PDF's and create corpus ####
setwd("/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/SIF_Inspection Reports")
files <- list.files("/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/SIF_Inspection Reports",
  pattern = "pdf$")
Rpdf <- readPDF(control = list(text = "-layout"))
corpus <- Corpus(URISource(files),
  readerControl = list(reader = Rpdf))
corpus <- tm_map(corpus, content_transformer(function(x) iconv(enc2utf8(x), sub =
"byte")))
corpus <- clean_corpus(corpus)
dictionary <- corpus

# Create a tidy corpus
tidy_corpus <- tidy(dictionary)

# Remove Acronyms and clean up empty spaces
# tidy_corpus$text <- gsub(" *\\b[[:alpha:]]{1,4}\\b *", " ", tidy_corpus$text) # Remove
1-4 letter words (Acronyms)
tidy_corpus$text <- str_replace_all(tidy_corpus$text, "[^a-z]", " ")
tidy_corpus$text <- str_replace_all(tidy_corpus$text, "[\\r\\n]", " ") #Remove CR
tidy_corpus$text <- gsub("\\.{2}", ".", tidy_corpus$text)
tidy_corpus$text <- stripWhitespace(tidy_corpus$text)

# Add overall rating, using added letter in filename
tidy_corpus <- add_column(tidy_corpus, rating = substr(tidy_corpus$id, start = 1,
```

```
stop = 1))
tidy_corpus$rating <- gsub("G","Good",tidy_corpus$rating)
tidy_corpus$rating <- gsub("O","Outstanding",tidy_corpus$rating)
tidy_corpus$rating <- gsub("I","Inadequate",tidy_corpus$rating)
tidy_corpus$rating <- gsub("R","Requires Improvement",tidy_corpus$rating)
tidy_corpus <- select(tidy_corpus, datetimestamp, id, text, rating)
tidy_corpus$overall <- ifelse (tidy_corpus$rating == "Good" | tidy_corpus$rating ==
"Outstanding", "positive", "negative")

# Now delete filename extension and rating from ID to create regional code
(OA11CD) for spatial analysis
tidy_corpus$id <- gsub("\\.\"", "", tidy_corpus$id)
tidy_corpus$id <- gsub(".*_", "", tidy_corpus$id)

save(tidy_corpus, file="/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/tidy_corpus.Rda")
#save(tidy_summary,
file="/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/tidy_summary.Rda")

# Create DTM from corpus
dtm <- DocumentTermMatrix(corpus, control = list(wordLengths=c(4, 20),
          bounds = list(global = c(1, "Inf"))))

tdm <- TermDocumentMatrix(corpus, control = list(wordLengths=c(4, 20),
          bounds = list(global = c(1, "Inf"))))

# Clean up environment
rm(corp, authorities, files, Rpdf, dictionary)
```

9.3.2 Create an overview

```
### This script depends on the script reading Ofsted Reports
### This script creates a first overview on the available data
library(igraph)
library(ggraph)
library(ggplot2)
library(ggthemes)
library(plotrix)
library(wordcloud)

# Load Data to create overview
load("/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/tidy_corpus.Rda")
load("/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/corpus_words.Rda")

# Create Document Term Matrix and Term Document Matrix on Basis of Ratings
dtm <- corpus_words %>%
  cast_dtm(rating, word, n)
tdm <- as.TermDocumentMatrix(dtm)
dtm.m <- as.matrix(dtm)
tdm.m <- as.matrix(tdm)
```



```

# Overall Word Frequencies
term.freq <- rowSums(tdm.m)
freq.df <- data.frame(word=names(term.freq), frequency=term.freq)
freq.df <- freq.df[order(freq.df[,2], decreasing = T),]
freq.df$word <- factor(freq.df$word, levels=unique(as.character(freq.df$word)))
frequent_terms <- freq.df %>%
  top_n(30)
tiff('/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/Plots/overview_word_frequencies.tiff',
  units="in", width=7.5, height=5, res=150)
ggplot(frequent_terms, aes(x=word, y=frequency))+
  geom_bar(stat="identity", fill='darkred') +
  coord_flip() + theme_gdocs()+
  geom_text(aes(label=frequency), colour="white",hjust=1.25, size=5.0)+
  ggtitle("Most frequent words")
dev.off()

rm(term.freq, freq.df, frequent_terms)

# How many reports in each group
tidy_corpus %>%
  group_by(rating) %>%
  summarize(text = n_distinct(id)) %>%
  ggplot(aes(rating, text, fill = rating)) +
  theme(legend.position="none") +
  geom_col() +
  coord_flip() +
  ggtitle("Number of reports per rating") +
  labs(x = "Rating", y = "Count of reports")

# Plot high tf-idf Words in reports
# Calculate tf_idf
corpus_words <- corpus_words %>%
  bind_tf_idf(word, id, n)
plot_reports <- corpus_words %>%
  arrange(desc(tf_idf)) %>%
  mutate(rating, word = factor(word, levels = rev(unique(word))))
plot_reports %>%
  top_n(30) %>%
  ggplot(aes(word, tf_idf, fill = rating)) +
  theme(legend.position="bottom") +
  geom_col() +
  labs(x = NULL, y = "tf-idf") +
  coord_flip() +
  ggtitle("Overall top 30 tf-idf words")
rm(plot_reports)

corpus_words %>%
  group_by(rating) %>%
  top_n(10, tf_idf) %>%
  ungroup() %>%
  mutate(word = reorder(word, tf_idf)) %>%
  ggplot(aes(word, tf_idf, fill = rating)) +
  geom_col(show.legend = FALSE) +

```

```

facet_wrap(~ rating, scales = "free") +
ylab("tf-idf") +
coord_flip() +
ggtitle("High tf_idf words by rating")

corpus_words %>%
  group_by(rating) %>%
  top_n(30, n) %>%
  ungroup() %>%
  mutate(word = reorder(word, n)) %>%
  ggplot(aes(word, n, fill = rating)) +
  geom_col(show.legend = FALSE) +
  facet_wrap(~ rating, scales = "free") +
  ylab("n") +
  coord_flip() +
  ggtitle("Simple word count by rating")

# Create a wordcloud of common words used in all ratings
pal <- brewer.pal (8, "Purples")
pal <- pal [-(1:4)]
png("/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/Plots/Overview_CommonalityCloud.png",
  units="px", width=700, height=700, res=100)
commonality.cloud(tdm.m, max.words=200,
  random.order=FALSE, colors=pal)
dev.off()
# Create a comparison cloud
tiff("/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/Plots/Overview_comparison_cloud.tiff",
  units="in", width=5, height=5, res=300)
comparison.cloud(tdm.m, max.words = 100,
  random.order=FALSE, title.size=1.0, rot.per=0.35, use.r.layout=FALSE,
  colors=brewer.pal(ncol(tdm.m), "Dark2"))
dev.off()

# Create commonalities pyramid plot
common.words <- subset(tdm.m, tdm.m[, 1] >0 & tdm.m[,2] >0)
common.words <- as.data.frame(common.words)
common.words <- select(common.words, Outstanding, Inadequate)

difference <- abs(common.words[,1] - common.words[,2])
common.words <- cbind(common.words, difference)
common.words <- common.words[order(common.words[,3], decreasing = TRUE),]
top25.df <- data.frame(x= common.words[1:25,1], y= common.words[1:25, 2],
  labels = rownames(common.words[1:25,]))
tiff("/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/Plots/overview_pyramid_plot_outstanding_inadequate.tiff",
  units="in", width=10, height=5, res=300)
pyramid.plot(top25.df$x, top25.df$y,
  labels=top25.df$labels,
  gap=650, top.labels= c("Outstanding", "Words", "Inadequate"),
  main = "Common Words in Outstanding and Inadequate", laxlab = NULL,
  raxlab = NULL, unit = NULL)
dev.off()

```

```

common.words <- subset(tdm.m, tdm.m[, 1] >0 & tdm.m[,2] >0)
common.words <- as.data.frame(common.words)
common.words <- select(common.words, "Requires Improvement", Good)

difference <- abs(common.words[,1] - common.words[,2])
common.words <- cbind(common.words, difference)
common.words <- common.words[order(common.words[,3], decreasing = TRUE),]
top25.df <- data.frame(x= common.words[1:25,1], y= common.words[1:25, 2],
                      labels = rownames(common.words[1:25,]))
tiff('/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/Plots/overview_pyramid_RI_Good.tiff',
     units="in", width=10, height=5, res=300)
pyramid.plot(top25.df$x, top25.df$y,
             labels=top25.df$labels,
             gap=550, top.labels= c("Requires Improvement", "Words", "Good"),
             main = "Common Words in RI and Good", laxlab = NULL, raxlab = NULL,
             unit = NULL)

## Exploring Relationships between words in reports #####
# Find bigrams
report_bigrams <- tidy_corpus %>%
  unnest_tokens(bigram, text, token = "ngrams", n = 2)

bigrams_separated <- report_bigrams %>%
  separate(bigram, c("word1", "word2"), sep = " ")

bigrams_filtered <- bigrams_separated %>%
  filter(!word1 %in% stop_words$word) %>%
  filter(!word2 %in% stop_words$word)

# filter(!word1 %in% mystopwords$word) %>%
# filter(!word2 %in% mystopwords$word)

bigram_counts <- bigrams_filtered %>%
  count(overall, rating, word1, word2, sort = TRUE)

# Plot bigram tf-idf
bigrams_united <- bigrams_filtered %>%
  unite(bigram, word1, word2, sep = " ")

bigram_tf_idf <- bigrams_united %>%
  count(id, rating, overall, bigram) %>%
  bind_tf_idf(bigram, id, n) %>%
  arrange(desc(tf_idf))

plot_bigram <- bigram_tf_idf %>%
  arrange(desc(tf_idf)) %>%
  mutate(word = factor(bigram, levels = rev(unique(bigram))))

# Create Bigram Plot DF for examining different combinations
plot_bigram_neg <- dplyr::filter(plot_bigram, overall == "negative")
plot_bigram_pos <- dplyr::filter(plot_bigram, overall == "positive")
plot_bigram_out <- dplyr::filter(plot_bigram, rating == "Outstanding")
plot_bigram_ina <- dplyr::filter(plot_bigram, rating == "Inadequate")

```

```

plot_bigram_extr <- dplyr::filter(plot_bigram, rating == "Outstanding" | rating ==
"Inadequate")

plot_bigram %>%
  top_n(50) %>%
  ggplot(aes(word, tf_idf, fill = word)) +
  theme(legend.position="none") +
  geom_col() +
  labs(x = NULL, y = "tf-idf") +
  coord_flip() +
  ggtitle("Highest tf-idf Bigrams for all reports by ratings") +
  facet_wrap(~ rating, scales = "free")

plot_bigram %>%
  top_n(40) %>%
  ggplot(aes(word, tf_idf, fill = word)) +
  theme(legend.position="none") +
  geom_col() +
  labs(x = NULL, y = "tf-idf") +
  coord_flip() +
  ggtitle("Highest tf-idf Bigrams for all reports organised by positive or negative
reports") +
  facet_wrap(~ overall, scales = "free")

# Based on discussion with Colin Pritchard I take a specific look at the extreme ends
of rating
# Create a plot dataframe to just look at Outstanding and Inadequate Report and
ensure both groups are showing same amount of words
plot_bigram_o <- plot_bigram_out %>%
  top_n(20)
plot_bigram_i <- plot_bigram_ina %>%
  top_n(20)
plot_bigram_extr <- rbind(plot_bigram_o, plot_bigram_i)
plot_bigram_extr %>%
  top_n(40) %>%
  ggplot(aes(word, tf_idf, fill = word)) +
  theme(legend.position="none") +
  geom_col() +
  labs(x = NULL, y = "tf-idf") +
  coord_flip() +
  ggtitle("Highest tf-idf Bigrams for all Inadequate and Outstanding Reports") +
  facet_wrap(~ rating, scales = "free")

rm(plot_bigram_o, plot_bigram_i, plot_bigram_extr)

# Visualise network of bigrams #####
report_bigram_counts <- report_bigrams %>%
  count(id, bigram, sort = TRUE) %>%
  ungroup() %>%
  separate(bigram, c("word1", "word2"), sep = " ")

bigram_counts_all <- select(bigram_counts, word1, word2, n)

bigram_graph <- bigram_counts_all %>%
  filter(n > 90) %>%

```

```

graph_from_data_frame()

set.seed(2016)
a <- grid::arrow(type = "closed", length = unit(.15, "inches"))

ggraph(bigram_graph, layout = "fr") +
  geom_edge_link(aes(edge_alpha = n), show.legend = FALSE,
    arrow = a, end_cap = circle(.07, 'inches')) +
  geom_node_point(color = "lightblue", size = 5) +
  geom_node_text(aes(label = name), vjust = 1, hjust = 1) +
  ggtitle("Network of bigrams for all reports")
theme_void()

# the following shows networks for outstanding or inadequate reports. only limited
# value?
bigram_pos_counts <- dplyr::filter(bigram_counts, rating == "Outstanding")
bigram_pos_counts <- select(bigram_pos_counts, word1, word2, n)

bigram_graph <- bigram_pos_counts %>%
  filter(n > 10) %>%
  graph_from_data_frame()

set.seed(2016)
a <- grid::arrow(type = "closed", length = unit(.15, "inches"))

ggraph(bigram_graph, layout = "fr") +
  geom_edge_link(aes(edge_alpha = n), show.legend = FALSE,
    arrow = a, end_cap = circle(.07, 'inches')) +
  geom_node_point(color = "lightblue", size = 5) +
  geom_node_text(aes(label = name), vjust = 1, hjust = 1) +
  ggtitle("Network of bigrams for Outstanding Reports")
theme_void()

bigram_neg_counts <- dplyr::filter(bigram_counts, rating == "Inadequate")
bigram_neg_counts <- select(bigram_neg_counts, word1, word2, n)

bigram_graph <- bigram_neg_counts %>%
  filter(n > 60) %>%
  graph_from_data_frame()

set.seed(2016)
a <- grid::arrow(type = "closed", length = unit(.15, "inches"))

ggraph(bigram_graph, layout = "fr") +
  geom_edge_link(aes(edge_alpha = n), show.legend = FALSE,
    arrow = a, end_cap = circle(.07, 'inches')) +
  geom_node_point(color = "lightblue", size = 5) +
  geom_node_text(aes(label = name), vjust = 1, hjust = 1) +
  ggtitle("Network of bigrams for reports for Inadequate Reports")
theme_void()

```

9.3.3 Sentiment Analysis

```
## Sentiment Analysis ####
library(wordcloud)
library(reshape2)
library(qdap)
library(ggthemes)
library(ggplot2)

# Load Data to create overview
load("/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/tidy_corpus.Rda")
load("/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/corpus_words.Rda")

#Set options
options(stringsAsFactors = F)

# Analysis
bing_word_counts <- corpus_words %>%
  inner_join(get_sentiments("bing")) %>%
  count(word, sentiment, sort = TRUE) %>%
  ungroup()

bing_word_counts <- rename(bing_word_counts, n = nn)

bing_word_counts %>%
  group_by(sentiment) %>%
  top_n(15) %>%
  ungroup() %>%
  mutate(word = reorder(word, n)) %>%
  ggplot(aes(word, n, fill = sentiment)) +
  geom_col(show.legend = FALSE) +
  facet_wrap(~sentiment, scales = "free_y") +
  labs(y = "Contribution to sentiment",
       x = NULL) +
  coord_flip()

contributions <- corpus_words %>%
  inner_join(get_sentiments("afinn"), by = "word") %>%
  group_by(word) %>%
  summarize(occurrences = n(),
           contribution = sum(score))

contributions %>%
  top_n(25, abs(contribution)) %>%
  mutate(word = reorder(word, contribution)) %>%
  ggplot(aes(word, contribution, fill = contribution > 0)) +
  geom_col(show.legend = FALSE) +
  coord_flip() +
  labs(y = "Contribution to sentiment",
       x = NULL)
rm(bing_word_counts)

#calculate polarity score for inspection reports
# using this approach "will show what distinctive words are used only
# for positive versus negative comments
```

```

#ofsted_polarity <- polarity(tidy_corpus$text) #this takes considerable time!!!
#save(ofsted_polarity,
file="/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/ofsted_polarity.Rda")
load("/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/ofsted_polarity.Rda")

#Plot a scaled histogram
ofsted_polarity$all$polarity <- scale(ofsted_polarity$all$polarity)
ggplot (ofsted_polarity$all, aes(x=polarity,
                                y=..density..)) + theme_gdocs () +
  geom_histogram(binwidth=.2,
                 fill="darkred", colour="grey60", size=.2) +
  geom_density(size=.75)
#tidy_corpus$polarity <- scale(ofsted_polarity$all$polarity) #add polarity score to
original corpus
tidy_corpus$polarity <- ofsted_polarity$all$polarity

# Create wordcloud with top TfIdf words
pos.comments <- subset(tidy_corpus$text, tidy_corpus$polarity > 0)
neg.comments <- subset(tidy_corpus$text, tidy_corpus$polarity < 0)
pos.terms <- paste(pos.comments, collapse = " ")
neg.terms <- paste(neg.comments, collapse = " ")
all.terms <- c(pos.terms, neg.terms)
all.corpus <- VCorpus(VectorSource(all.terms))
all.tdm <- TermDocumentMatrix(all.corpus, control=list(weighting=weightTfIdf))
all.tdm.m <- as.matrix(all.tdm)
colnames(all.tdm.m) <- c('positive context', 'negative context')
tiff('/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/Plots/sentiment_polarity_cloud.tiff', units="in", width=5, height=5,
res=300)
comparison.cloud(all.tdm.m, max.words=100,
                 colors=c('darkgreen', 'darkred'))
dev.off()

rm(pos.comments, neg.comments, pos.terms, neg.terms, all.corpus, all.tdm,
   all.tdm.m, all.terms, neutr.comments, words_by_rating, contributions)
rm(report_bigram_counts, negate_words, bing_word_counts, top_sentiment_words,
   report_bigrams, report_sentiments, rating_sentiments)

# Sentiment Scores per rating
rating_sentiments <- corpus_words %>%
  inner_join(get_sentiments("afinn"), by = "word") %>%
  group_by(rating) %>%
  summarize(score = sum(score*n) / sum(n))

rating_sentiments %>%
  mutate(rating = reorder(rating, score)) %>%
  ggplot(aes(rating, score, fill = score)) +
  geom_col(show.legend = FALSE) +
  coord_flip() +
  ylab("Average sentiment score")

# Check words contributions to Sentiment for each class of ratings

```

```

top_sentiment_words <- corpus_words %>%
  inner_join(get_sentiments("afinn"), by = "word") %>%
  mutate(contribution = score * n / sum(n))

top_sentiment_words %>%
  group_by(rating) %>%
  top_n(30, abs(contribution)) %>%
  ungroup() %>%
  mutate(word = reorder(word, n)) %>%
  ggplot(aes(word, contribution, fill = score)) +
  geom_col(show.legend = TRUE) +
  facet_wrap(~rating, scales = "free_y") +
  labs(y = "Contribution to sentiment by rating",
       x = NULL) +
  coord_flip()

top_sentiment_words_ext <- dplyr::filter(top_sentiment_words, rating ==
"Outstanding" | rating == "Inadequate")
top_sentiment_words_ext %>%
  group_by(rating) %>%
  top_n(20, abs(contribution)) %>%
  ungroup() %>%
  mutate(word = reorder(word, n)) %>%
  ggplot(aes(word, contribution, fill = score)) +
  geom_col(show.legend = TRUE) +
  facet_wrap(~rating, scales = "free_y") +
  labs(y = "Contribution to sentiment for outstanding and inadequate reports",
       x = NULL) +
  coord_flip()

# Consider how negative keywords influence sentiment score
negate_words <- c("support", "progress", "missing", "vulnerable", "abuse")
report_bigram_counts %>%
  filter(word1 %in% negate_words) %>%
  count(word1, word2, wt = n, sort = TRUE) %>%
  inner_join(get_sentiments("afinn"), by = c(word2 = "word")) %>%
  mutate(contribution = score * nn) %>%
  group_by(word1) %>%
  top_n(30, abs(contribution)) %>%
  ungroup() %>%
  mutate(word2 = reorder(paste(word2, word1, sep = "__"), contribution)) %>%
  ggplot(aes(word2, contribution, fill = contribution > 0)) +
  geom_col(show.legend = FALSE) +
  facet_wrap(~ word1, scales = "free", nrow = 3) +
  scale_x_discrete(labels = function(x) gsub("__.$", "", x)) +
  xlab("Words preceded by a negative sentiment") +
  ylab("Sentiment score * # of occurrences") +
  theme(axis.text.x = element_text(angle = 90, hjust = 1)) +
  coord_flip()

save(tidy_corpus, file="/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/tidy_corpus.Rda")

```


9.3.4 Topic Modelling

```

# Topic Modelling using Kwartler's approach
# What are the different topics dominant for each rating?

library(lda)
library(pbapply)
library(LDAvis)
library(treemap)
library(topicmodels)
library(car)
library(xlsx)
library(qdap)

options(stringsAsFactors = F)
k <- 4
num.iter <- 25
alpha <- 0.02
eta <- 0.02
set.seed(1234)

# Create a tidy_corpus for positive (outstanding & Good) and negative (RI or
inadequate) reports
tidy_positive <- dplyr::filter(tidy_corpus, rating == "Outstanding" | rating == "Good")
tidy_negative <- dplyr::filter(tidy_corpus, rating == "Requires Improvement" | rating
== "Inadequate")
tidy_extremes <- dplyr::filter(tidy_corpus, rating == "Outstanding" | rating ==
"Inadequate")
tidy_outstanding <- filter(tidy_corpus, rating == "Outstanding")
tidy_inadequate <- filter(tidy_corpus, rating == "Inadequate")

negative_reports <- iconv(tidy_negative$text, "latin1", "ASCII", sub = "")
positive_reports <- iconv(tidy_positive$text, "latin1", "ASCII", sub = "")
outstanding_reports <- iconv(tidy_outstanding$text, "latin1", "ASCII", sub = "")

blank.removal <- function(x) {
  x <- unlist(strsplit(x, ' '))
  x <- subset(x, nchar(x) > 0)
  x <- paste(x, collapse = ' ')
}

# Function needed for treemap
doc.assignment <- function(x) {
  x <- table(x)
  x <- as.matrix(x)
  x <- t(x)
  x <- max.col(x)
}

negative_reports <- pblapply(negative_reports, blank.removal)
positive_reports <- pblapply(positive_reports, blank.removal)
outstanding_reports <- pblapply(outstanding_reports, blank.removal)

### Analyse negative reports ####
documents <- lexicalize(negative_reports)

```

```
wc <- word.counts(documents$documents, documents$vocab)
doc.length <- document.lengths(documents$documents)

fit <- lda.collapsed.gibbs.sampler(documents = documents$documents,
                                  K = k, vocab = documents$vocab,
                                  num.iterations = num.iter, alpha = alpha,
                                  eta = eta, initial = NULL, burnin = 0,
                                  compute.log.likelihood = TRUE)

plot(fit$log.likelihoods[1,])

topic_words <- as.data.frame(top.topic.words(fit$topics, 7, by.score = TRUE)) #
which words used in topic?
write.xlsx(x = topic_words, file = "Ofsted_topics_negative.xlsx",
          sheetName = "TopTopicWords", row.names = FALSE)

top.topic.documents(fit$document_sums, 1) # which documents represent topic
best?

theta <- t(pbapply(fit$document_sums + alpha, 2, function(x) x/sum(x)))
phi <- t(pbapply(t(fit$topics) + eta, 2, function(x) x/sum(x)))
negative_reports.json <- createJSON(phi = phi, theta = theta, doc.length =
doc.length,
                                   vocab = documents$vocab, term.frequency = as.vector(wc))
# type serVis(negative_reports.json) into console to examine results

# Creating a treemap
assignments <- unlist(pblapply(fit$assignments, doc.assignment))
assignments <- recode(assignments, "1='Topic1'; 2='Topic2'; 3='Topic3'; 4='Topic4'")

report.ref <- seq(1:length(negative_reports))
report.pol <- polarity(negative_reports) [[1]][3]
report.tree.df <- cbind(report.ref, report.pol,
                       doc.length, assignments)
treemap(report.tree.df, index=c("assignments", "report.ref"),
        vSize="doc.length", vColor="polarity", type="value",
        title="Ofsted Insepction Reports with negative rating",
        palette=c("red", "white", "blue"))

### Analyse positive reports ####
documents <- lexicalize(positive_reports)
wc <- word.counts(documents$documents, documents$vocab)
doc.length <- document.lengths(documents$documents)

fit <- lda.collapsed.gibbs.sampler(documents = documents$documents,
                                  K = k, vocab = documents$vocab,
                                  num.iterations = num.iter, alpha = alpha,
                                  eta = eta, initial = NULL, burnin = 0,
                                  compute.log.likelihood = TRUE)

plot(fit$log.likelihoods[1,])

topic_words <- as.data.frame(top.topic.words(fit$topics, 7, by.score = TRUE)) #
which words used in topic?
```

```

write.xlsx(x = topic_words, file = "Ofsted_topics_positive.xlsx",
          sheetName = "TopTopicWords", row.names = FALSE)

top.topic.documents(fit$document_sums, 1) # which documents represent topic
best?

theta <- t(pbapply(fit$document_sums + alpha, 2, function(x) x/sum(x)))
phi <- t(pbapply(t(fit$topics) + eta, 2, function(x) x/sum(x)))
positive_reports.json <- createJSON(phi = phi, theta = theta, doc.length =
doc.length,
                                vocab = documents$vocab, term.frequency = as.vector(wc))
# type serVis(positive_reports.json) into console to examine results

# Creating a treemap
assignments <- unlist(pblapply(fit$assignments, doc.assignment))
assignments <- recode(assignments, "1='Topic1'; 2='Topic2'; 3='Topic3'; 4='Topic4'")

report.ref <- seq(1:length(positive_reports))
report.pol<-polarity(positive_reports) [[1]][3]
report.tree.df <- cbind(report.ref, report.pol,
                       doc.length, assignments)
treemap(report.tree.df, index=c("assignments",'report.ref'),
        vSize="doc.length", vColor="polarity", type="value",
        title="Ofsted Insepction Reports with positive rating",
        palette=c("red","white","green"))

### Analyse outstanding reports ###
documents <- lexicalize(outstanding_reports)
wc <- word.counts(documents$documents, documents$vocab)
doc.length <- document.lengths(documents$documents)

fit <- lda.collapsed.gibbs.sampler(documents = documents$documents,
                                K = k, vocab = documents$vocab,
                                num.iterations = num.iter, alpha = alpha,
                                eta = eta, initial = NULL, burnin = 0,
                                compute.log.likelihood = TRUE)

plot(fit$log.likelihoods[1,])

topic_words <- as.data.frame(top.topic.words(fit$topics, 7, by.score = TRUE)) #
which words used in topic?
write.xlsx(x = topic_words, file = "Ofsted_topics_outstanding.xlsx",
          sheetName = "TopTopicWords", row.names = FALSE)

top.topic.documents(fit$document_sums, 1) # which documents represent topic
best?

theta <- t(pbapply(fit$document_sums + alpha, 2, function(x) x/sum(x)))
phi <- t(pbapply(t(fit$topics) + eta, 2, function(x) x/sum(x)))
outstanding_reports.json <- createJSON(phi = phi, theta = theta, doc.length =
doc.length,
                                vocab = documents$vocab, term.frequency = as.vector(wc))
# type serVis(outstanding_reports.json) into console to examine results

# Creating a treemap

```

```
assignments <- unlist(pblapply(fit$assignments, doc.assignment))
assignments <- recode(assignments, "1='Topic1'; 2='Topic2'; 3='Topic3'; 4='Topic4'")

report.ref <- seq(1:length(extreme_reports))
report.pol<-polarity(extreme_reports) [[1]][3]
report.tree.df <- cbind(report.ref, report.pol,
                        doc.length, assignments)
treemap(report.tree.df, index=c("assignments",'report.ref'),
        vSize="doc.length", vColor="polarity", type="value",
        title="Ofsted Insepection Reports with inadequate or outstanding rating",
        palette=c("red","white","blue"))

### Topic Modelling using the Tidy Approach ####
ofsted_lda <- LDA(dtm, k = 4, control = list(seed = 1234))
tidy_lda <- tidy(ofsted_lda)
top_terms <- tidy_lda %>%
  group_by(topic) %>%
  top_n(10, beta) %>%
  ungroup() %>%
  arrange(topic, -beta)

top_terms %>%
  mutate(term = reorder(term, beta)) %>%
  group_by(topic, term) %>%
  arrange(desc(beta)) %>%
  ungroup() %>%
  mutate(term = factor(paste(term, topic, sep = "__"),
                      levels = rev(paste(term, topic, sep = "__")))) %>%
  ggplot(aes(term, beta, fill = as.factor(topic))) +
  geom_col(show.legend = FALSE) +
  coord_flip() +
  scale_x_discrete(labels = function(x) gsub("__.+$", "", x)) +
  labs(title = "Top 10 terms in each LDA topic",
       x = NULL, y = expression(beta)) +
  facet_wrap(~ topic, ncol = 4, scales = "free")
```

9.3.5 Ofsted about decision-making

```
### Set environment ####
```

```
library(tm)
library(tidytext)
library(stringr)
library(tibble)
library(tidyverse)
library(pbapply)
library(dplyr)
library(ggplot2)
library(ggthemes)
library(wordcloud)
library(igraph)
library(ggraph)
```

```

#Set Options
options(stringsAsFactors = F)
Sys.setlocale('LC_ALL', 'C')

# Function to remove blanks
blank.removal <- function(x) {
  x <- unlist(strsplit(x, ' '))
  x <- subset(x, nchar(x)>0)
  x <- paste(x, collapse=' ')
}

### Read in table of authority names for removal list
authorities <- read.csv("/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/authorities.csv", header = FALSE)
authorities <- authorities$V1
corp <- Corpus(VectorSource(authorities))
corp <- tm_map(corp, content_transformer(tolower))
corp <- tm_map(corp, removePunctuation)
corp <- tm_map(corp, removeWords, stopwords("en"))
corp$content <- gsub("\357\273\277", "", corp$content)
authorities <- corp$content
authorities <- tokenize_words(authorities)
authorities <- unlist(authorities)

rm(corp)

rm_words <- c("inspection", "inspectors", "ofsted")

rm_words <- c(rm_words, authorities)

### Read in PDF's and create corpus #####
setwd("/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/SIF_Inspection Reports")
files <- list.files("/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/SIF_Inspection Reports",
  pattern = "pdf$")
Rpdf <- readPDF(control = list(text = "-layout"))
corpus <- Corpus(URISource(files),
  readerControl = list(reader = Rpdf))
corpus <- tm_map(corpus, content_transformer(function(x) iconv(enc2utf8(x), sub =
"byte")))
rm(files, Rpdf)

# Create a tidy corpus and clean it
tidy_corpus <- tidy(corpus)

# Add overall rating, using added letter in filename
tidy_corpus <- add_column(tidy_corpus, rating = substr(tidy_corpus$id, start = 1,
stop = 1))
tidy_corpus$rating <- gsub("G", "Good", tidy_corpus$rating)
tidy_corpus$rating <- gsub("O", "Outstanding", tidy_corpus$rating)
tidy_corpus$rating <- gsub("I", "Inadequate", tidy_corpus$rating)
tidy_corpus$rating <- gsub("R", "Requires Improvement", tidy_corpus$rating)
tidy_corpus$text <- gsub("decisions", "decision", tidy_corpus$text)
tidy_corpus$text <- gsub("judgements", "judgment", tidy_corpus$text)

```

```
tidy_corpus$text <- gsub("judgments", "judgment", tidy_corpus$text)
tidy_corpus <- select(tidy_corpus, id, text, rating)
# Now delete filename extension and rating from ID to create regional code
(OA11CD) for spatial analysis
tidy_corpus$id <- gsub("\\.+", "", tidy_corpus$id)
tidy_corpus$id <- gsub(".*_", "", tidy_corpus$id)

# Select only Outstanding or good reports
tidy_corpus <- dplyr::filter(tidy_corpus, rating == "Outstanding" | rating == "Good")

# Tokenize to sentences
sentences <- tidy_corpus %>%
  unnest_tokens(text, text, token = "sentences")

sentences$text <- gsub("[[:digit:]]+", " ", sentences$text)
sentences$text <- gsub("[[:punct:]]+", " ", sentences$text)
#sentences$text <- gsub(" *\\b[[:alpha:]]{1,1}\\b *", " ", sentences$text) # Remove 1-
4 letter words (Acronyms)
sentences$text <- str_replace_all(sentences$text, "[\\r\\n]", " ") #Remove CR
sentences$text <- pblapply(sentences$text, blank.removal)

# Select only sentences using the words decision or judgment
#sentences <- dplyr::filter(sentences, grepl('decision|judgment', text))

# Select only sentences using the word assessment or assessing
sentences <- dplyr::filter(sentences, grepl('decision|judgment|judgement|decisions',
text))
sentences$text <- unlist(sentences$text)

decisions <- sentences %>%
  unnest_tokens(word, text)

data("stop_words")
mystopwords <- data_frame(word = rm_words)

#decisions <- anti_join(decisions, stop_words, by = "word")
decisions <- anti_join(decisions, mystopwords, by = "word")

rm(corpus)

### Count Word Frequencies ###
decisions <- decisions %>%
  count(id, word, sort = TRUE) %>%
  ungroup()

total_words <- decisions %>%
  group_by(id) %>%
  summarize(total = sum(n))

decisions <- left_join(decisions, total_words)
rm(total_words)
# Cast tibble into document term matrix and term document matrix
dtm <- decisions %>%
  cast_dtm(id, word, n)
```

```

tdm <- as.TermDocumentMatrix(dtm)

dtm_tfidf <- decisions %>%
  cast_dtm(id, word, n, weighting = tm::weightTfIdf)

#Create frequency plot
# Overall Word Frequencies
tdm.m <- as.matrix(tdm)
term.freq <- rowSums(tdm.m)
freq.df <- data.frame(word=names(term.freq), frequency=term.freq)
freq.df <- freq.df[order(freq.df[,2], decreasing = T),]
freq.df$word <- factor(freq.df$word, levels=unique(as.character(freq.df$word)))
frequent_terms <- freq.df %>%
  top_n(20)

#(filename="/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/Plots/Assessments/20_most_frequent_words.png")
ggplot(frequent_terms, aes(x=word, y=frequency))+
  geom_bar(stat="identity", fill='darkred') +
  coord_flip() + theme_gdocs()+
  geom_text(aes(label=frequency), colour="white",hjust=1.25, size=5.0)+
  ggtitle("20 Most frequent words")
#dev.off()

# Create the usual wordcloud
png(filename="/Users/stefan_kleipoedszus/Documents/@Work/Research
Projects/Ofsted/Plots/Assessments/wordcloud.png")
wordcloud(freq.df$word, freq.df$frequency, max.words = 150, colors =
c('black','darkred'),
  rot.per=0.15, scale=c(3.5, 0.5))
dev.off()
rm(freq.df, term.freq, frequent_terms)

#### Plot high tf-idf Words in reports ####
# Calculate tf_idf
decisions <- decisions %>%
  bind_tf_idf(word, id, n)
plot_reports <- decisions %>%
  arrange(desc(tf_idf)) %>%
  mutate(word = factor(word, levels = rev(unique(word))))
plot_reports %>%
  top_n(20) %>%
  ggplot(aes(word, tf_idf, fill = "darkred")) +
  theme(legend.position="none") +
  geom_col() +
  labs(x = NULL, y = "tf-idf") +
  coord_flip() +
  ggtitle("Top 20 tf-idf words")
rm(plot_reports)

#### Word Associations #####
word_a <- c("delay")
associations <- findAssocs(tdm, "timely", 0.4)
associations <- as.data.frame(associations)
associations$terms <- row.names (associations)

```

```
associations$terms <- factor(associations$terms,
                             levels=associations$terms)
ggplot(associations, aes(y=terms)) +
  geom_point(aes(x=timely), data=associations, size=5)+
  theme_gdocs() + geom_text(aes(x=timely, label = timely),
                             color="darkred", hjust=-.25, size=8)+
  theme(text=element_text(size=20),
         axis.title.y = element_blank())
rm(associations)

# Find bigrams
report_bigrams <- sentences %>%
  unnest_tokens(bigram, text, token = "ngrams", n = 2)

bigrams_separated <- report_bigrams %>%
  separate(bigram, c("word1", "word2"), sep = " ")

bigrams_filtered <- bigrams_separated %>%
  filter(!word1 %in% stop_words$word) %>%
  filter(!word2 %in% stop_words$word)

bigram_counts <- bigrams_filtered %>%
  count(word1, word2, sort = TRUE)

# Plot bigram tf-idf
bigrams_united <- bigrams_filtered %>%
  unite(bigram, word1, word2, sep = " ")

bigram_tf_idf <- bigrams_united %>%
  count(id, rating, bigram) %>%
  bind_tf_idf(bigram, id, n) %>%
  arrange(desc(tf_idf))

plot_bigram <- bigram_tf_idf %>%
  arrange(desc(tf_idf)) %>%
  mutate(word = factor(bigram, levels = rev(unique(bigram))))

plot_bigram %>%
  top_n(30) %>%
  ggplot(aes(word, tf_idf, fill = 'navy')) +
  theme(legend.position="none") +
  geom_col() +
  labs(x = NULL, y = "tf-idf") +
  coord_flip() +
  ggtitle("Highest tf-idf Bigrams")

# Visualise network of bigrams
report_bigram_counts <- report_bigrams %>%
  count(id, bigram, sort = TRUE) %>%
  ungroup() %>%
  separate(bigram, c("word1", "word2"), sep = " ")

bigram_counts_all <- select(bigram_counts, word1, word2, n)

bigram_graph <- bigram_counts_all %>%
```



```

filter(n > 20) %>%
graph_from_data_frame()

set.seed(2016)
a <- grid::arrow(type = "closed", length = unit(.15, "inches"))

ggraph(bigram_graph, layout = "fr") +
  geom_edge_link(aes(edge_alpha = n), show.legend = FALSE,
    arrow = a, end_cap = circle(.07, 'inches')) +
  geom_node_point(color = "lightblue", size = 5) +
  geom_node_text(aes(label = name), vjust = 1, hjust = 1) +
  ggtitle("Network of bigrams")
theme_void()

# Word network
tdm2 <- removeSparseTerms(tdm, sparse=0.4) #Create sparse tdm to make network
simpler
tdm2.m <- as.matrix(tdm2)
tdm2.adj <- tdm2.m %*% t(tdm2.m)
tdm2.adj <- graph.adjacency(tdm2.adj, weighted=TRUE,
  mode="undirected", diag = T)
tdm2.adj <- simplify(tdm2.adj)
plot.igraph(tdm2.adj, vertex.shape="none",
  vertex.label.font=2, vertex.label.color='darkred',
  vertex.label.cex=.7, edge.color="grey85")
title(main='Word Network')

word_network_plot(sentences$text[714:715]) # COULD I USE THE TOP
SENTENCES FOR EACH TOPIC?
title(main='Word Networks of Decision Making')

word_associate(sentences$text, match.string=c('delay'),
  stopwords = Top200Words, wordcloud = T,
  cloud.colors = c('navy', 'darkred'))
title(main='Decision Word Network')

rm(bigram_counts, bigram_counts_all, bigram_graph, bigram_tf_idf,
  bigram_tf_idf, bigrams_filtered, bigrams_separated, bigrams_united,
  plot_bigram, report_bigram_counts, report_bigrams, tdm2, tdm2.m, tdm2.adj)

### Clustering ####
library(LDAvis)
library(treemap)
library(topicmodels)
library(car)
library(xlsx)
library(cluster)
library(fpc)
library(clue)
library(skmeans)

# K-Means Clustering
dtm.s <- scale(dtm_tfidf, scale=T)
dtm.clusters <- kmeans(dtm.s, 3)

```

```
barplot(dtm.clusters$size, main = 'k-means')
plotcluster(cmdscale(dist(dtm_tfidf)),
            dtm.clusters$cluster)
dissimilarity.m <- dist(dtm.s)
plot(silhouette(dtm.clusters$cluster, dissimilarity.m))
work.clus.proto<- t(cl_prototypes(dtm.clusters))
comparison.cloud(work.clus.proto, max.words=200)
# Spherical k-means clustering
soft.part <- skmeans(dtm_tfidf, 3, m =1.2, control = list (nruns = 5, verbose = T))
barplot(table(soft.part$cluster), main='Spherical k-means')
plotcluster(cmdscale(dist(dtm_tfidf)), soft.part$cluster)
plot(silhouette(soft.part))
s.clus.proto <- t(cl_prototypes(soft.part))
comparison.cloud(s.clus.proto, max.words = 150)

sort(s.clus.proto[,1], decreasing=T) [1:5]
sort(s.clus.proto[,2], decreasing=T) [1:5]
sort(s.clus.proto[,3], decreasing=T) [1:5]

# K-Mediod Clustering
wk.mediods <- pamk(dtm_tfidf, krange=2:4, critout = T)
dissimilarity.m <- dist(dtm_tfidf)
plot(silhouette(wk.mediods$pamobject$clustering,
               dissimilarity.m))

# Create a dendrogram
tdm2 <- removeSparseTerms(tdm, sparse=0.4)
hc <- hclust(dist(tdm2, method="euclidean"), method="complete")
plot(hc, yaxt='n', main='Decision Dendrogram')
hcd <- as.dendrogram(hc)

library(dendextend)
library(circlize)
hcd <- color_labels(hcd,4, col = c('navy', 'darkgrey', 'black', 'darkred'))
hcd <- color_branches(hcd,4, col = c('navy', 'darkgrey', 'black', 'darkred'))
circlize_dendrogram(hcd, labels_track_height = 0.5, dend_track_height = 0.4)

rm(tdm2, clusDendro, hc, hcd, clusMember, labelColor, labelColors)

#### Topic Modelling ####
# Set Environment
library(lda)
library(qdap)

options(stringsAsFactors = F)
k <- 4
num.iter <- 25
alpha <- 0.02
eta <- 0.02
set.seed(1234)

x <- unlist(sentences$text)
dec_text <- iconv(x, "latin1", "ASCII", sub = "")
rm(x)
documents <- lexicalize(dec_text)
```

```

wc <- word.counts(documents$documents, documents$vocab)
doc.length <- document.lengths(documents$documents)

fit <- lda.collapsed.gibbs.sampler(documents = documents$documents,
                                  K = k, vocab = documents$vocab,
                                  num.iterations = num.iter, alpha = alpha,
                                  eta = eta, initial = NULL, burnin = 0,
                                  compute.log.likelihood = TRUE)

plot(fit$log.likelihoods[1,])

topic_words <- as.data.frame(top.topic.words(fit$topics, 7, by.score = TRUE)) #
which words used in topic?
write.xlsx(x = topic_words, file = "Ofsted_topics_negative.xlsx",
          sheetName = "TopTopicWords", row.names = FALSE)

top.topic.documents(fit$document_sums, 1) # which documents represent topic
best?
top.topic.documents(fit$document_sums, 2) # which documents represent topic
best?
top.topic.documents(fit$document_sums, 3) # which documents represent topic
best?
top.topic.documents(fit$document_sums, 4) # which documents represent topic
best?

theta <- t(pbapply(fit$document_sums + alpha, 2, function(x) x/sum(x)))
phi <- t(pbapply(t(fit$topics) + eta, 2, function(x) x/sum(x)))
decisions.json <- createJSON(phi = phi, theta = theta, doc.length = doc.length,
                             vocab = documents$vocab, term.frequency = as.vector(wc))
# type serVis(decisions.json) into console to examine results

topic_words

rm(theta, phi, s.clus.proto, fit, wk.methods, x)

### Topic Modelling using the Tidy Approach ####
decisions_lda <- LDA(dtm, k = 4, control = list(seed = 1234))
tidy_lda <- tidy(decisions_lda)
top_terms <- tidy_lda %>%
  group_by(topic) %>%
  top_n(10, beta) %>%
  ungroup() %>%
  arrange(topic, -beta)

top_terms %>%
  mutate(term = reorder(term, beta)) %>%
  group_by(topic, term) %>%
  arrange(desc(beta)) %>%
  ungroup() %>%
  mutate(term = factor(paste(term, topic, sep = "__"),
                       levels = rev(paste(term, topic, sep = "__")))) %>%
  ggplot(aes(term, beta, fill = as.factor(topic))) +
  geom_col(show.legend = FALSE) +
  coord_flip() +
  scale_x_discrete(labels = function(x) gsub("__.+$", "", x)) +

```

```
labs(title = "Top 10 terms in each LDA topic",  
      x = NULL, y = expression(beta)) +  
facet_wrap(~ topic, ncol = 4, scales = "free")
```

```
top_terms
```

```
rm(decisions_lda, tidy_lda, top_terms)
```

9.4 R Script Analysing Transcripts and Reasoning

9.4.1 Set environment

```
# Load additional libraries
```

```
library(magrittr)  
library(tm)  
library(tidytext)  
library(textmineR)  
library(tidyverse)  
library(antiword)  
library(data.table)  
library(tibble)  
library(stringr)  
library(formattable)  
library(knitr)  
library(kableExtra)  
library(pbapply)  
library(ggplot2)  
library(parallel)
```

```
# Set Options and Locale
```

```
Sys.setlocale('LC_ALL', 'C')
```

```
## [1] "C/C/C/C/C/en_GB.UTF-8"
```

```
# For parallel processing, detect available cores
```

```
numCores <- detectCores()
```

```
# Define a Function to clean up text
```

```
clean_data <- function(text) {  
  text <- iconv(text, "utf-8", "ASCII", sub = "")  
  text <- str_replace_all(text, "[\r\n]", " ") #Remove CR  
  text <- tolower(text) #Set text to lower  
  text <- removeNumbers(text) #Remove numbers  
  #Remove english stopwords  
  text <- removeWords(text, stopwords("english"))  
  #Remove additional words defined in table imported in the following chunk  
  text <- removeWords(text, removal_words)  
  # Remove punctuation  
  text <- removePunctuation(text)  
  # Remove 1-2 letter words (Acronyms)  
  text <- gsub(" *\\b[:alpha:]{1,2}\\b *", " ", text)  
}
```

```
#Define function to remove blanks
blank.removal <- function(x) {
  #Separate text to be cleaned where there is a blank
  x <- unlist(strsplit(x, ' '))
  #Subset text vector and loose all points where there is a blank space
  x <- subset(x, nchar(x)>0)
  #Bring text vector together with one space between words
  x <- paste(x, collapse=' ')
}
```

9.4.2 Load Data

```
human_values <- readRDS(file =
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing Transcript/Hum
  an_Value_Questionnaire.RDS")
human_values$experience <- as.numeric(as.character(human_values$experience))
human_values$timeRole <- as.numeric(human_values$timeRole)
human_values$autonomy_work <- as.numeric(human_values$autonomy_work)
human_values$Influence_org <- as.numeric(human_values$Influence_org)
transcripts <- readRDS(file =
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing Transcript/code
  d_transcripts.RDS")
transcripts$seconds <- as.numeric(as.difftime(transcripts$start))
bag <- readRDS(file =
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing Transcript/trans
  cripts_bag.RDS")
x_vignette <- readRDS(file =
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing Transcript/anno
  t_vignettes.RDS")
x_docID <- readRDS(file =
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing Transcript/anno
  t_docID.RDS")
keylogs <- readRDS(file=
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing Transcript/keyl
  ogs.RDS")
risks <- readRDS(file=
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing Transcript/KLRi
  sks.RDS")
information <- readRDS(file=
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing Transcript/KLI
  nformation.RDS")
intervention <- readRDS(file=
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing Transcript/KLI
  nterventions.RDS")
```

9.4.3 Questionnaire

9.4.3.1 Role Descriptions

```
## Create a wordcloud for previous experience ####
library(wordcloud)
df <- dplyr::select(human_values, doc_id, experience, jobTitle, roleDescr)
# Define removal words that do not add value to the analysis
# (as they are shared across all participants)
removal_words <- c("social", "worker", "children", "child",
```

```

"childrens", "childs", "people", "young",
"incomprehensible", "reading", "yeah")
# Clean role descriptions
df$roleDescr <- pblapply(df$roleDescr, clean_data)
# Remove Blanks
df$roleDescr <- pblapply(df$roleDescr, blank.removal)
# Create a wordcloud based on bigrams
role_bigrams <- df %>%
  unnest_tokens(bigram, roleDescr, token = "ngrams", n = 2) %>%
  count(bigram, sort = TRUE)
pal=brewer.pal(8,"Blues")
pal=pal[-(1:3)]
wordcloud(role_bigrams$bigram, role_bigrams$n,
  min.freq = 1,
  scale=c(3,.2),
  random.order = F,
  colors = pal)

```



9.4.3.2 Experience, Influence and Autonomy

```

df$experience <- df$experience/12
mean(df$experience)
## [1] 6.316667
median(df$experience)
## [1] 2

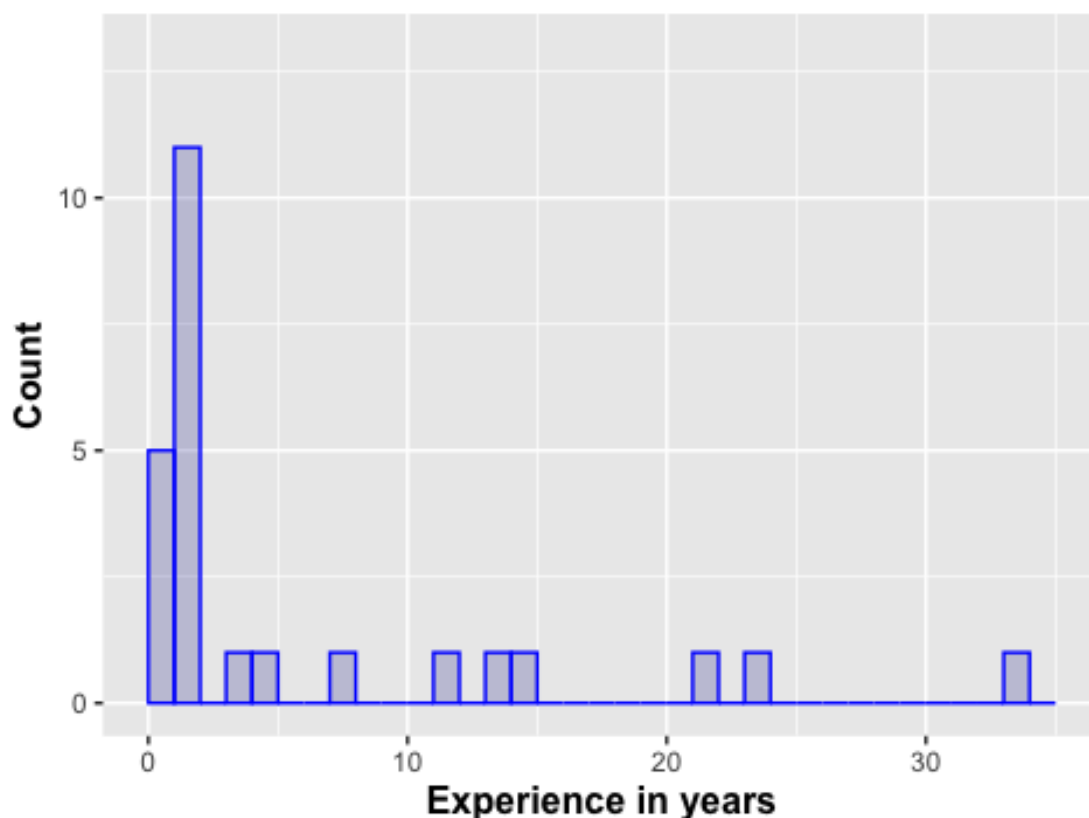
```

```

# Histogram for `Experience`
ggplot(data=df, aes(x=experience)) +
  geom_histogram(breaks=seq(0, 35, by=1),
                col="blue",
                fill="darkblue",
                alpha = .2) +
  labs(title="Histogram for Experience", x="Experience in years", y="Count") +
  xlim(c(0,35)) +
  ylim(c(0,13)) +
  theme(plot.title = element_text(size=14),
        axis.title=element_text(size=12,face="bold"))

```

Histogram for Experience

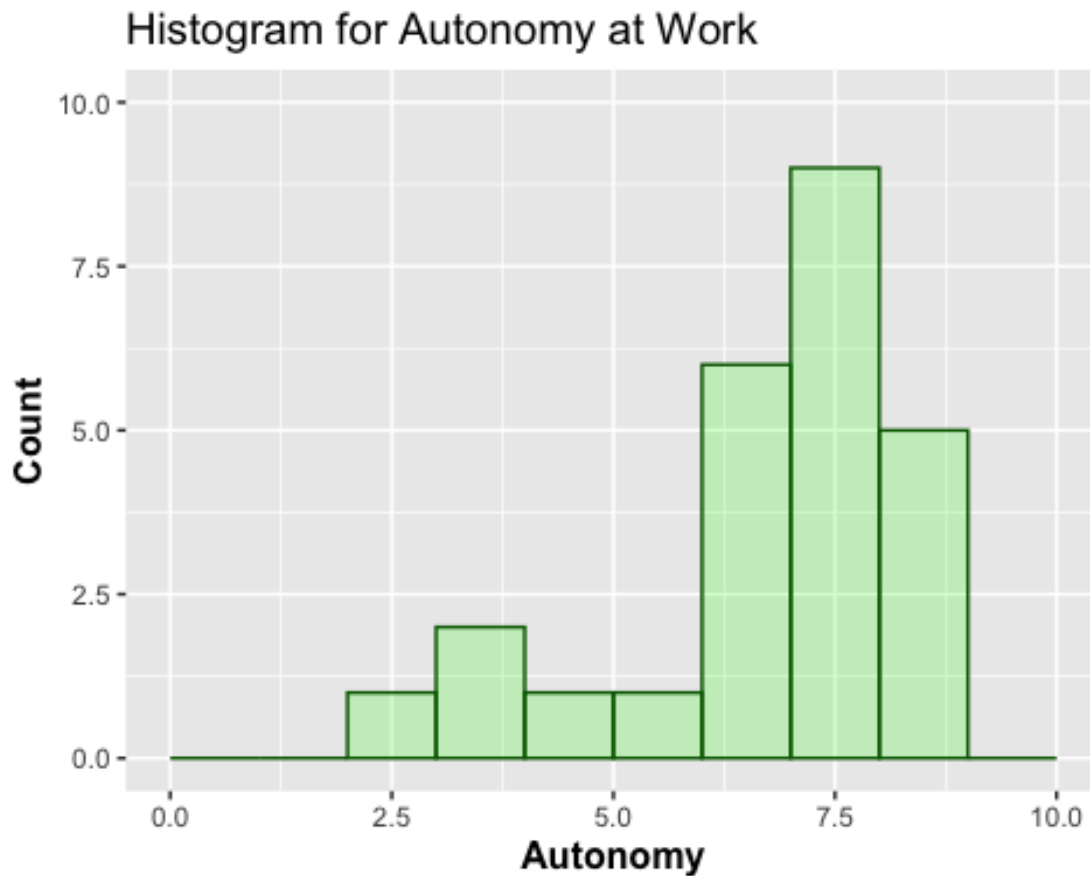


9.4.3.3 Histogram for Autonomy

```

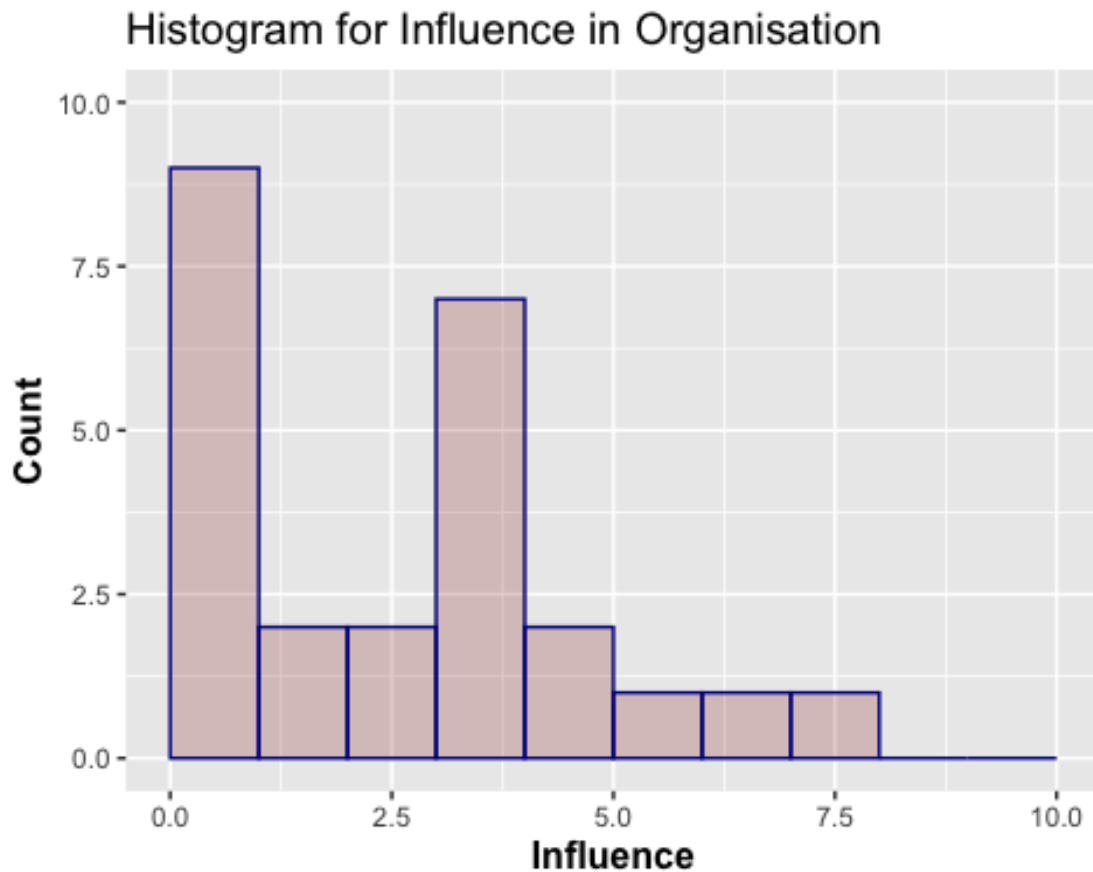
ggplot(data=human_values, aes(x=autonomy_work)) +
  geom_histogram(breaks=seq(0, 10, by=1),
                col="darkgreen",
                fill="green",
                alpha = .2) +
  labs(title="Histogram for Autonomy at Work", x="Autonomy", y="Count") +
  xlim(c(0,10)) +
  ylim(c(0,10)) +
  theme(plot.title = element_text(size=14),
        axis.title=element_text(size=12,face="bold"))

```



9.4.3.4 Histogram for Influence at work

```
ggplot(data=human_values, aes(x=Influence_org)) +  
  geom_histogram(breaks=seq(0, 10, by=1),  
                col="darkblue",  
                fill="darkred",  
                alpha = .2) +  
  labs(title="Histogram for Influence in Organisation", x="Influence", y="Count") +  
  xlim(c(0,10)) +  
  ylim(c(0,10)) +  
  theme(plot.title = element_text(size=14),  
        axis.title=element_text(size=12,face="bold"))
```

9.4.3.5 Create categorical data for experience, autonomy, influence

```

human_values$expertise <- ifelse(human_values$experience <= 12, "Novice",
                                ifelse(human_values$experience <= 60,
                                        "Competent", "Expert"))
human_values$independence_work <- rowMeans(human_values[c('autonomy_work'
,
                                'Influence_org')],
                                na.rm=TRUE)

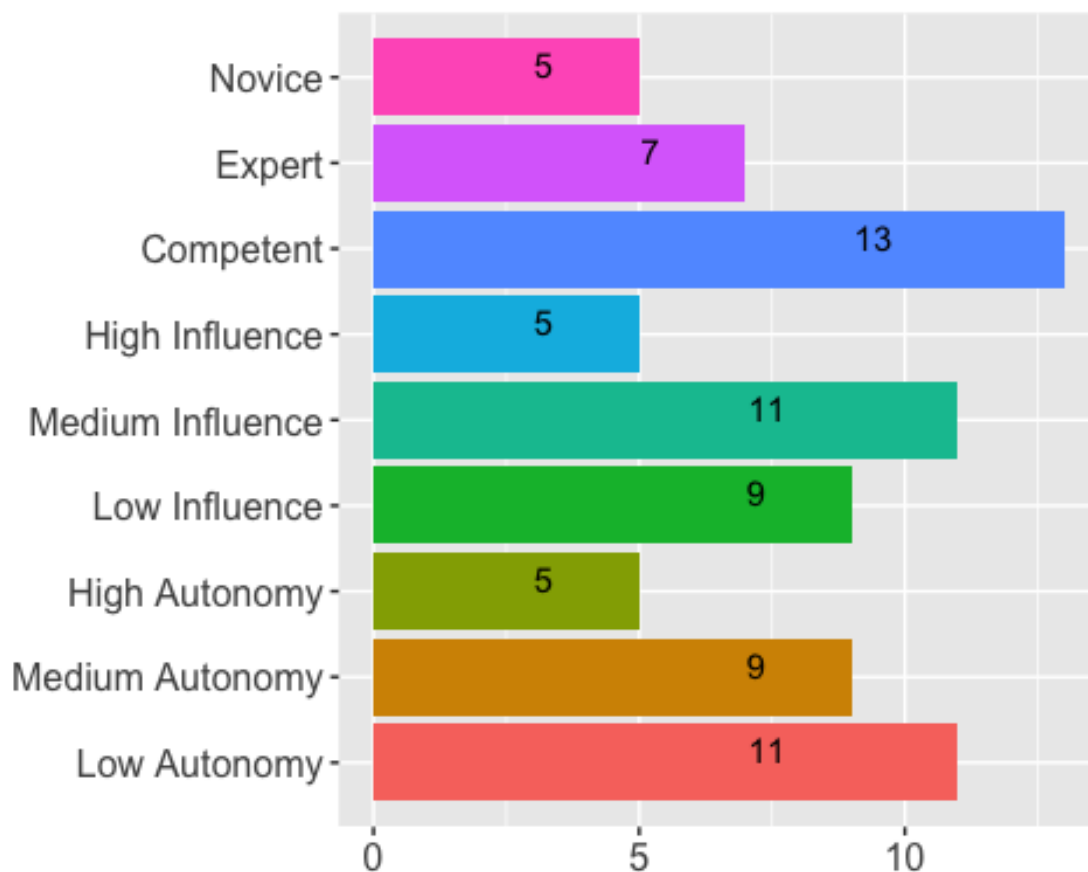
x <- quantile(human_values$autonomy_work, c(0:3/3))
human_values$Autonomy <- with(human_values,
                              cut(autonomy_work,
                                  x,
                                  include.lowest = T,
                                  labels = c("Low Autonomy", "Medium Autonomy",
                                             "High Autonomy")))

x <- quantile(human_values$Influence_org, c(0:3/3))
human_values$Influence <- with(human_values,
                              cut(Influence_org,
                                  x,
                                  include.lowest = T,
                                  labels = c("Low Influence",
                                             "Medium Influence",
                                             "High Influence")))

```

9.4.3.6 Plotting Autonomy, Influence and Expertise

```
df <- dplyr::select(human_values, Autonomy, Influence, expertise)
x <- as.data.frame(table(df['Autonomy']))
colnames(x) <- c("Var1", "Freq")
y <- as.data.frame(table(df['Influence']))
colnames(y) <- c("Var1", "Freq")
z <- as.data.frame(table(df['expertise']))
colnames(z) <- c("Var1", "Freq")
df <- base::rbind(x, y, z)
ggplot(data = df, mapping = aes(x=Var1, y=Freq,
                                fill = Var1,
                                label = Freq)) +
  geom_col() +
  theme(axis.title.x = element_blank()) +
  theme(axis.title.y = element_blank()) +
  geom_text(aes(label=Freq), position=position_dodge(width=1.5),
            vjust= 0, hjust = 5.5) +
  coord_flip() +
  theme(legend.position = "none",
        axis.text = element_text(size=12))
```



```
rm(x,y,z)
```

```
df <- dplyr::select(human_values, jobTitle, expertise)
```

9.4.3.7 Check if indexing is possible

```
library(ltm)
df <- human_values[,c('autonomy_work', 'Influence_org', "experience")]
cronbach.alpha(df)

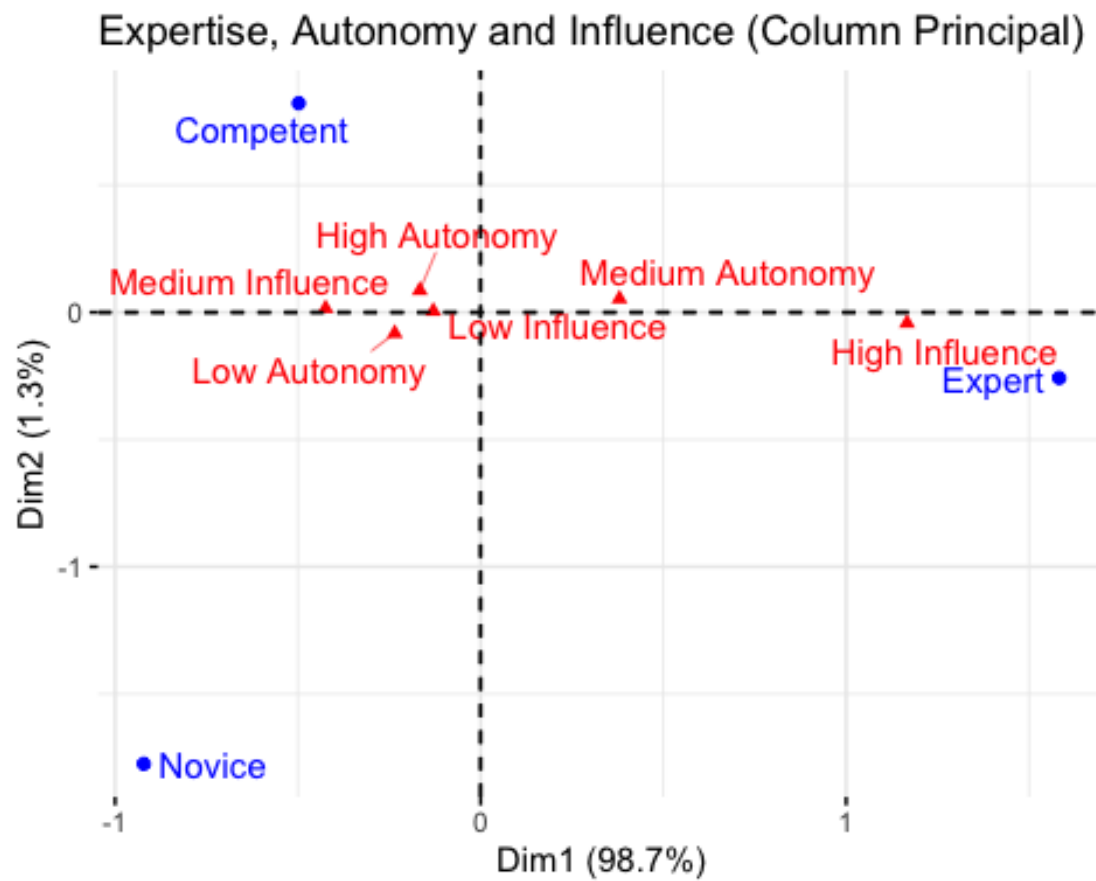
##
## Cronbach's alpha for the 'df' data-set
##
## Items: 3
## Sample units: 25
## alpha: 0.015
```

9.4.3.8 CA: Explore relationships between experience, autonomy and influence

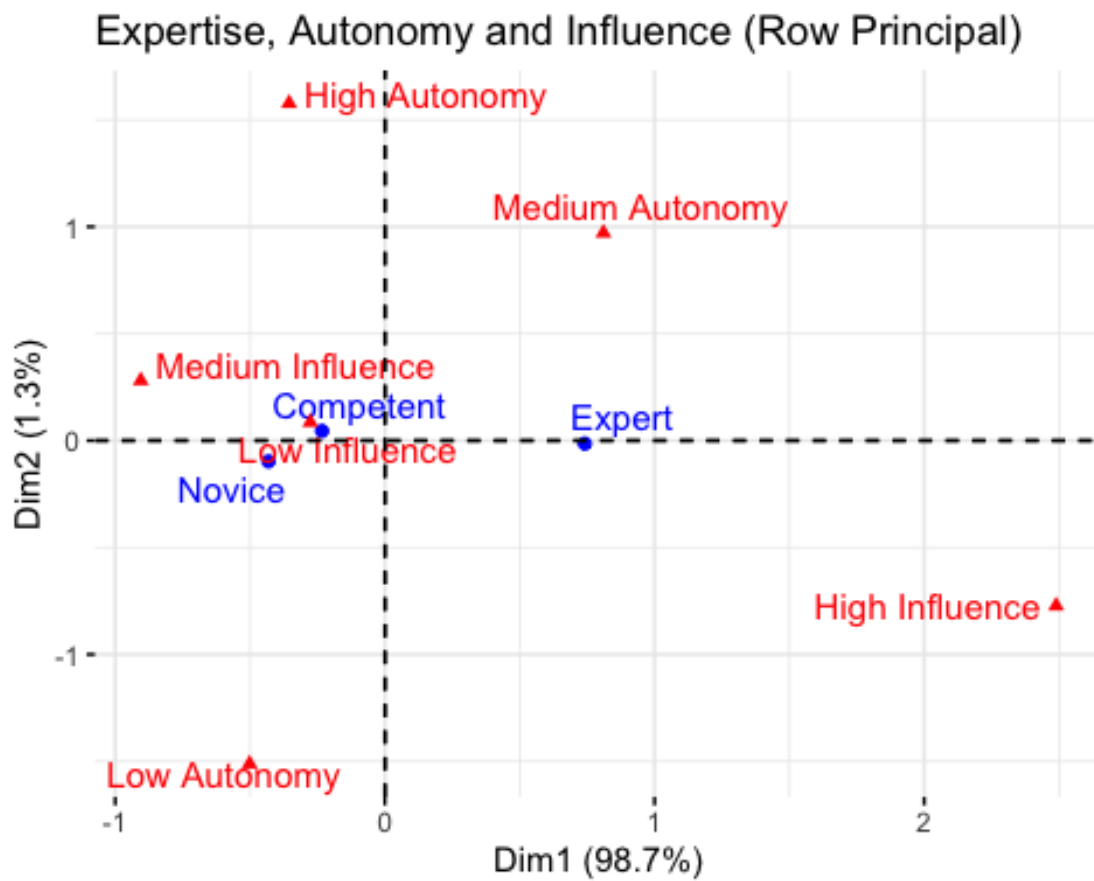
```
library(ca)
library(FactoMineR) #for correlation plots
library(factoextra) #for correlation plots
library(pivottabler)

# Create Function for making Pivot tables
pivot <- function(row, column) {
  pt <- PivotTable$new()
  pt$addData(df)
  pt$addColumnDataGroups(column)
  pt$addRowDataGroups(row)
  pt$defineCalculation(calculationName="Total",
                      summariseExpression="n()")
  pt$evaluatePivot()
  df <- pt$asDataFrame()
  df <- dplyr::select(df, -last_col())
  df <- head(df, -1)
}

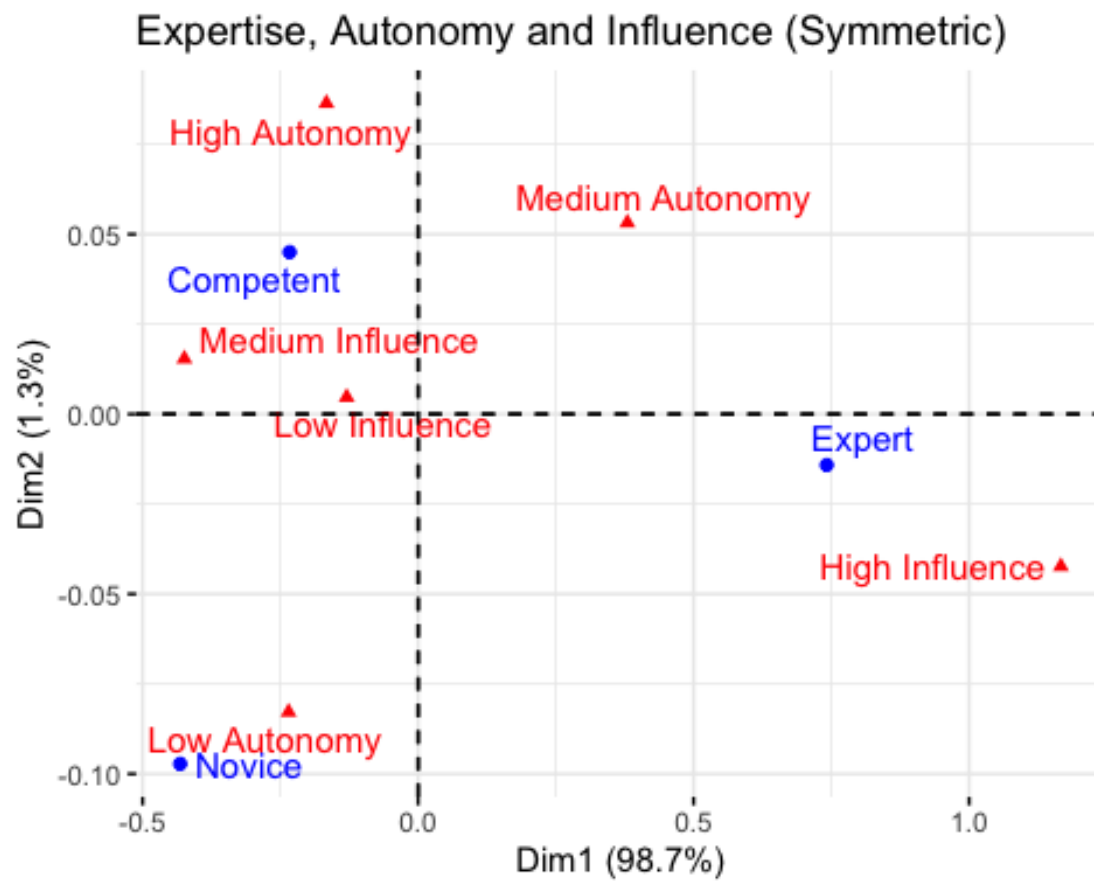
df <- dplyr::select(human_values, expertise, Autonomy, Influence)
auton <- pivot("expertise", "Autonomy")
influ <- pivot("expertise", "Influence")
influ[is.na(influ)] <- 0
df <- merge(auton, influ, by = 0, all = TRUE)
rownames(df) <- df[,1]
df[,1] <- NULL
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"),
               map = "colprincipal", repel = TRUE,
               title = "Expertise, Autonomy and Influence (Column Principal)")
```



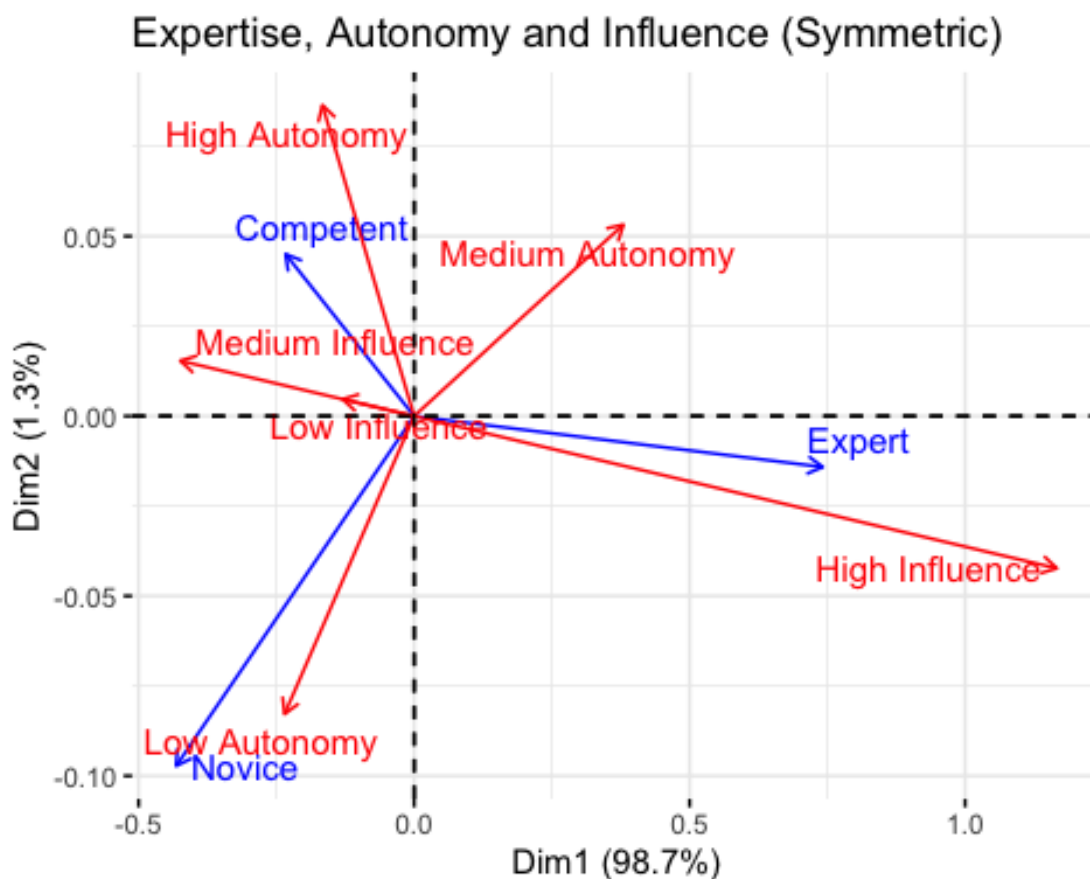
```
fviz_ca_biplot(res.ca, geom = c("point", "text"),
  map = "rowprincipal", repel = TRUE,
  title = "Expertise, Autonomy and Influence (Row Principal)")
```



```
fviz_ca_biplot(res.ca, geom = c("point", "text"),  
  map = "symetric", repel = TRUE,  
  title = "Expertise, Autonomy and Influence (Symmetric)")
```



```
fviz_ca_biplot(res.ca, geom = c("arrow", "text"),
  map = "symmetric", repel = TRUE,
  title = "Expertise, Autonomy and Influence (Symmetric)")
```



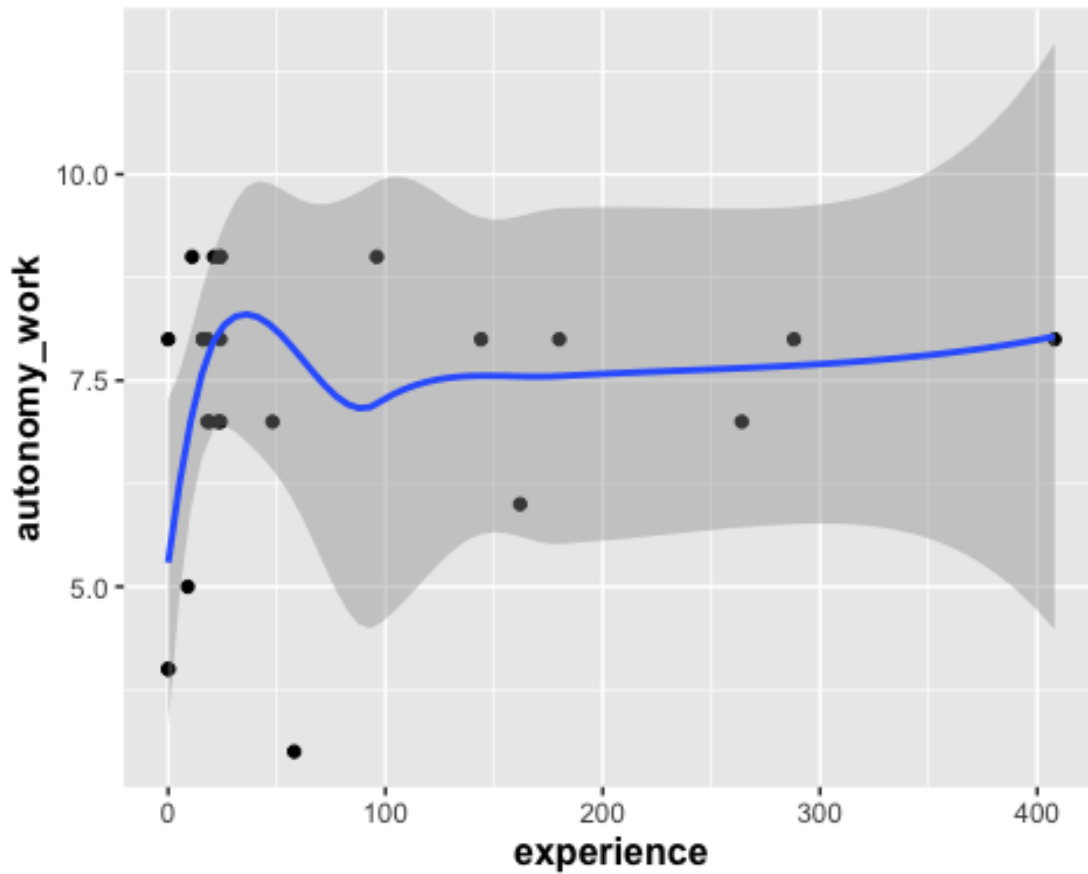
```
rm(auton, influ)
```

9.4.3.9 Plot experience and autonomy at work

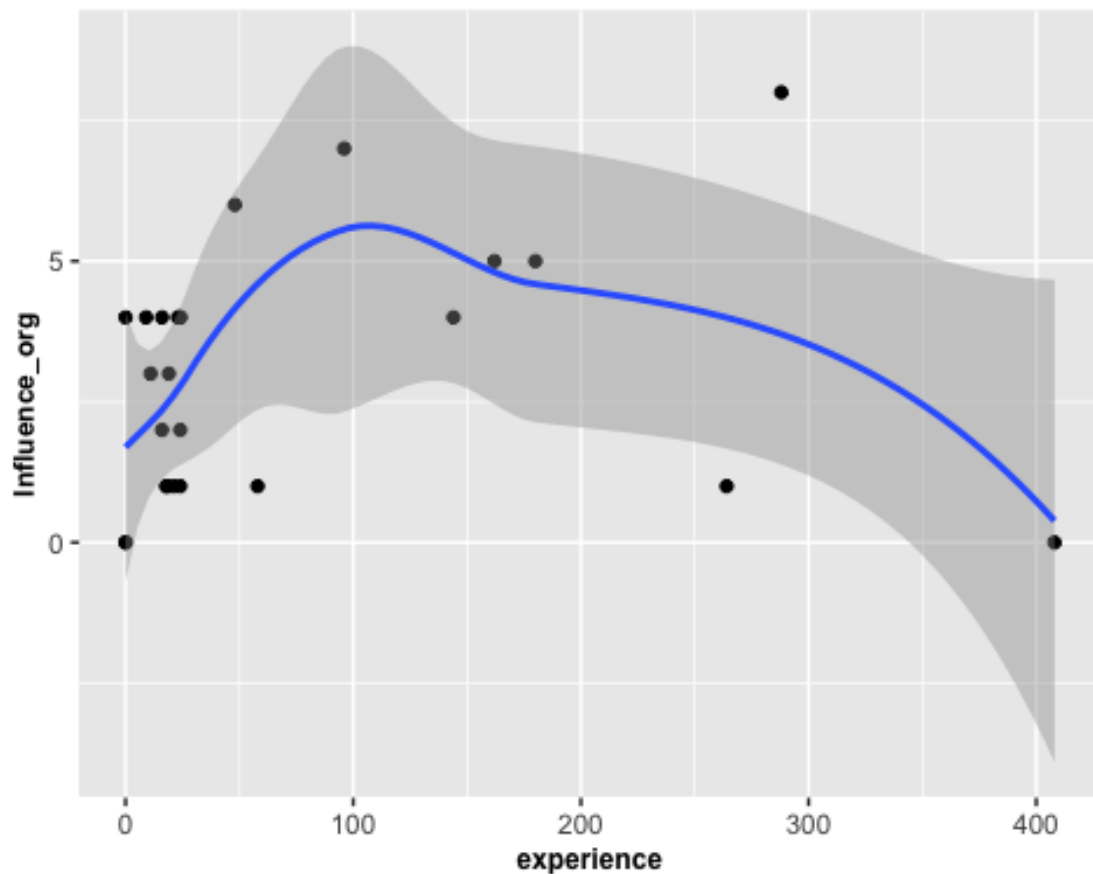
```
df <- dplyr::select(human_values, doc_id, experience, autonomy_work, Influence_or
g)
summary(df)
```

```
##      doc_id          experience    autonomy_work  Influence_org
## Length:25      Min.   : 0.0      Min.   :3.00      Min.   :0
## Class :character 1st Qu.: 16.0     1st Qu.:7.00     1st Qu.:1
## Mode  :character Median : 24.0     Median :8.00     Median :3
##          Mean   : 75.8     Mean   :7.24     Mean   :3
##          3rd Qu.: 96.0     3rd Qu.:8.00     3rd Qu.:4
##          Max.   :408.0     Max.   :9.00     Max.   :8
```

```
ggplot(df, aes(x=experience, y=autonomy_work)) +
  geom_point()+
  geom_smooth()+
  theme(plot.title = element_text(size=14),
        axis.title=element_text(size=12,face="bold"))
```



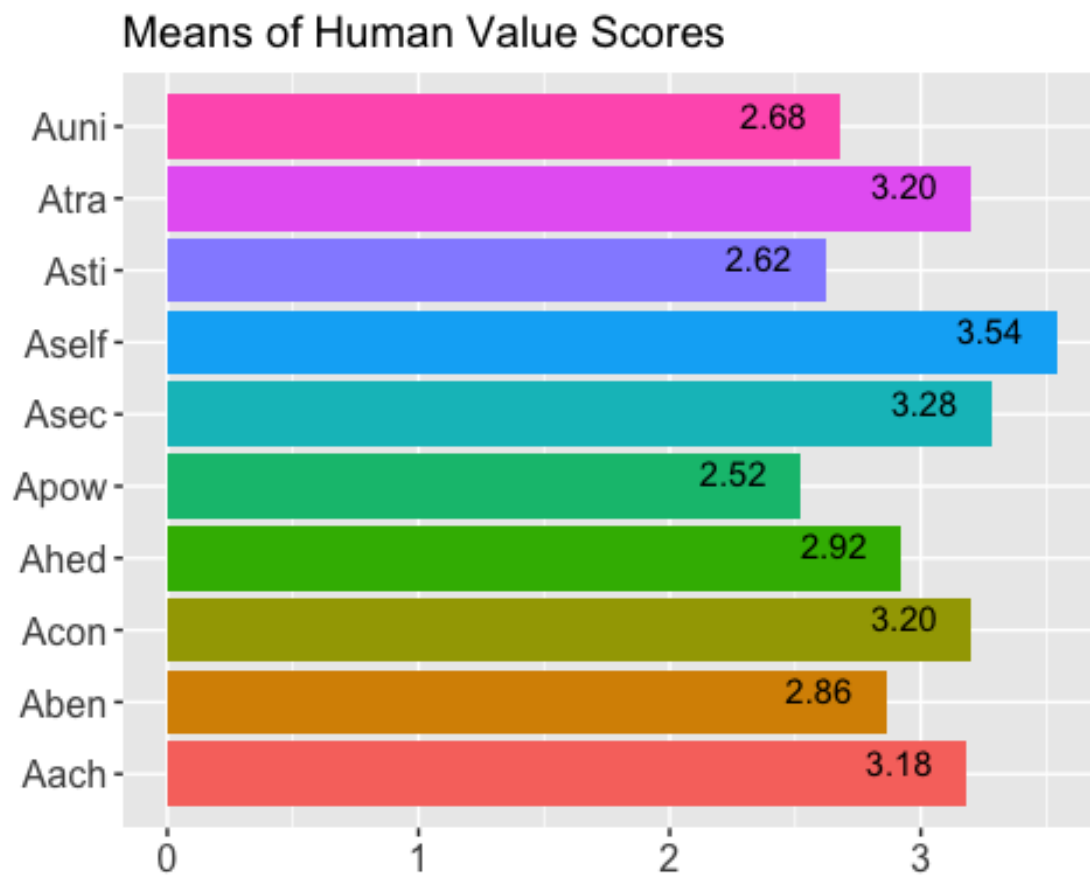
```
# Plot experience and influence in organisation
ggplot(df, aes(x=experience, y=Influence_org)) +
  geom_point()+
  geom_smooth() +
  theme(plot.title = element_text(size=12),
        axis.title=element_text(size=9,face="bold"))
```

9.4.4 Human Values

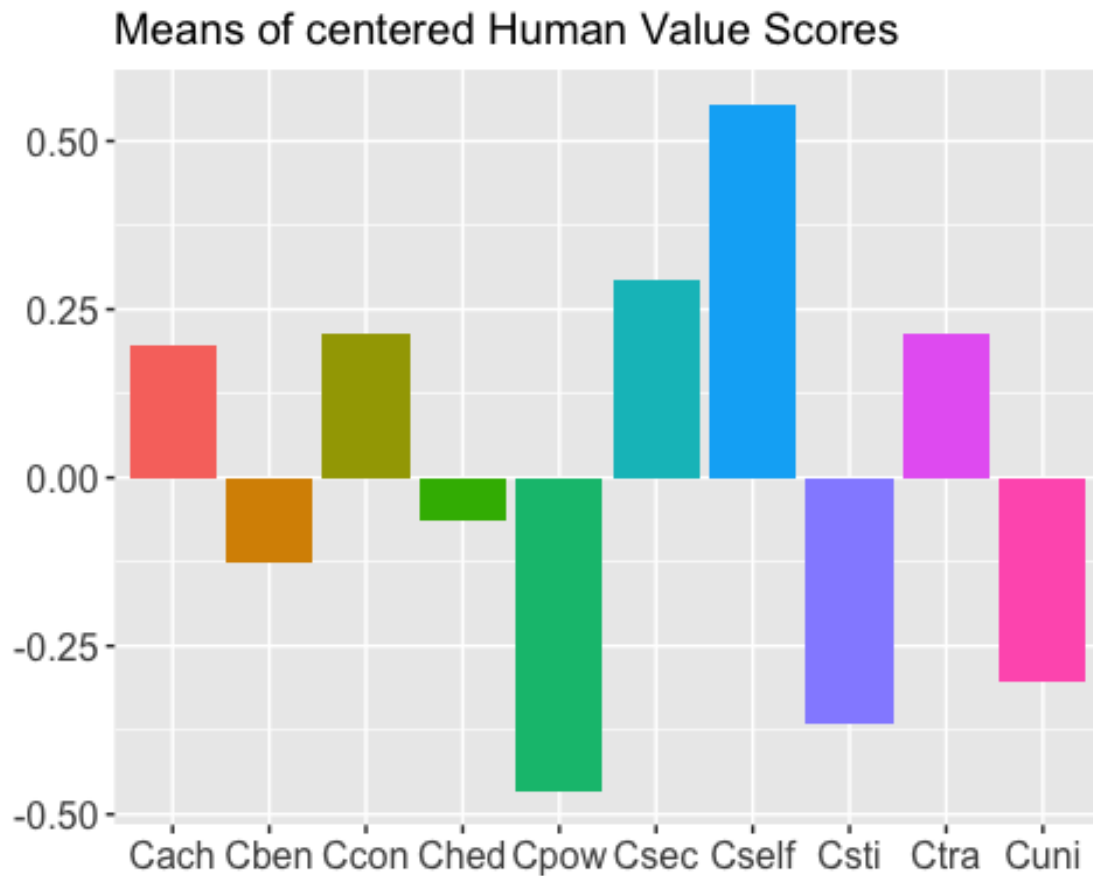
9.4.4.1 Plot individual scores

```
df <- dplyr::select(human_values, Apow, Aach, Ahed, Asti, Aself, Auni,
  Aben, Atra, Acon, Asec)
df <- as.data.frame(colMeans(df))
colnames(df) <- c("Means")
ggplot(data = df, mapping = aes(x=rownames(df), y=Means,
  fill = rownames(df))) +
  geom_col() +
  geom_text(aes(label=sprintf("%0.2f", round(Means, digits = 2)),
    position=position_dodge(width=1.5),
    vjust= 0, hjust = 1.5) +
  coord_flip() +
  ggtitle("Means of Human Value Scores") +
  theme(axis.title.x = element_blank()) +
  theme(axis.title.y = element_blank()) +
  theme(legend.position = "none",
    plot.title = element_text(size=14),
    axis.text = element_text(size=12))
```



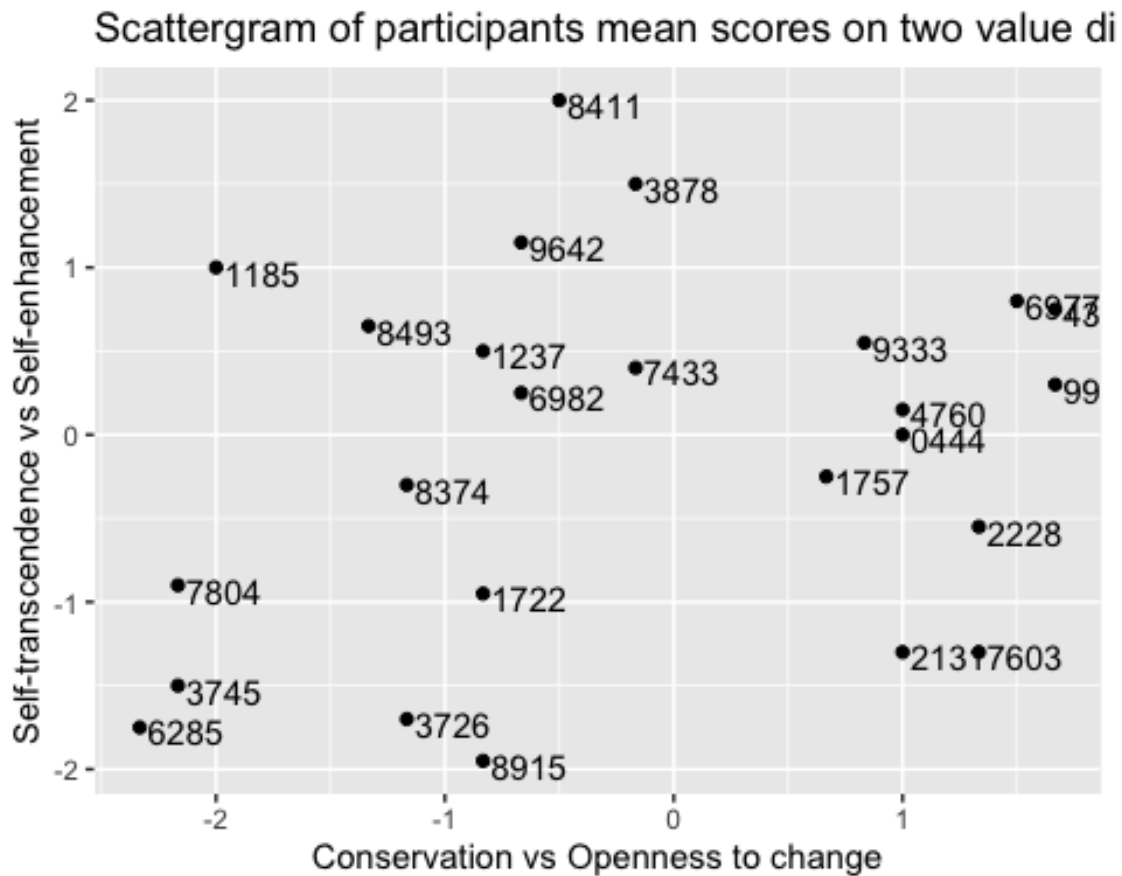
9.4.4.2 Plot centered scores

```
df <- dplyr::select(human_values, Cpow, Cach, Ched, Csti, Cself, Cuni, Cben, Ctra,
Ccon, Csec)
df <- as.data.frame(colMeans(df))
colnames(df) <- c("Means")
ggplot(data = df, mapping = aes(x=rownames(df), y=Means,
fill = rownames(df),
label = Means)) +
geom_col() +
ggtitle("Means of centered Human Value Scores") +
theme(axis.title.x = element_blank()) +
theme(axis.title.y = element_blank()) +
theme(legend.position = "none",
plot.title = element_text(size=14),
axis.text = element_text(size=12))
```



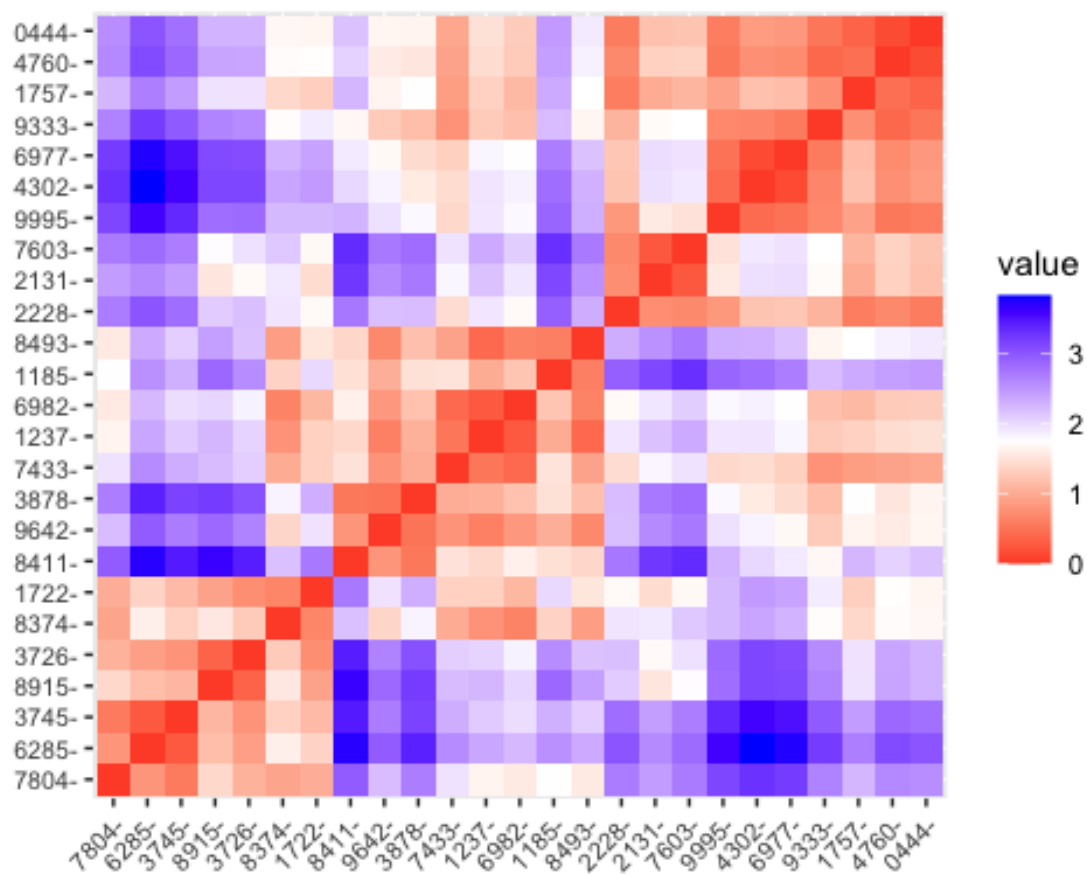
9.4.4.3 Plot participants and higher order value scales

```
ggplot(human_values, aes(x= opendim, y= selfdim, label=doc_id))+
  geom_point() +
  geom_text(aes(label=doc_id),hjust=-0.1, vjust=0.7) +
  xlab("Conservation vs Openness to change") +
  ylab("Self-transcendence vs Self-enhancement") +
  ggtitle("Scattergram of participants mean scores on two value dimensions")
```

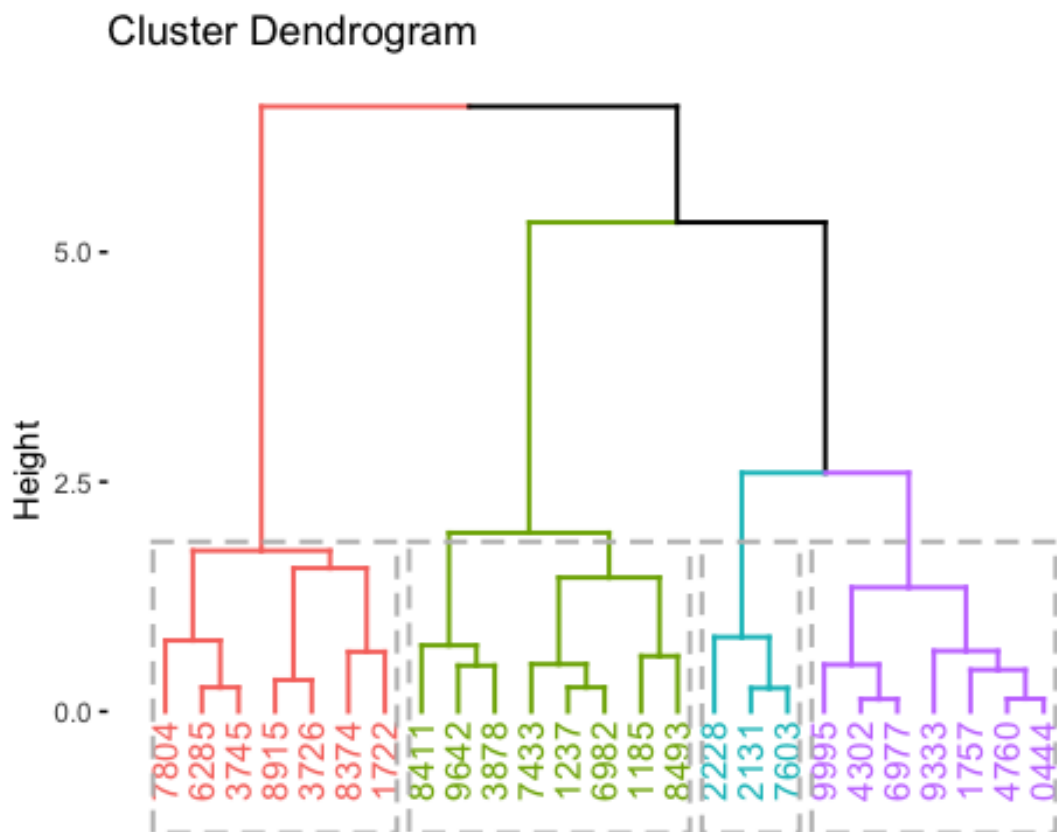


9.4.4.4 Cluster participants in the value scales

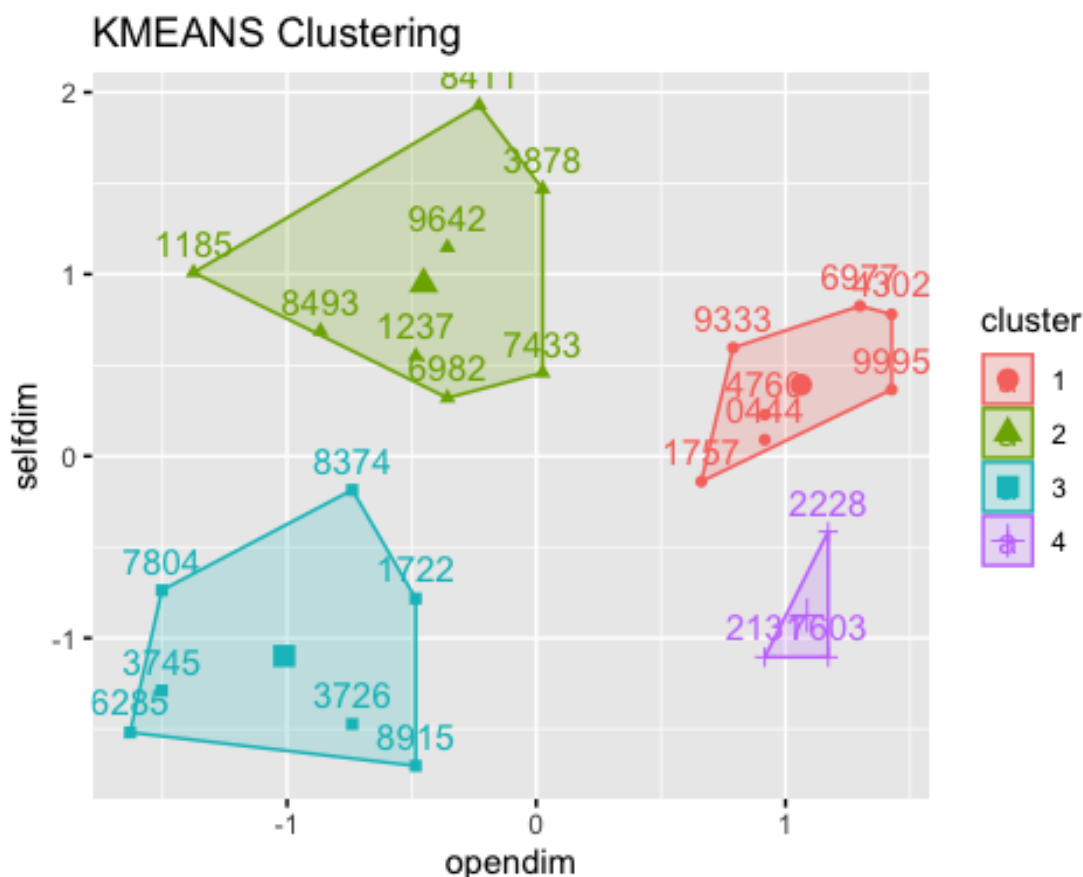
```
df <- dplyr::select(human_values, doc_id, opendim, selfdim)
rownames(df) <- df[,1]
df <- df[,-1]
# Correlation-based distance method
df <- scale(df)
res.dist <- get_dist(df, method = "euclidian")
# Visualize the dissimilarity matrix
fviz_dist(res.dist, lab_size = 8)
```



```
# Enhanced hierarchical clustering  
res.hc <- eclust(df, "hclust", k = 4) # compute hclust  
fviz_dend(res.hc, rect = TRUE) # dendrogram
```



```
# Enhanced k-means clustering
res.km <- eclust(df, "kmeans", k = 4)
```



9.4.4.5 Allocate clusters to HVS Dataframe

```
df <- as.data.frame(res.km$cluster)
df <- tibble::rownames_to_column(df, "doc_id")
human_values <- merge(human_values, df,
  by.x = 'doc_id',
  all.x = TRUE)
colnames(human_values)[55] <- "HVS_Cluster"
human_values$HVS_Cluster <- as.factor(human_values$HVS_Cluster)
human_values$HVS_Cluster <- ifelse(human_values$HVS_Cluster == 1, "Self-/Open+",
  ifelse(human_values$HVS_Cluster == 2, "Self+/Open-",
    ifelse(human_values$HVS_Cluster == 3, "Self-/Open-", "
Self+/Open+"))))
```

9.4.4.6 Plot means of centered value scores for each cluster

```
df <- dplyr::select(human_values, HVS_Cluster, Cpow, Cach, Ched, Csti,
  Cself, Cuni, Cben, Ctra, Ccon, Csec)
df <- df %>%
  group_by(HVS_Cluster) %>%
  summarise(across(Cpow:Csec, mean))
# Turn long table to wide table
df <- melt(setDT(df), id.vars = c("HVS_Cluster"), variable.name = "Values")
# Plot value means for each cluster
ggplot(data = df, mapping = aes(x=Values, y=value,
  fill = Values,
  label = value)) +
```

```
geom_col() +
theme(axis.title.x = element_blank()) +
theme(axis.title.y = element_blank()) +
theme(legend.position = "none") +
facet_wrap(~HVS_Cluster)
```



9.4.4.7 Correspondence Analysis of Human Values, Expertise, Autonomy and Influence

```
values <- dplyr::select(human_values, doc_id, HVS_Cluster, Autonomy,
                        Influence, expertise)
```

```
# Function to do simple pivot tables
create_pivot <- function(column, row) {
  pt <- PivotTable$new()
  pt$addData(values)
  pt$addColumnDataGroups(column)
  pt$addRowDataGroups(row)
  pt$defineCalculation(calculationName="Total", summariseExpression="n()")
  pt$evaluatePivot()
  pt$asDataFrame()
  df <- pt$asDataFrame()
  df <- head(df, -1)
  df <- df[1:(length(df)-1)]
  df[is.na(df)] <- 0
  return(df)
}
```



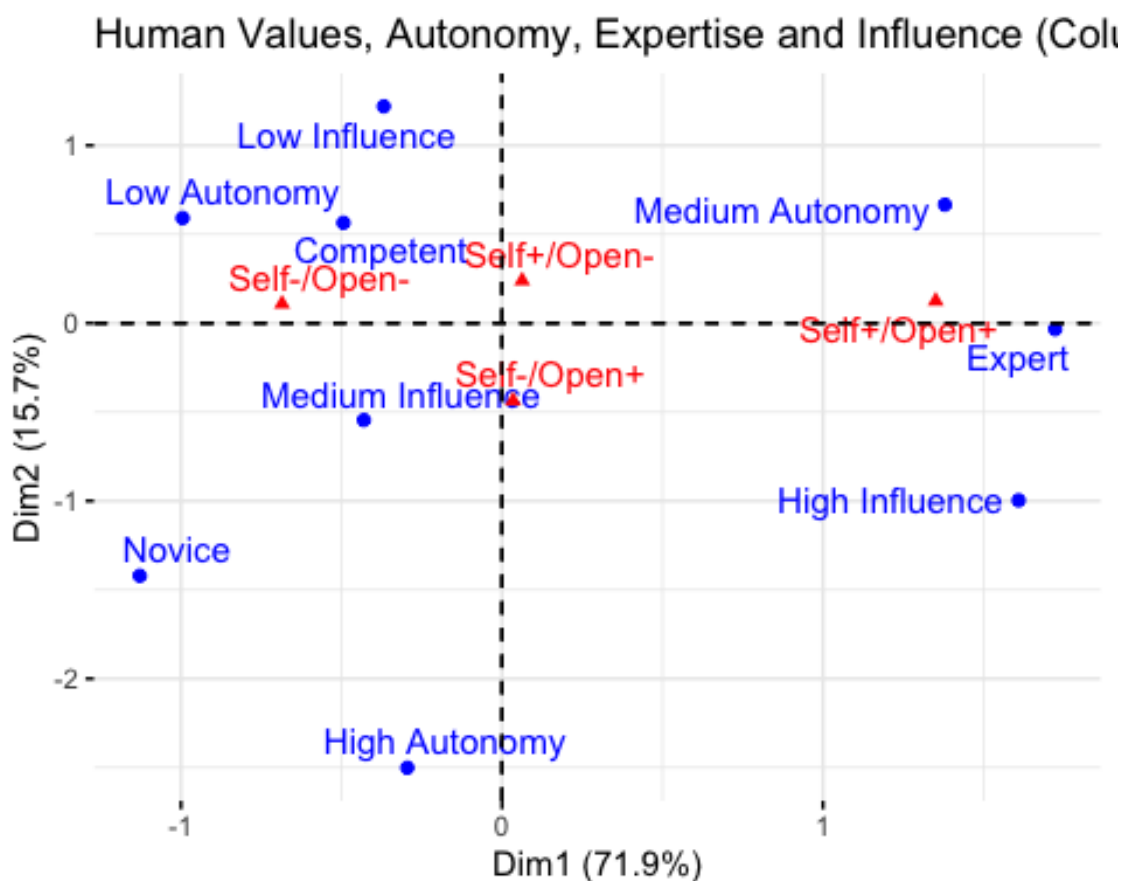
```

# Create and bind pivot tables
x <- create_pivot("HVS_Cluster", "Autonomy")
y <- create_pivot("HVS_Cluster", "Influence")
z <- create_pivot("HVS_Cluster", "expertise")
df <- rbind(x, y)
pivot_table <- rbind(df, z)

# Create pivot table with expertise as columns
x <- create_pivot("expertise", "Autonomy")
y <- create_pivot("expertise", "Influence")
pivot_expertise <- rbind(x, y)

# Create correspondence analysis and plots
res.ca <- CA(pivot_table, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "colprincipal", repel = TRUE,
  title =
    "Human Values, Autonomy, Expertise and Influence (Column Principal)")

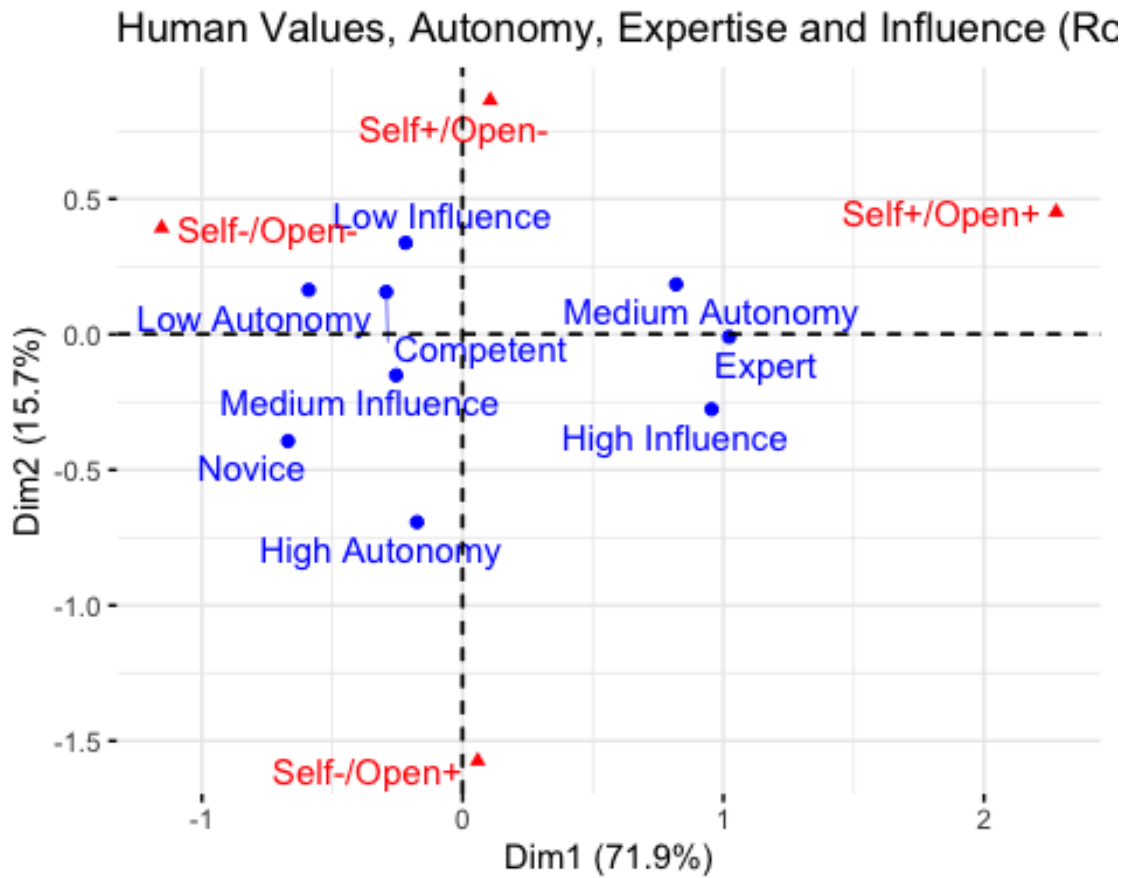
```



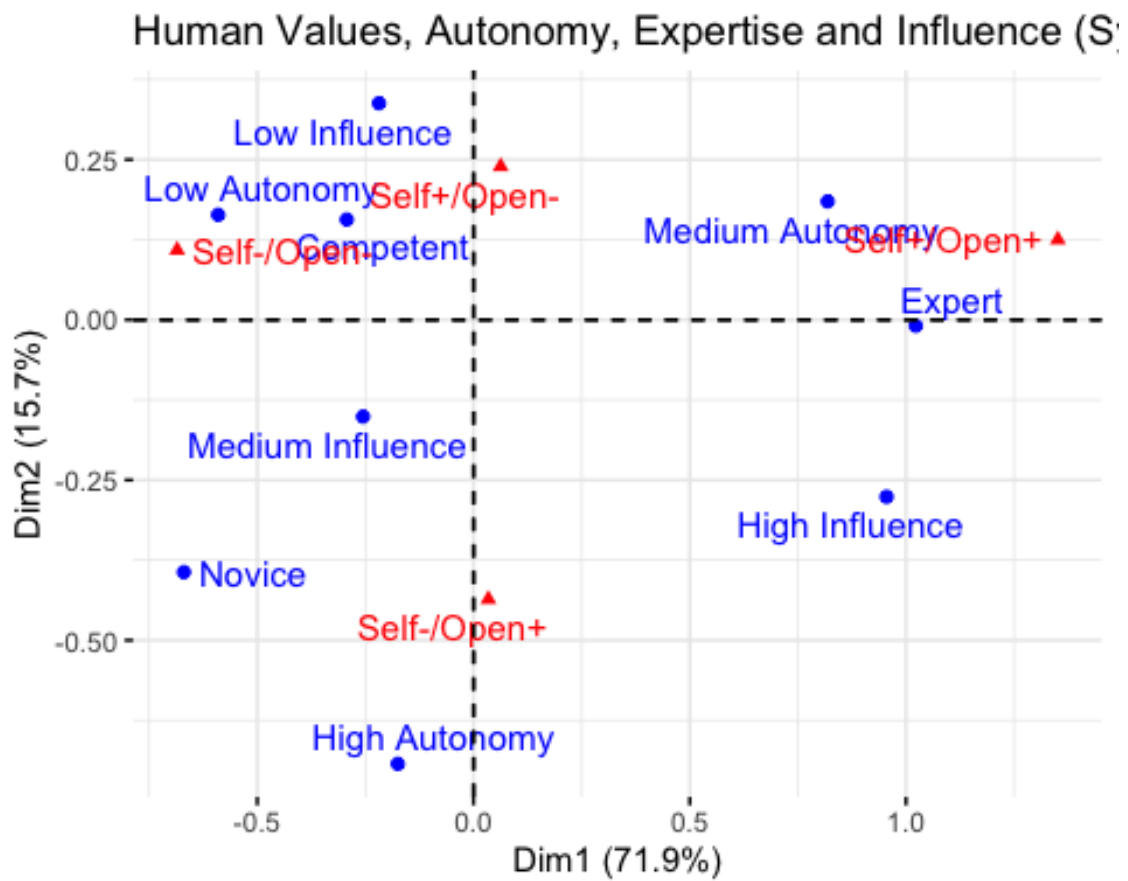
```

fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "rowprincipal", repel = TRUE,
  title =
    "Human Values, Autonomy, Expertise and Influence (Row Principal)")

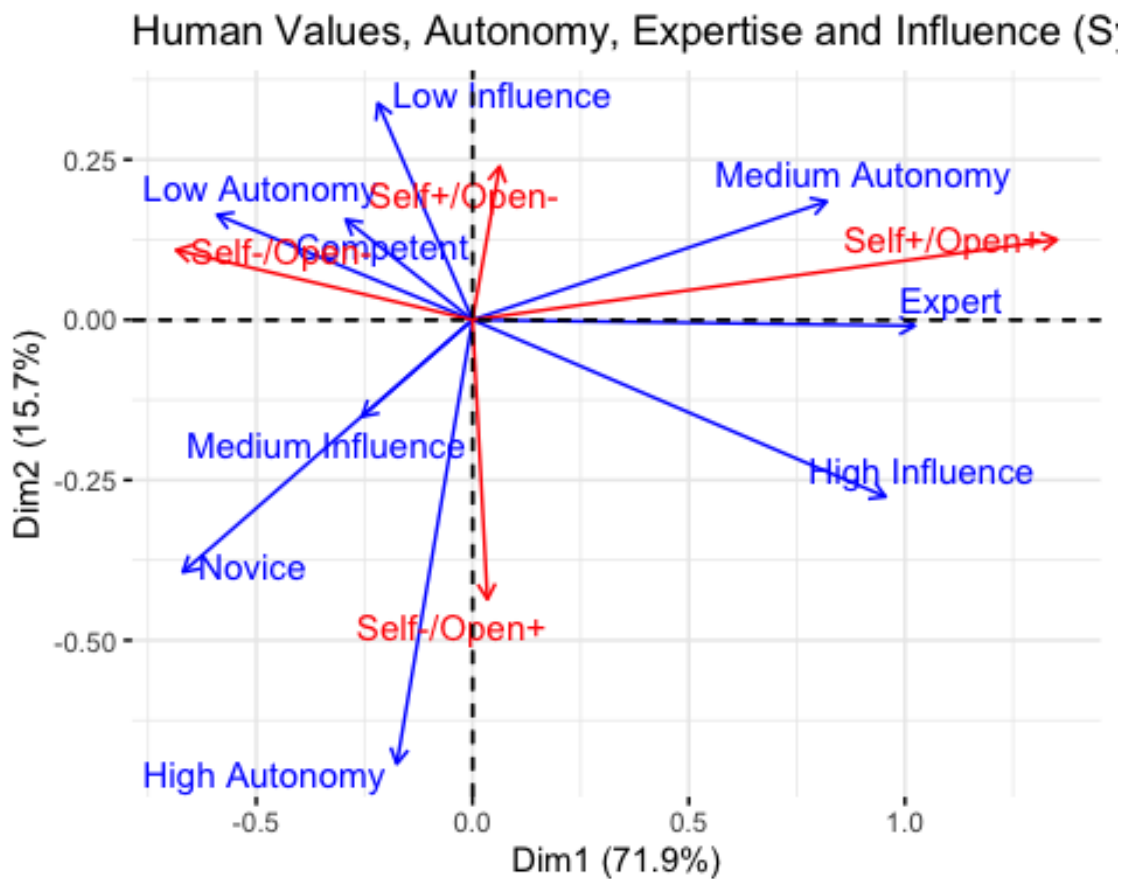
```



```
fviz_ca_biplot(res.ca, geom = c("point","text"), map = "symetric", repel = TRUE,
  title =
    "Human Values, Autonomy, Expertise and Influence (Symmetric)")
```

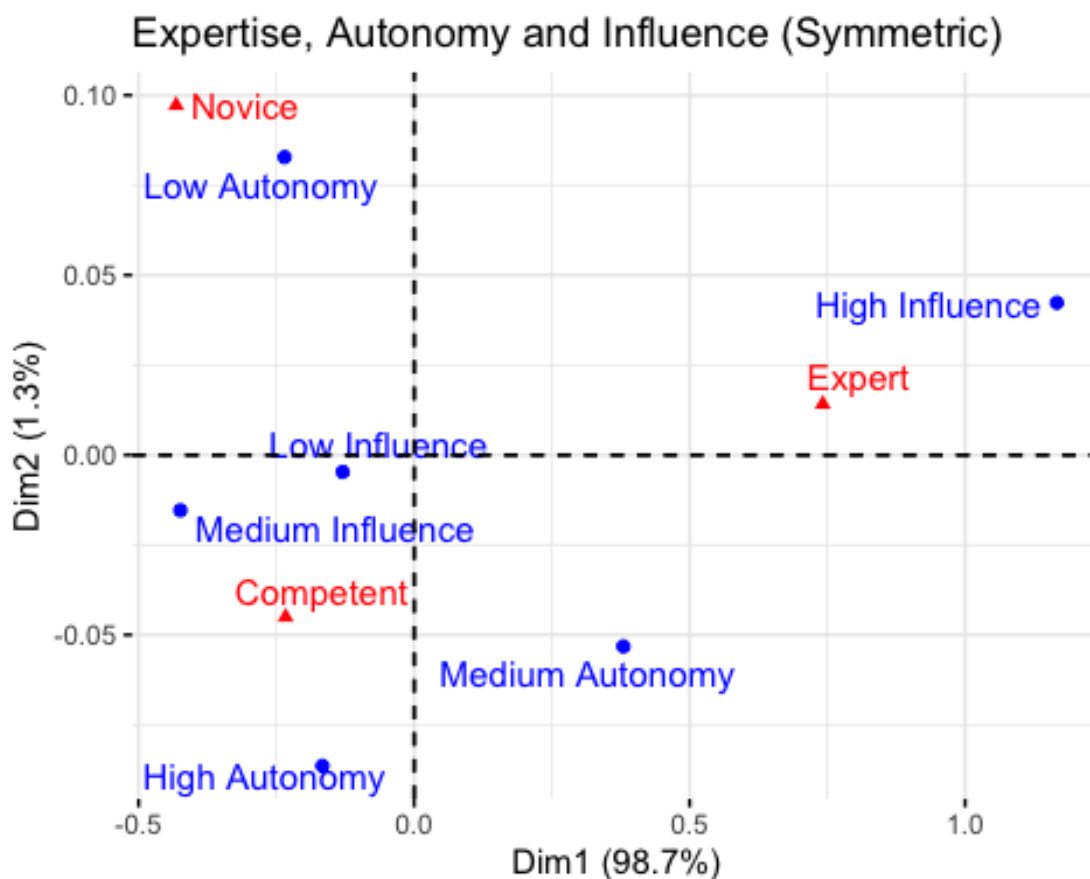


```
fviz_ca_biplot(res.ca, geom = c("arrow", "text"), map = "symmetric", repel = TRUE,
  title =
    "Human Values, Autonomy, Expertise and Influence (Symmetric)")
```



9.4.4.8 Create CA with focus on expertise

```
res.ca <- CA(pivot_expertise, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symmetric",
  repel = TRUE,
  title =
    "Expertise, Autonomy and Influence (Symmetric)")
```



```
# Clean up the environment occasionally
rm(values, role_bigrams, res.ca, res.hc, res.km,
    res.dist, x, y, z)
```

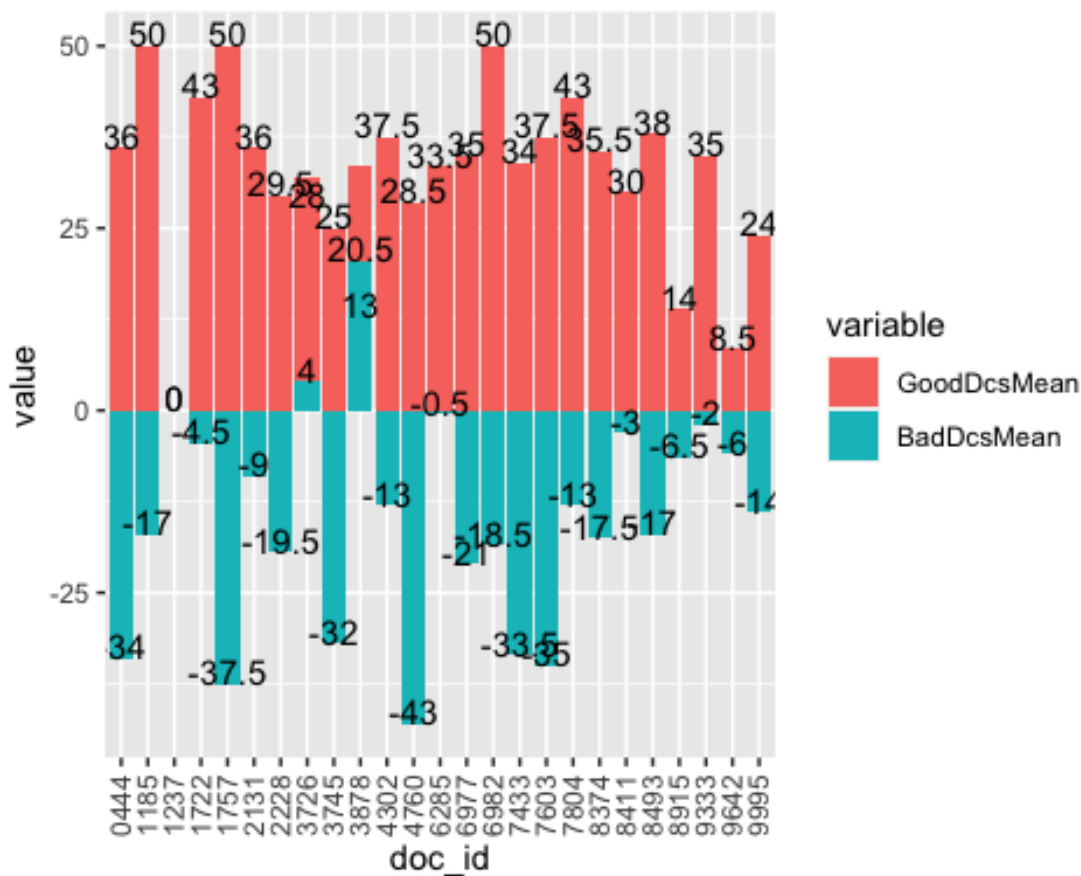
9.4.4.9 Good and Bad Decisions

```
# Read transcript data for text analysis
good_bad <- readRDS(
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing Transcript/good_bad.RDS")

library(reshape) #Needed for data wrangling
### Good and bad decisions for each participants ####
# Calculate a score that represents the distance between Good Decisions and Bad Decisions
human_values$decDist <- human_values$GoodDcsMean + human_values$BadDcsMean
x <- quantile(human_values$decDist, c(0:2/2))
human_values$decDist <- with(human_values,
  cut(decDist,
    x,
    include.lowest = T,
    labels = c("Good-Bad + Dist",
      "Good-Bad - Dist")))

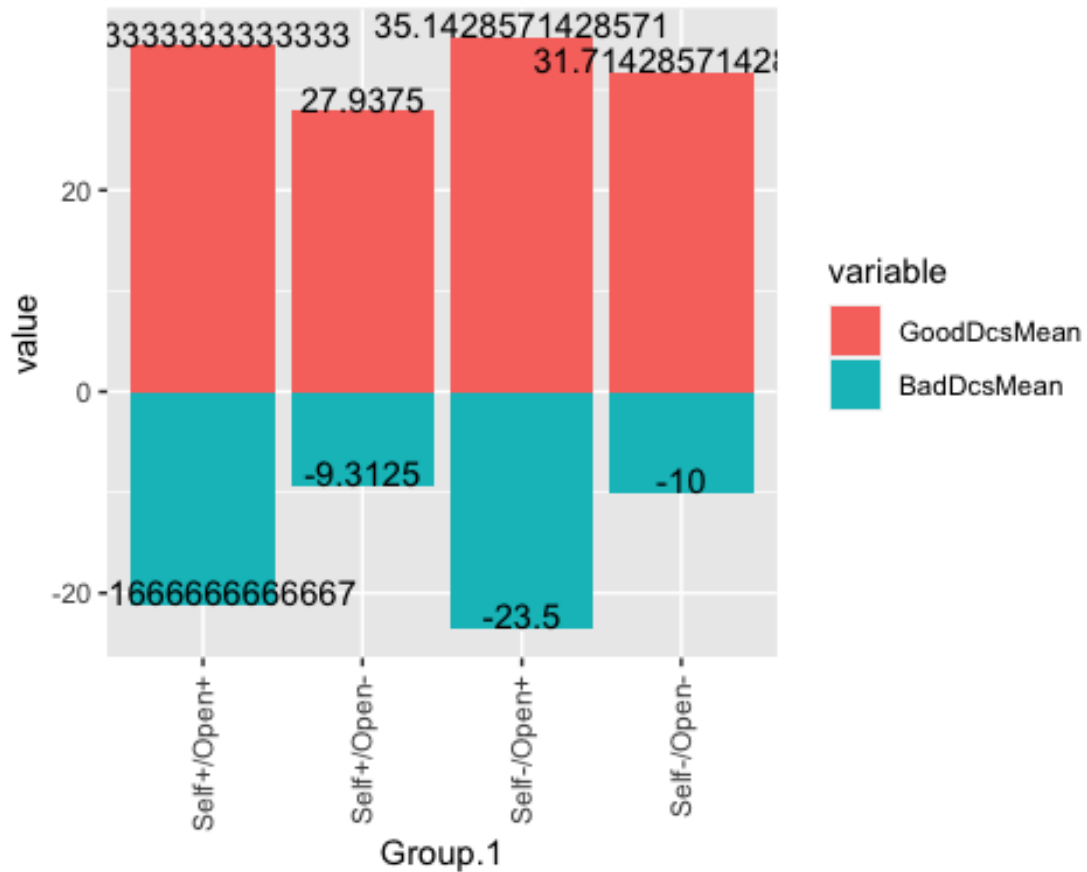
df <- dplyr::select(human_values, doc_id, GoodDcsMean, BadDcsMean)
df <- reshape::melt(df, id.vars='doc_id')
ggplot(df, aes(x=doc_id, y=value, fill = variable)) +
```

```
geom_bar(stat='identity', position='stack') +
geom_text(data=df,aes(x=doc_id, y=value, label = value),vjust=0) +
theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1, size = 9))
```



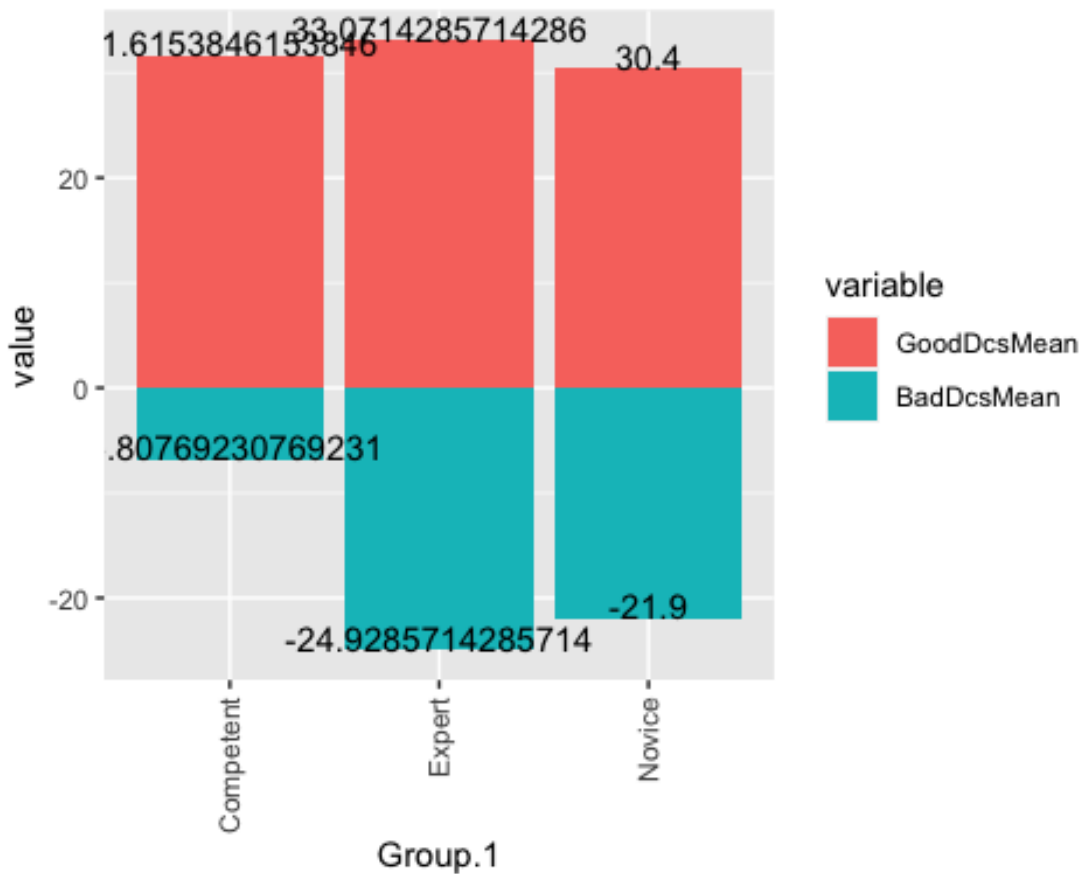
9.4.4.10 Good and Bad Decisions and HVS

```
df <- dplyr::select(human_values, HVS_Cluster, GoodDcsMean, BadDcsMean)
df <- aggregate(df[, 2:3], list(df$HVS_Cluster), mean)
df <- reshape::melt(df, id.vars='Group.1')
ggplot(df, aes(x=Group.1, y=value, fill = variable)) +
geom_bar(stat='identity', position='stack') +
geom_text(data=df,aes(x=Group.1, y=value, label = value),vjust=0) +
theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1, size = 9))
```



9.4.4.11 Good and Bad Decisions and Expertise

```
df <- dplyr::select(human_values, expertise, GoodDcsMean, BadDcsMean)
df <- aggregate(df[, 2:3], list(df$expertise), mean)
df <- reshape::melt(df, id.vars='Group.1')
ggplot(df, aes(x=Group.1, y=value, fill = variable)) +
  geom_bar(stat='identity', position='stack') +
  geom_text(data=df, aes(x=Group.1, y=value, label = value), vjust=0) +
  theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1, size = 9))
```

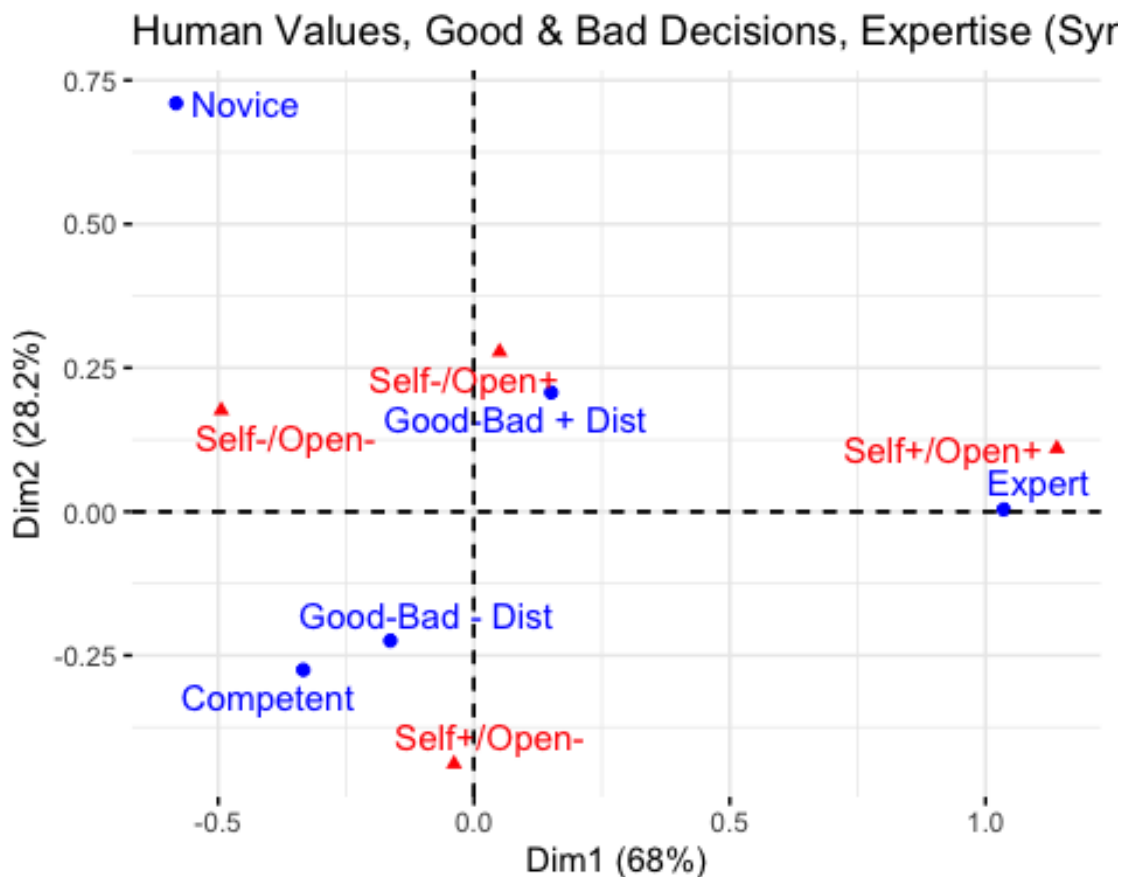


9.4.4.12 Correspondence Analysis

```

values <- dplyr::select(human_values, doc_id, HVS_Cluster, Autonomy, Influence, e
xpertise, decDist)
q <- create_pivot("HVS_Cluster", "decDist")
x <- create_pivot("HVS_Cluster", "expertise")
df <- rbind(x, q)

# Create correspondence analysis and plots
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symetric", repel = TRUE,
               title = "Human Values, Good & Bad Decisions, Expertise (Symmetric)")
    
```

```
# Create and bind pivot tables
```

```
values <- dplyr::select(human_values, doc_id, HVS_Cluster, Autonomy, Influence, expertise, decDist)
```

```
x <- create_pivot("HVS_Cluster", "Autonomy")
```

```
y <- create_pivot("HVS_Cluster", "Influence")
```

```
z <- create_pivot("HVS_Cluster", "expertise")
```

```
q <- create_pivot("HVS_Cluster", "decDist")
```

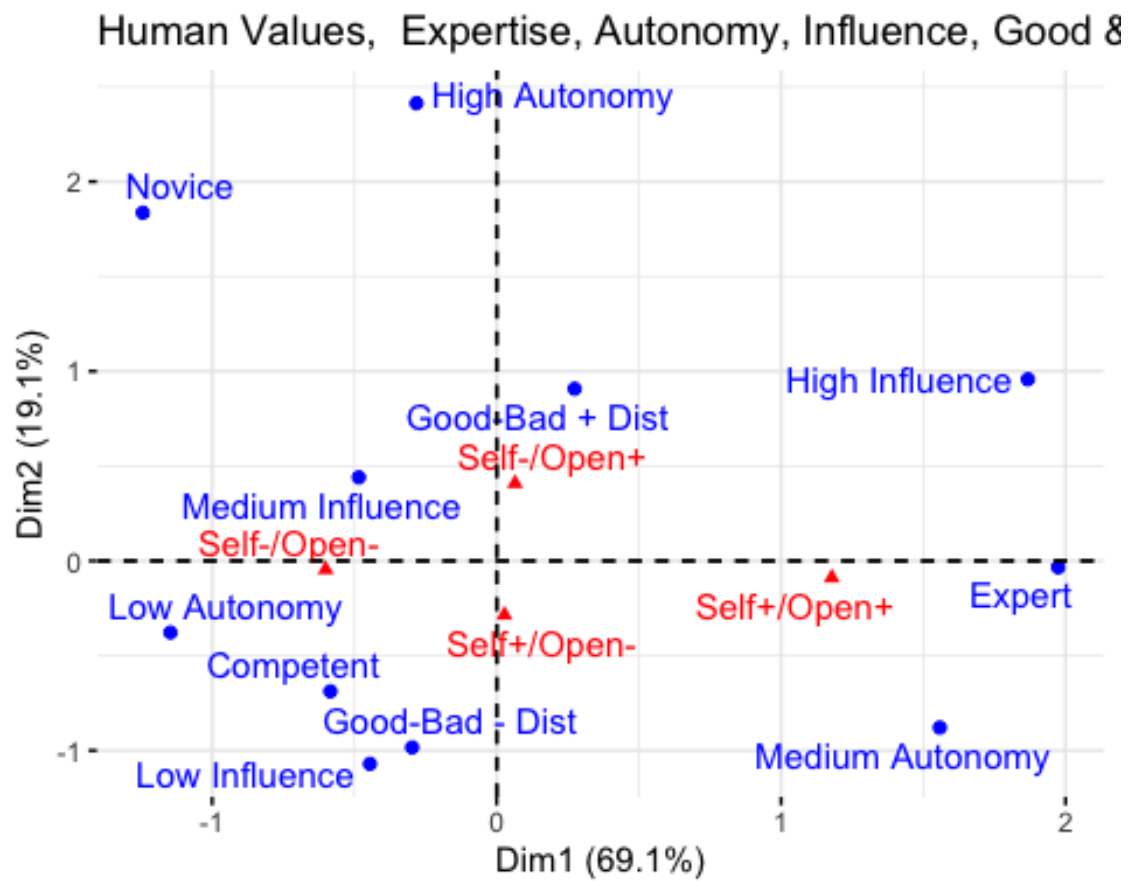
```
pivot_table <- rbind(x, y, q, z)
```

```
rm(q,x,y,z)
```

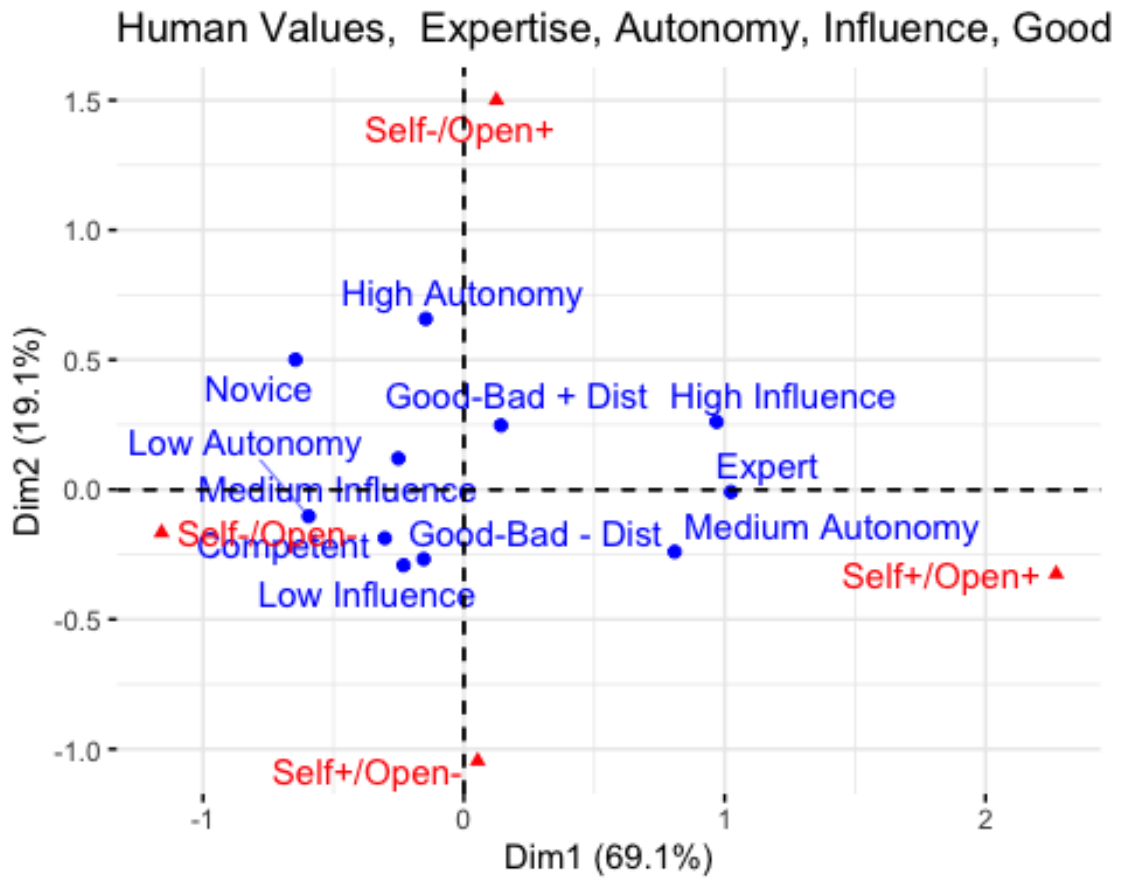
```
# Create correspondence analysis and plots
```

```
res.ca <- CA(pivot_table, graph = FALSE)
```

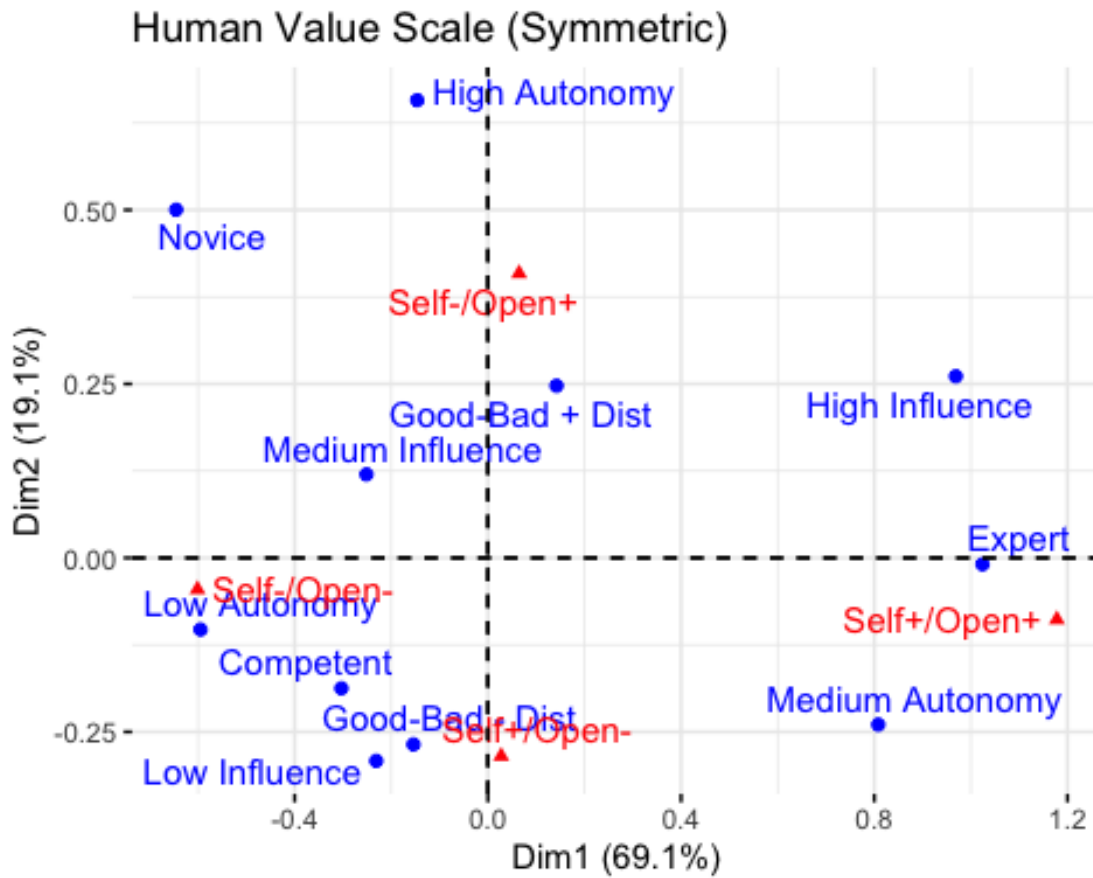
```
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "colprincipal", repel = TRUE,
  title = "Human Values, Expertise, Autonomy, Influence, Good & Bad Decision (Column Principal)")
```



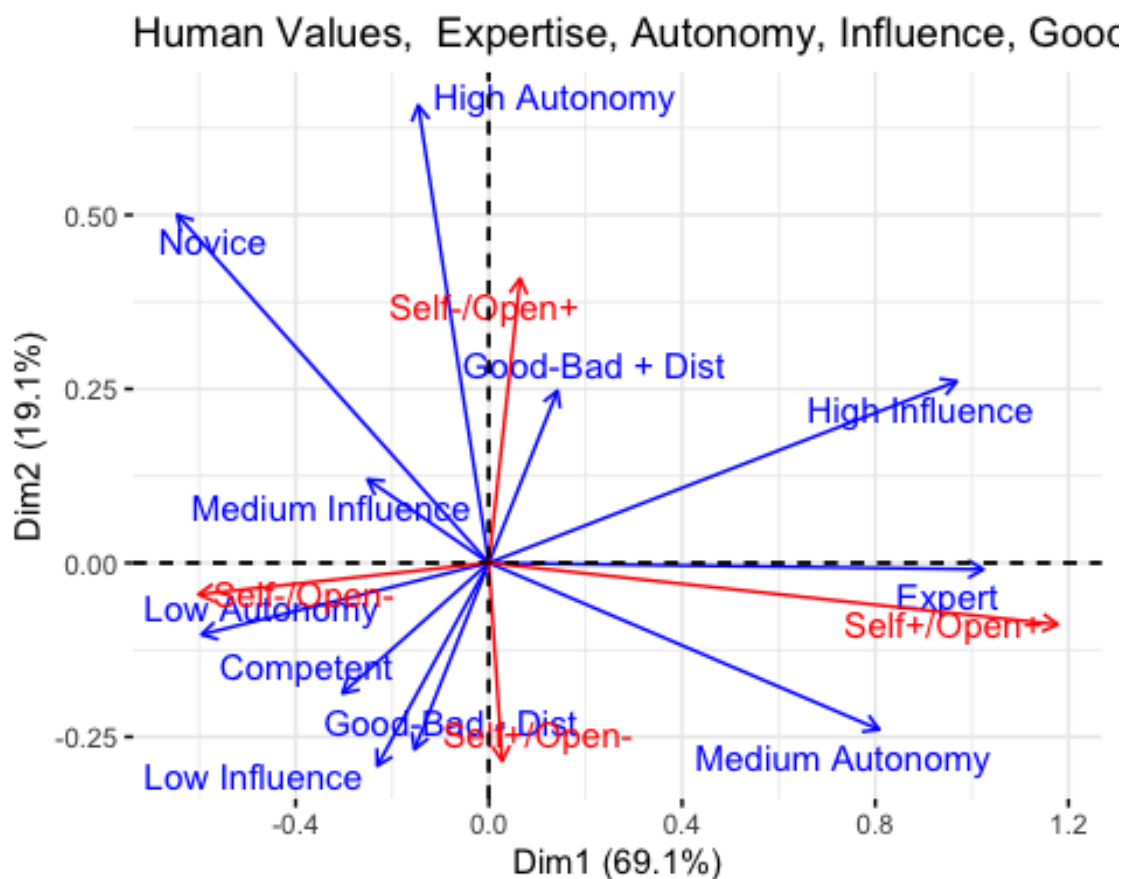
```
fviz_ca_biplot(res.ca, geom = c("point","text"), map = "rowprincipal", repel = TRUE,
               title = "Human Values, Expertise, Autonomy, Influence, Good & Bad Decision (Row Principal)")
```



```
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symetric", repel = TRUE,
  title = "Human Value Scale (Symmetric)")
```



```
fviz_ca_biplot(res.ca, geom = c("arrow", "text"), map = "symmetric", repel = TRUE,
  title = "Human Values, Expertise, Autonomy, Influence, Good & Bad Decision (Symmetric)")
```



9.4.5 Analyse keylog data

9.4.5.1 Generate a risk score for each participant

```
# Turn categorical data into numeric score
df <- transcripts
df <- data.frame(lapply(df, function(x) {
  gsub("Severe", "4", x)})
df <- data.frame(lapply(df, function(x) {
  gsub("High", "3", x)})
df <- data.frame(lapply(df, function(x) {
  gsub("Moderate", "2", x)})
df <- data.frame(lapply(df, function(x) {
  gsub("Low", "1", x)})
df <- data.frame(lapply(df, function(x) {
  gsub("Formal_Care", "4", x)})
df <- data.frame(lapply(df, function(x) {
  gsub("Kinship_Care", "3", x)})
df <- data.frame(lapply(df, function(x) {
  gsub("CP", "2", x)})
df <- data.frame(lapply(df, function(x) {
  gsub("CIN", "1", x)})

df[is.na(df)] <- 0
df$risks <- as.numeric(df$risks)
df$intervention <- as.numeric(df$intervention)
# Calculate means and median for each participant
```

```
riskMean <- df %>%
  group_by(doc_id) %>%
  dplyr::summarize(RiskMean = mean(risks, na.rm=TRUE))
interventionMean <- df %>%
  group_by(doc_id) %>%
  dplyr::summarize(InterventionMean = mean(intervention, na.rm=TRUE))
risk <- merge(riskMean, interventionMean)

# Merge new variables with human_values dataframe
human_values <- merge(human_values, risk, by = "doc_id", all.x = TRUE)
rm(risk)
```

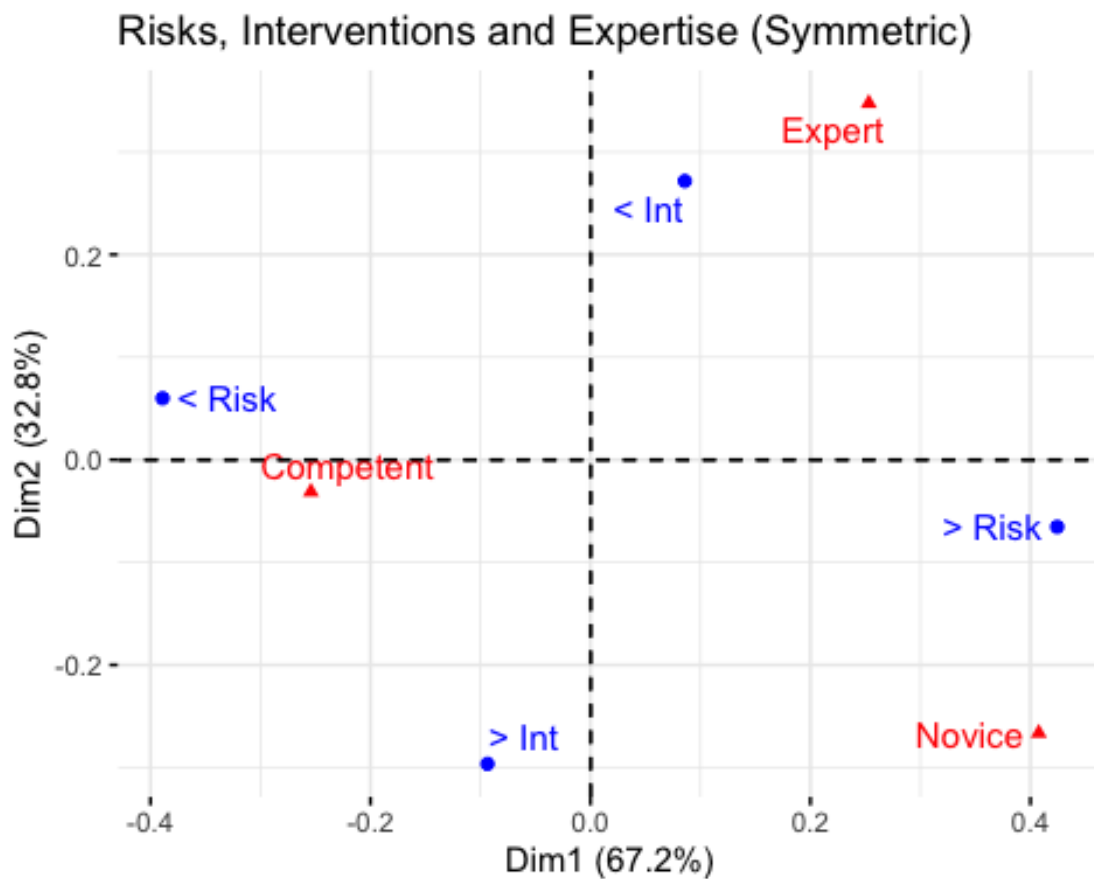
9.4.5.2 Create categorical data

```
x <- quantile(human_values$RiskMean, c(0:2/2), na.rm = TRUE)
human_values$RiskCat <- with(human_values,
  cut(RiskMean,
    x,
    include.lowest = T,
    labels = c("< Risk", "> Risk")))

x <- quantile(human_values$InterventionMean, c(0:2/2), na.rm = TRUE)
human_values$IntCat <- with(human_values,
  cut(InterventionMean,
    x,
    include.lowest = T,
    labels = c("< Int", "> Int")))
```

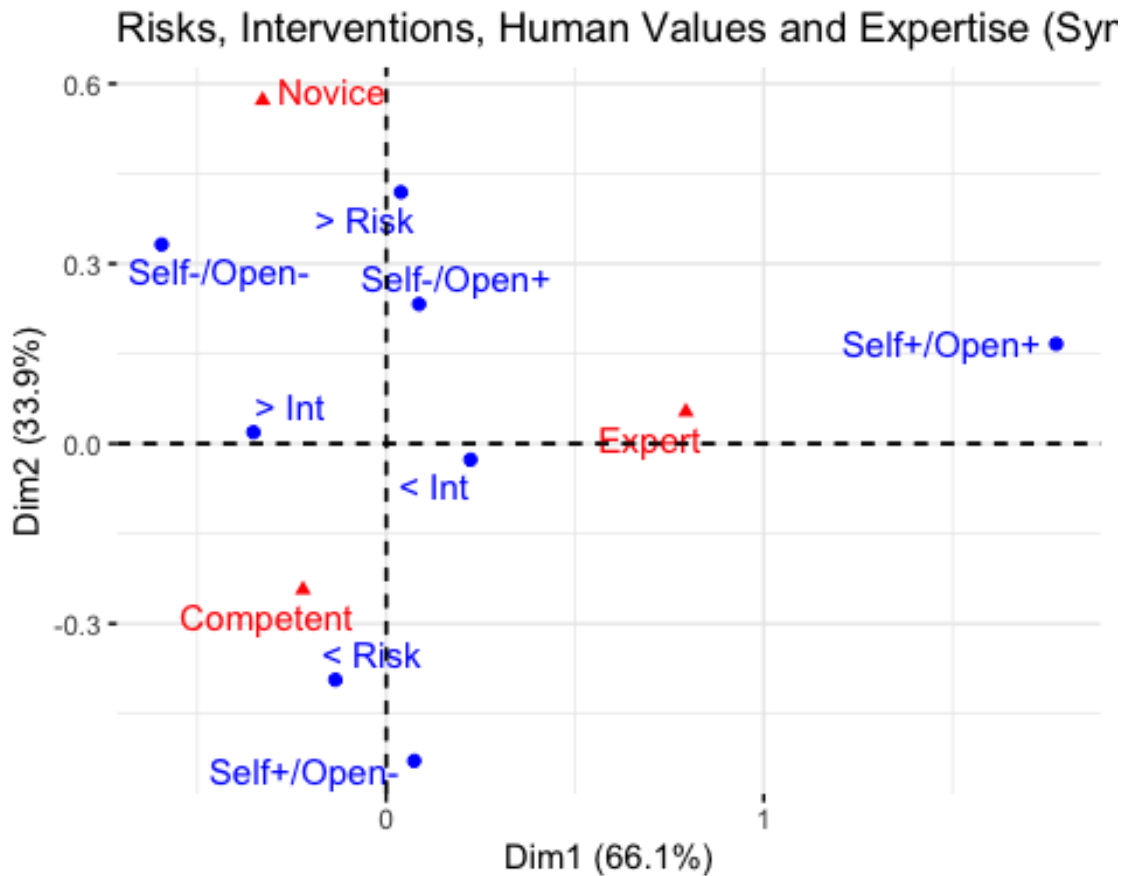
9.4.5.3 Correspondence Analysis: Risks, Interventions and Expertise

```
# Create pivot table with expertise as columns
values <- dplyr::select(human_values, doc_id, HVS_Cluster, Autonomy,
  Influence, expertise, RiskCat, IntCat, decDist)
#x <- create_pivot("expertise", "Autonomy")
#y <- create_pivot("expertise", "Influence")
z <- create_pivot("expertise", "RiskCat")
q <- create_pivot("expertise", "IntCat")
df <- rbind(z, q)
df <- df[grepl("^ANA", rownames(df))==F,]
# Create correspondence analysis and plots
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symetric", repel = TRUE,
  title = "Risks, Interventions and Expertise (Symmetric)")
```



9.4.5.4 Correspondence Analysis: Risks, Interventions, Human Values and Expertise

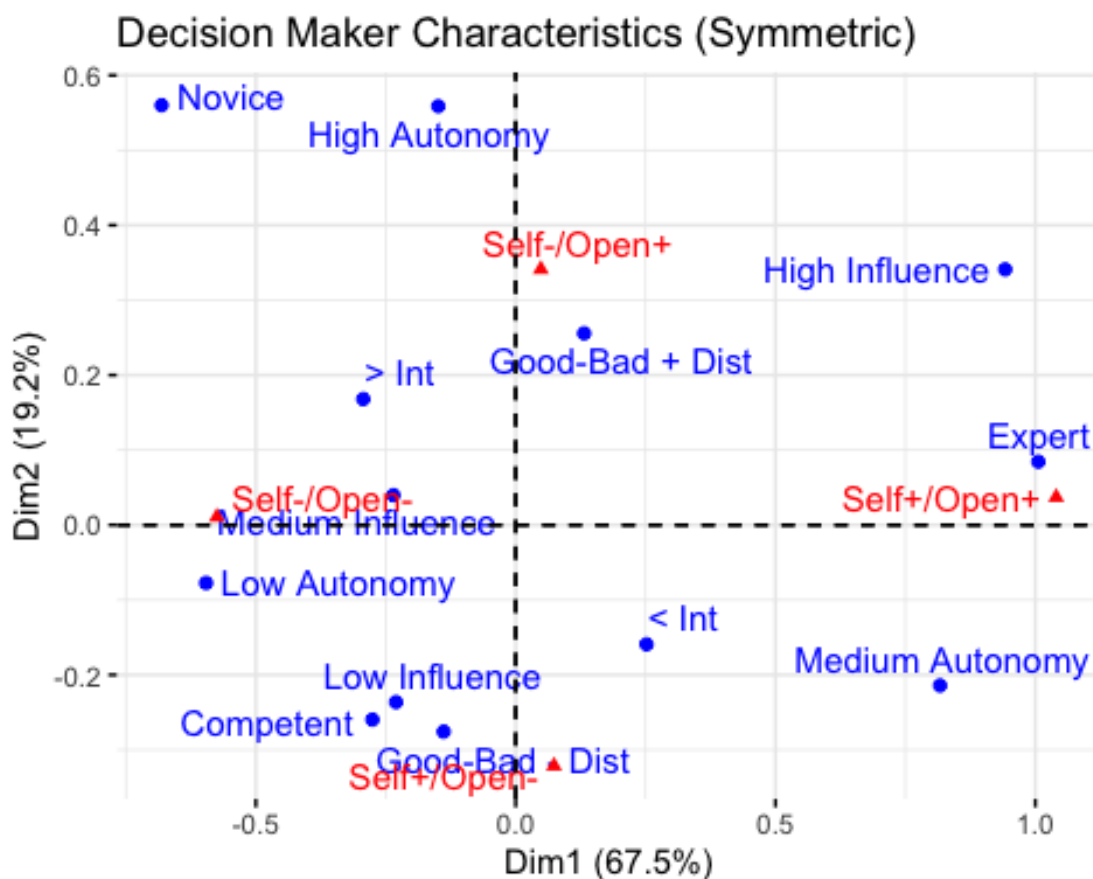
```
z <- create_pivot("expertise", "RiskCat")
q <- create_pivot("expertise", "IntCat")
x <- create_pivot("expertise", "HVS_Cluster")
#x <- create_pivot("HVS_Cluster", "expertise")
df <- rbind(z, q, x)
df <- df[grepl("NA", rownames(df))==F,]
# Create correspondence analysis and plots
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symetric", repel = TRUE,
               title = "Risks, Interventions, Human Values and Expertise (Symmetric)")
```



9.4.6 Correspondence Analysis: Decision Maker Characteristics

```
# Create and bind pivot tables for all decision maker characteristics
x <- create_pivot("HVS_Cluster", "Autonomy")
y <- create_pivot("HVS_Cluster", "Influence")
z <- create_pivot("HVS_Cluster", "expertise")
q <- create_pivot("HVS_Cluster", "decDist")
#w <- create_pivot("HVS_Cluster", "RiskCat")
v <- create_pivot("HVS_Cluster", "IntCat")
df <- rbind(x, y, q, z, v)
rm(v, q, x, y, z, riskMean)
# Remove rows with NA
df <- df[grepl("^NA", rownames(df))==F,]

# Create correspondence analysis and plots
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symetric", repel = TRUE,
               title = "Decision Maker Characteristics (Symmetric)")
```

9.4.7 Analyzing Thinking Aloud

Clean Data

```
transcripts$tidy <- mclapply(transcripts$text, clean_data, mc.cores = numCores)
transcripts$tidy <- unlist(transcripts$tidy)
transcripts$tidy <- mclapply(transcripts$tidy, blank.removal, mc.cores = numCores)
transcripts$tidy <- unlist(transcripts$tidy)
```

Create text vector grouped by docID and vignette

```
transcripts <- transcripts %>%
  group_by(doc_id, vignette) %>%
  mutate(txtVec = paste0(text, collapse = " "))
```

Collate patterns from keylog data

```
information <- information %>%
  dplyr::select(doc_id, vignette, information) %>%
  group_by(doc_id, vignette) %>%
  mutate(infopattern = paste0(information, collapse = ", ")) %>%
  distinct(doc_id, vignette, infopattern)
```

```
risks <- risks %>%
  dplyr::select(doc_id, vignette, risks) %>%
  group_by(doc_id, vignette) %>%
  mutate(riskpattern = paste0(risks, collapse = ", ")) %>%
  distinct(doc_id, vignette, riskpattern)
```

```
intervention <- intervention %>%
```

```

dplyr::select(doc_id, vignette, intervention) %>%
group_by(doc_id, vignette) %>%
mutate(intervention = paste0(intervention, collapse = ", ")) %>%
distinct(doc_id, vignette, intervention)

patterns <- merge(information, risks, by=c("doc_id", "vignette"))
patterns <- merge(patterns, intervention, by=c("doc_id", "vignette"))

# Count number of information looked at and create new dataframe with means for k
eylog information
patterns$infocount <- lengths(gregexpr("\\W+", patterns$infopattern)) + 1
patterns$riskcount <- lengths(gregexpr("\\W+", patterns$riskpattern)) + 1
df <- aggregate(patterns[, 6:7], list(patterns$doc_id), mean)
# RiskTertile was RiskCat but that led to duplicate RiskCat and errors
df <- df %>%
mutate(InfoCat = ntile(infocount, 3)) %>%
mutate(RiskTertile = ntile(riskcount, 3))
df$InfoCat <- factor(df$InfoCat,
labels = c("1st Tertile #Info", "2nd Tertile #Info",
"3rd Tertile #Info"))
df$RiskTertile <- factor(df$RiskTertile,
labels = c("1st Tertile #Risk", "2nd Tertile #Risk",
"3rd Tertile #Risk"))
# Merge this average data with participant information
human_values <- merge(human_values, df, by.x = "doc_id", by.y = "Group.1",
all.x = TRUE)

```

9.4.8 Sentiment Analysis

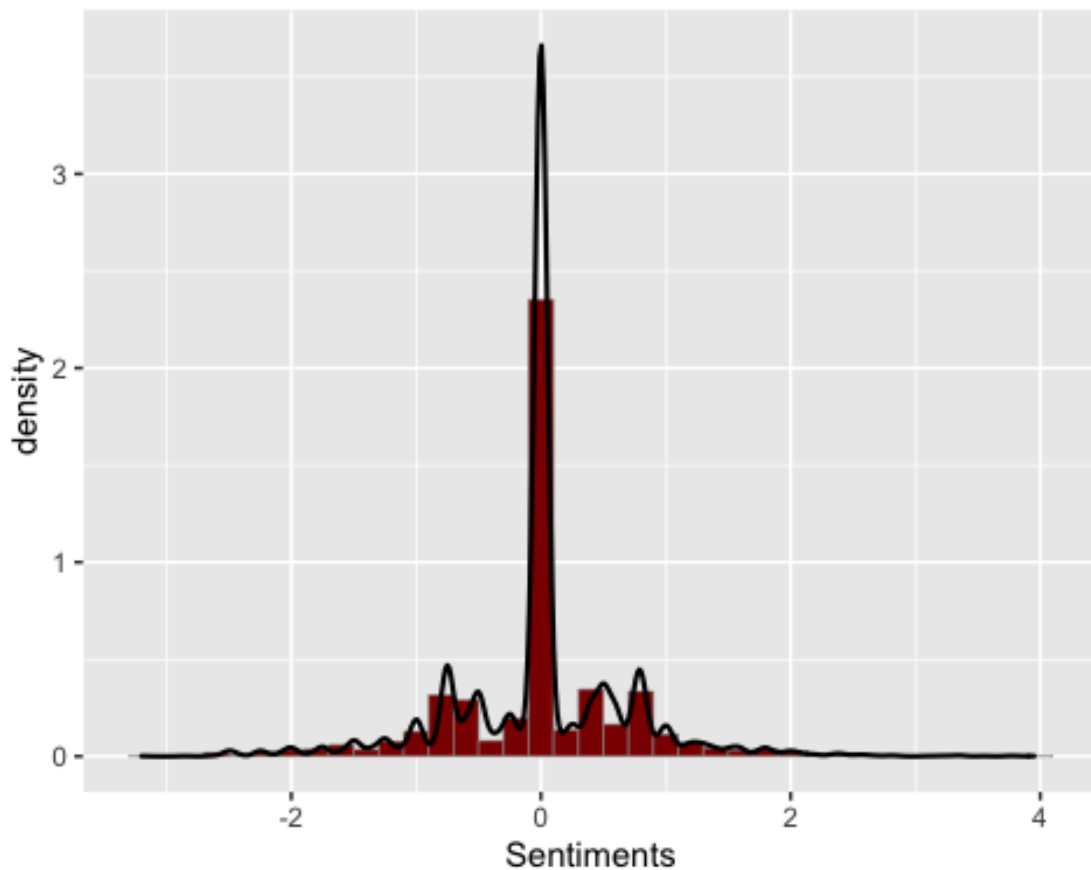
9.4.8.1 Calculate Syuzhet, QDAP and NCR Sentiment Scores

```

library(syuzhet)
library(SentimentAnalysis)
transcripts$syuzhet <- get_sentiment(transcripts$tidy, method="syuzhet")
transcripts$nrc <- get_nrc_sentiment(transcripts$tidy)
sentiments <- analyzeSentiment(transcripts$tidy)
sentiments <- sentiments$SentimentQDAP
transcripts$SentimentQDAP <- sentiments
transcripts$Sentiments <- transcripts$syuzhet
rm(sentiments)

# Plot a histogram
ggplot (transcripts, aes(x=Sentiments,
y=..density..)) +
geom_histogram(binwidth=.2,
fill="darkred", colour="grey60", size=.2) +
geom_density(size=.75)

```



```
transcripts <- transcripts %>%
  mutate(SentimentCat = ntile(Sentiments, 3))
transcripts$SentimentCat <- factor(transcripts$SentimentCat,
  labels = c("Negative Sentiment",
             "Neutral Sentiment",
             "Positive Sentiment"))
df_simple <- dplyr::select(transcripts, doc_id, seconds, text, Sentiments,
  vignette, risks, intervention, information)
df_simple <- df_simple[!duplicated(df_simple), ]
```

9.4.8.2 Draw basic sentiment line plots

```
pl_sent <- function(df) {
  ggplot(data = df, aes(x = seconds, y = Sentiments, color = vignette))+
    geom_point(color = "#00AFBB", size = 1.5) +
    geom_line()+
    geom_smooth(method = "loess", color = "#E7B803", size = 2.5) +
    facet_wrap(~ doc_id, scales = "fixed", ncol = 2)
}
```

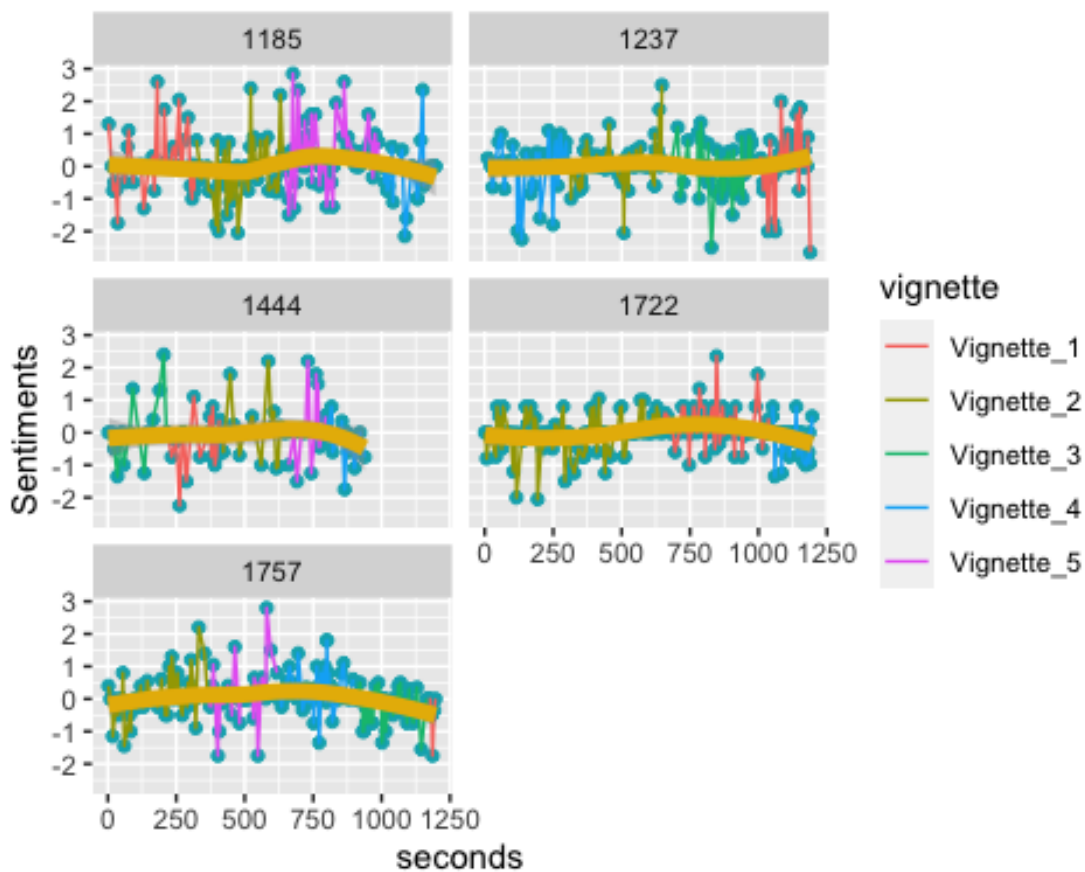
```
pl_keylog <- function(df) {
  ggplot() +
    geom_line(data = df, aes(x = seconds, y = vignette),
              color = "#00AFBB", size = 2) +
    geom_point(data = df, aes(x = seconds, y = risks),
               color = "Blue", size = 2) +
    geom_point(data = df, aes(x = seconds, y = information),
               color = "Green", size = 2) +
```

```

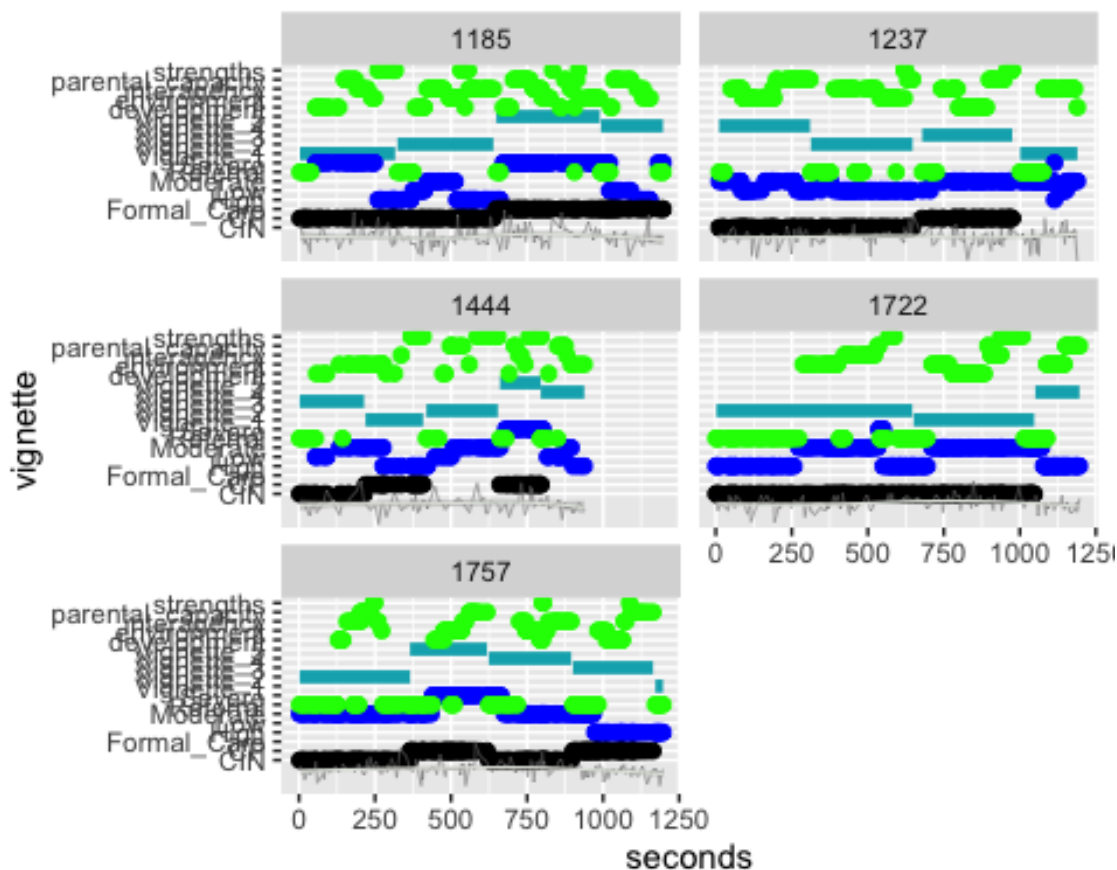
geom_point(data = df, aes(x = seconds, y = intervention,
  color = "Black", size = 2) +
geom_line(data = df, aes(x = seconds, y = Sentiments),
  color = "#808080", size = 0.2) +
geom_smooth(data = df, aes(x = seconds, y = Sentiments),
  color = "#E2E5DE", size = 0.4) +
facet_wrap(~ doc_id, scales = "fixed", ncol = 2)
}

x <- unique(transcripts$doc_id)
df <- dplyr::filter(df_simple,
  doc_id == x[1] |
  doc_id == x[2] |
  doc_id == x[3] |
  doc_id == x[4] |
  doc_id == x[5] |
  doc_id == x[6])
#df <- df[complete.cases(df), ]
df <- df[apply(df[,-1], 1, function(x) !all(x==0)),]
pl_sent(df)

```



```
pl_keylog(df)
```



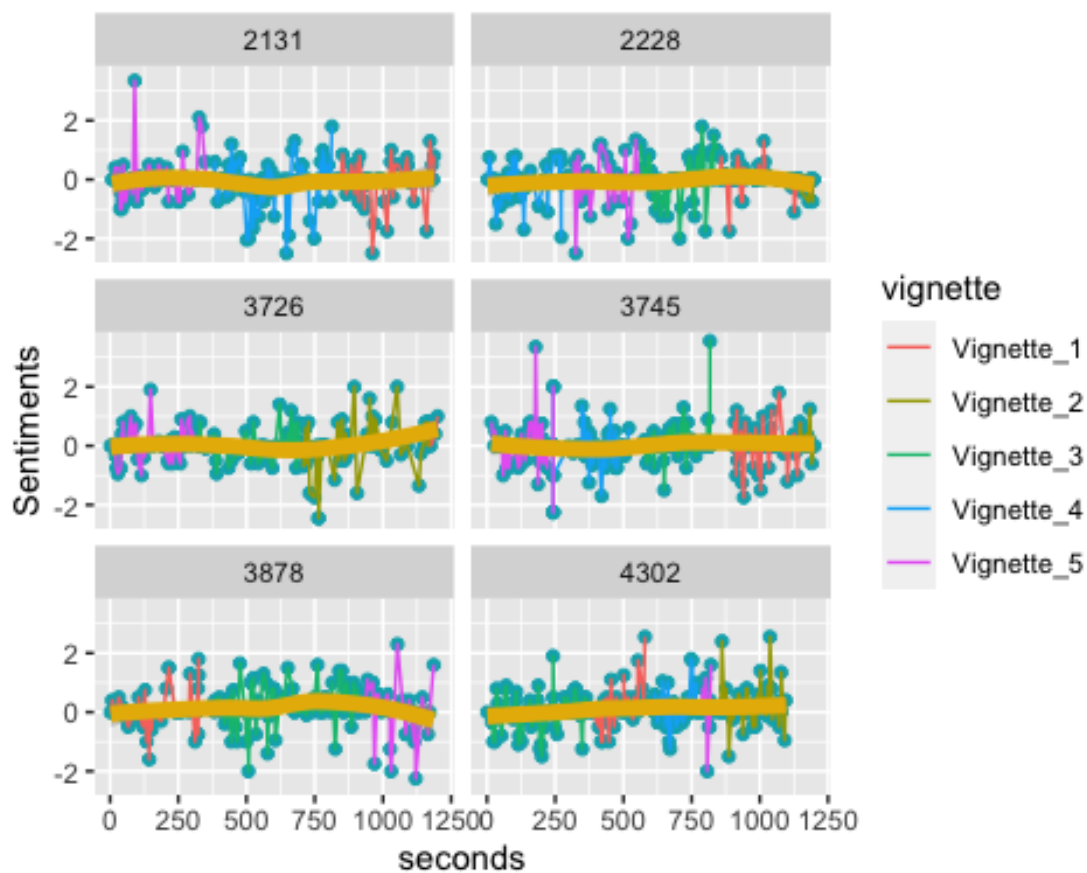
```
df <- dplyr::filter(df_simple,
  doc_id == x[7] |
  doc_id == x[8] |
  doc_id == x[9] |
  doc_id == x[10] |
  doc_id == x[11] |
  doc_id == x[12])
#df <- df[complete.cases(df), ]
df[apply(df[,-1], 1, function(x) !all(x==0)),]

## # A tibble: 1,155 x 8
## # Groups:   doc_id, vignette [25]
##   doc_id seconds text                Senti~1 vigne~2 risks
inter~3 infor~4
##   <chr>      <dbl> <chr>                <dbl> <chr>   <chr>
<chr> <chr>
## 1 2131          7 I'm looking at the name~  0   Vignet~ <NA>
Kinshi~ Referr~
## 2 2131         14 I'm realizing the child~  0   Vignet~ <NA>
Kinshi~ Referr~
## 3 2131         18 For me, making some ass~  0.4 Vignet~ <NA>
Kinshi~ Referr~
## 4 2131         31 I am reading the referr~  0.4 Vignet~ <NA>
Kinshi~ Referr~
## 5 2131         37 She's a year old and sh~ -1   Vignet~ <NA>
Kinshi~ Referr~
## 6 2131         41 and a fracture,
```

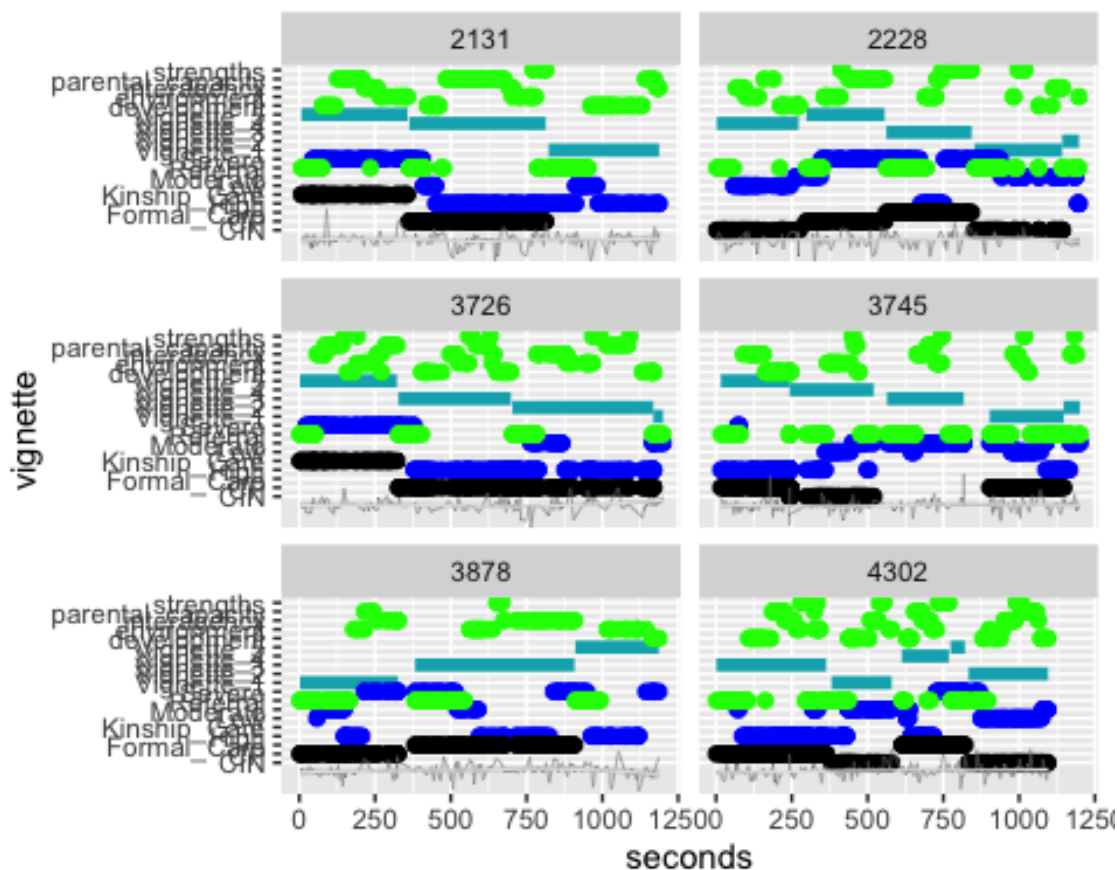
Appendices

```
Kinshi~ Referr~  
## 7 2131      43 non accidental.      -1    Vignet~ <NA>  
Kinshi~ Referr~  
## 8 2131      44 So that's high risk.    -0.75 Vignet~ Seve~  
Kinshi~ Referr~  
## 9 2131      48 She was had a floppy, l~  0.5  Vignet~ Seve~  
Kinshi~ Referr~  
## 10 2131     54 So high risk just based~ -0.35 Vignet~ Seve~  
Kinshi~ Referr~  
## # ... with 1,145 more rows, and abbreviated variable names 1: Sen  
timents,  
## # 2: vignette, 3: intervention, 4: information  
## # i Use `print(n = ...)` to see more rows
```

```
pl_sent(df)
```



```
pl_keylog(df)
```



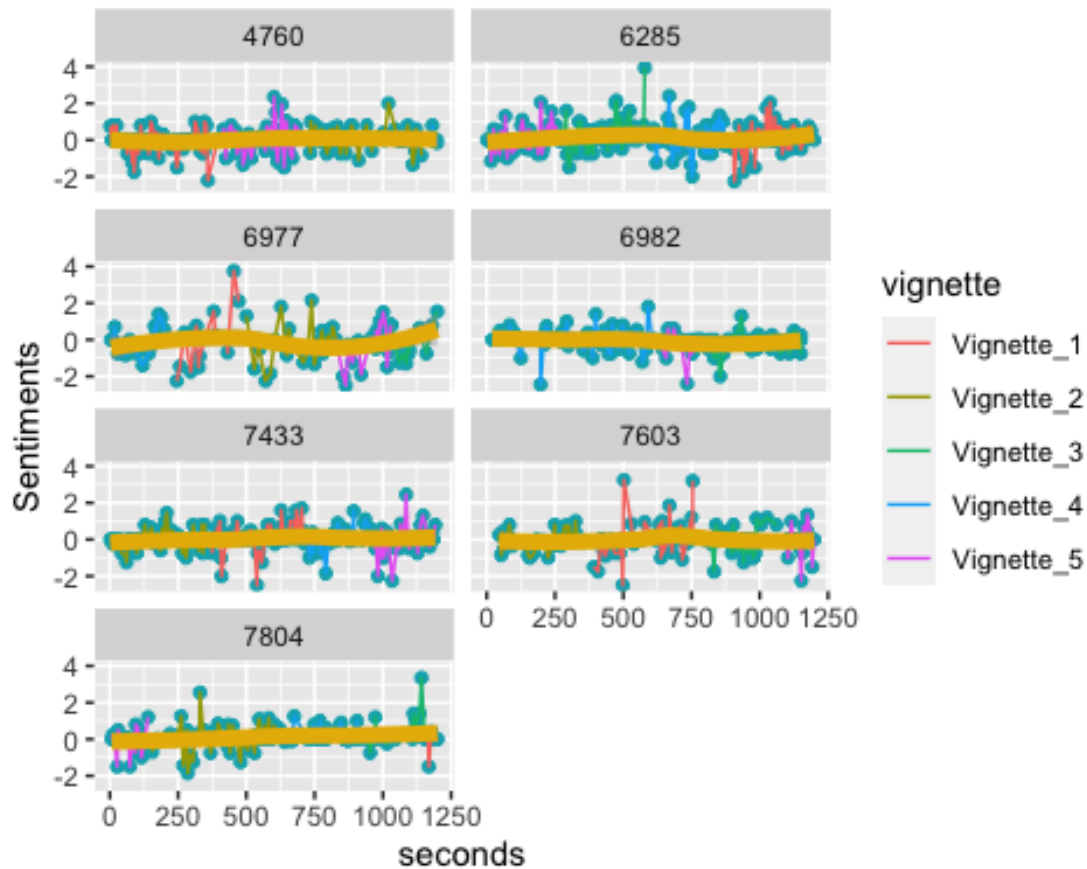
```
df <- dplyr::filter(df_simple,
  doc_id == x[13] |
  doc_id == x[14] |
  doc_id == x[15] |
  doc_id == x[16] |
  doc_id == x[17] |
  doc_id == x[18] |
  doc_id == x[19])
#df <- df[complete.cases(df), ]
df[apply(df[,-1], 1, function(x) !all(x==0)),]

## # A tibble: 1,118 x 8
## # Groups:   doc_id, vignette [30]
##   doc_id seconds text                Senti~1 vigne~2 risks
inter~3 infor~4
##   <chr>      <dbl> <chr>                <dbl> <chr>    <chr>
<chr> <chr>
## 1 4760          2 OK, so I'm thinking thi~ 0.75  Vignet~ <NA>
CP Referr~
## 2 4760          7 All those quick decisio~ 0     Vignet~ <NA>
CP Referr~
## 3 4760          9 you can.                0     Vignet~ <NA>
CP Referr~
## 4 4760         12 Right, the first thing ~ 0.8   Vignet~ <NA>
CP Referr~
## 5 4760         19 A lot of the time, whet~ 0     Vignet~ <NA>
CP Referr~
```

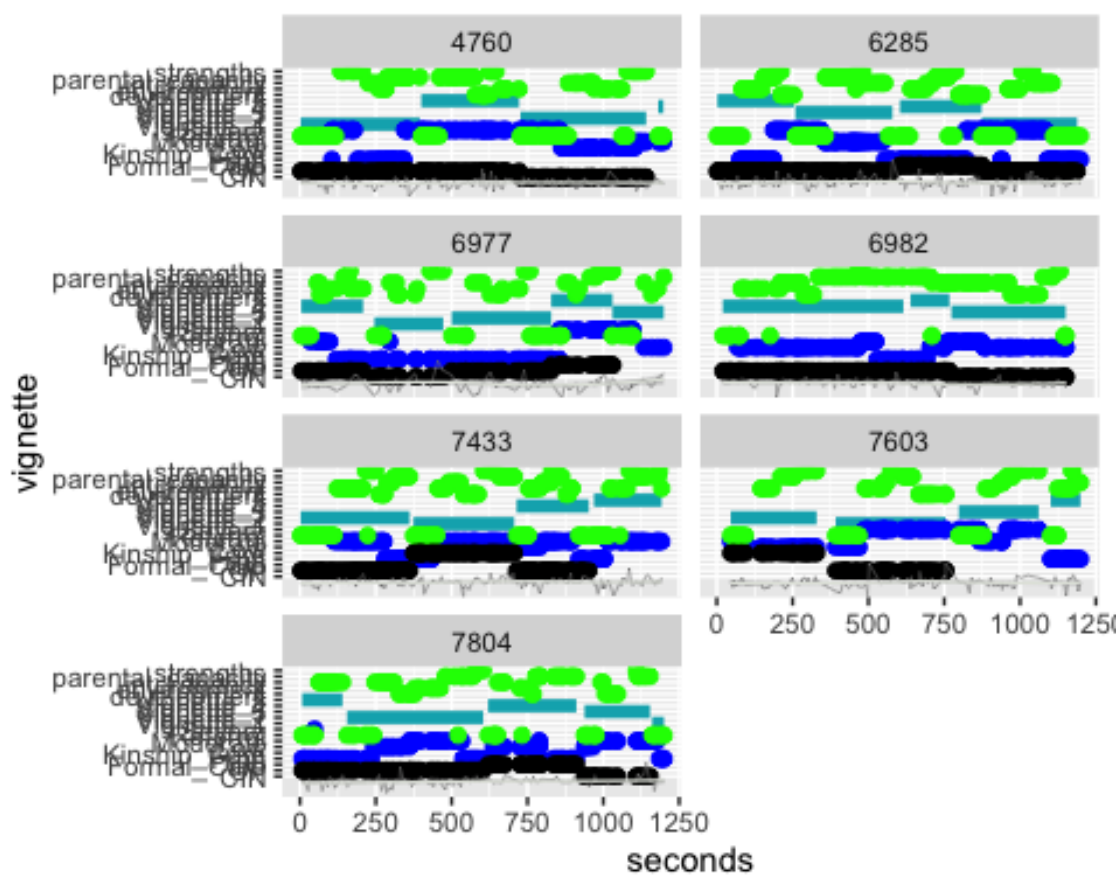
Appendices

```
## 6 4760      25 Right.                0.8   Vignet~ <NA>
CP      Referr~
## 7 4760      28 Lots of brothers and si~ 0     Vignet~ <NA>
CP      Referr~
## 8 4760      32 Three fathers.              0     Vignet~ <NA>
CP      Referr~
## 9 4760      39 Who have we got.          0     Vignet~ <NA>
CP      Referr~
## 10 4760     56 Right, that's a bit con~ 0.0500 Vignet~ <NA>
CP      Referr~
## # ... with 1,108 more rows, and abbreviated variable names 1: Sen
timents,
## # 2: vignette, 3: intervention, 4: information
## # i Use `print(n = ...)` to see more rows
```

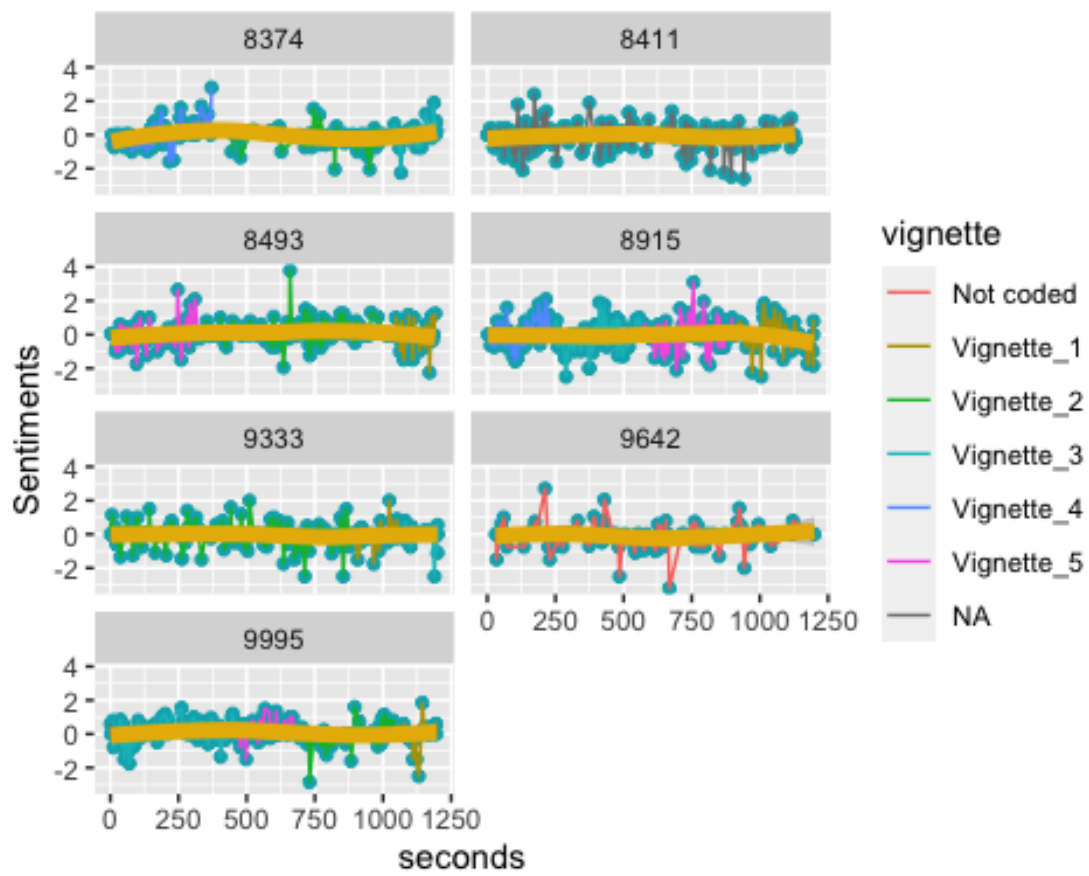
```
pl_sent(df)
```



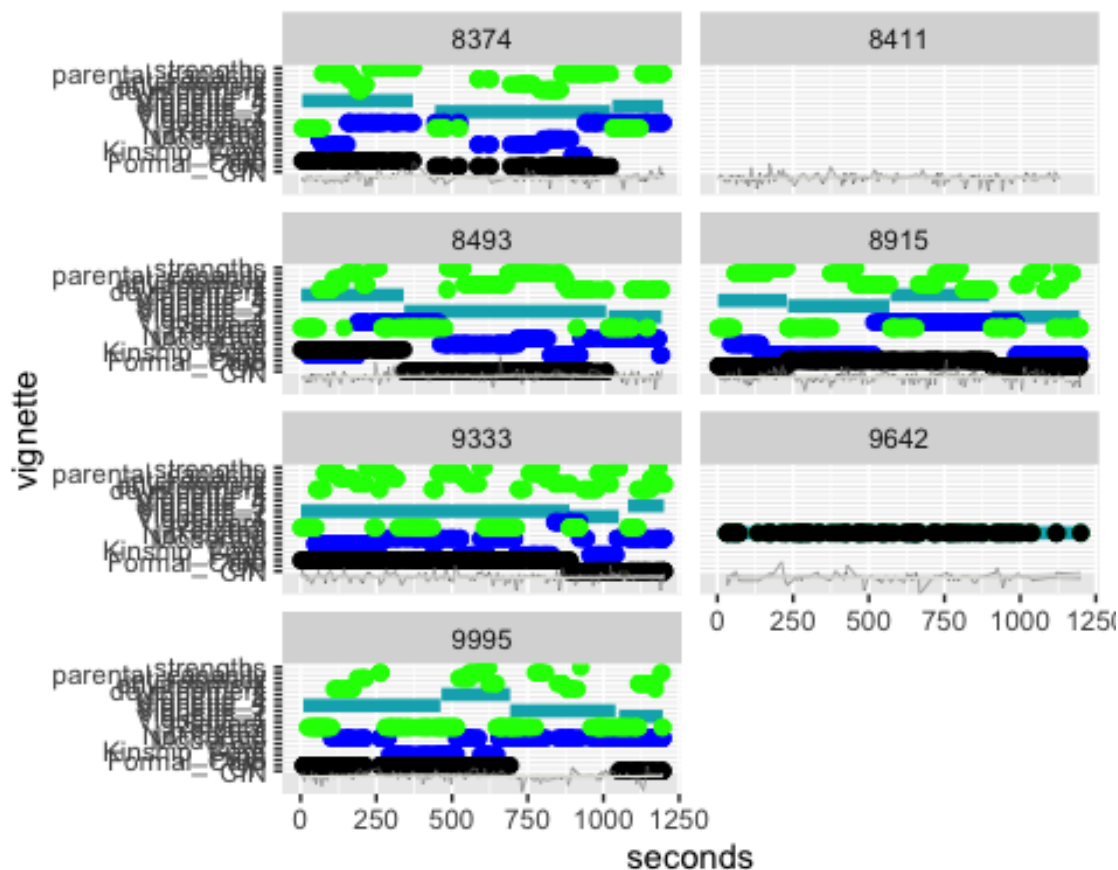
```
pl_keylog(df)
```

```
df <- dplyr::filter(df_simple,
  doc_id == x[20] |
  doc_id == x[21] |
  doc_id == x[22] |
  doc_id == x[23] |
  doc_id == x[24] |
  doc_id == x[25] |
  doc_id == x[26])
#df <- df[complete.cases(df), ]
df <- df[apply(df[,-1], 1, function(x) !all(x==0)), ]
pl_sent(df)
```



pl_keylog(df)



```
rm(df_simple, x)
```

9.4.8.3 Sentiments for participants

Calculate sentiment means for participants

```
df <- transcripts %>%
  group_by(doc_id) %>%
  summarise(MeanSentiment = mean(Sentiments, na.rm = TRUE))

# Create labels for three quantiles
df <- df %>%
  mutate(SentCat = ntile(MeanSentiment, 3))
# mutate(syuzhetCat = ntile(MeanSyuzhet, 3))

df$SentCat <- factor(df$SentCat,
  labels = c("Negative Sentiments", "Neutral Sentiments",
    "Positive Sentiments"))
human_values <- merge(human_values, df, by = "doc_id", all.x = TRUE)
```

NRC Sentiment Words for each vignette

```
# Create a dataframe with one token (word) per line and add nrc Sentiment
thinkAloudWords <- transcripts %>%
  unnest_tokens(word, tidy) %>%
  inner_join(get_sentiments("nrc"))

# Select relevant columns for analysis from Human Values
df <- dplyr::select(human_values, doc_id, expertise, Autonomy, Influence,
```

```
HVS_Cluster, SentCat)
thinkAloudWords <- merge(thinkAloudWords, df, by = "doc_id")
```

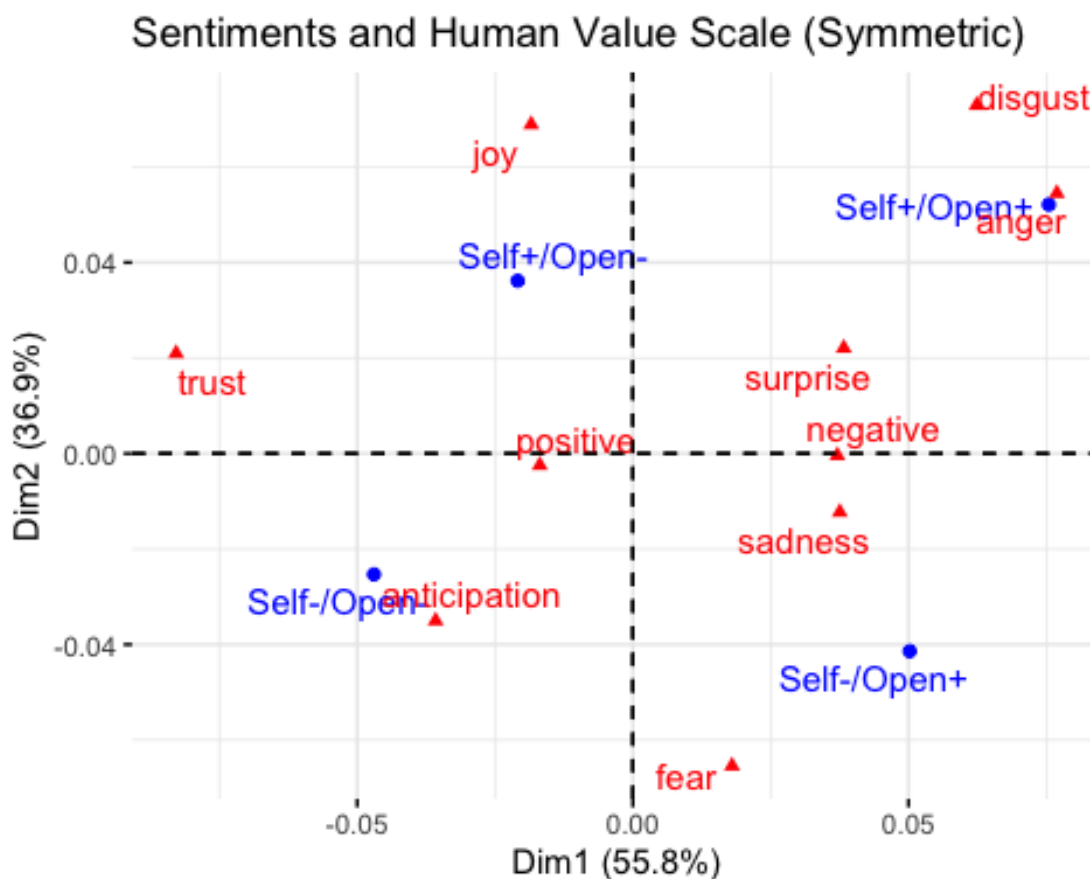
Count NRC Sentiment words for each HVS Cluster

```
df <- dplyr::select(thinkAloudWords, doc_id, sentiment, HVS_Cluster)
df <- df %>%
  group_by(HVS_Cluster) %>%
  count(HVS_Cluster, sentiment)
df <- as_tibble(df)
df <- df %>%
  pivot_wider(names_from = sentiment, values_from = n)
hvs <- df %>%
  dplyr::select(HVS_Cluster)
df <- df %>%
  dplyr::select(-HVS_Cluster)
df <- df / rowSums(df) * 100
df <- cbind(hvs, df)
```

Correspondence Analysis of Sentiments

```
df <- dplyr::select(thinkAloudWords, doc_id, sentiment, expertise)
df <- df %>%
  group_by(expertise) %>%
  count(expertise, sentiment)
df <- as_tibble(df)
df <- df %>%
  pivot_wider(names_from = sentiment, values_from = n)
hvs <- df %>%
  dplyr::select(expertise)
df <- df %>%
  dplyr::select(-expertise)
df <- df / rowSums(df) * 100
df <- cbind(hvs, df)
df <- dplyr::select(thinkAloudWords, doc_id, sentiment, HVS_Cluster)
df <- df %>%
  group_by(HVS_Cluster) %>%
  count(HVS_Cluster, sentiment) %>%
  pivot_wider(names_from = sentiment, values_from = n)
df <- column_to_rownames(df, "HVS_Cluster")

# I really should do this CA with the reasoning
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symetric", repel = TRUE,
  title = "Sentiments and Human Value Scale (Symmetric)")
```



Plot NRC Words for Vignettes

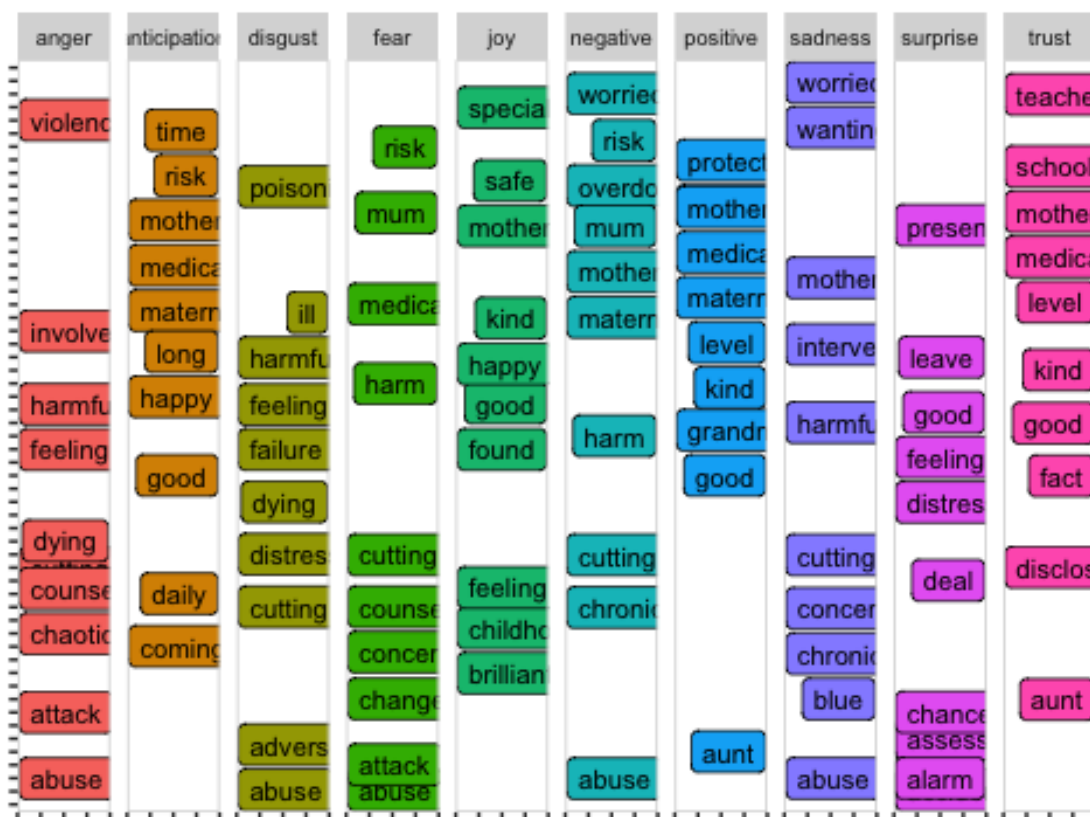
```
# Create a function to plot NRC words for selected focus group or individual
library(ggplot2)
nrc_plot <- function(title){
  p <- plot_words %>%
    # Set 'y = 1' to just plot one variable and use word as the label
    ggplot(aes(word, 1, label = word, fill = sentiment)) +
    # You want the words, not the points
    geom_point(color = 'transparent') +
    # Make sure the labels don't overlap
    geom_label_repel(force = 1, nudge_y = .5,
      direction = "y",
      box.padding = 0.04,
      segment.color = "transparent",
      size = 3) +
    facet_grid(~sentiment) +
    #theme_sentiments() +
    theme(axis.text.y = element_blank(), axis.text.x = element_blank(),
      axis.title.x = element_text(size = 9),
      legend.position = "none",
      panel.grid = element_blank(), panel.background = element_blank(),
      panel.border = element_rect("lightgray", fill = NA),
      strip.text.x = element_text(size = 7)) +
    xlab(NULL) + ylab(NULL) +
    ggtitle(paste("NRC Sentiments for", title, sep = " ")) +
    coord_flip()
}
```

```
print(p)
}
```

NRC Plot for Vignette 1

```
plot_words <- thinkAloudWords %>%
  filter(vignette %in% c("Vignette_1")) %>%
  group_by(sentiment) %>%
  count(word, sort = TRUE) %>%
  arrange(desc(n)) %>%
  slice(seq_len(10)) %>%
  ungroup()
nrc_plot("Vignette 1")
```

NRC Sentiments for Vignette 1



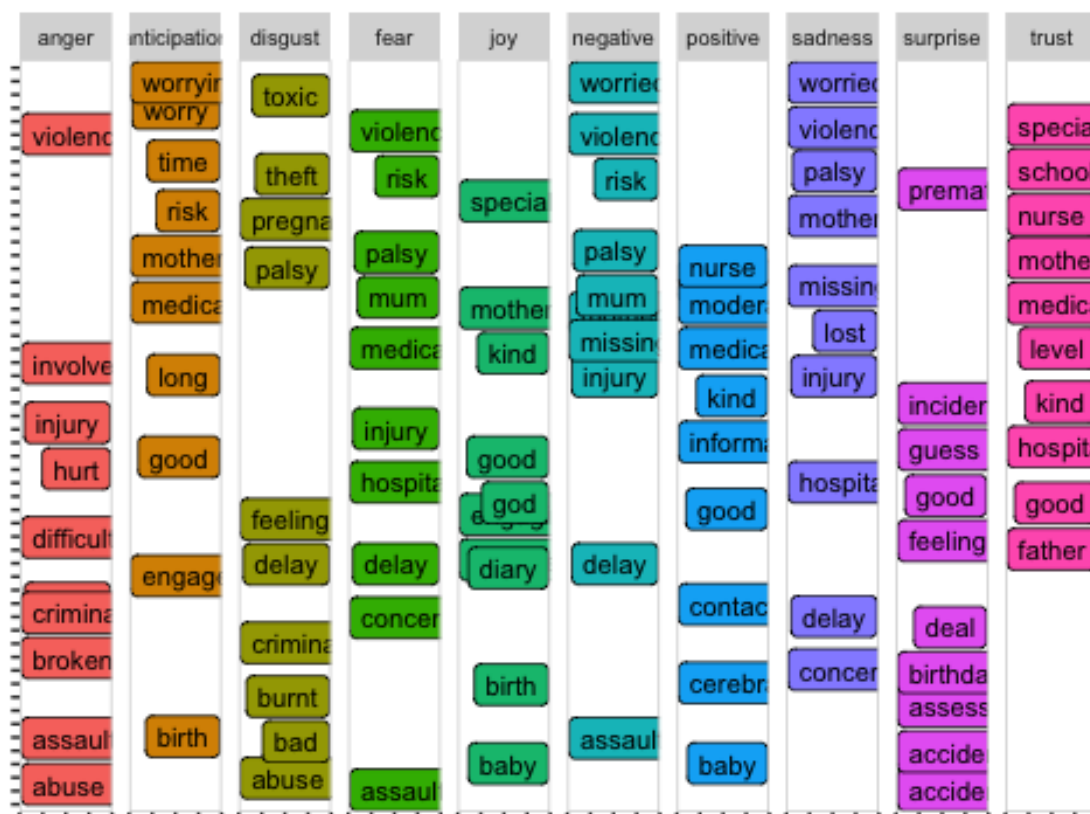
NRC Plot for Vignette 2

```

plot_words <- thinkAloudWords %>%
  filter(vignette %in% c("Vignette_2")) %>%
  group_by(sentiment) %>%
  count(word, sort = TRUE) %>%
  arrange(desc(n)) %>%
  slice(seq_len(10)) %>%
  ungroup()
nrc_plot("Vignette 2")

```

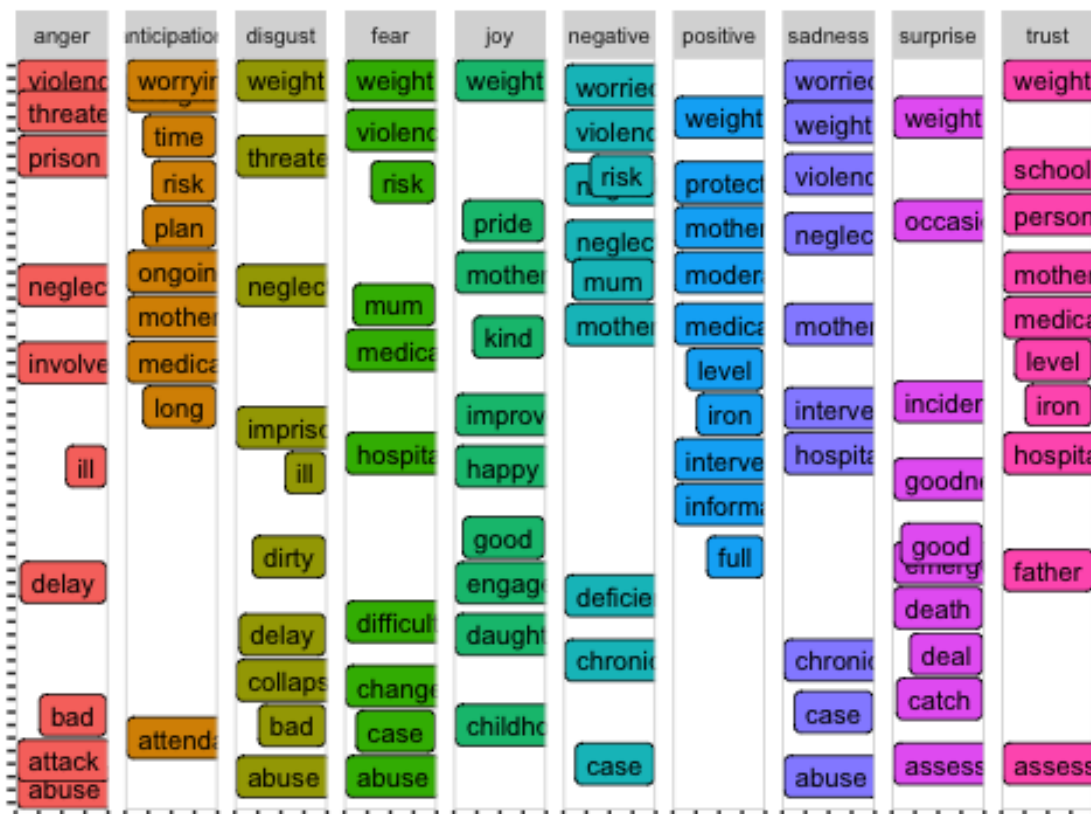
NRC Sentiments for Vignette 2



NRC Plot for Vignette 3

```
plot_words <- thinkAloudWords %>%
  filter(vignette %in% c("Vignette_3")) %>%
  group_by(sentiment) %>%
  count(word, sort = TRUE) %>%
  arrange(desc(n)) %>%
  slice(seq_len(10)) %>%
  ungroup()
nrc_plot("Vignette 3")
```

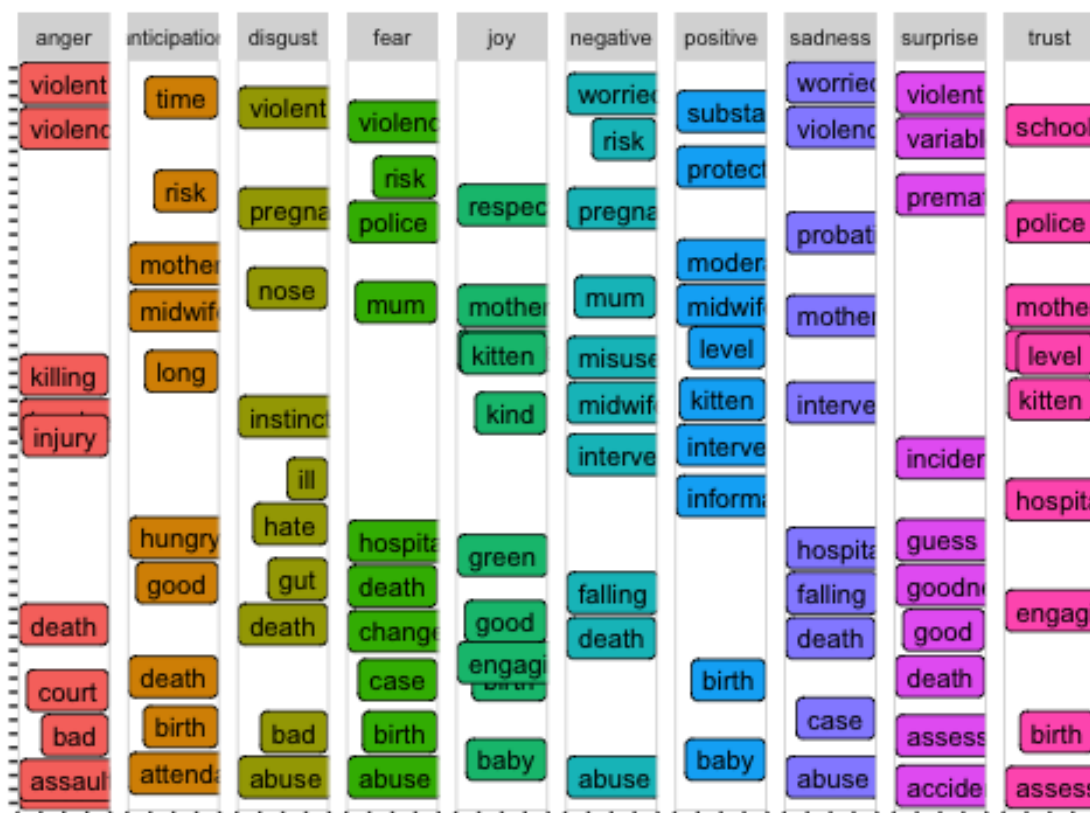
NRC Sentiments for Vignette 3



NRC Plot for Vignette 4

```
plot_words <- thinkAloudWords %>%
  filter(vignette %in% c("Vignette_4")) %>%
  group_by(sentiment) %>%
  count(word, sort = TRUE) %>%
  arrange(desc(n)) %>%
  slice(seq_len(10)) %>%
  ungroup()
nrc_plot("Vignette 4")
```

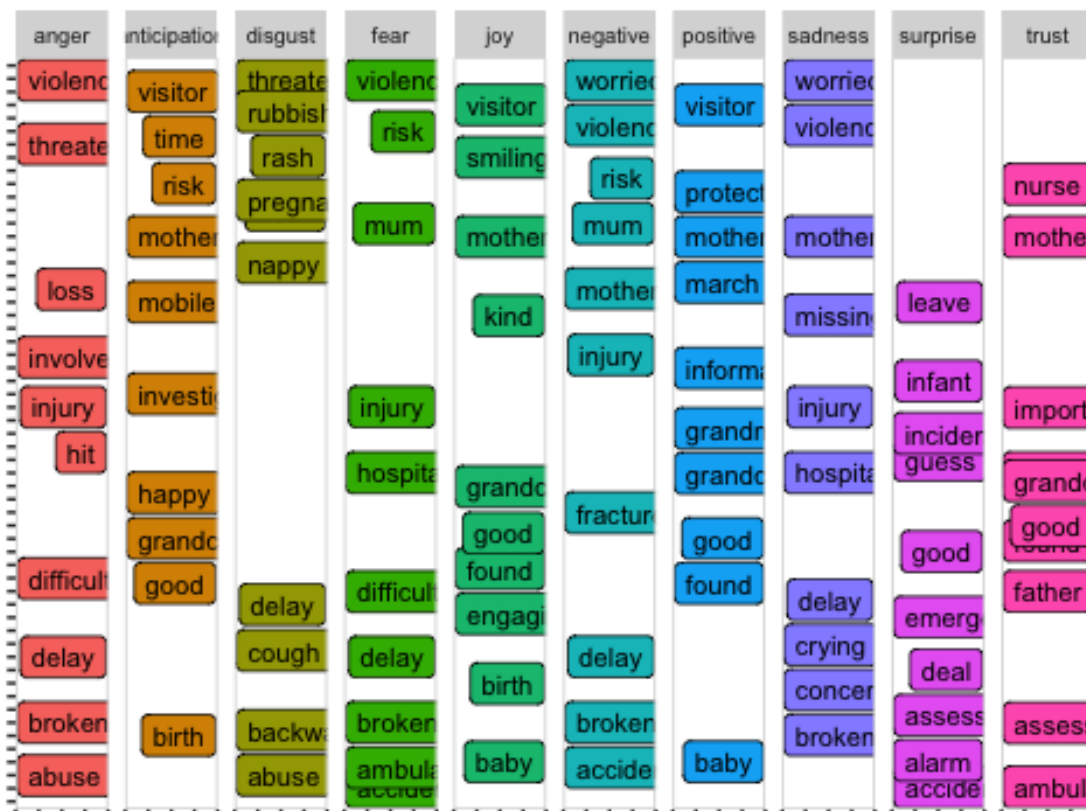
NRC Sentiments for Vignette 4



NRC Plot for Vignette 5

```
plot_words <- thinkAloudWords %>%
  filter(vignette %in% c("Vignette_5")) %>%
  group_by(sentiment) %>%
  count(word, sort = TRUE) %>%
  arrange(desc(n)) %>%
  slice(seq_len(10)) %>%
  ungroup()
nrc_plot("Vignette 5")
```

NRC Sentiments for Vignette 5



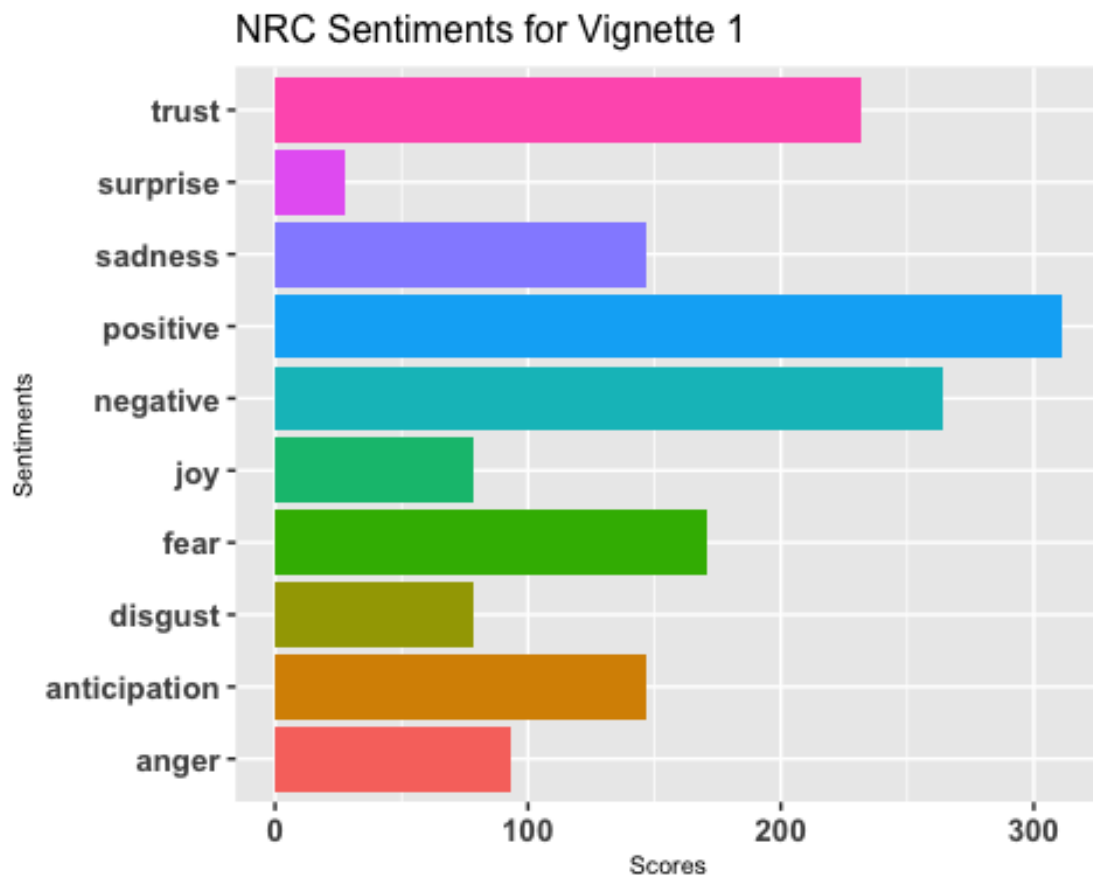
9.4.9 Analyse NRC Sentiments

```
# Create function to plot NRC Sentiment Counts for focus group
prNRC <- function(title) {
  df <- as.data.frame(table(df$sentiment))
  p <- ggplot(data=df, aes(x=Var1, y=Freq))+
    geom_bar(aes(fill=Var1), stat = "identity")+
    theme(legend.position="none")+
    xlab("Sentiments")+ylab("Scores")+
    ggtitle("Total sentiment based on scores")+
    theme(axis.text=element_text(size=10,face="bold"),
          axis.title=element_text(size=8),
          legend.position = "none",
          plot.title = element_text(size=12)) +
    ggtitle(paste("NRC Sentiments for", title, sep = " ")) +
    coord_flip()
  print(p)
}
```

9.4.9.1 NRC Counts

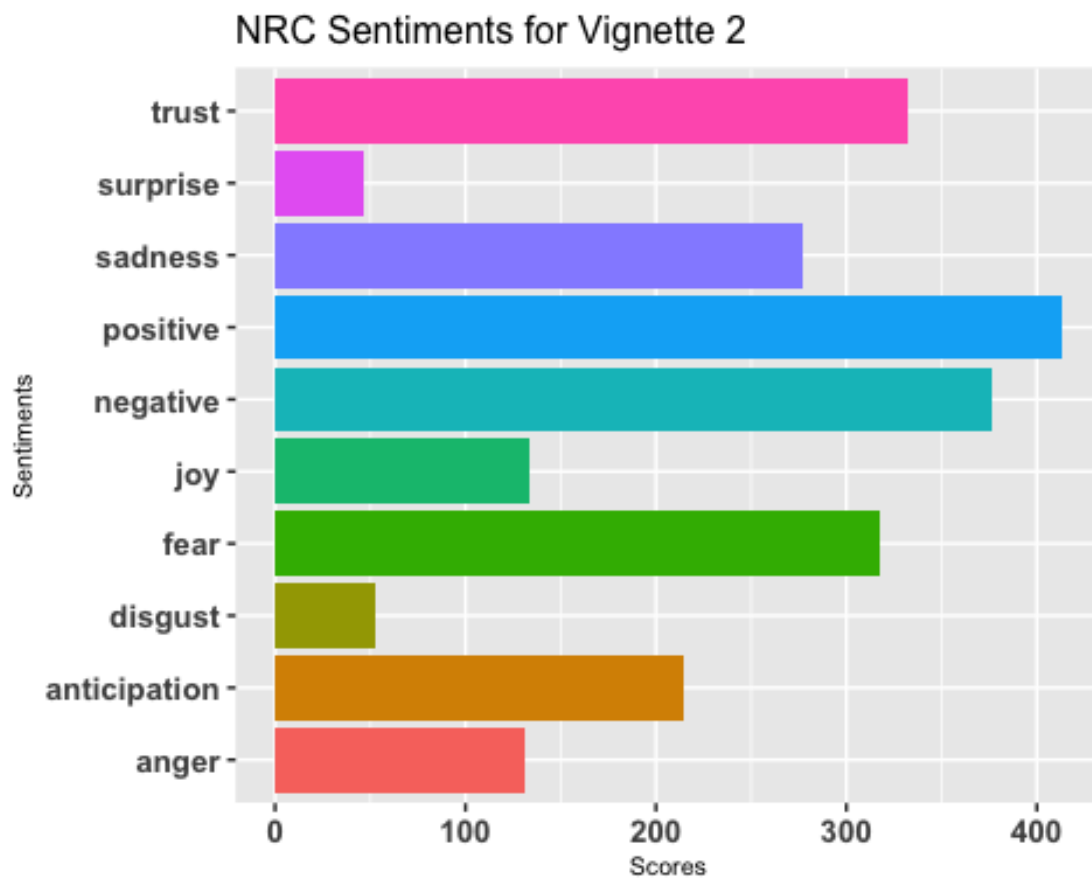
Vignette 1

```
df <- filter(thinkAloudWords, vignette == "Vignette_1")
prNRC("Vignette 1")
```



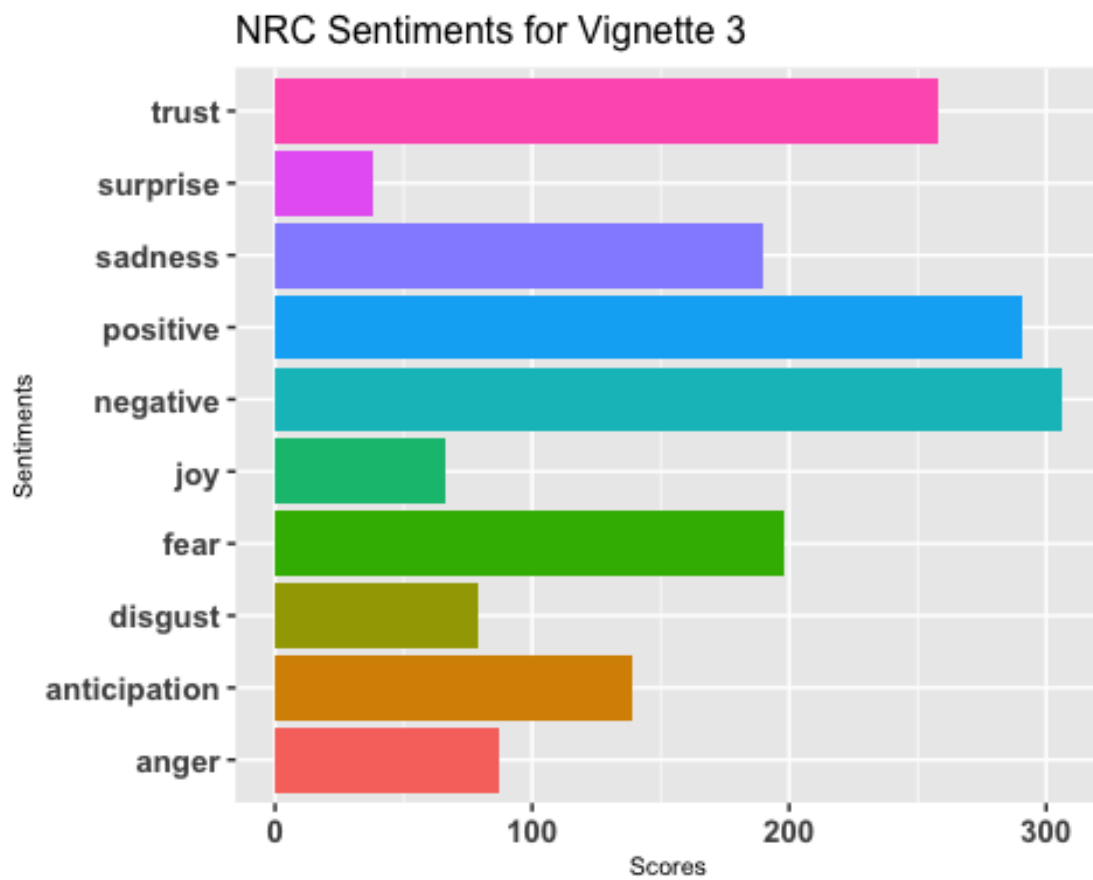
Vignette 2

```
df <- filter(thinkAloudWords, vignette == "Vignette_2")  
prNRC("Vignette 2")
```



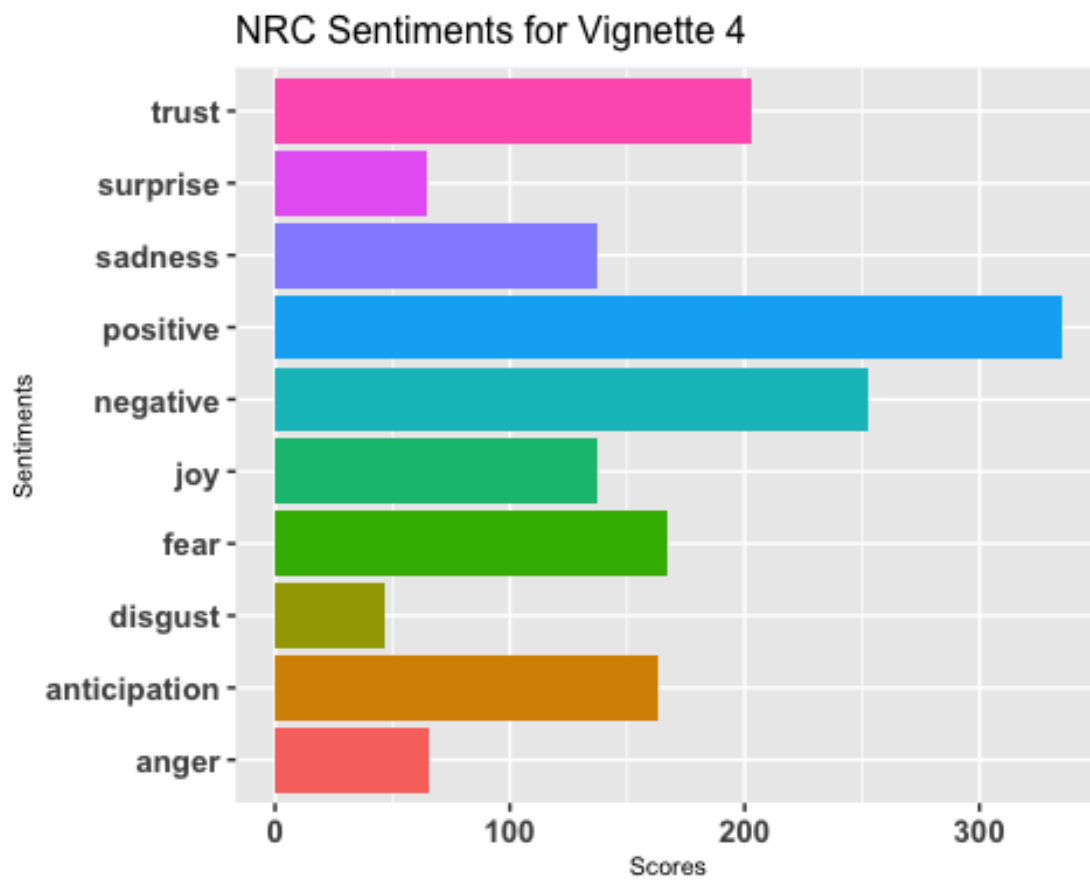
Vignette 3

```
df <- filter(thinkAloudWords, vignette == "Vignette_3")  
prNRC("Vignette 3")
```



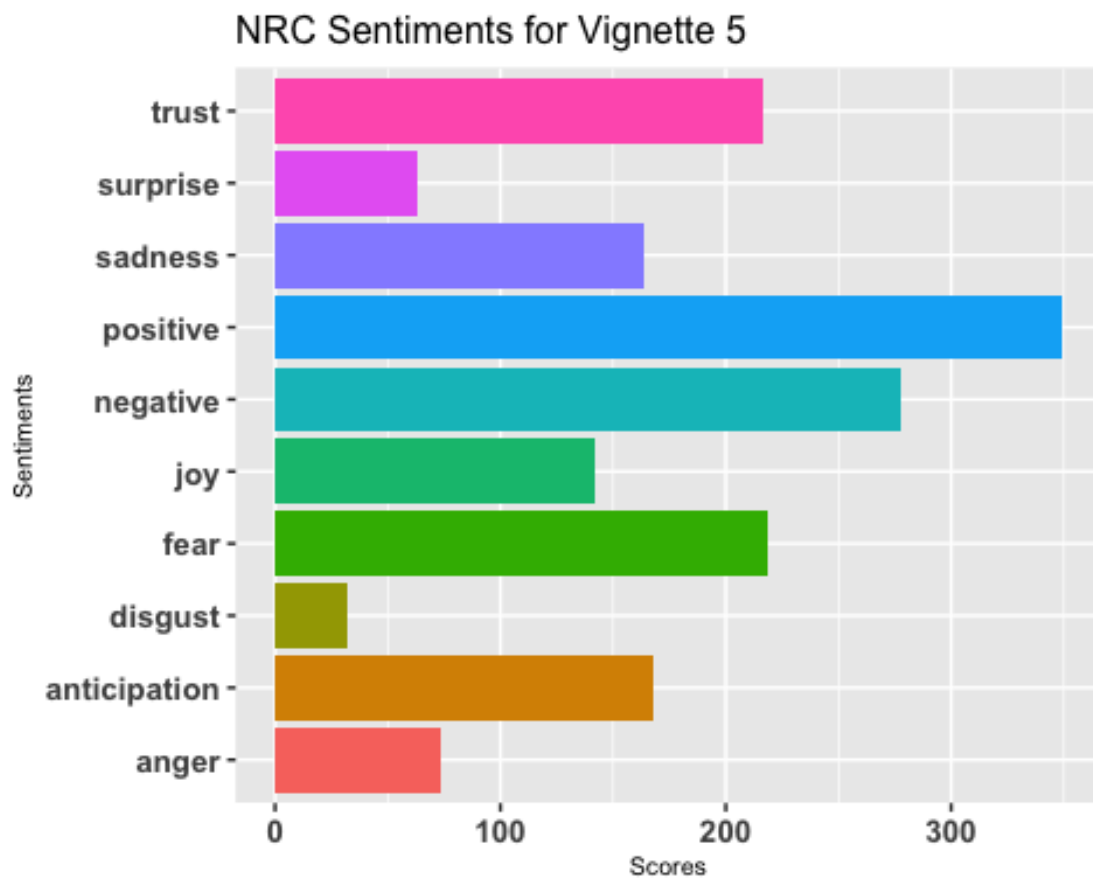
Vignette 4

```
df <- filter(thinkAloudWords, vignette == "Vignette_4")  
prNRC("Vignette 4")
```



Vignette 5

```
df <- filter(thinkAloudWords, vignette == "Vignette_5")  
prNRC("Vignette 5")
```

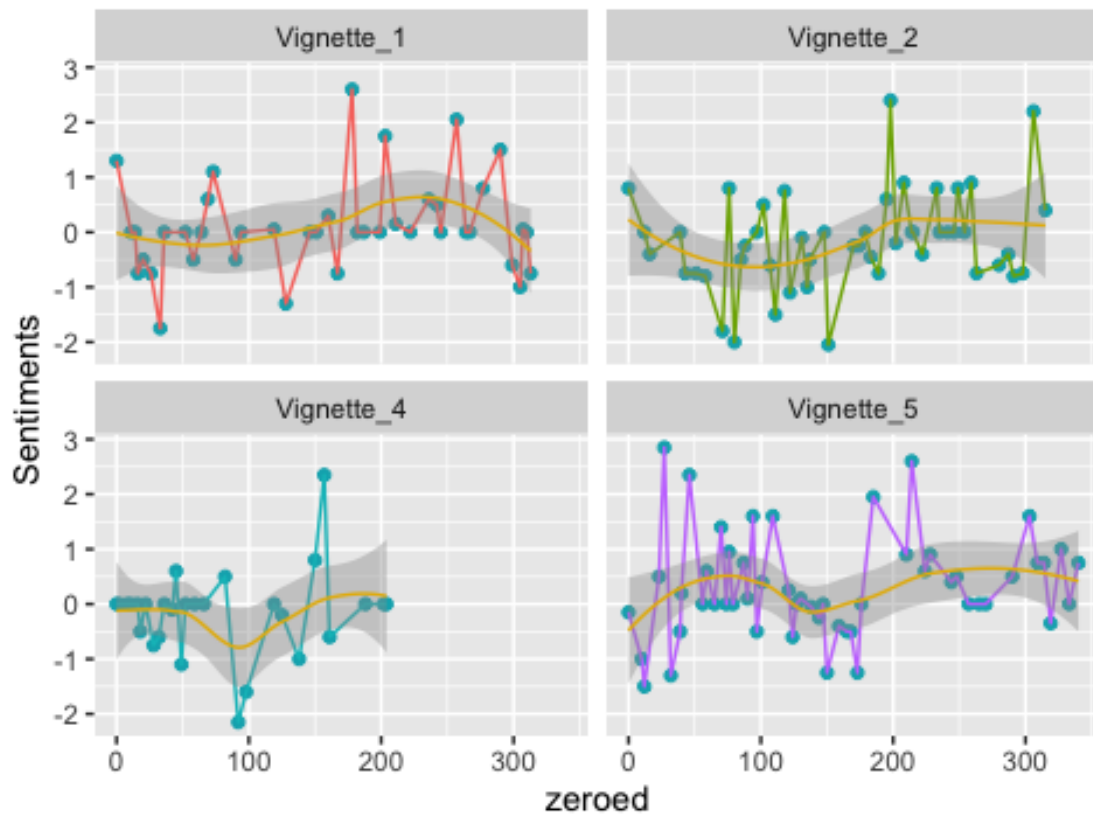


9.4.10 Sentiment Scores for each participant in relation to vignettes

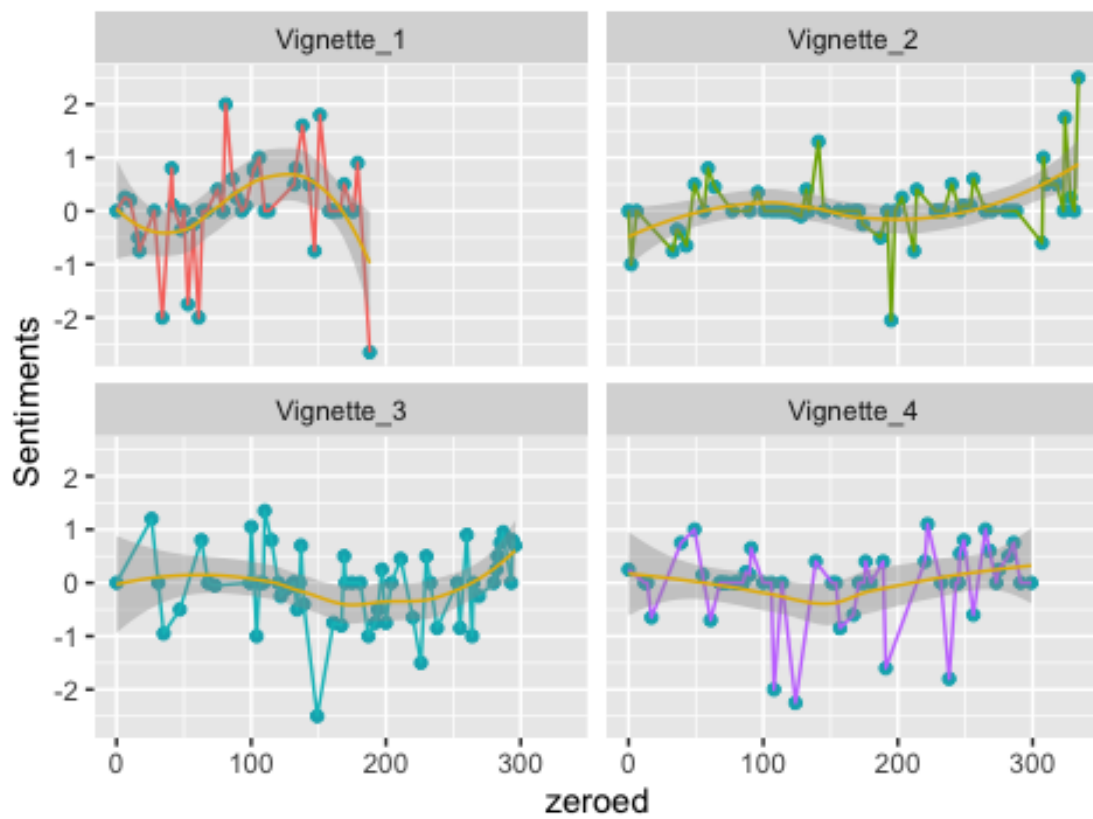
```
df <- dplyr::select(transcripts, doc_id, seconds, text, Sentiments, vignette)
df <- df[!duplicated(df), ]
# Remove participant where keylog is corrupt
df <- dplyr::filter(df, doc_id != "8411")
x <- unique(df$doc_id)
pl_sent <- function(q) {
  print(ggplot(data = q, aes(x = zeroed, y = Sentiments, color = vignette))+
    geom_point(color = "#00AFBB", size = 1.5) +
    geom_line()+
    labs(title = y) +
    geom_smooth(method = "loess", color = "#E7B803", size = 0.5) +
    theme(legend.position = "none") +
    facet_wrap(~ vignette, scales = "fixed", ncol = 2))
}

# Filter for participant here
for (i in 1:length(x)) {
  y <- x[i]
  df1 <- dplyr::filter(df, doc_id == y)
  df1 <- df1 %>%
    group_by(doc_id, vignette) %>%
    mutate(first(seconds)) %>%
    mutate(zeroed = seconds - first(seconds))
  df <- df[complete.cases(df), ]
  # Offset seconds to zero for each vignette
  pl_sent(df1)
}
```

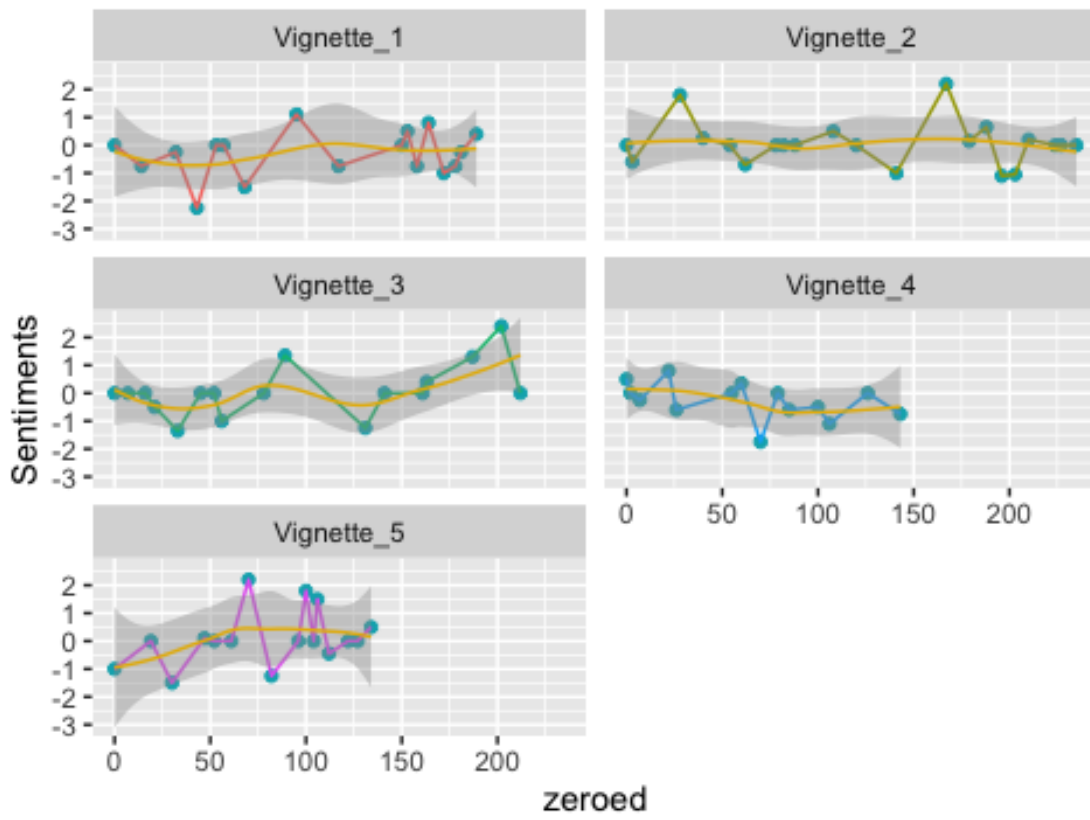

1185



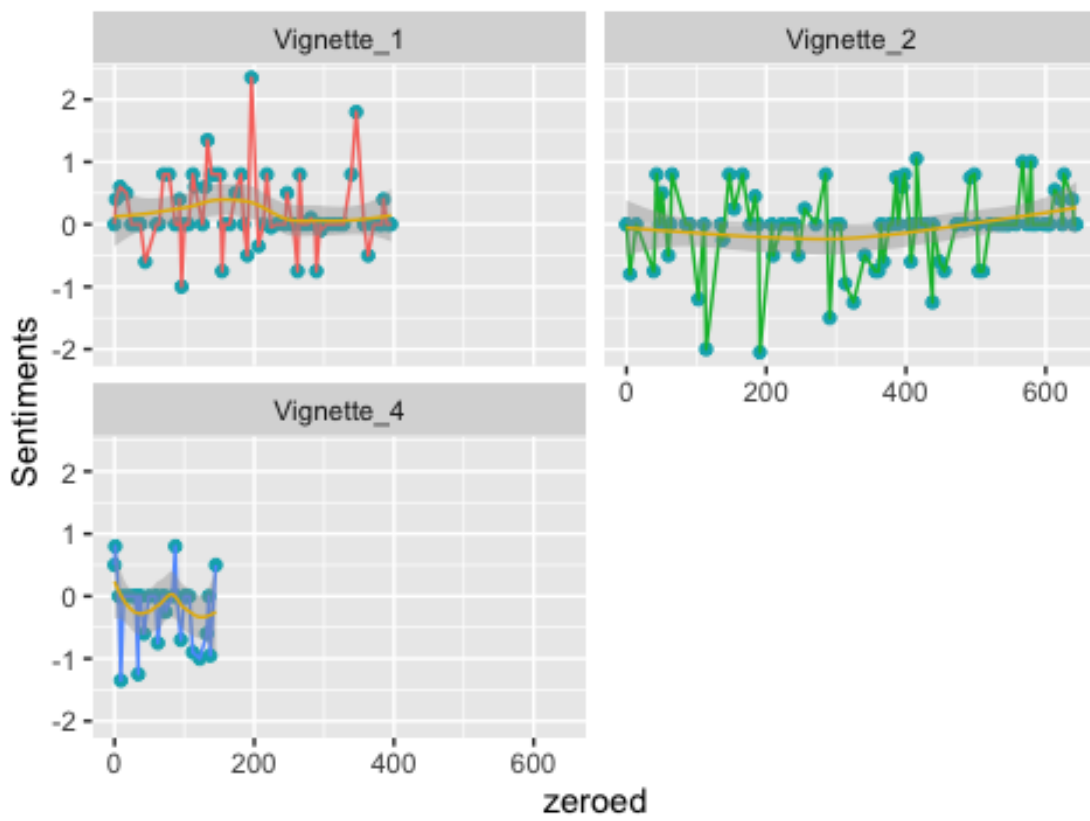
1237



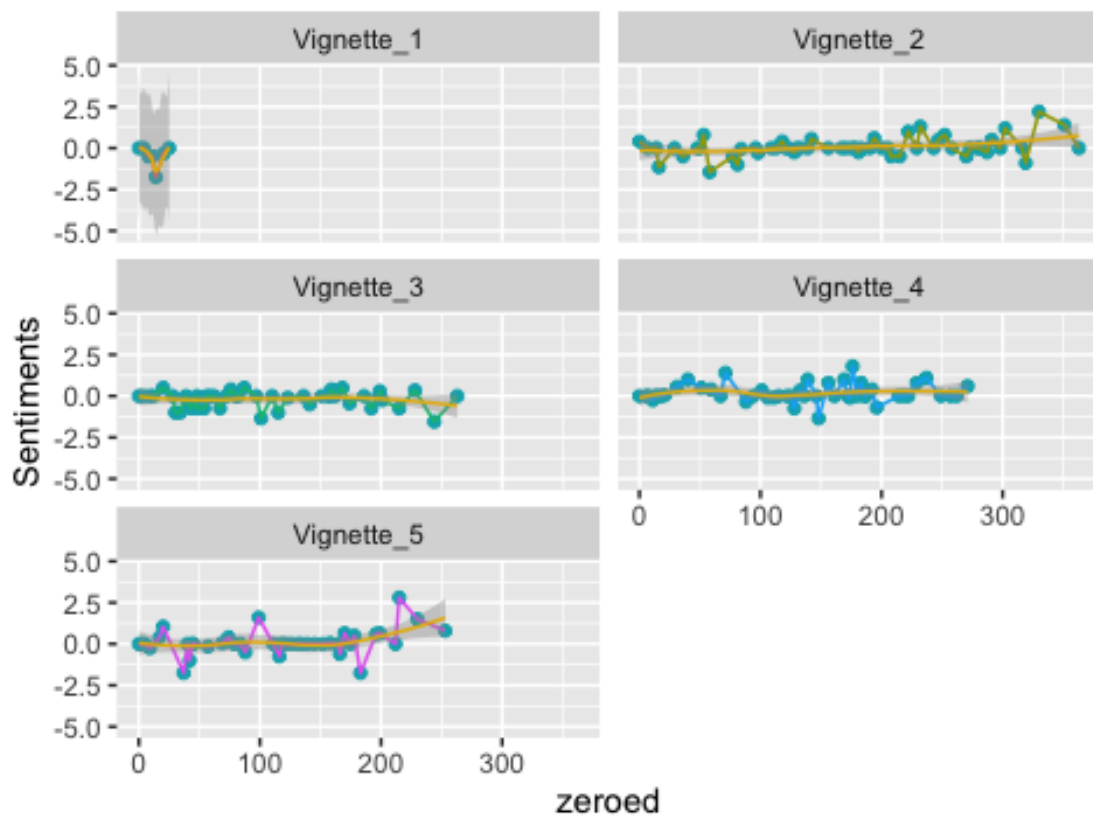
1444



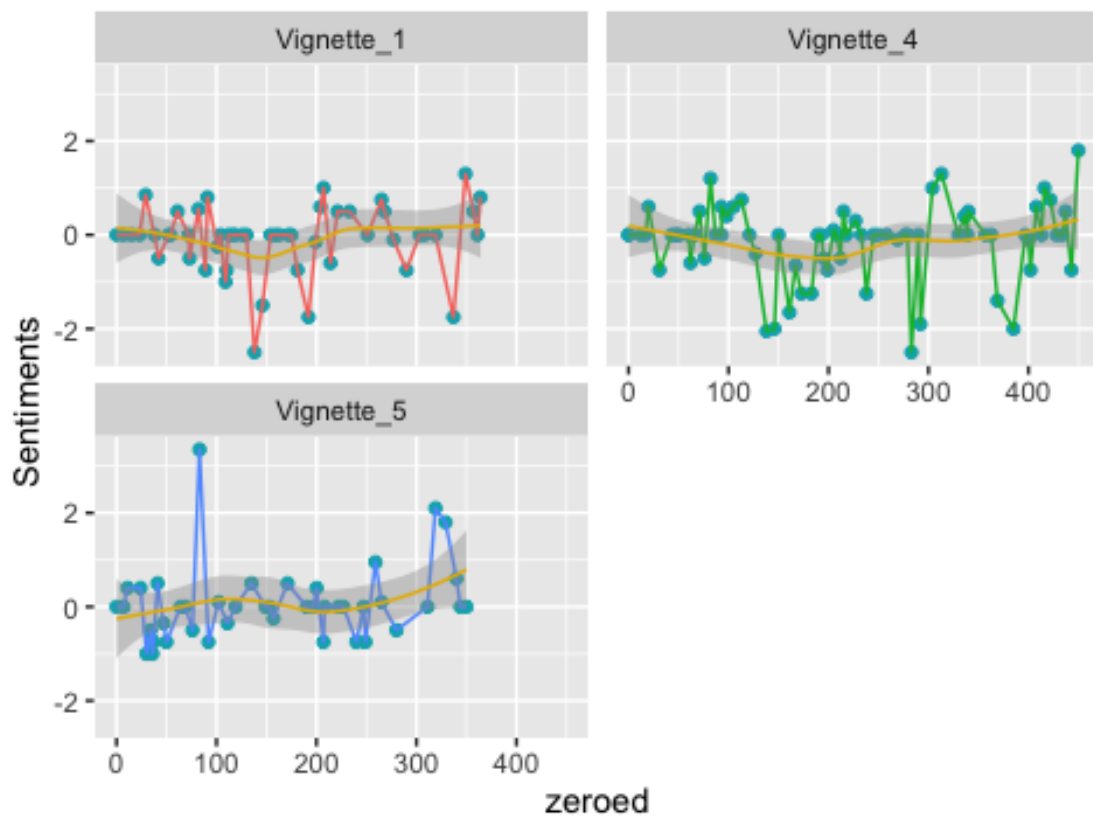
1722



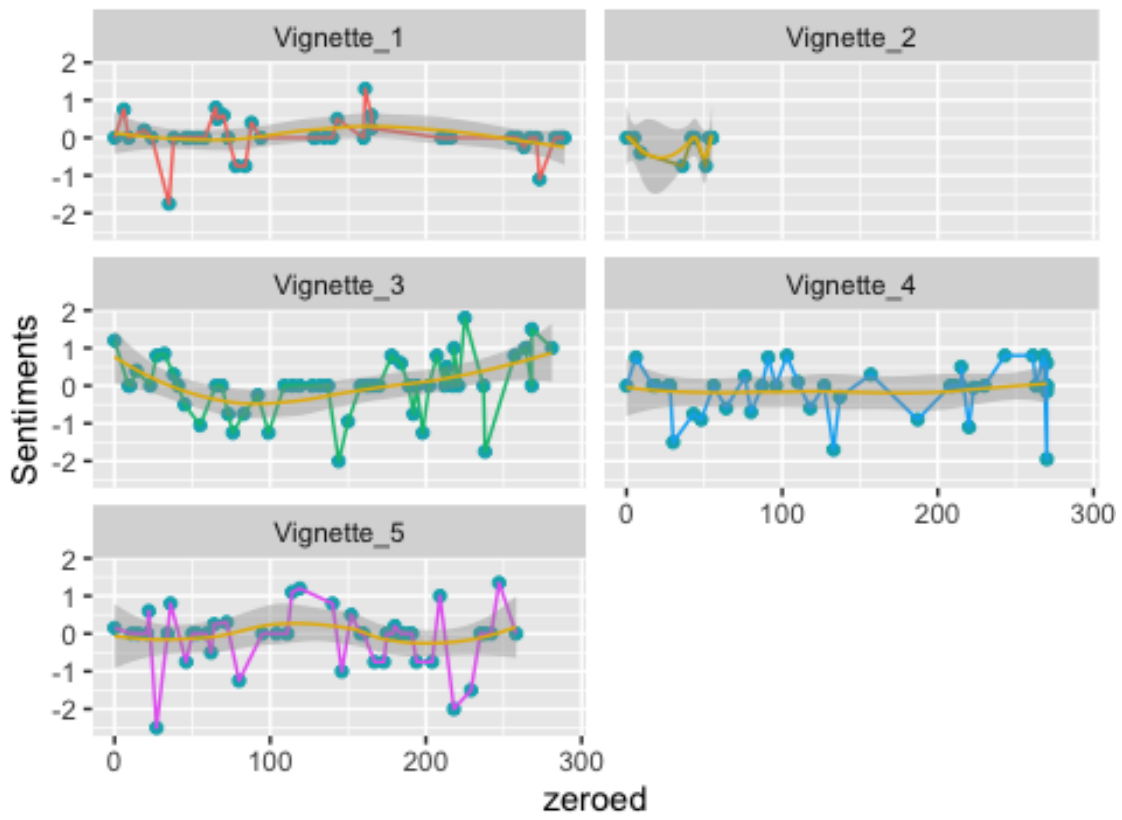
1757



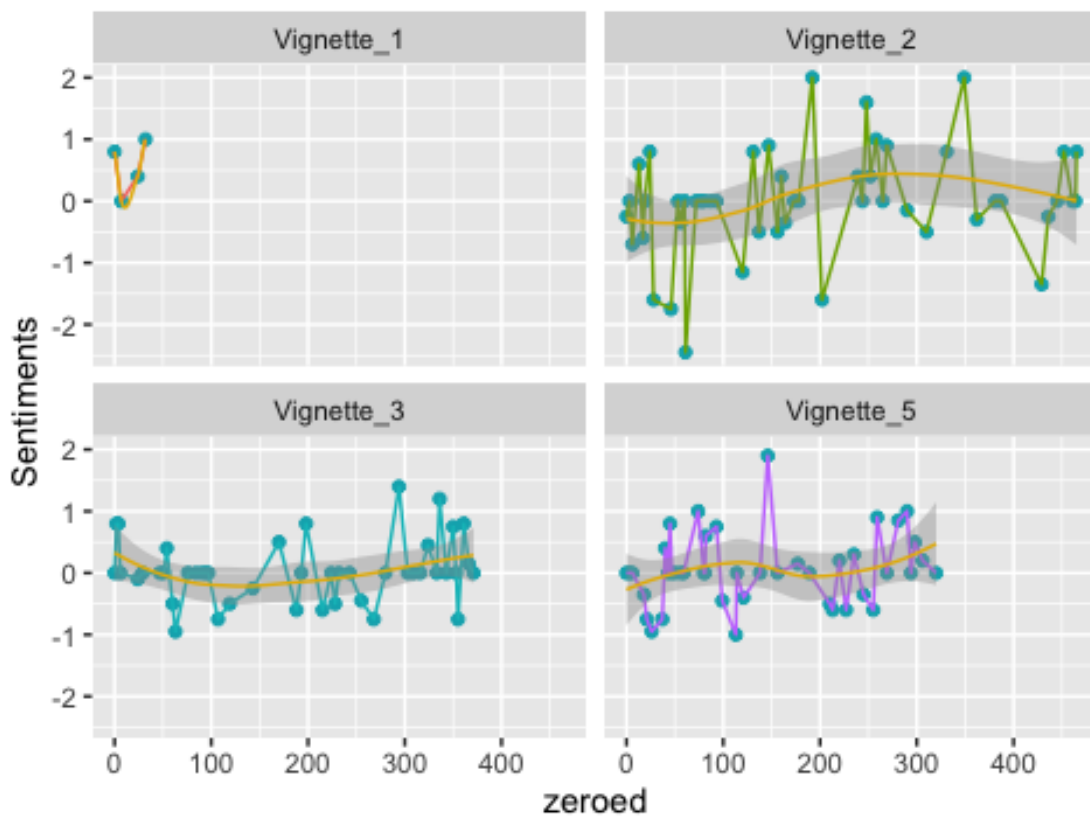
2131



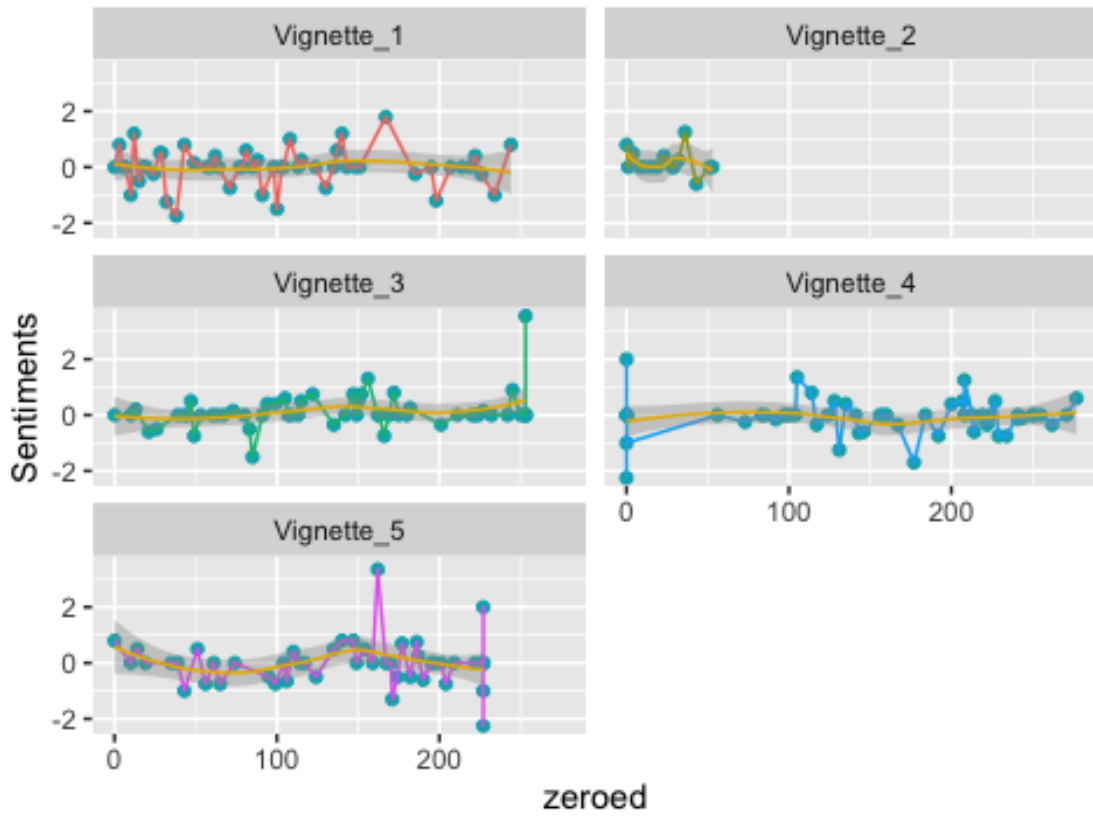
2228



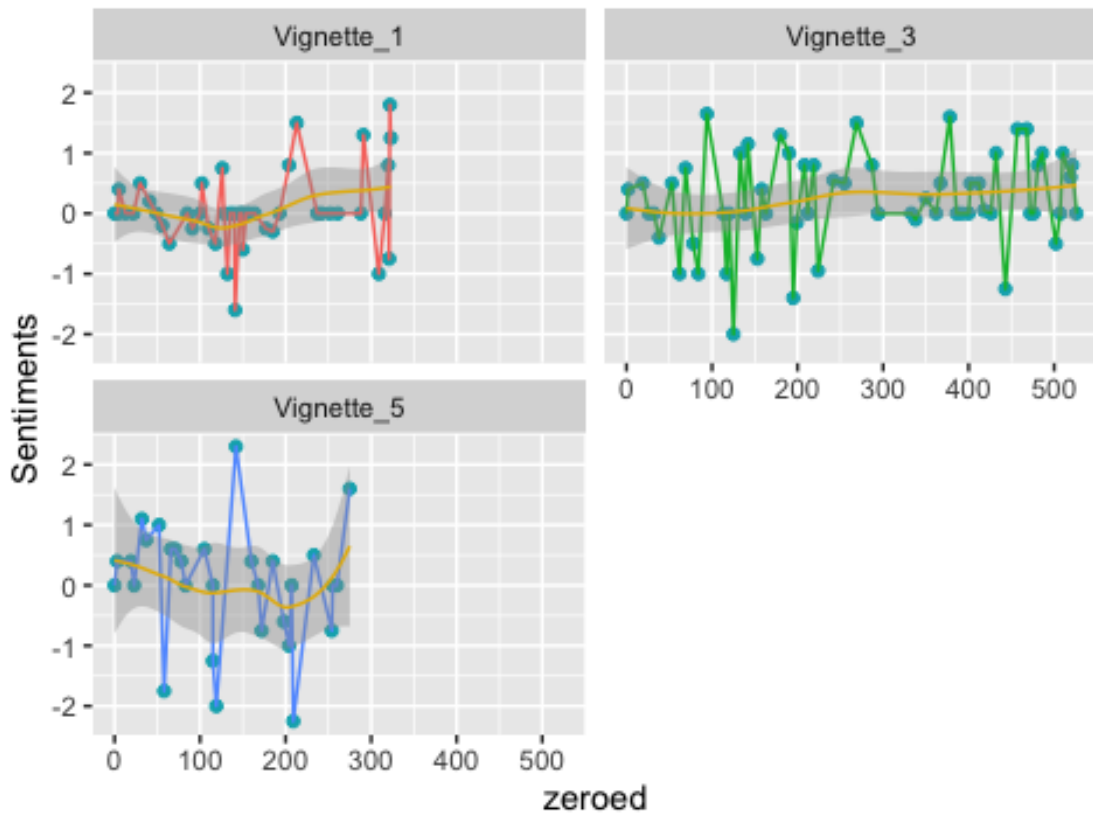
3726



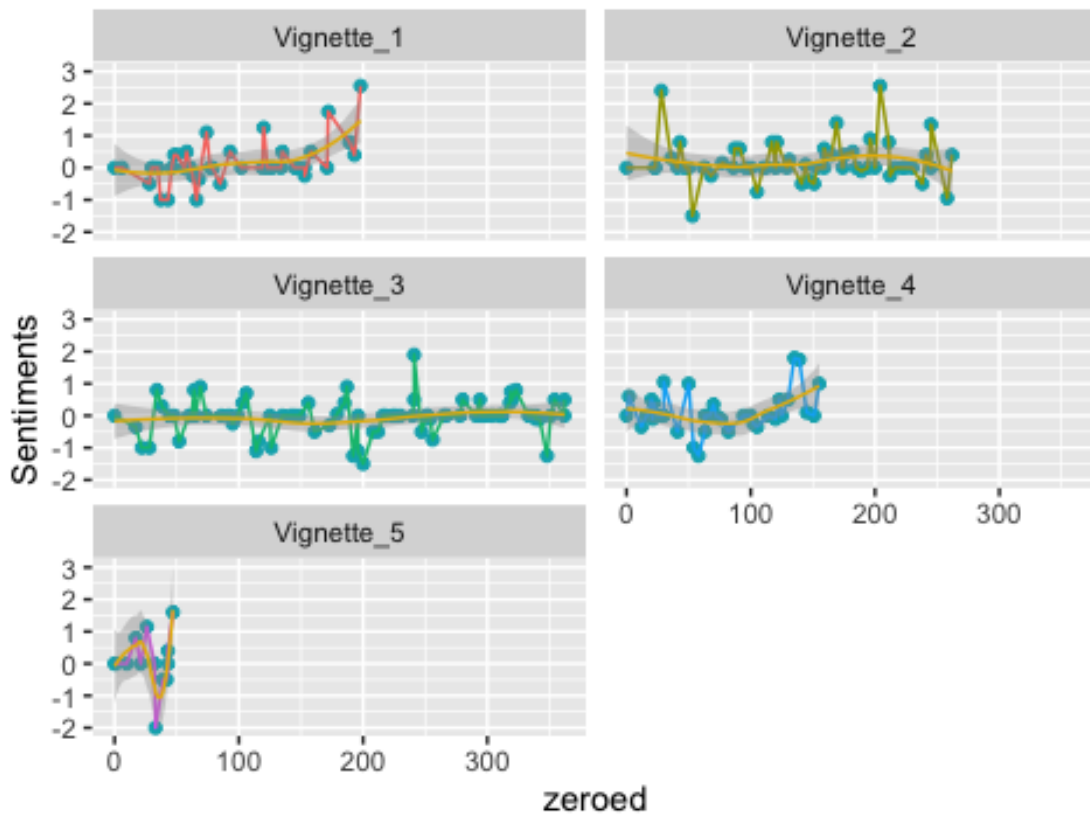
3745



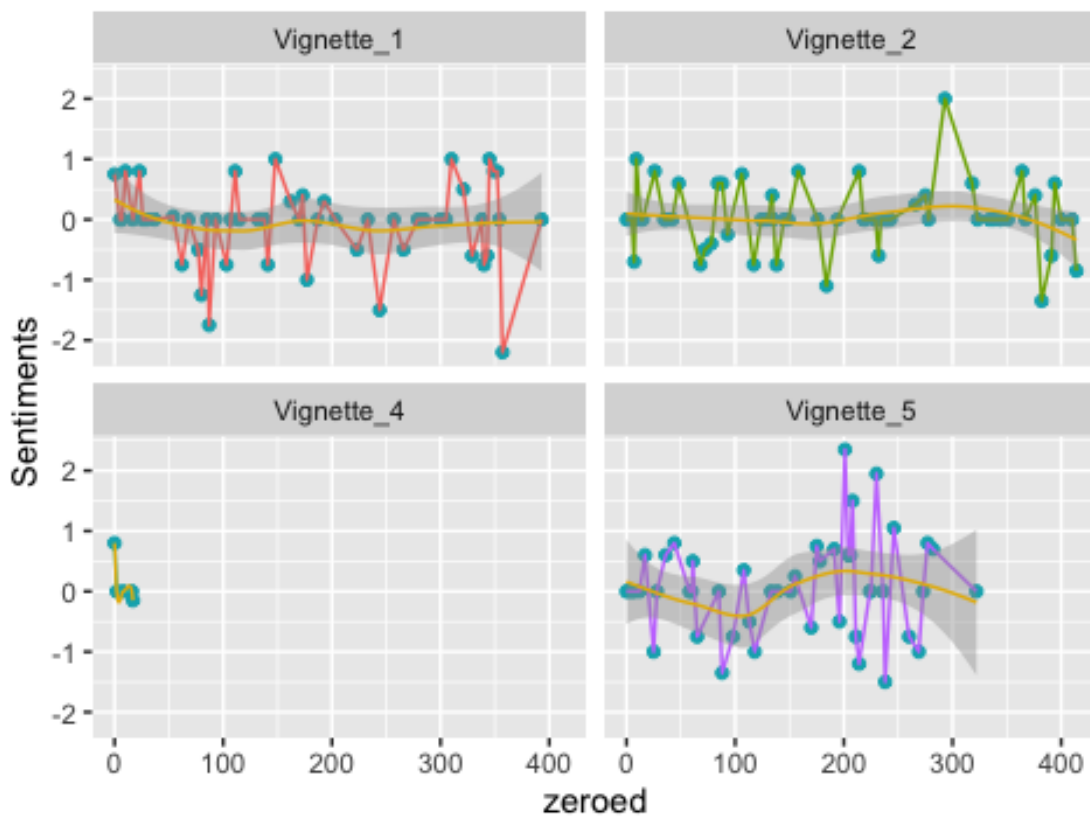
3878



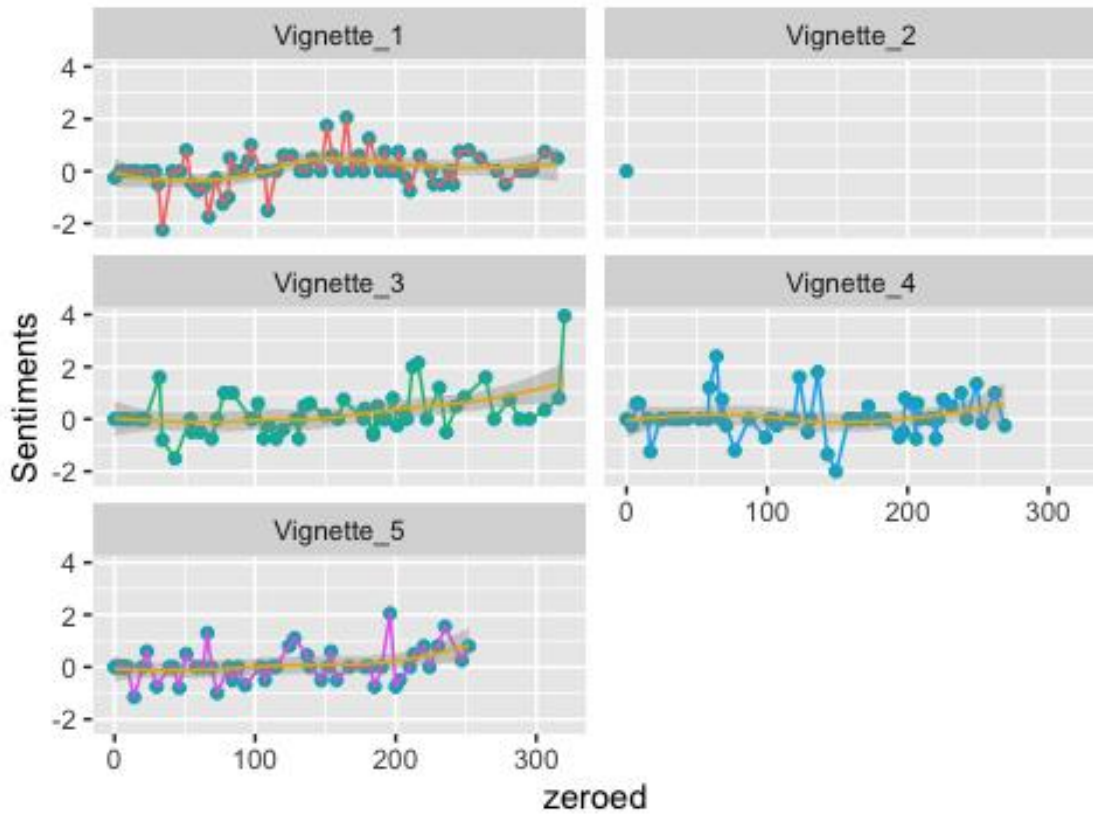
4302



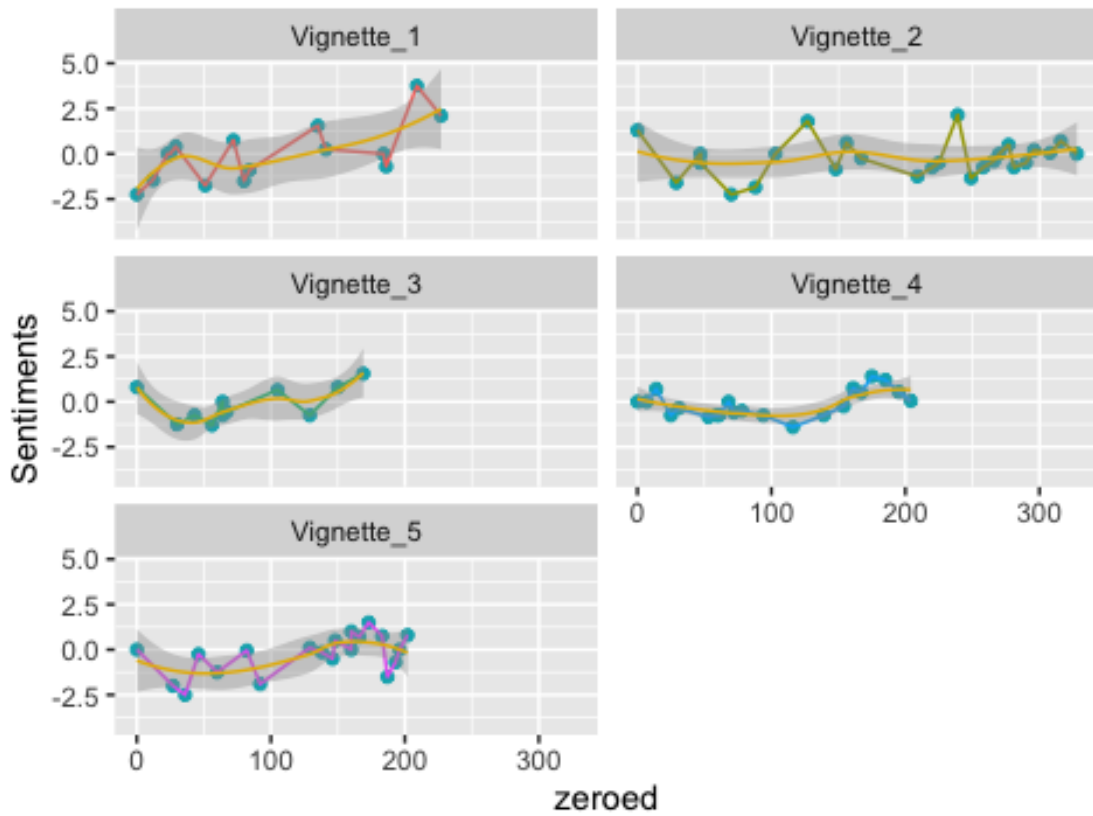
4760



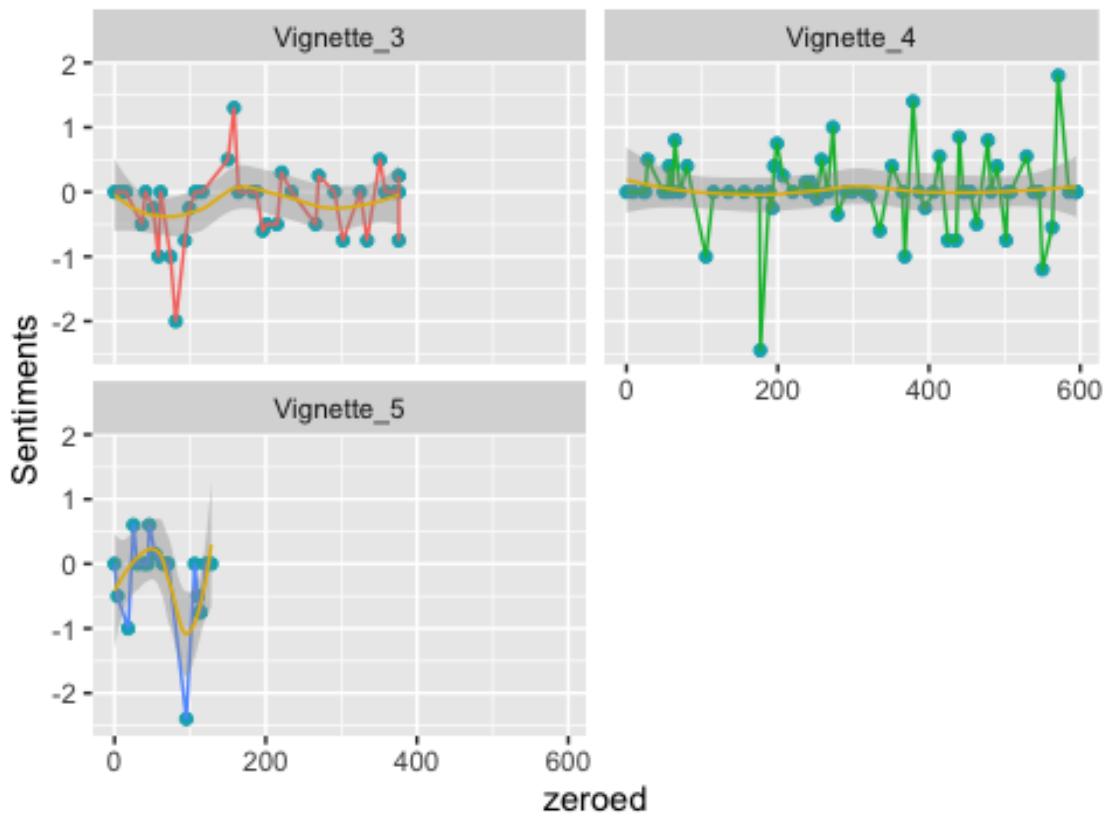
6285



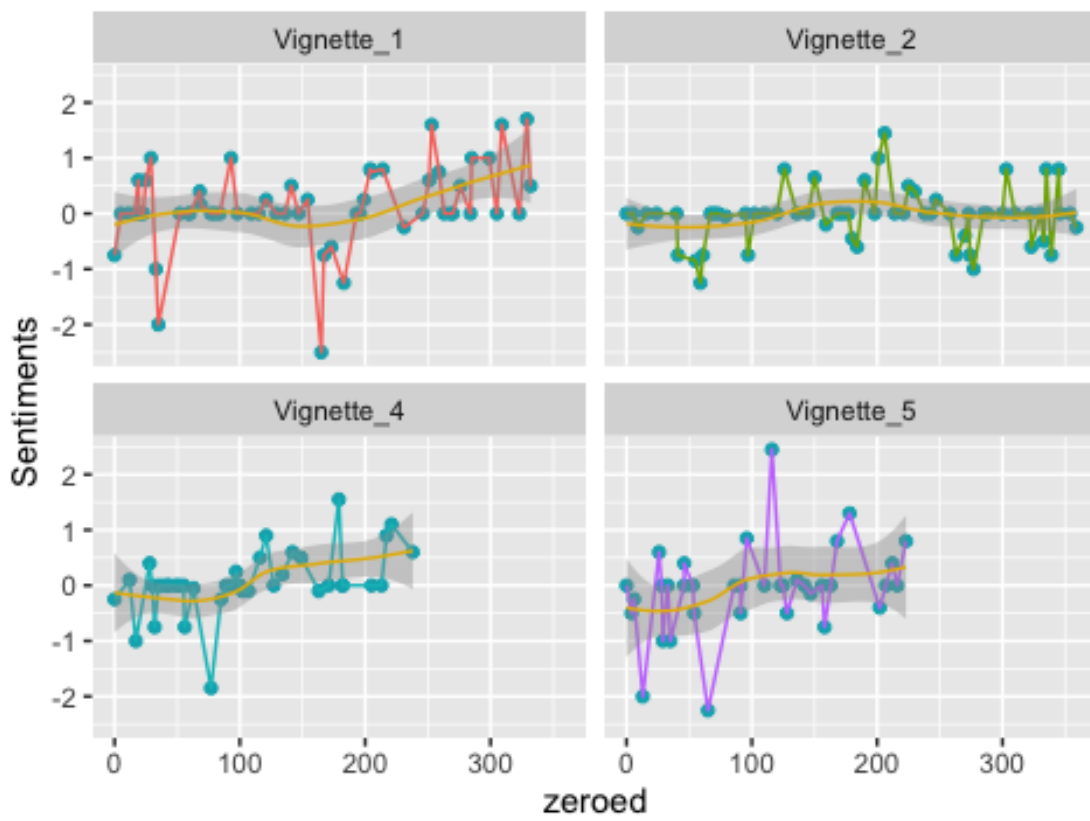
6977



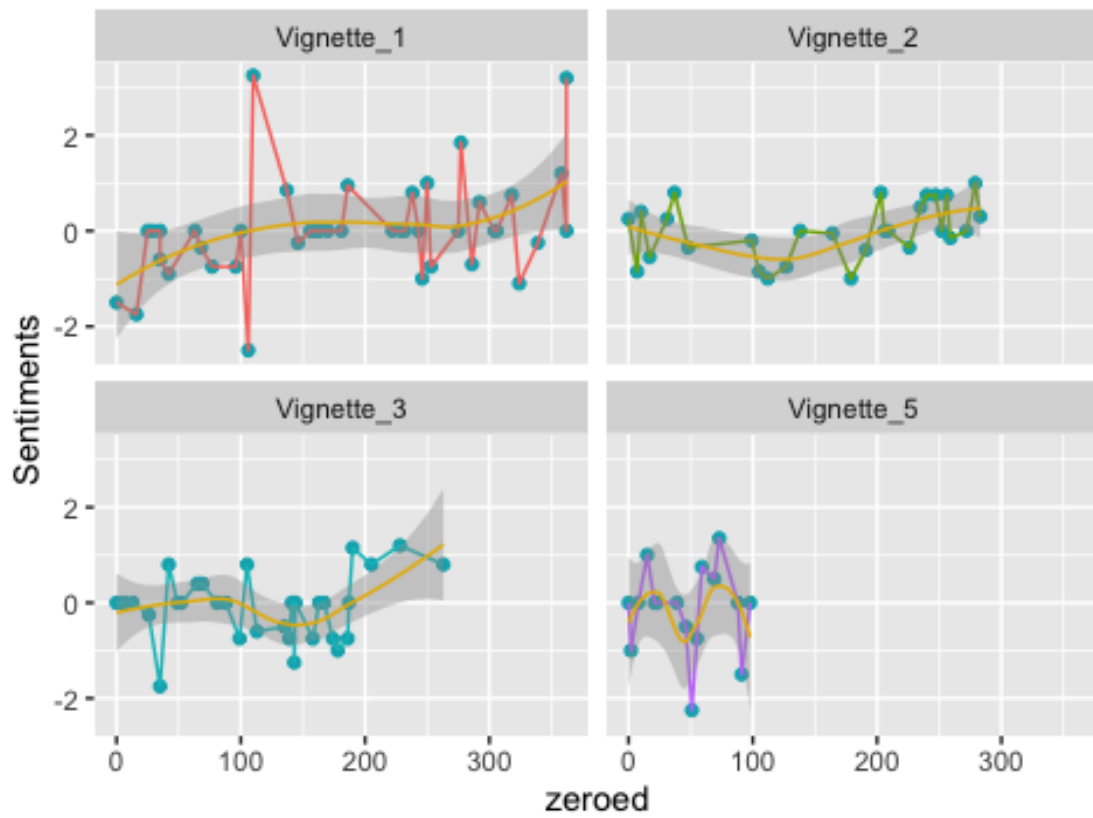
6982



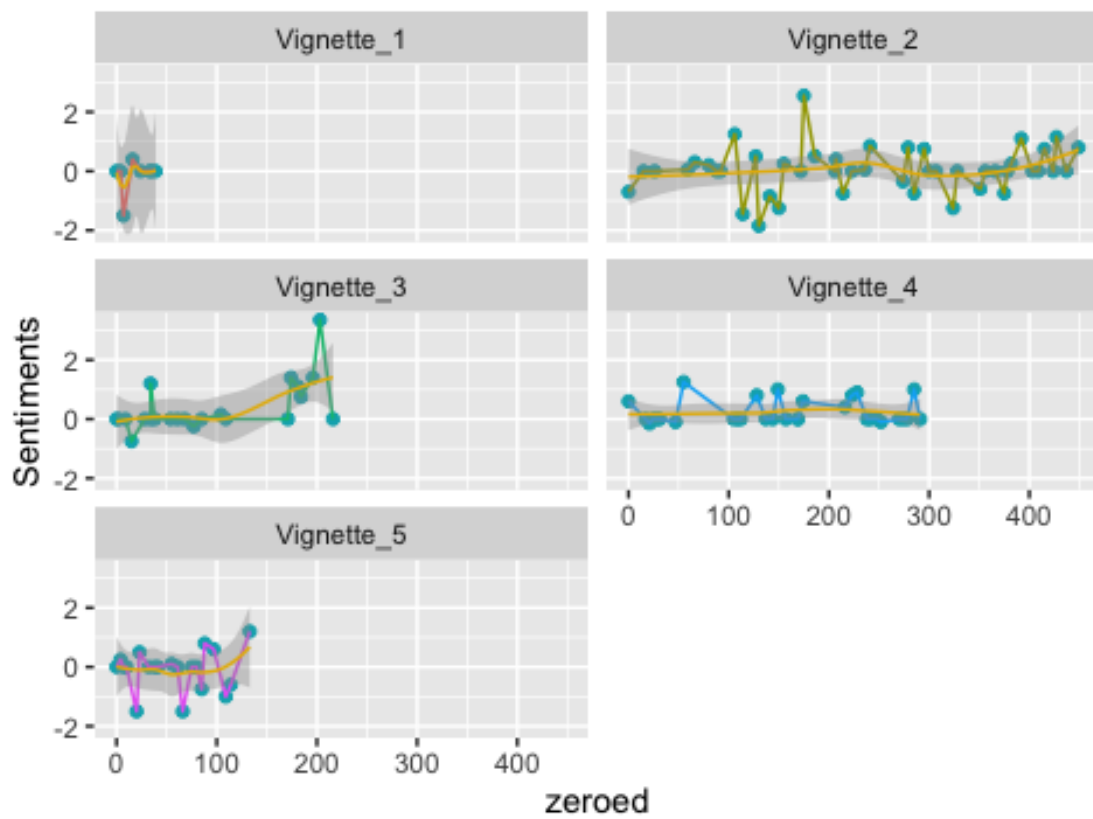
7433



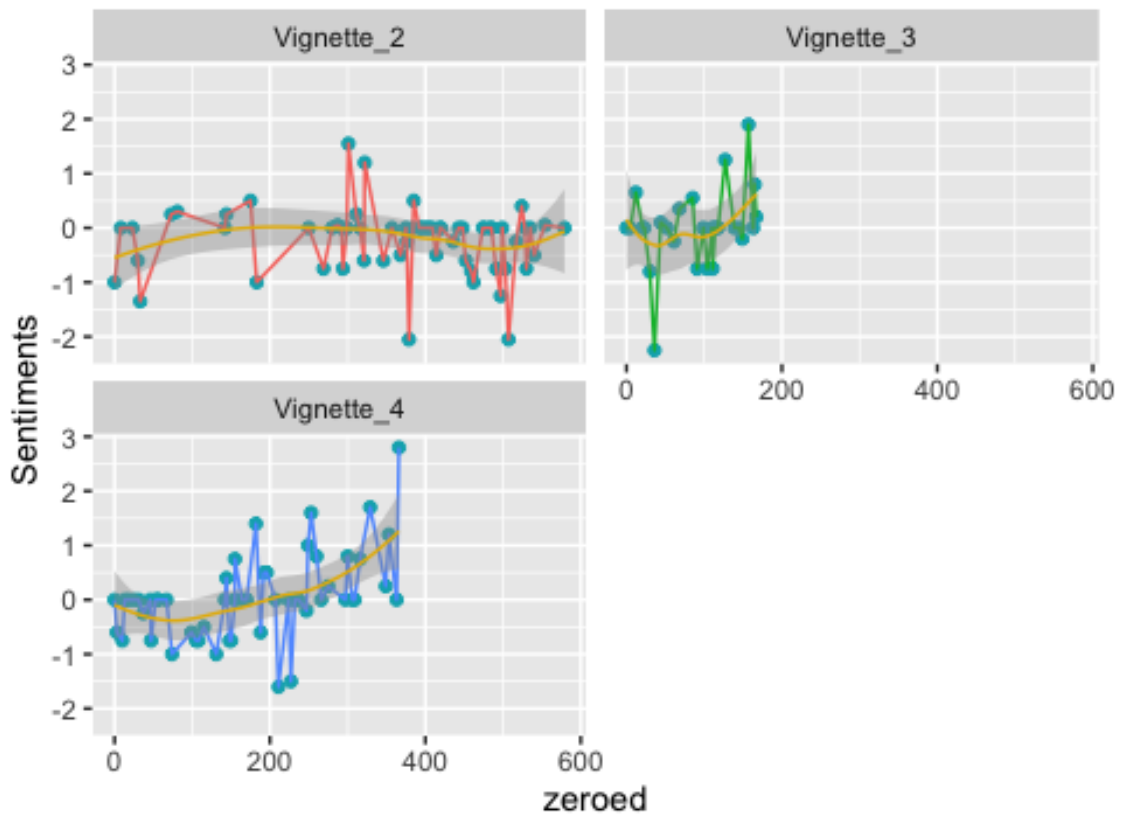
7603



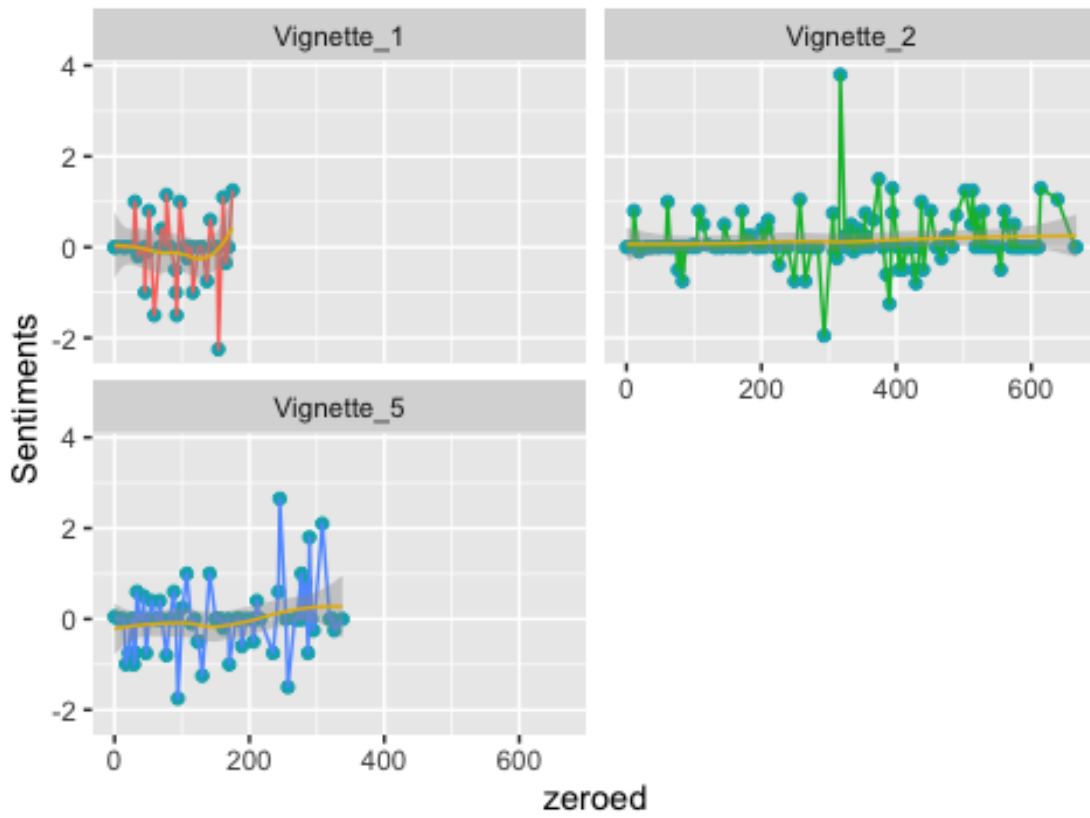
7804



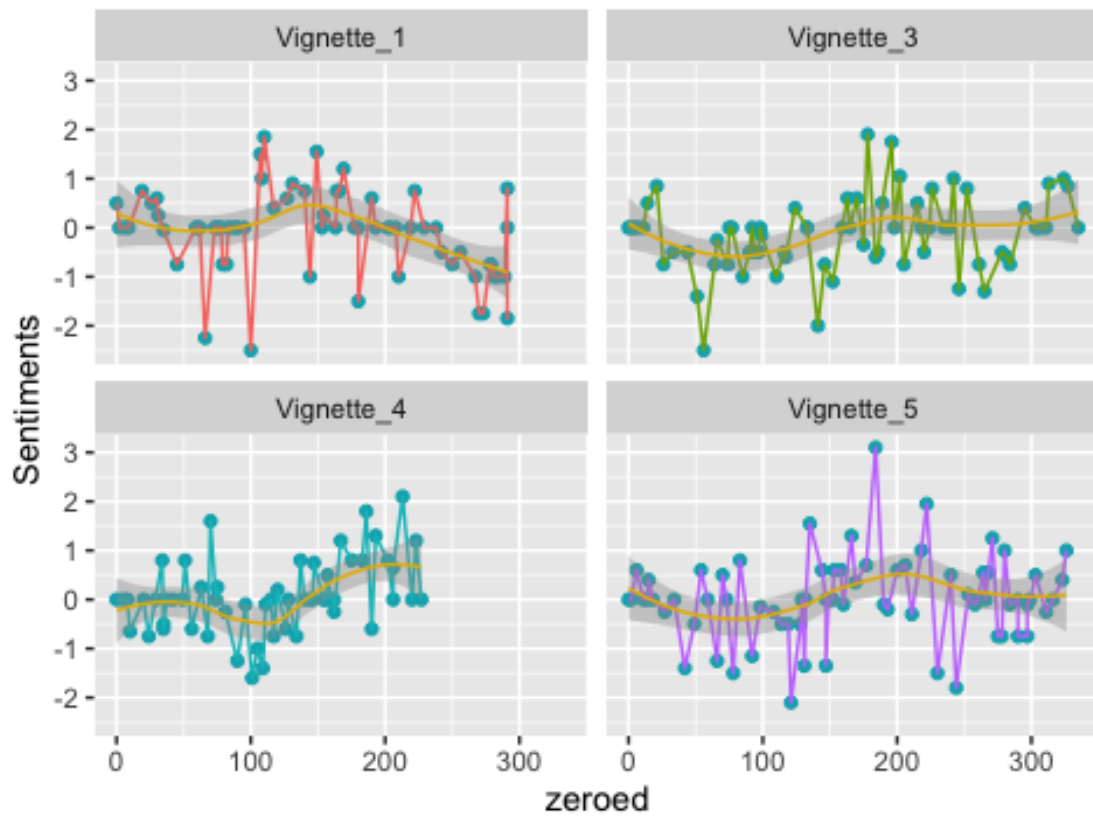
8374



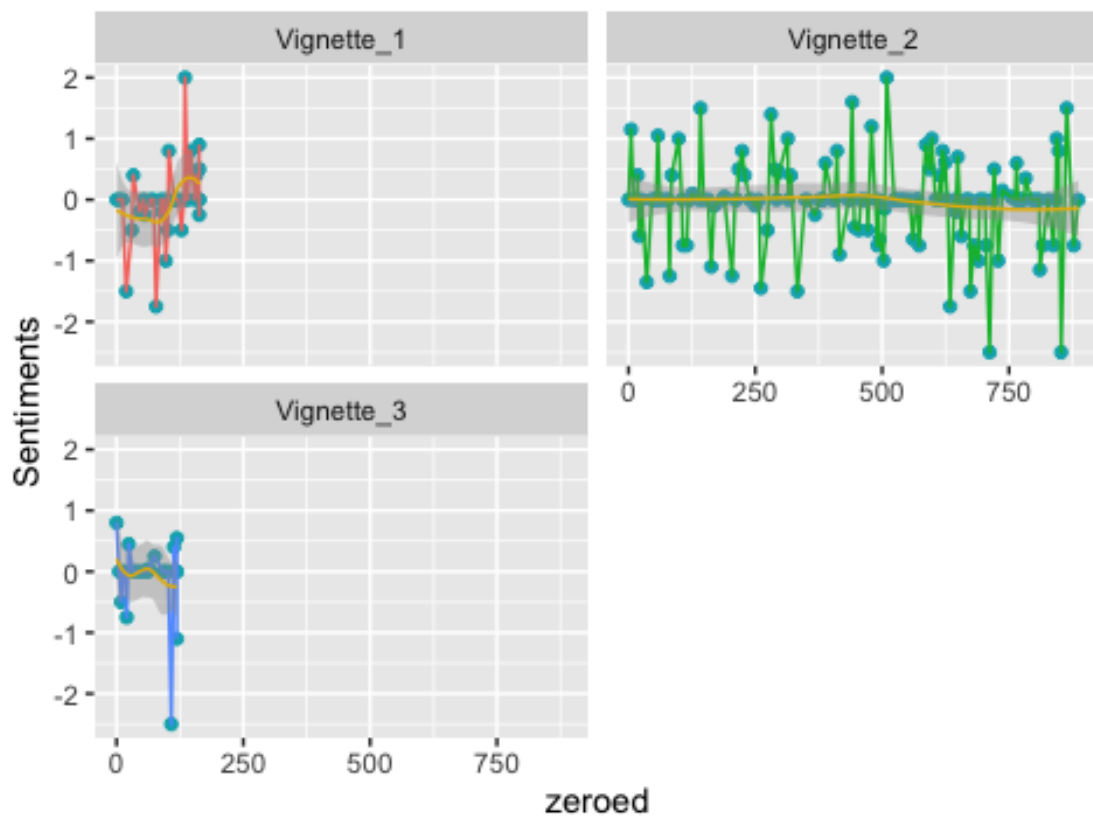
8493



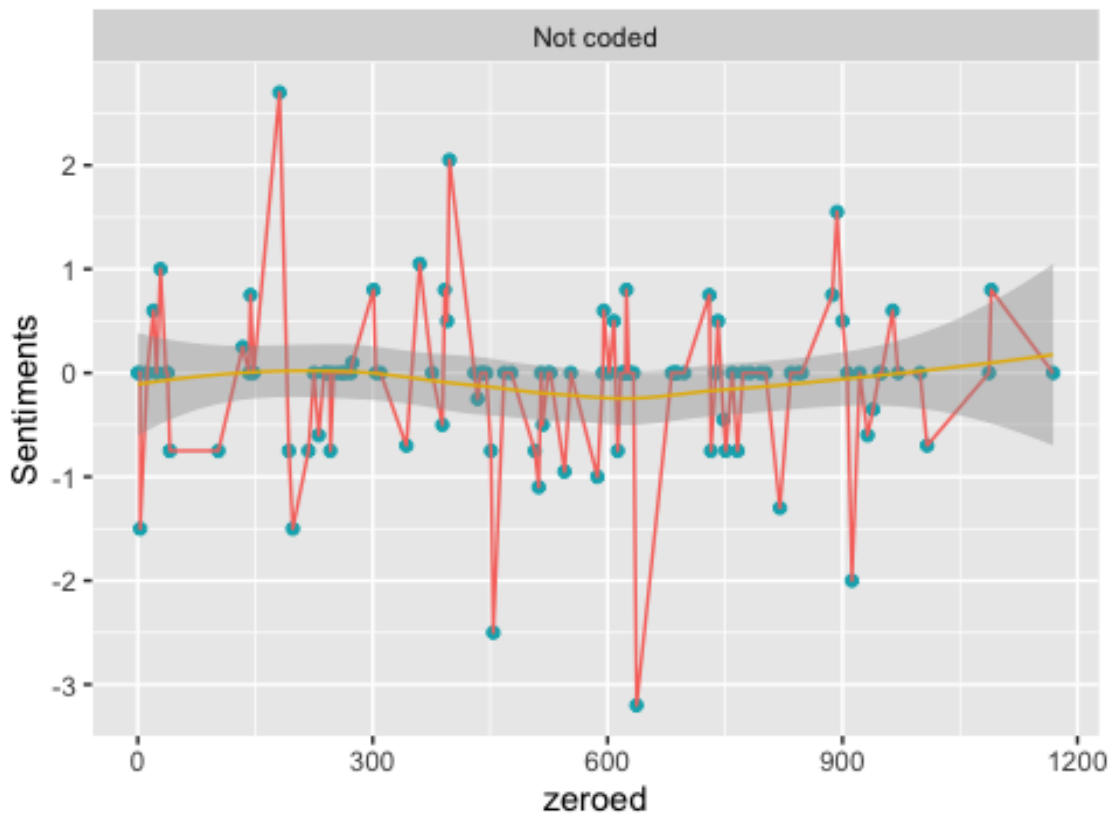
8915



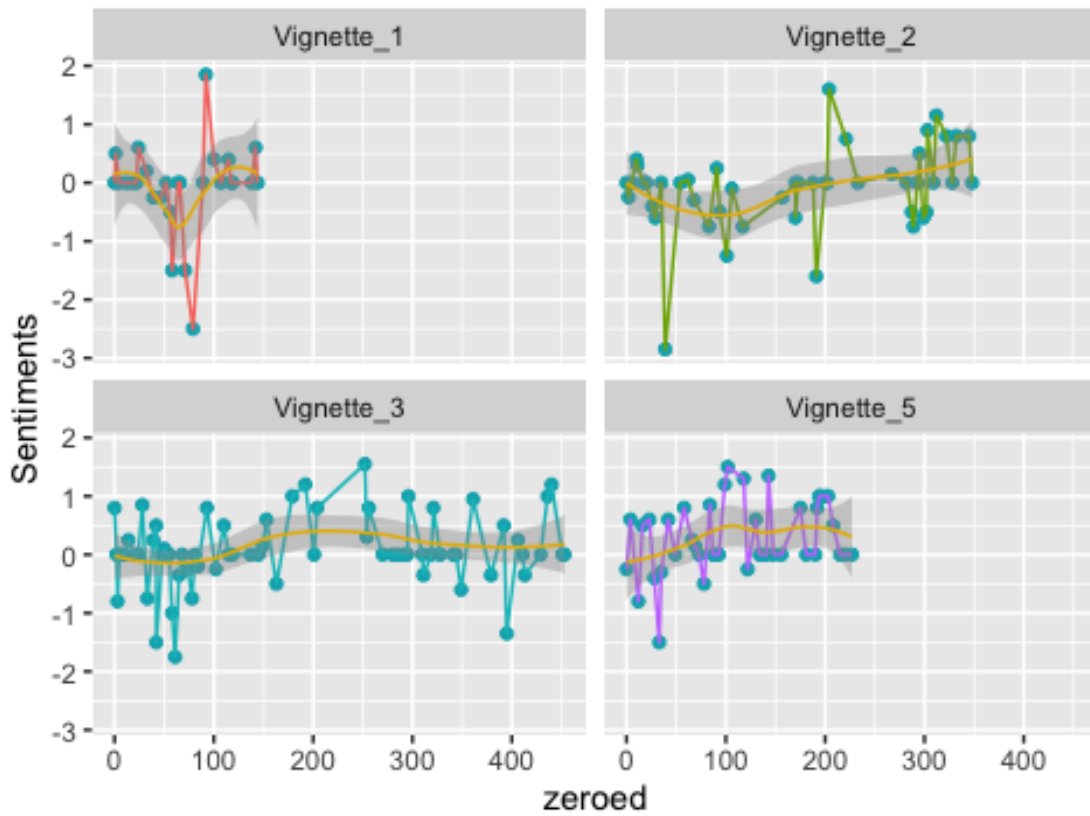
9333



9642



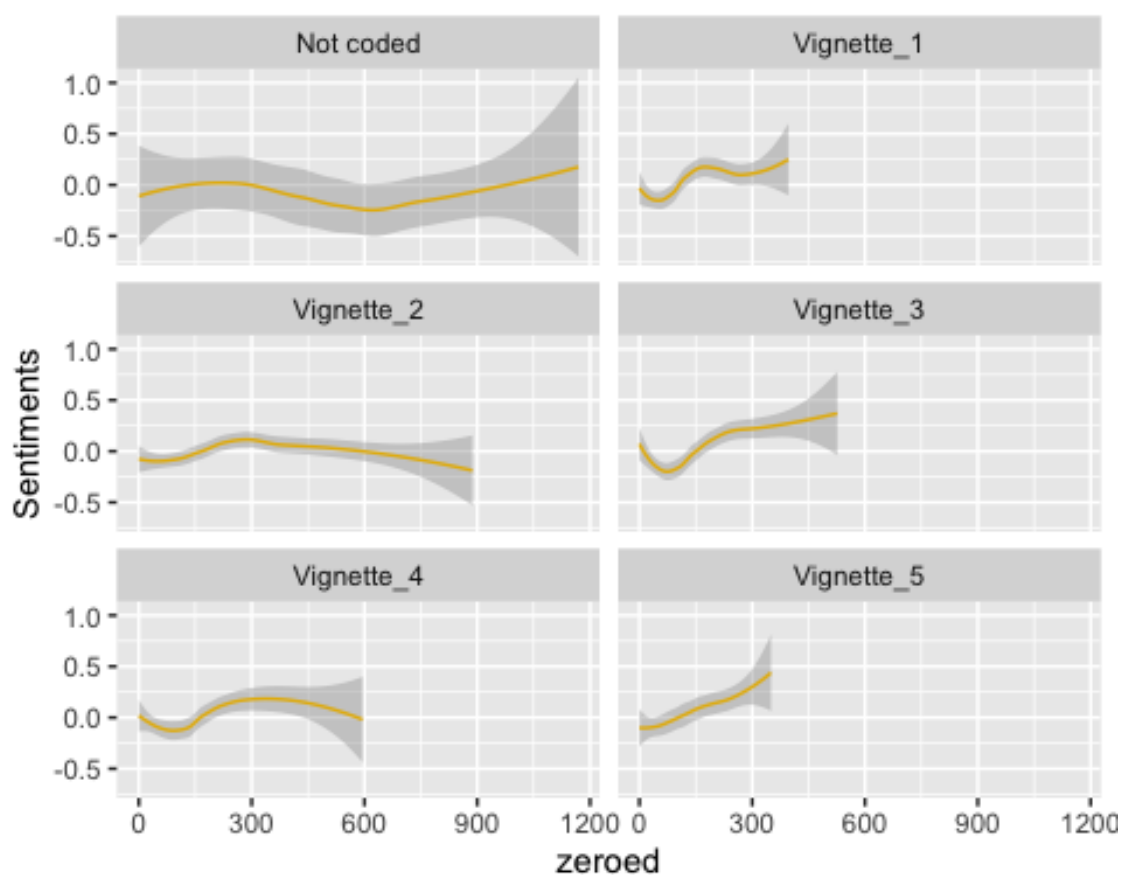
9995



rm(df1)

9.4.11 Sentiment Timeline for each vignette

```
df1 <- df %>%
  group_by(doc_id, vignette) %>%
  mutate(first(seconds)) %>%
  mutate(zeroed = seconds - first(seconds)) %>%
  ungroup()
df1 <- df1[complete.cases(df1), ]
ggplot(data = df1, aes(x = zeroed, y = Sentiments, color = vignette))+
  geom_smooth(method = "loess", color = "#E7B803", size = 0.5) +
  theme(legend.position = "none") +
  facet_wrap(~ vignette, scales = "fixed", ncol = 2)
```



9.4.12 Merge Sentiment Data for transcripts and human value data

```
df <- dplyr::select(human_values, doc_id, expertise, independence_work,
  Autonomy, Influence, HVS_Cluster, MeanSentiment, SentCat)
transcripts <- merge(transcripts, df, by = "doc_id")
# Order of entries not accurate anymore
# So, next step returns order
transcripts <- transcripts %>%
  group_by(doc_id) %>%
  arrange(seconds, .by_group = TRUE)
```

9.4.13 Save transcripts to Nvivo

```

nvivo <- dplyr::select(transcripts, doc_id, text, vignette, information,
                      risks, intervention, SentimentCat,
                      expertise, Autonomy, Influence, HVS_Cluster, SentCat)
library("writexl")
#write_xlsx(nvivo, "/Users/stefan_kleipoedszus/Documents/@Promotion/R
Analysing Transcript/NVIVOtranscripts.xlsx")

```

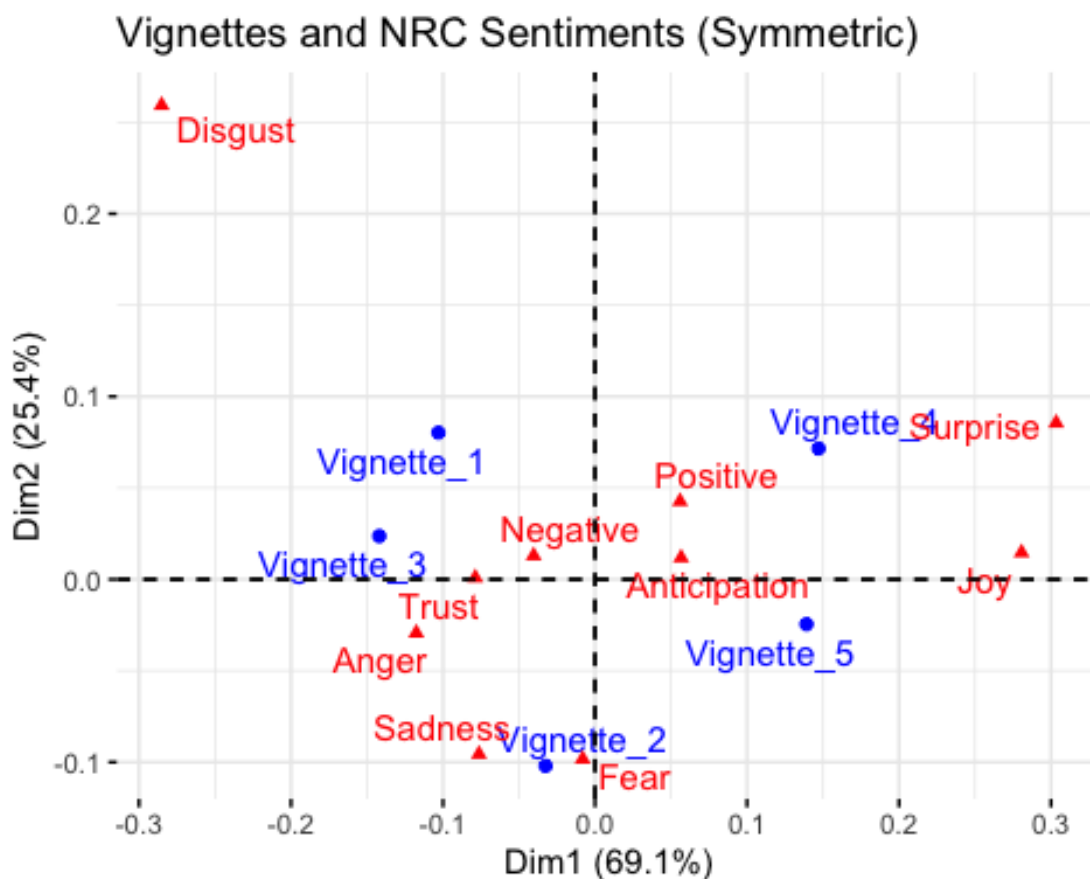
9.4.14 Create a correspondence analysis for NRC sentiment counts

```

df <- thinkAloudWords %>%
  dplyr::select(vignette, sentiment) %>%
  #filter(vignette %in% c("Vignette_1")) %>%
  group_by(vignette) %>%
  count(sentiment, sort = TRUE) %>%
  arrange(desc(n)) %>%
  slice(seq_len(10)) %>%
  ungroup()
df <- as.data.frame(df)
df <- na.omit(df)
df <- reshape(data=df, idvar="vignette", v.names = "n", timevar = "sentiment", direction="wide")
df2 <- df[,-1]
rownames(df2) <- df[,1]
df <- df2[-1,]
colnames(df) <- c("Negative", "Fear", "Trust", "Anticipation", "Positive",
                 "Anger", "Surprise", "Sadness", "Joy", "Disgust")

res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symmetric", repel = TRUE,
               title = "Vignettes and NRC Sentiments (Symmetric)")

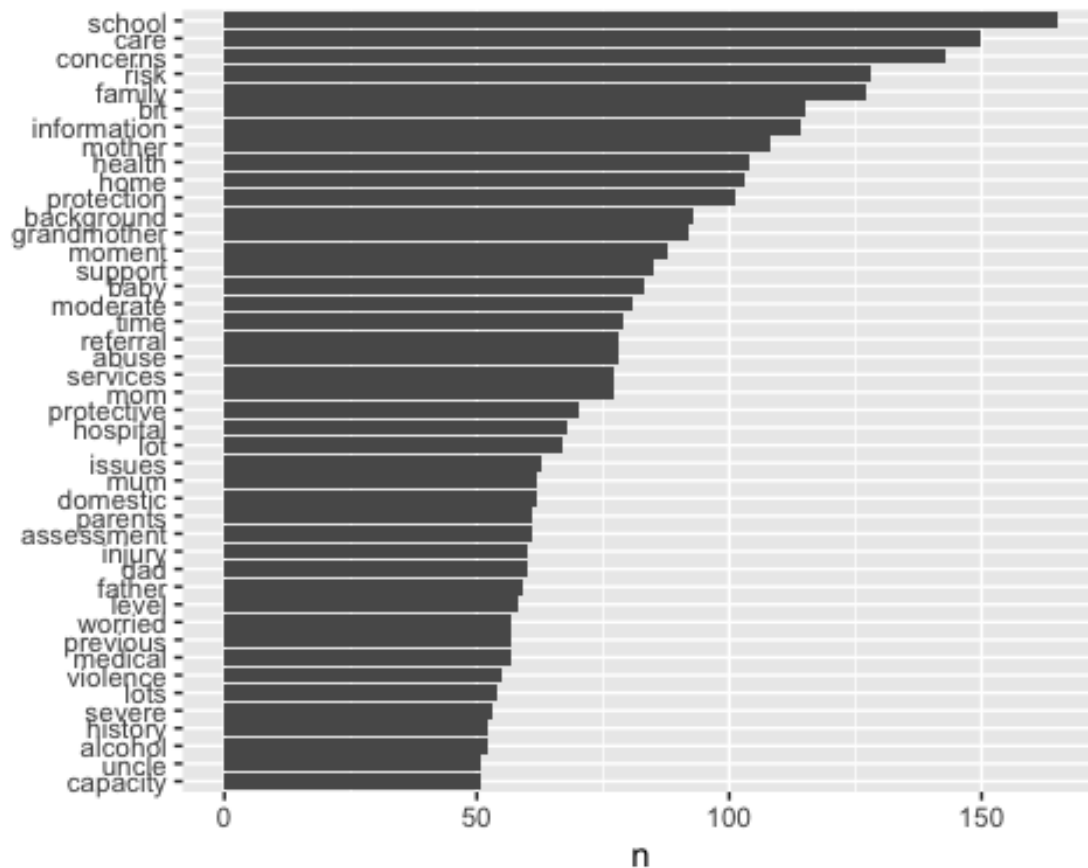
```



9.4.15 Word Frequencies

9.4.15.1 Overall word frequencies

```
# Select data to be analysed
df <- dplyr::select(transcripts, doc_id, tidy, vignette)
df <- tibble(df)
# Create one-token-per-unit-per-row, remove stopwords and count remaining words
df <- df %>%
  unnest_tokens(word, tidy) %>%
  anti_join(stop_words)%>%
  drop_na()
# Plot most frequent words
df %>%
  count(word, sort = TRUE) %>%
  filter(n>50) %>%
  mutate(word = reorder(word, n)) %>%
  ggplot(aes(n, word)) +
  geom_col() +
  labs(y=NULL)
```

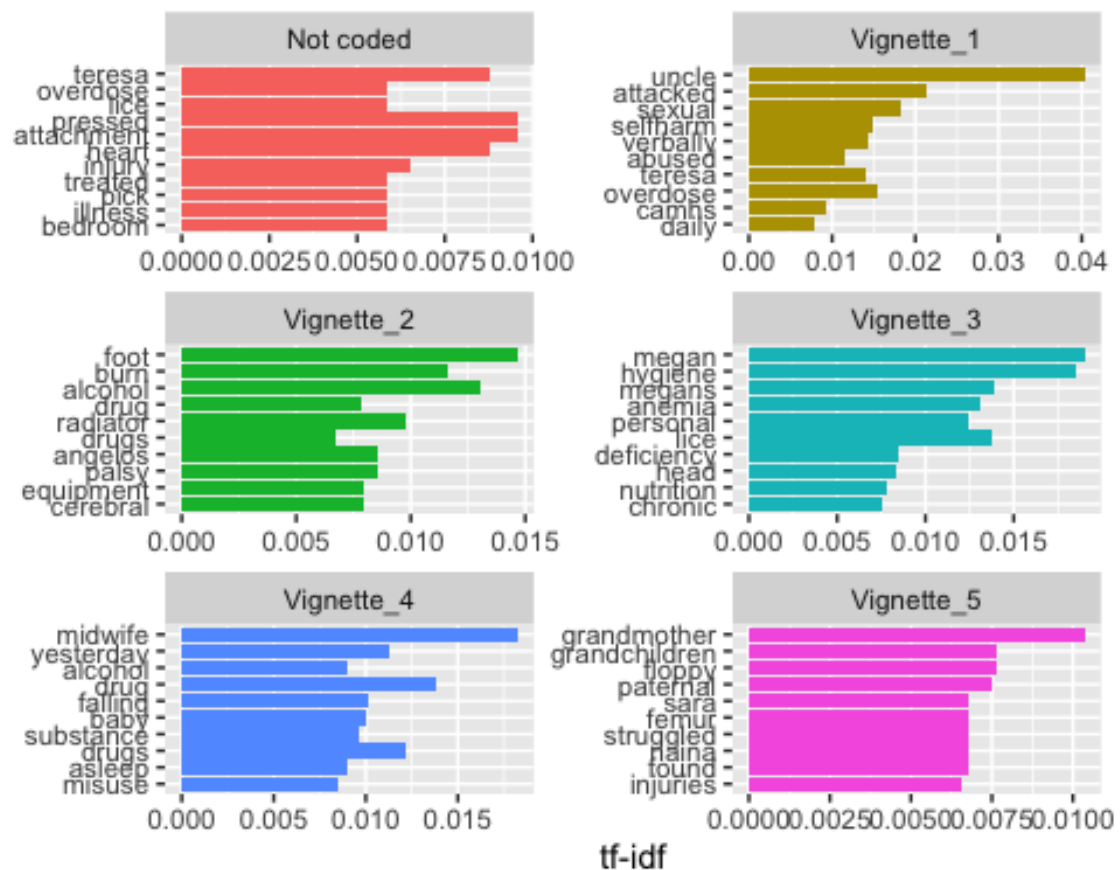


9.4.15.2 Word Frequencies per vignette

```

transcripts <- ungroup(transcripts)
df <- dplyr::select(transcripts, tidy, group = vignette)
df <- df %>%
  unnest_tokens(word, tidy) %>%
  anti_join(stop_words) %>%
  filter(!is.na(word)) %>%
  count(group, word, sort = TRUE)
df <- df[!(is.na(df$group) | df$word==""), ]
total_words <- df %>%
  group_by(group) %>%
  summarize(total = sum(n))
df <- left_join(df, total_words)
df <- df %>%
  bind_tf_idf(word, group, n)
# Plot word frequencies weighted by tfidf for each vignette
df %>%
  group_by(group) %>%
  slice_max(tf_idf, n = 10) %>%
  ungroup() %>%
  ggplot(aes(tf_idf, fct_reorder(word, tf_idf), fill = group)) +
  geom_col(show.legend = FALSE) +
  facet_wrap(~group, ncol=2, scales = "free") +
  labs(x="tf-idf", y = NULL)

```

9.4.15.3 Comparison Cloud

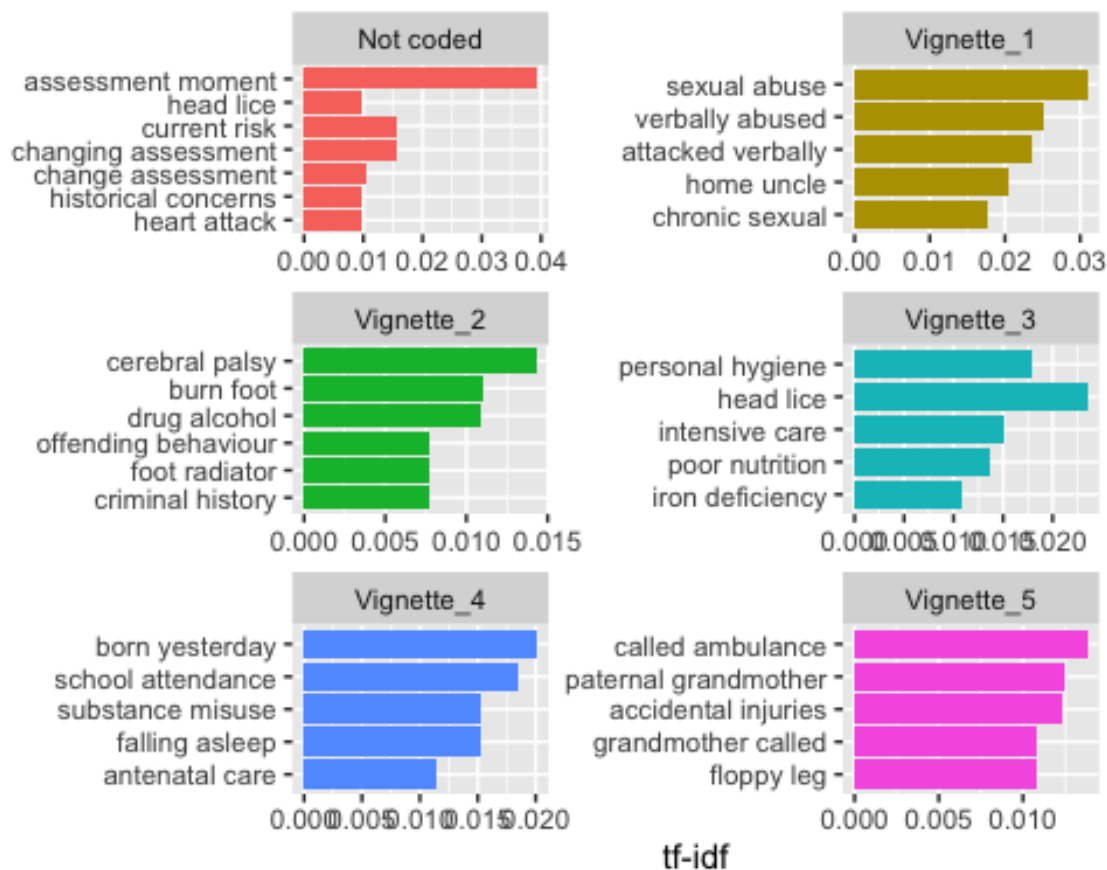
```
# Create a function to draw comparison maps
pl_comparison <- function(df, max) {
  dtm <- df %>%
    cast_dtm(group, word, n)
  tdm <- as.TermDocumentMatrix(dtm)
  dtm.m <- as.matrix(dtm)
  tdm.m <- as.matrix(tdm)
  comparison.cloud(tdm.m, max.words = max,
    random.order=FALSE, scale = c(1,1), title.size=1.0,
    rot.per=0.35, use.r.layout=FALSE,
    colors=brewer.pal(ncol(tdm.m), "Dark2"))
}

# Create a comparison map for vignettes
pl_comparison(df, 200)
```



```
bigram_graph <- df %>%
  filter(n > q) %>%
  graph_from_data_frame()
set.seed(9999)
a <- grid::arrow(type = "closed", length = unit(.15, "inches"))
ggraph(bigram_graph, layout = "fr") +
  geom_edge_link(aes(edge_alpha = n), show.legend = FALSE,
    arrow = a, end_cap = circle(.07, "inches")) +
  geom_node_point(color = "lightblue", size = 8) +
  geom_node_text(aes(label = name, size = 15),
    vjust = 0.5, hjust = 1,
    check_overlap = FALSE,
    repel = TRUE,
    show.legend = FALSE) +
  theme_void()
return(bigram_graph)
}

df <- dplyr::select(transcripts, tidy, group = vignette)
df <- bigrams(df)
# Visualise bigrams
df %>%
  group_by(group) %>%
  slice_max(tf_idf, n = 5) %>%
  ungroup() %>%
  ggplot(aes(tf_idf, fct_reorder(bigram, tf_idf), fill = group)) +
  geom_col(show.legend = FALSE) +
  facet_wrap(~group, ncol=2, scales = "free") +
  labs(x="tf-idf", y = NULL)
```



visualize_bigrams(6)

```
## IGRAPH 93b243b DN-- 70 72 --
## + attr: name (v/c), n (e/n), tf (e/n), idf (e/n), tf_idf (e/n)
## + edges from 93b243b (vertex names):
## [1] Vignette_1->sexual abuse      Vignette_1->verbally abused
## [3] Vignette_1->attacked verbally  Vignette_3->head lice
## [5] Vignette_1->home uncle         Vignette_4->born yesterday
## [7] Vignette_4->school attendance  Vignette_3->personal hygien
e
## [9] Vignette_1->chronic sexual     Vignette_4->falling asleep
## [11] Vignette_4->substance misuse   Vignette_3->intensive care
## [13] Vignette_2->cerebral palsy     Vignette_5->called ambulanc
e
## [15] Vignette_3->poor nutrition     Vignette_1->abused home
## + ... omitted several edges
```

9.4.15.8 Bigrams for HVS Clusters

```
df <- dplyr::select(transcripts, tidy, group = HVS_Cluster)
df <- bigrams(df)
# Visualise bigrams
df %>%
  group_by(group) %>%
  slice_max(tf_idf, n = 5) %>%
  ungroup() %>%
  ggplot(aes(tf_idf, fct_reorder(bigram, tf_idf), fill = group)) +
  geom_col(show.legend = FALSE) +
```

```
facet_wrap(~group, ncol=2, scales = "free") +
labs(x="tf-idf", y = NULL)
```



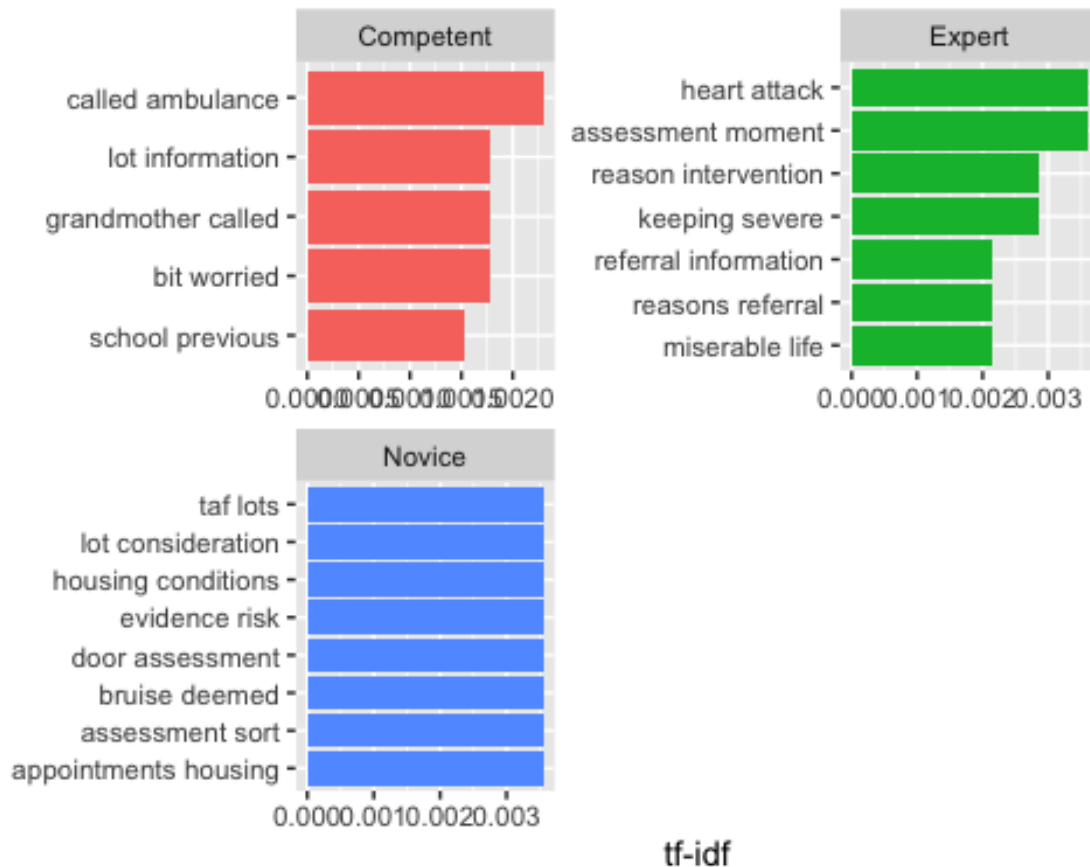
```
visualize_bigrams(4)
```

```
## IGRAPH 509cce2 DN-- 58 92 --
## + attr: name (v/c), n (e/n), tf (e/n), idf (e/n), tf_idf (e/n)
## + edges from 509cce2 (vertex names):
## [1] Self-/Open-->megans mother      Self-/Open-->previous histo
ry
## [3] Self+/Open-->assessment moment   Self-/Open-->based informat
ion
## [5] Self-/Open-->parenting capacity  Self-/Open+>drugs alcohol
## [7] Self+/Open+>substance misuse     Self-/Open+>family support
## [9] Self-/Open-->lots missed         Self-/Open+>cerebral palsy
## [11] Self-/Open+>personal hygiene     Self-/Open+>accidental inj
ury
## [13] Self-/Open+>drug alcohol         Self-/Open-->substance misu
se
## [15] Self-/Open-->accidental injury   Self-/Open-->school attenda
nce
## + ... omitted several edges
```

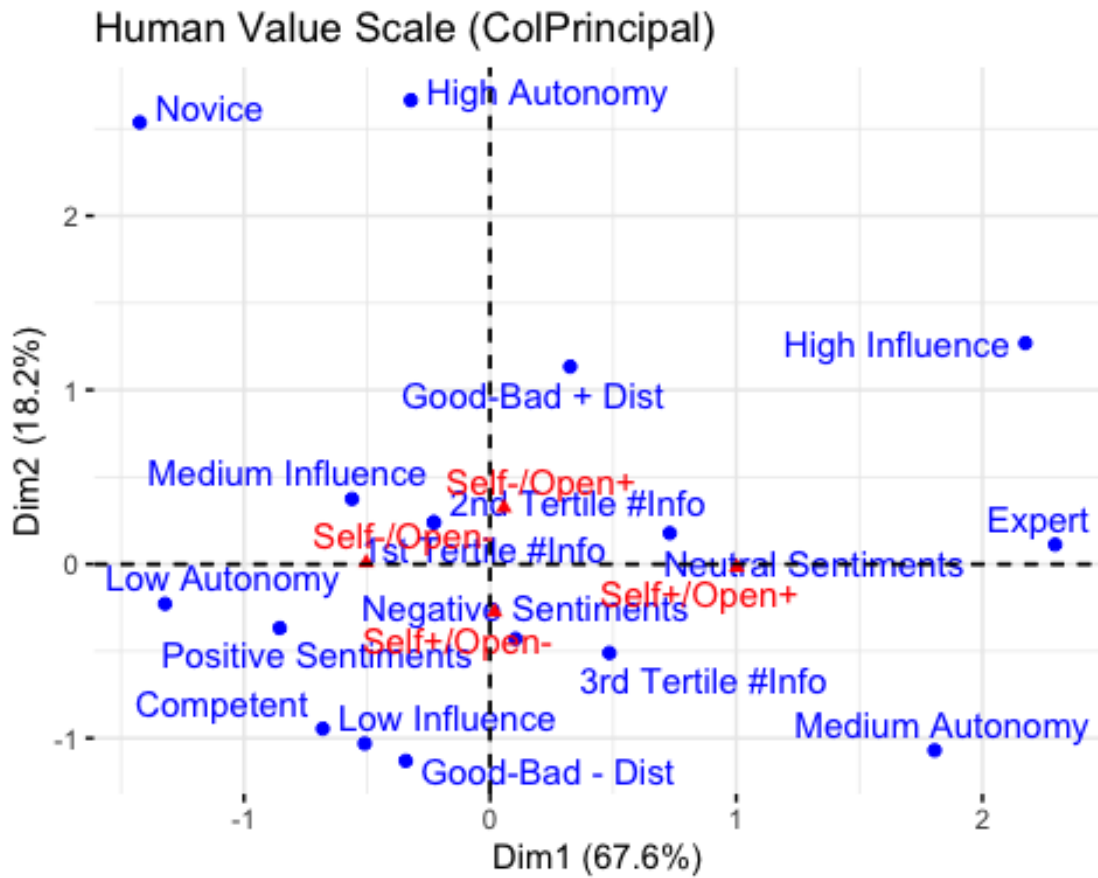
9.4.15.9 Bigrams for Expertise

```
df <- dplyr::select(transcripts, tidy, group = expertise)
df <- bigrams(df)
# Visualise bigrams
```

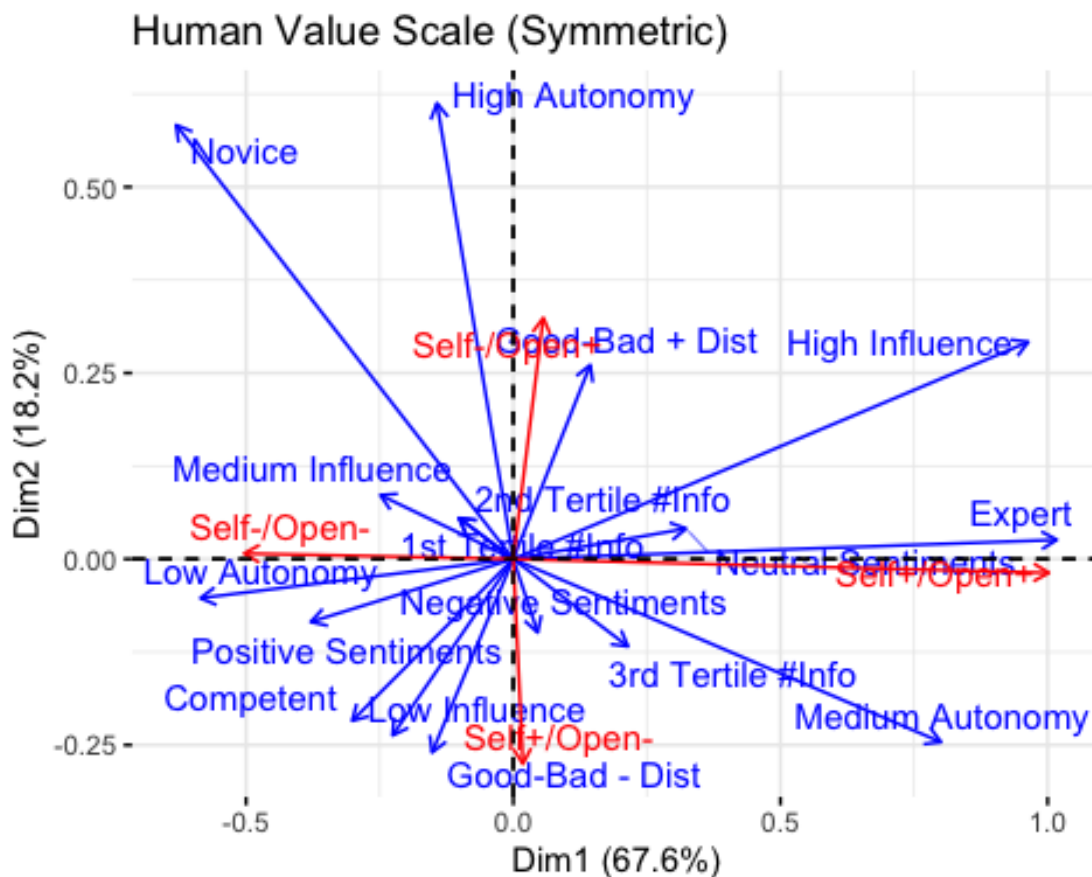
```
df %>%
  group_by(group) %>%
  slice_max(tf_idf, n = 5) %>%
  ungroup() %>%
  ggplot(aes(tf_idf, fct_reorder(bigram, tf_idf), fill = group)) +
  geom_col(show.legend = FALSE) +
  facet_wrap(~group, ncol=2, scales = "free") +
  labs(x="tf-idf", y = NULL)
```



```
visualize_bigrams(5)
## IGRAPH ac970fc DN-- 65 80 --
## + attr: name (v/c), n (e/n), tf (e/n), idf (e/n), tf_idf (e/n)
## + edges from ac970fc (vertex names):
## [1] Novice ->based information      Competent->called ambulanc
ce
## [3] Expert ->change assessment        Competent->bit worried
## [5] Competent->grandmother called   Competent->lot informatio
n
## [7] Expert ->risk moment            Competent->school previou
s
## [9] Competent->iron deficiency       Competent->poor nutrition
## [11] Competent->bruising body       Competent->foot radiator
## [13] Competent->protection plan     Competent->transverse fra
cture
## [15] Competent->drugs alcohol       Competent->parental respo
nsibility
## + ... omitted several edges
```

```
fviz_ca_biplot(res.ca, geom = c("arrow", "text"), map = "symmetric", repel = TRUE,
  title = "Human Value Scale (Symmetric)")
```

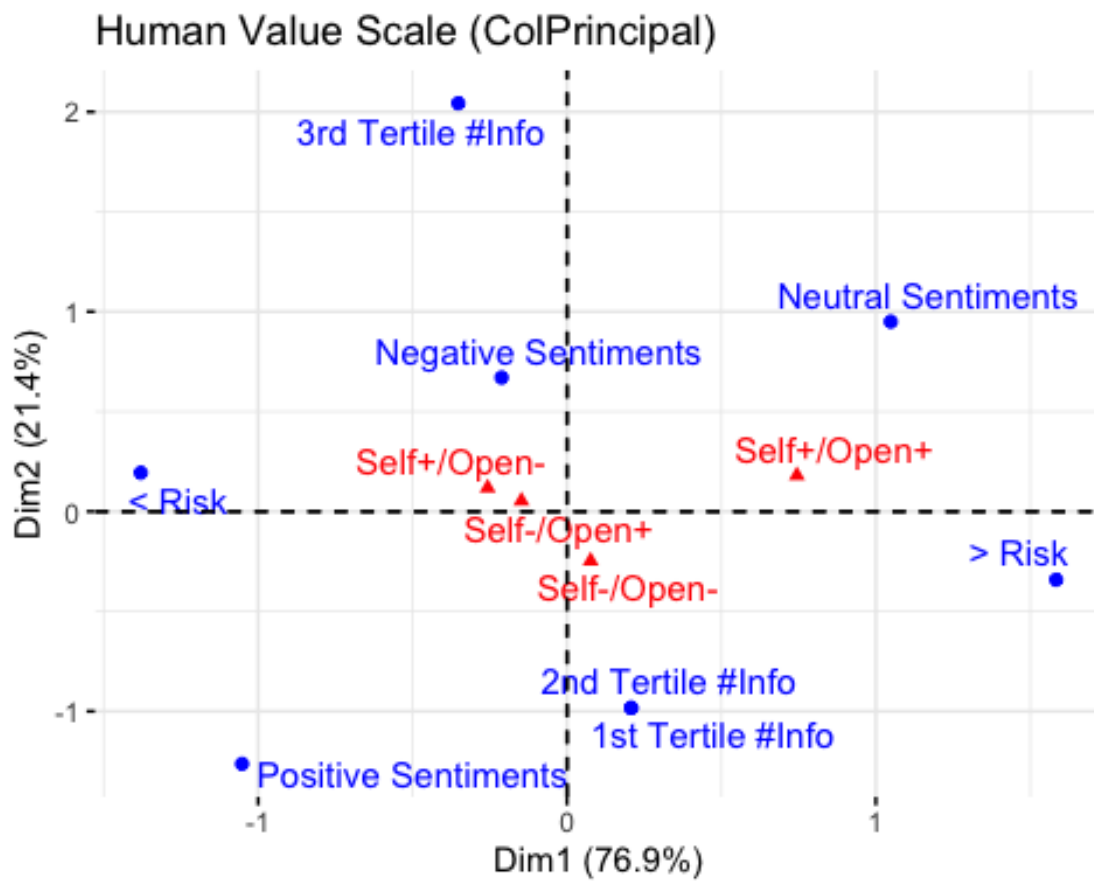


9.4.17.2 Correspondence Analysis with a focus on Human Values

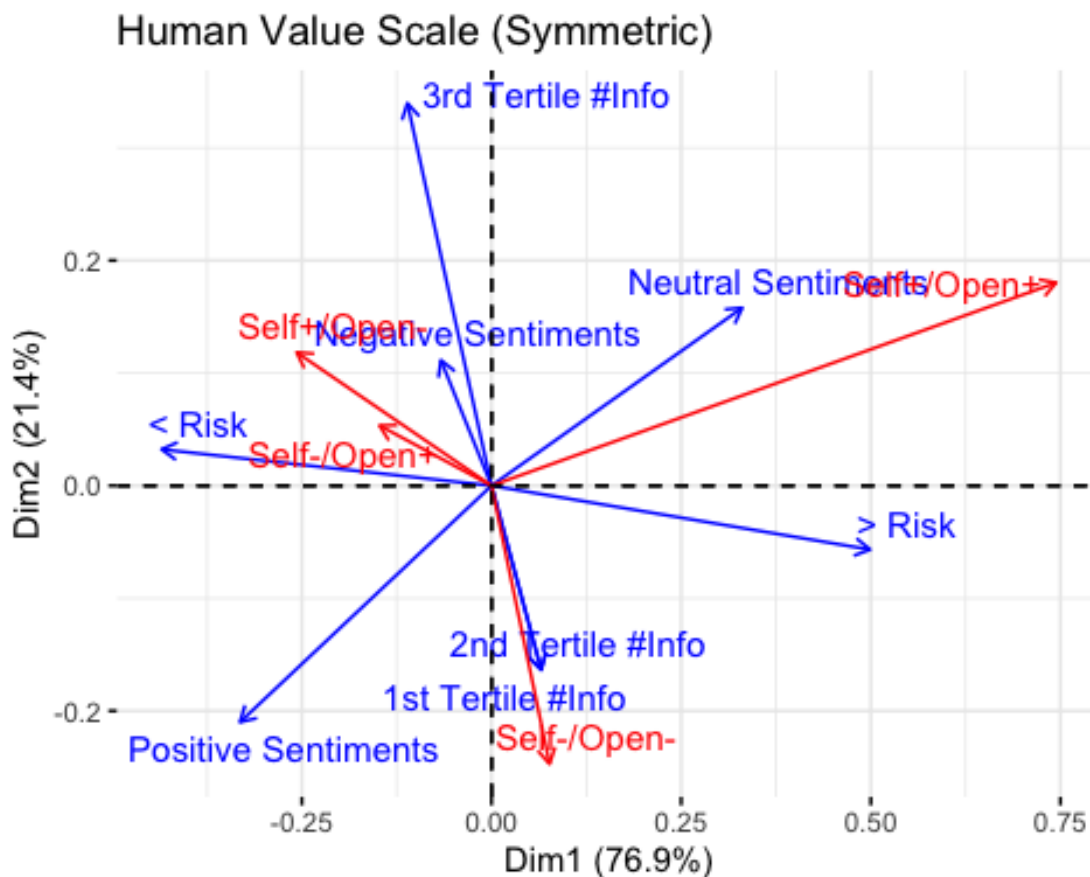
```

values <- dplyr::select(human_values, doc_id, SentCat, HVS_Cluster)
pt_thinkAloud <- create_pivot("HVS_Cluster", "SentCat")
values <- dplyr::select(human_values, doc_id, RiskCat, HVS_Cluster)
x <- create_pivot("HVS_Cluster", "RiskCat")
values <- dplyr::select(human_values, doc_id, InfoCat, HVS_Cluster)
y <- create_pivot("HVS_Cluster", "InfoCat")
pt_thinkAloud <- rbind(pt_thinkAloud, x, y)

pt_thinkAloud <- pt_thinkAloud[grepl("^NA", rownames(pt_thinkAloud))==F,]
# Create and plot a correspondence analysis
res.ca <- CA(pt_thinkAloud, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "colprincipal",
               repel = TRUE,
               title = "Human Value Scale (ColPrincipal)")
    
```



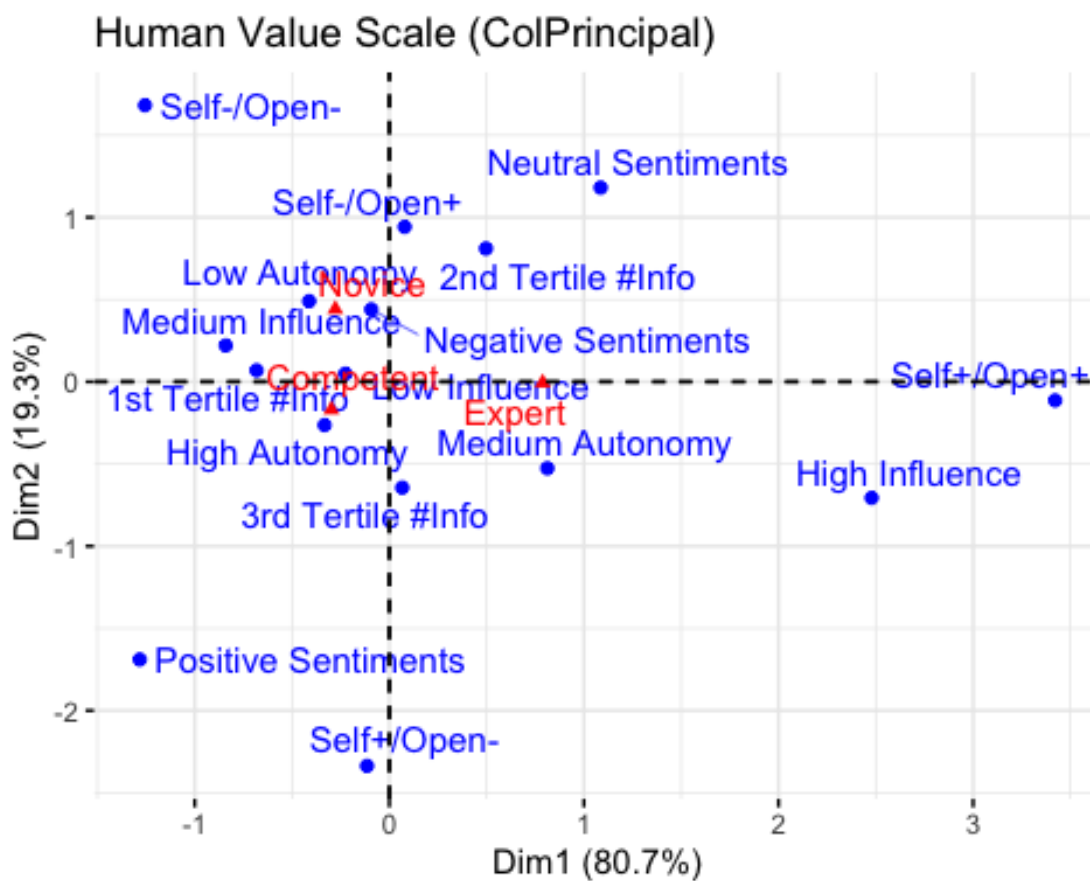
```
fviz_ca_biplot(res.ca, geom = c("arrow", "text"), map = "symmetric",
  repel = TRUE,
  title = "Human Value Scale (Symmetric)")
```



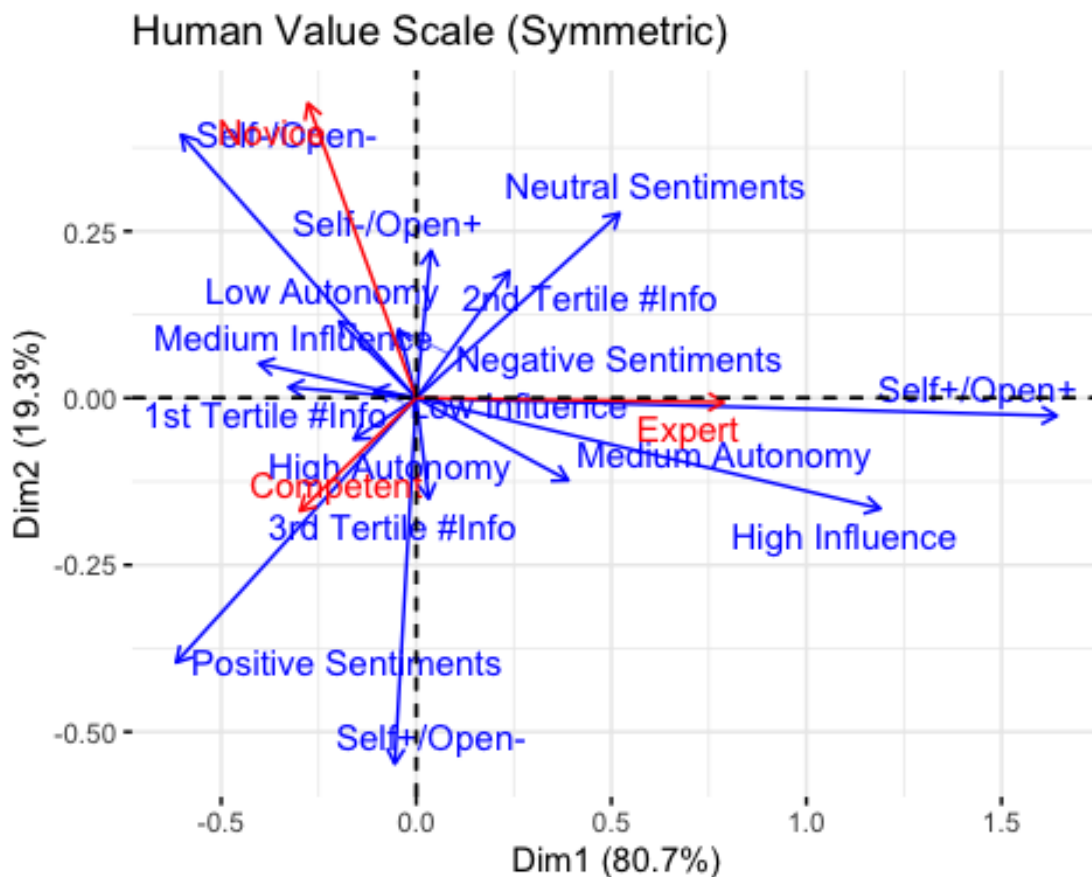
9.4.17.3 Correspondence Analysis with a focus on expertise

```

values <- dplyr::select(human_values, doc_id, expertise, HVS_Cluster)
pt_expertise <- create_pivot("expertise", "HVS_Cluster")
values <- dplyr::select(human_values, doc_id, expertise, SentCat)
x <- create_pivot("expertise", "SentCat")
pt_expertise <- rbind(pt_expertise, x)
values <- dplyr::select(human_values, doc_id, expertise, Autonomy)
x <- create_pivot("expertise", "Autonomy")
pt_expertise <- rbind(pt_expertise, x)
values <- dplyr::select(human_values, doc_id, expertise, Influence)
x <- create_pivot("expertise", "Influence")
pt_expertise <- rbind(pt_expertise, x)
values <- dplyr::select(human_values, doc_id, expertise, InfoCat)
x <- create_pivot("expertise", "InfoCat")
pt_expertise <- rbind(pt_expertise, x)
pt_expertise <- pt_expertise[grepl("^NA", rownames(pt_expertise))==F,]
# Create and plot a correspondence analysis
res.ca <- CA(pt_expertise, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "colprincipal",
               repel = TRUE,
               title = "Human Value Scale (ColPrincipal)")
    
```



```
fviz_ca_biplot(res.ca, geom = c("arrow", "text"), map = "symmetric",
  repel = TRUE,
  title = "Human Value Scale (Symmetric)")
```



```
rm(x, pt_thinkAloud, pt_expertise, values)
```

9.4.18 Using multivariate cluster analysis to construct a habitus

```
library(cluster)
library(readr)
library(Rtsne)
# Select variables to be considered
df <- dplyr::select(human_values, HVS_Cluster, expertise, decDist,
                    RiskCat, IntCat)

#Autonomy, Influence, SentCat, InfoCat,
df$RiskCat <- as.factor(df$RiskCat)
df$IntCat <- as.factor(df$IntCat)
df$expertise <- as.factor(df$expertise)
df$HVS_Cluster <- as.factor(df$HVS_Cluster)
gower_dist <- daisy(df, metric = "gower")
gower_mat <- as.matrix(gower_dist)
```

9.4.18.1 Print most similar participants

```
df[which(gower_mat == min(gower_mat[gower_mat != min(gower_mat)]),
        arr.ind = TRUE)[1, ], ]

##      HVS_Cluster expertise      decDist RiskCat IntCat
## 13 Self-/Open- Competent Good-Bad - Dist > Risk > Int
## 2  Self+/Open- Competent Good-Bad - Dist > Risk > Int
```

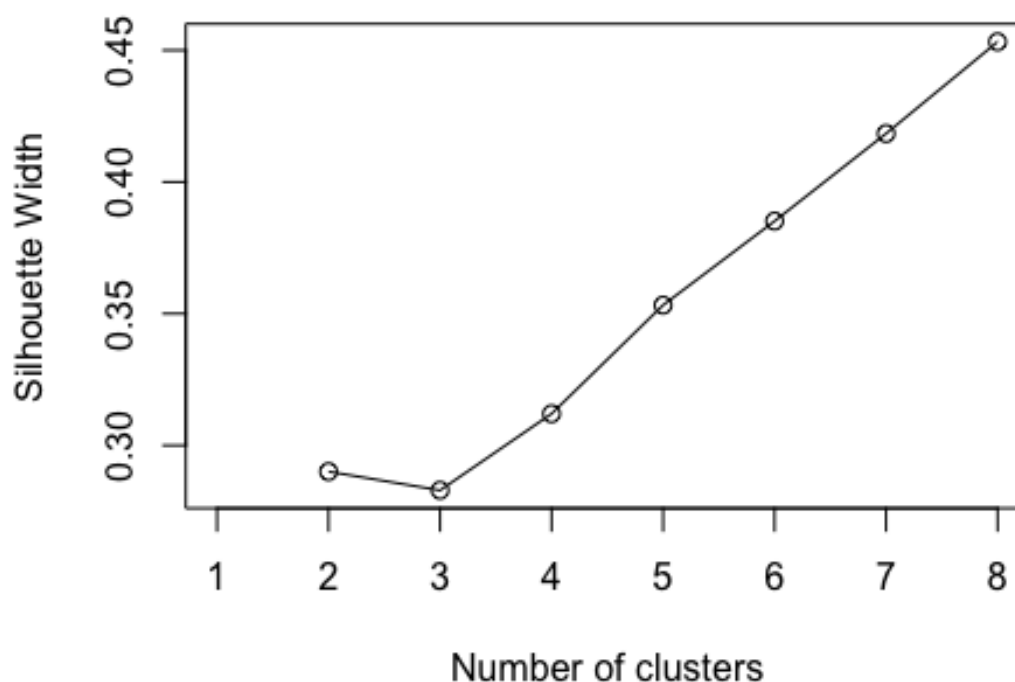

9.4.18.2 Print most dissimilar participants

```
df[which(gower_mat == max(gower_mat[gower_mat != max(gower_mat)]),
  arr.ind = TRUE)[1, ], ]

##   HVS_Cluster expertise      decDist RiskCat IntCat
## 12 Self-/Open+   Novice Good-Bad + Dist > Risk < Int
##  2 Self+/Open- Competent Good-Bad - Dist > Risk > Int
```

9.4.18.3 Find best number of clusters

```
sil_width <- c(NA)
for(i in 2:8){
  pam_fit <- pam(gower_dist, diss = TRUE, k = i)
  sil_width[i] <- pam_fit$silinfo$avg.width
}
plot(1:8, sil_width,
  xlab = "Number of clusters",
  ylab = "Silhouette Width")
lines(1:8, sil_width)
```



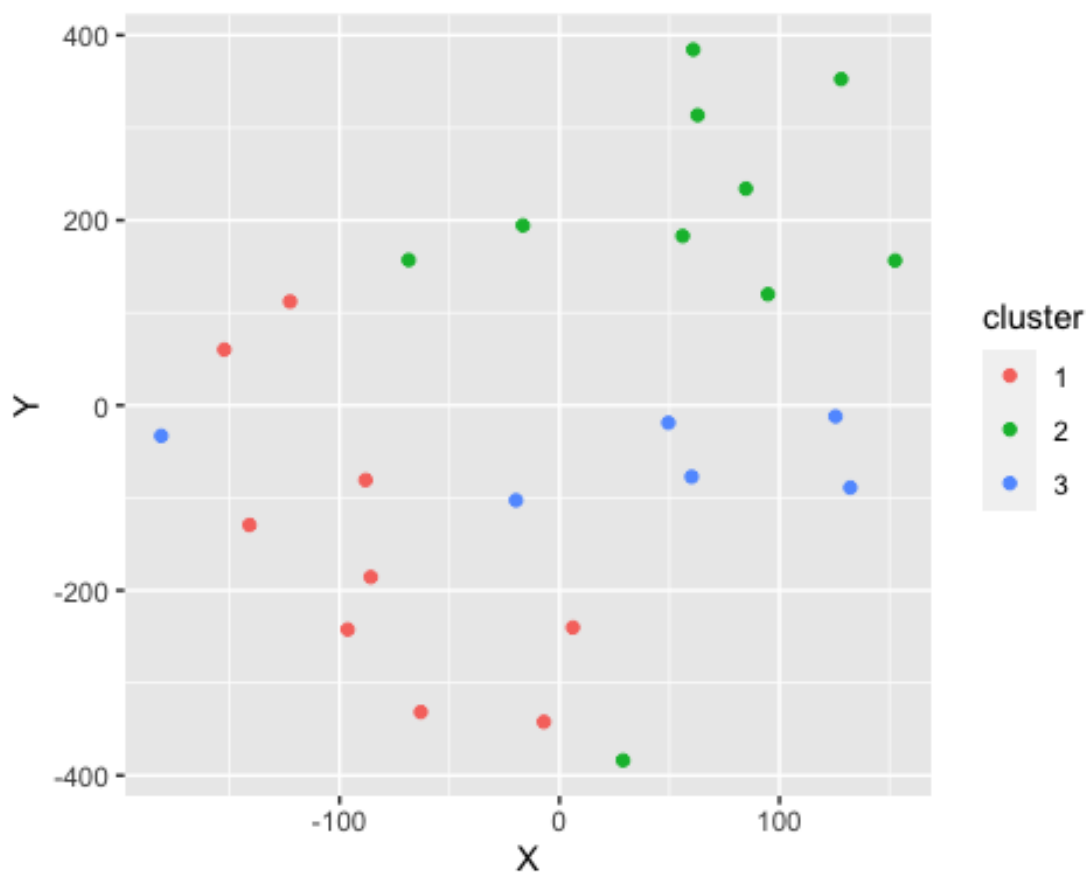
```
k <- 3
pam_fit <- pam(gower_dist, diss = TRUE, k)
pam_results <- df %>%
  mutate(cluster = pam_fit$clustering) %>%
  group_by(cluster) %>%
  do(the_summary = summary(.))
pam_results$the_summary
```

Appendices

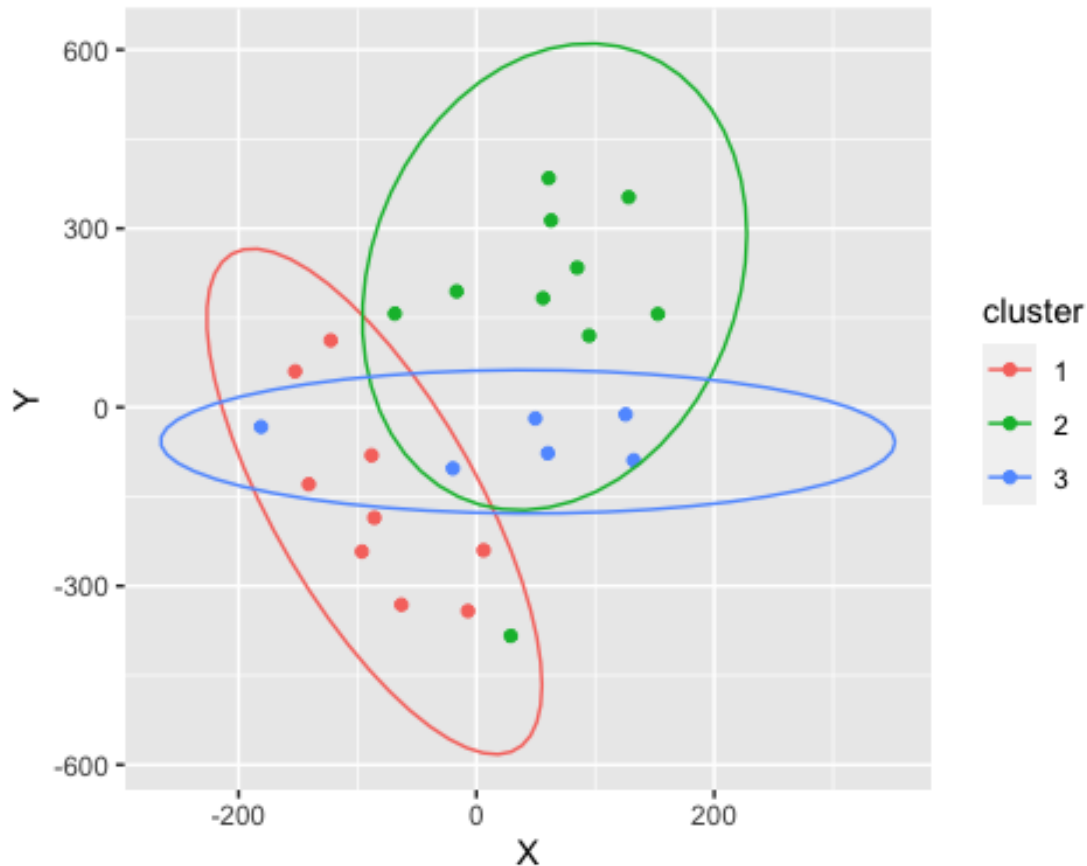
```
## [[1]]
##      HVS_Cluster      expertise      decDist      RiskCat
IntCat
## Self+/Open+:2      Competent:1      Good-Bad + Dist:9      < Risk:3      <
Int:5
## Self+/Open-:2      Expert      :6      Good-Bad - Dist:0      > Risk:4      >
Int:2
## Self-/Open+:5      Novice      :2      NA's      :2      NA
's :2
## Self-/Open-:0
##
##
##      cluster
## Min.      :1
## 1st Qu.:1
## Median :1
## Mean      :1
## 3rd Qu.:1
## Max.      :1
##
## [[2]]
##      HVS_Cluster      expertise      decDist      RiskCat
IntCat
## Self+/Open+:1      Competent:7      Good-Bad + Dist:2      < Risk:3      <
Int:1
## Self+/Open-:2      Expert      :1      Good-Bad - Dist:8      > Risk:7      >
Int:9
## Self-/Open+:2      Novice      :2
## Self-/Open-:5
##
##
##      cluster
## Min.      :2
## 1st Qu.:2
## Median :2
## Mean      :2
## 3rd Qu.:2
## Max.      :2
##
## [[3]]
##      HVS_Cluster      expertise      decDist      RiskCat
IntCat
## Self+/Open+:0      Competent:5      Good-Bad + Dist:2      < Risk:6      <
Int:6
## Self+/Open-:4      Expert      :0      Good-Bad - Dist:4      > Risk:0      >
Int:0
## Self-/Open+:0      Novice      :1
## Self-/Open-:2
##
##
##      cluster
## Min.      :3
## 1st Qu.:3
## Median :3
```

```
## Mean :3
## 3rd Qu.:3
## Max. :3

tsne_obj <- Rtsne(gower_dist, is_distance = TRUE,
                 perplexity = 6)
tsne_data <- tsne_obj$Y %>%
  data.frame() %>%
  setNames(c("X", "Y")) %>%
  mutate(cluster = factor(pam_fit$clustering))
ggplot(aes(x = X, y = Y), data = tsne_data) +
  geom_point(aes(color = cluster))
```



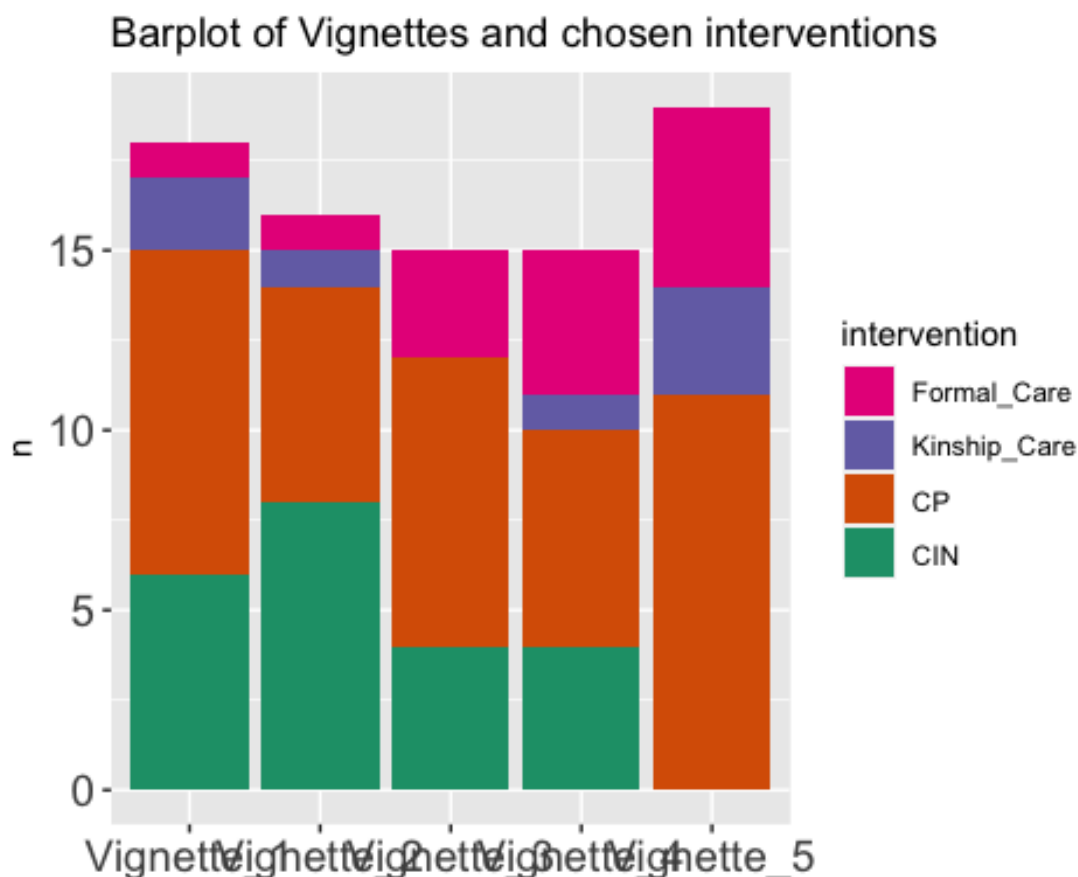
```
ggplot(tsne_data, aes(x=X, y=Y, colour=cluster)) +
  geom_point() +
  stat_ellipse()
```



9.4.19 Case Characteristics

9.4.19.1 What are the preferred interventions in each case?

```
# Transform df-intervention into summary
intervention <- ungroup(intervention)
#saveRDS(intervention, file =
#       "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing Transcript
/intervention.RDS")
df <- dplyr::select(intervention, vignette, intervention)
df <- count(df, vignette, intervention)
df$intervention = factor(df$intervention,
                        levels = c("Formal_Care", "Kinship_Care", "CP", "CIN"),
                        ordered = TRUE)
df <- subset(df, intervention != 'NA')
# Create a barplot
ggplot(df, aes(factor(vignette), n, fill = intervention)) +
  geom_bar(stat="identity") + #, position = "dodge") +
  scale_fill_brewer(palette = "Dark2", direction = -1) +
  ggtitle("Barplot of Vignettes and chosen interventions") +
  theme(axis.text=element_text(size=14),
        axis.title.x=element_blank())
```

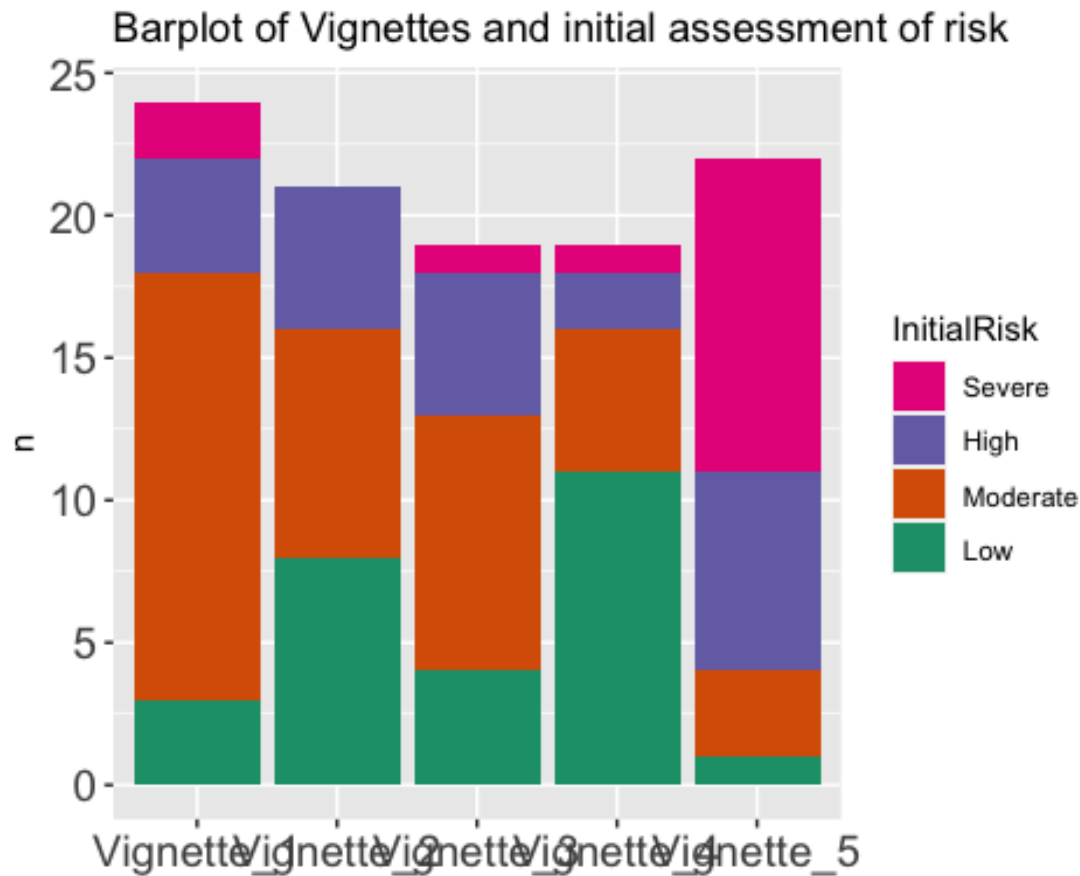


9.4.20 Correspondence Analysis

```
df <- pivot_wider(df, names_from = vignette,
                 values_from = n)
case_interventions <- df %>%
  remove_rownames %>%
  column_to_rownames(var="intervention")
```

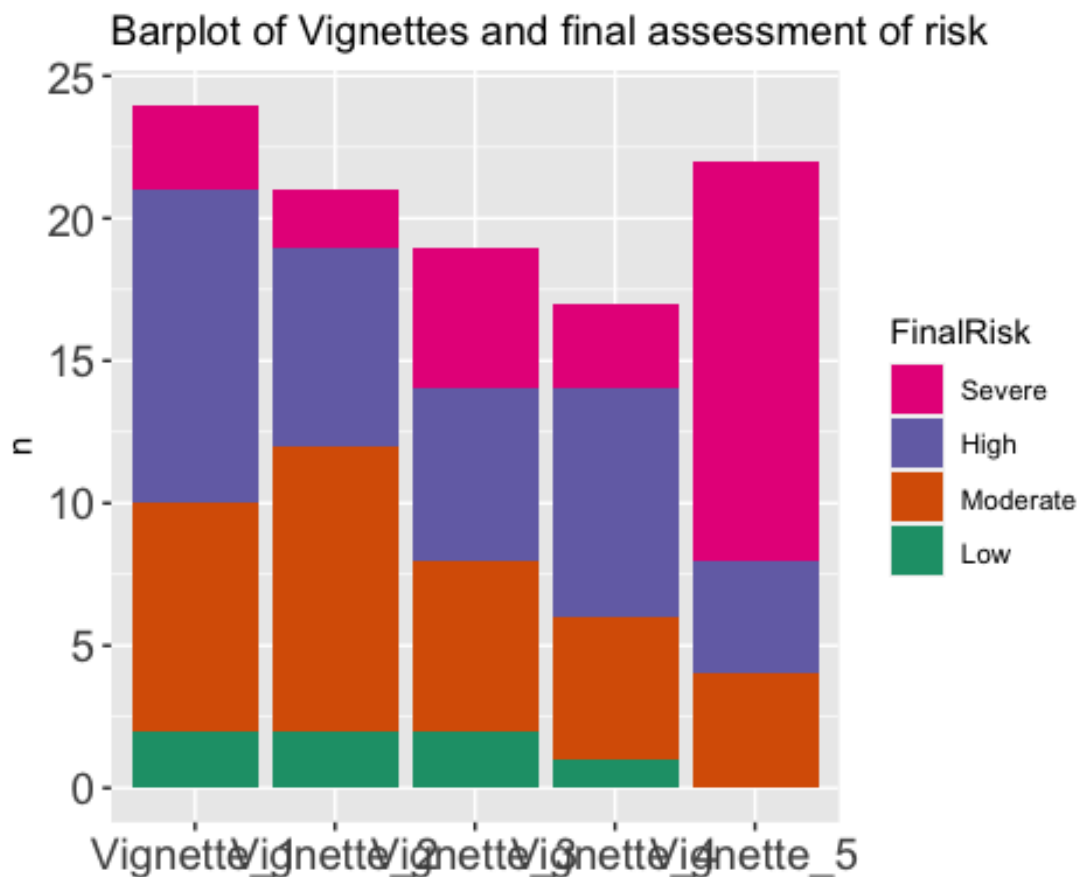
9.4.20.1 What are the initial risks assessments?

```
# Transform df-risks into summary
risks$InitialRisk <- word(risks$riskpattern, 1)
risks$FinalRisk <- word(risks$riskpattern, -1)
risks$InitialRisk <- gsub(",","",risks$InitialRisk)
risks <- ungroup(risks)
df <- dplyr::select(risks, vignette, InitialRisk)
df <- count(df, vignette, InitialRisk)
df$InitialRisk = factor(df$InitialRisk,
                       levels = c("Severe", "High", "Moderate", "Low"),
                       ordered = TRUE)
df <- df[complete.cases(df$InitialRisk), ]
# Create a barplot
ggplot(df, aes(factor(vignette), n, fill = InitialRisk)) +
  geom_bar(stat="identity") + #, position = "dodge") +
  scale_fill_brewer(palette = "Dark2", direction = -1) +
  ggtitle("Barplot of Vignettes and initial assessment of risk") +
  theme(axis.text=element_text(size=14),
        axis.title.x=element_blank())
```



9.4.20.2 What are the final risk assessments?

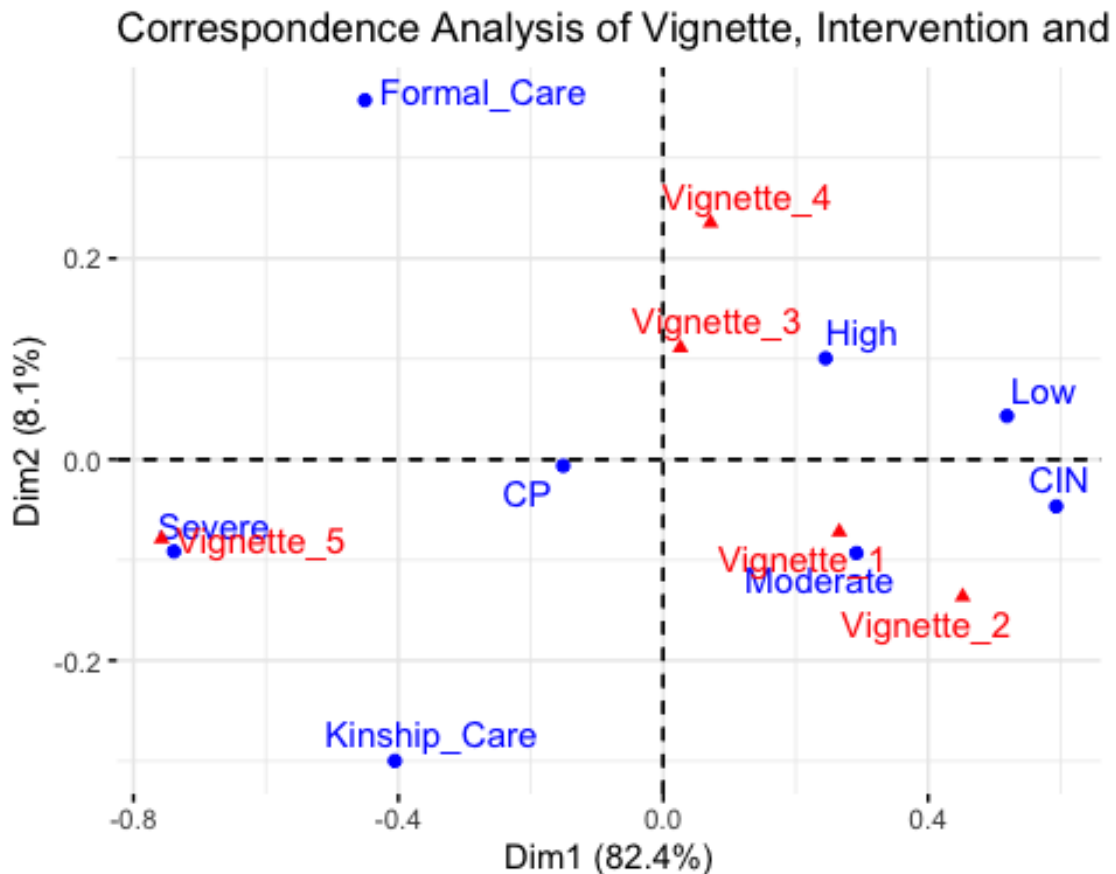
```
# Final Risks
df <- dplyr::select(risks, vignette, FinalRisk)
df <- count(df, vignette, FinalRisk)
df$FinalRisk = factor(df$FinalRisk,
  levels = c("Severe", "High", "Moderate", "Low"),
  ordered = TRUE)
df <- df[complete.cases(df$FinalRisk), ]
# Create a barplot
ggplot(df, aes(factor(vignette), n, fill = FinalRisk)) +
  geom_bar(stat="identity") + #, position = "dodge") +
  scale_fill_brewer(palette = "Dark2", direction = -1) +
  ggtitle("Barplot of Vignettes and final assessment of risk") +
  theme(axis.text=element_text(size=14),
    axis.title.x=element_blank())
```



9.4.20.3 Correspondence Analysis of initial risks and vignettes for a correspondence analysis

```
df <- pivot_wider(df, names_from = vignette,
                  values_from = n)
case_risks <- df %>%
  remove_rownames %>%
  column_to_rownames(var="FinalRisk")

# Merge pivot tables for CA Analysis
df <- rbind(case_interventions, case_risks)
df[is.na(df)] <- 0
# Create Correspondence Analysis
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symetric", repel = TRUE,
               title =
                 "Correspondence Analysis of Vignette, Intervention and Risk (Symmetric)
")
```

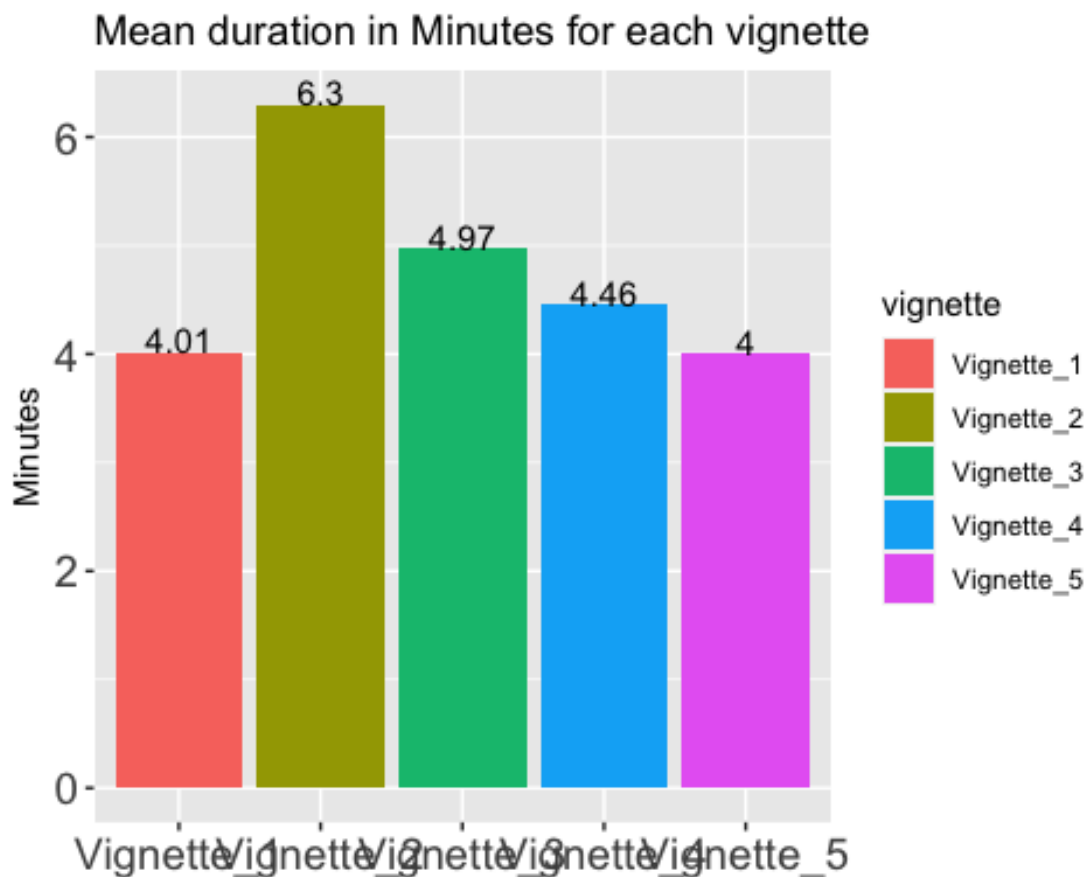


9.4.20.4 How much time are participants using for each vignette?

```
## Calculate time used for each vignette
df <- dplyr::select(transcripts, doc_id, vignette, seconds)
time <- df %>%
  group_by(doc_id, vignette) %>%
  summarize(time = seconds[which.max(seconds)] - seconds[which.min(seconds)])

df <- time %>%
  group_by(vignette) %>%
  summarize(Minutes = mean(time)/60)
df <- df[-(1),]
df <- df[-(6),]

# Create a barplot for time
ggplot(df, aes(factor(vignette), Minutes, fill = vignette)) +
  geom_bar(stat="identity") +
  geom_text(aes(label=round(Minutes, digits = 2)), vjust=0) +
  ggtitle("Mean duration in Minutes for each vignette") +
  theme(axis.text=element_text(size=14),
        axis.title.x=element_blank())
```

9.4.20.5 Create a sankey diagram to show movement between risks

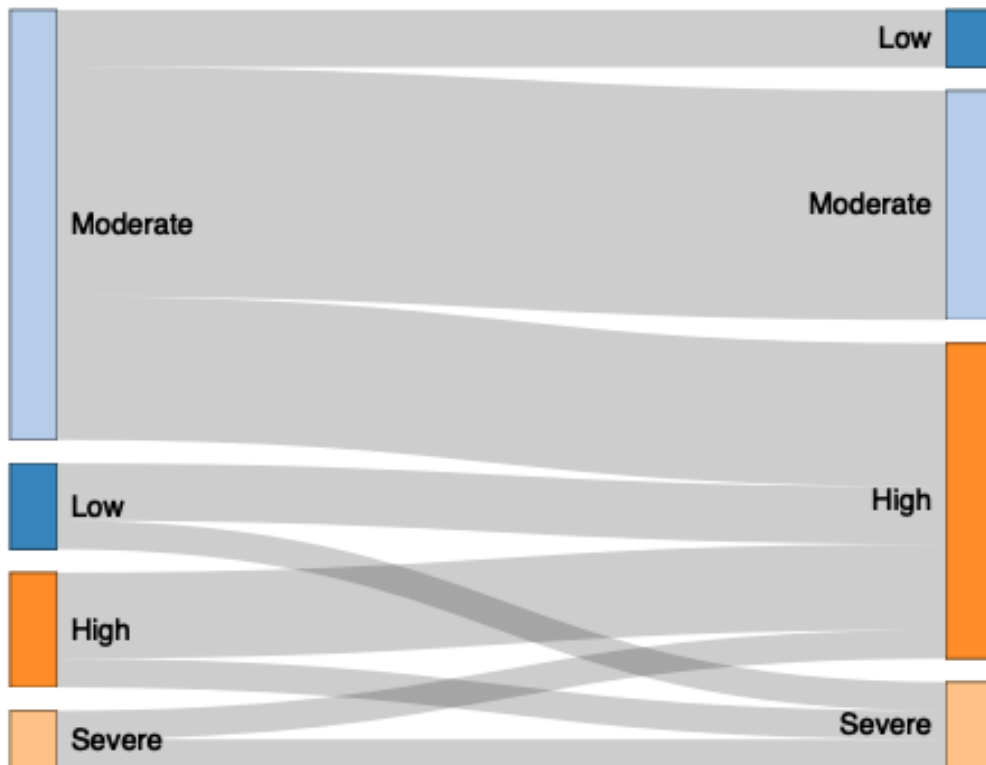
```
library(networkD3)
df <- risks
df <- df[!grepl("NA", df$riskpattern),]
df$InitialRisk <- as.character(df$InitialRisk)
df$InitialRisk[which(df$InitialRisk=="Low")] <- "0"
df$InitialRisk[which(df$InitialRisk=="Moderate")] <- "1"
df$InitialRisk[which(df$InitialRisk=="High")] <- "2"
df$InitialRisk[which(df$InitialRisk=="Severe")] <- "3"
df$InitialRisk <- as.integer(df$InitialRisk)

df$FinalRisk <- as.character(df$FinalRisk)
df$FinalRisk[which(df$FinalRisk=="Low")] <- "4"
df$FinalRisk[which(df$FinalRisk=="Moderate")] <- "5"
df$FinalRisk[which(df$FinalRisk=="High")] <- "6"
df$FinalRisk[which(df$FinalRisk=="Severe")] <- "7"
df$FinalRisk <- as.integer(df$FinalRisk)

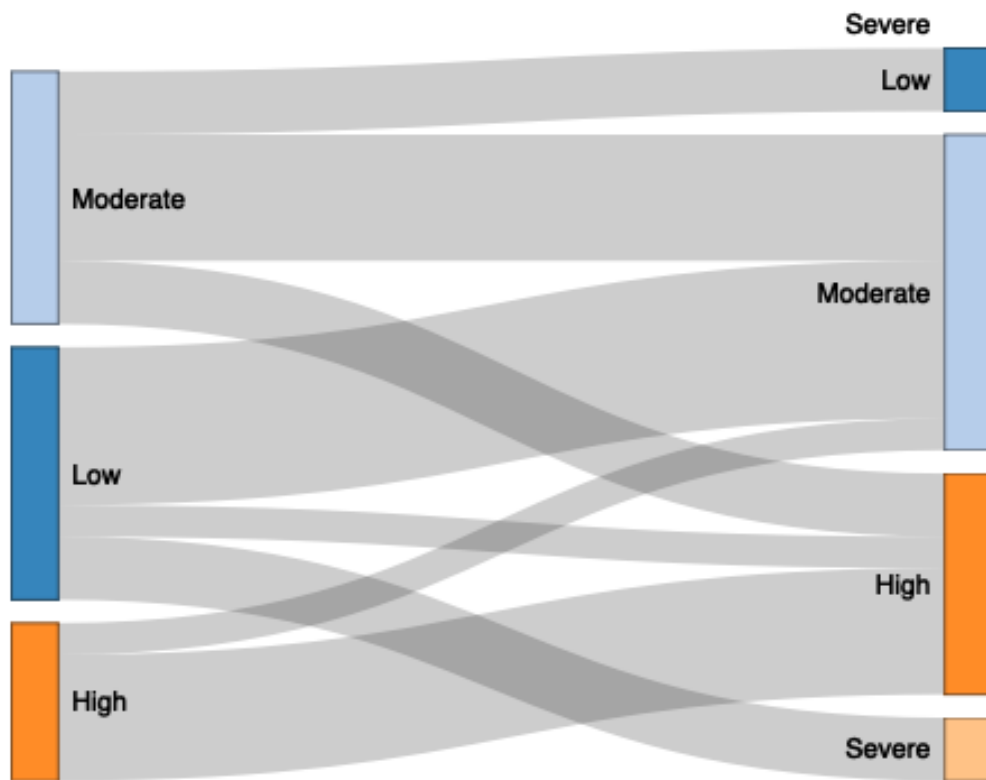
sankeyDiagram <- function(vig){
  sankey <- df %>%
    dplyr::filter(vignette == vig) %>%
    dplyr::select(InitialRisk, FinalRisk) %>%
    dplyr::group_by(InitialRisk, FinalRisk) %>%
    summarise(n=n())
  sankey <- as.data.frame(sankey)

  nodes <- data.frame(name = c("Low", "Moderate", "High", "Severe",
```

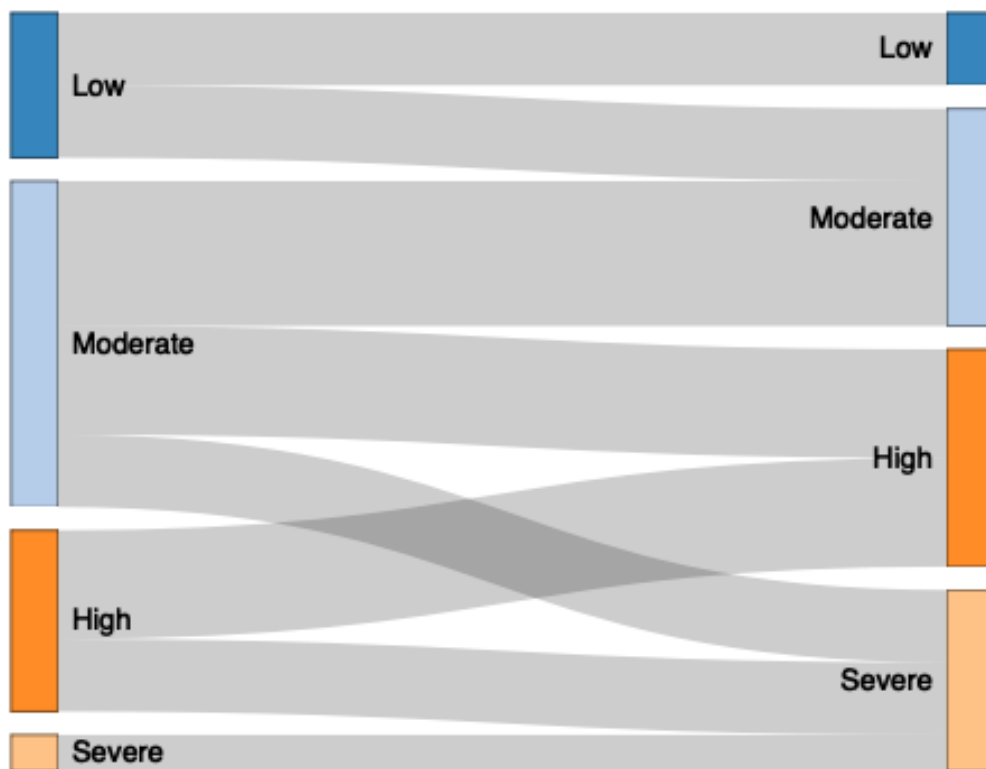
```
      "Low", "Moderate", "High", "Severe"))
sankeyNetwork(Links = sankey, Nodes = nodes, Source = "InitialRisk",
              Target = "FinalRisk", Value = "n", NodeID = "name",
              units = "n", fontSize = 12, nodeWidth = 20)
}
sankeyDiagram("Vignette_1")
```



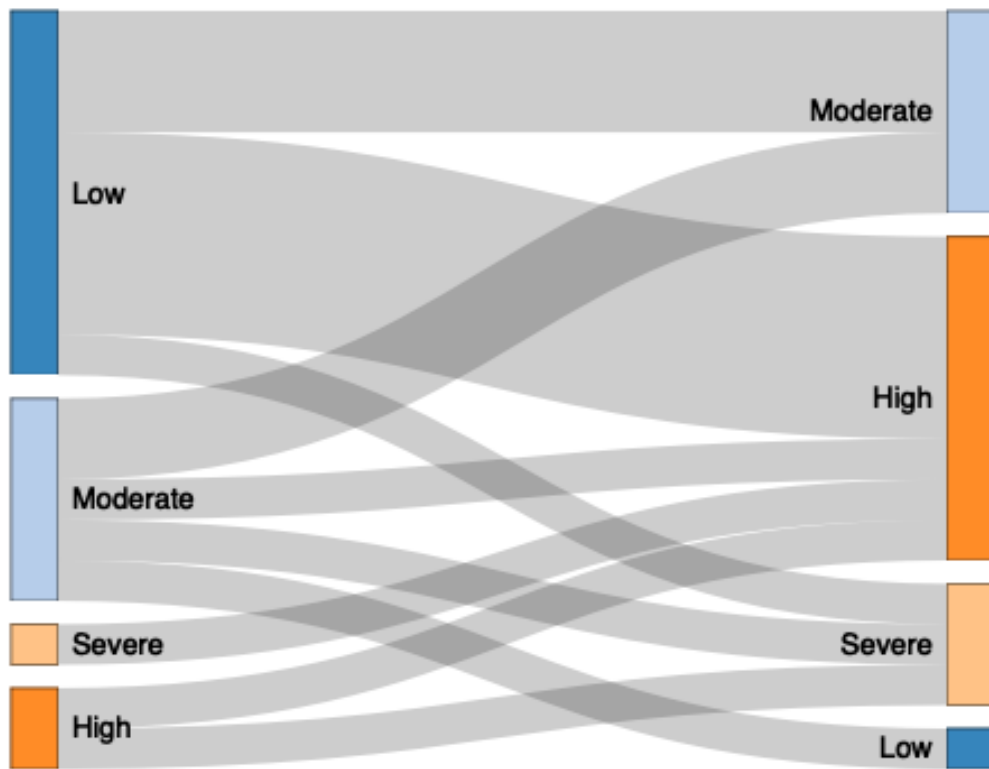
```
sankeyDiagram("Vignette_2")
```



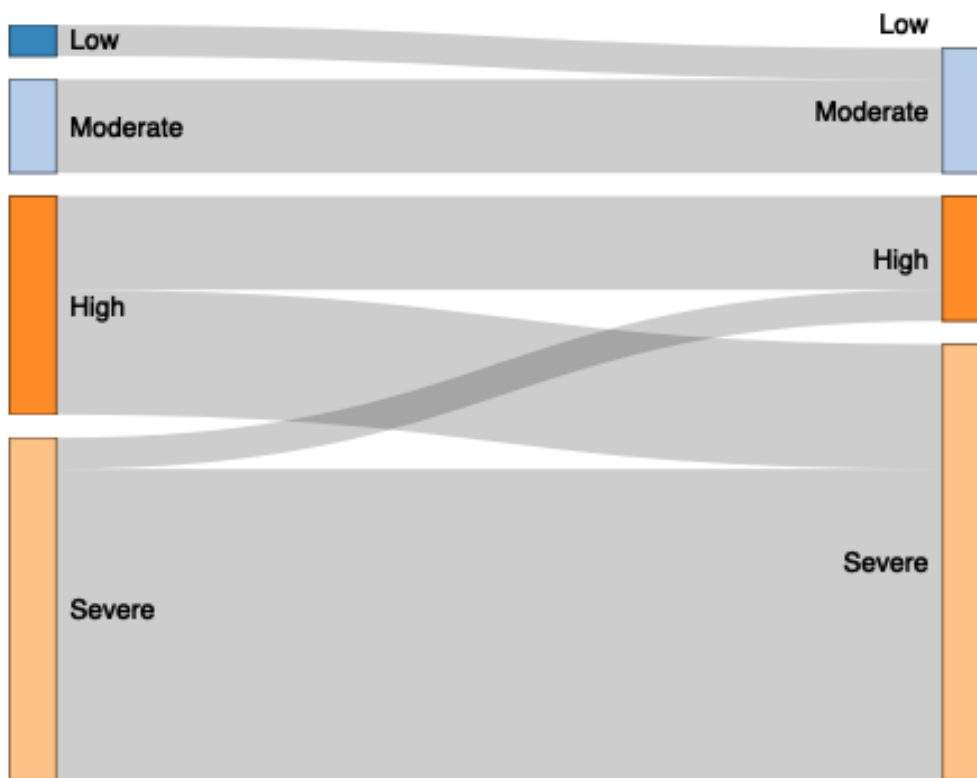
sankeyDiagram("Vignette_3")



```
sankeyDiagram("Vignette_4")
```



sankeyDiagram("Vignette_5")



9.4.20.6 Comparing different vignettes using a pyramid plot

```
# First, create a term-document matrix
df <- thinkAloudWords %>%
  dplyr::select(vignette, word) %>%
  group_by(vignette) %>%
  count(word, vignette)
df <- df[!(df$vignette=="Not coded"),]
tdm <- df %>%
  cast_tdm(word, vignette, n)
tdm <- as.matrix(tdm)
# Create a function to plot a pyramid of common word between columns in tdm
library(plotrix)
pyramid <- function(left, right, size, labels) {
  common.words <- subset(tdm, tdm[, left] > 5 & tdm[, right] > 5)
  difference <- abs(common.words[, left] - common.words[, right])
  common.words <- cbind(common.words, difference)
  common.words <- common.words[order(common.words[, 7],
    decreasing = TRUE), ]
  top25.df <- data.frame(x = common.words[1:size, left],
    y = common.words[1:size, right],
    labels = rownames(common.words[1:size, ]))
  pyramid.plot(top25.df$x, top25.df$y,
    labels = top25.df$labels,
    gap = 30,
    top.labels = labels,
    main = "Words in common", laxlab = NULL,
```

```

    raxlab = NULL, unit = NULL)
}

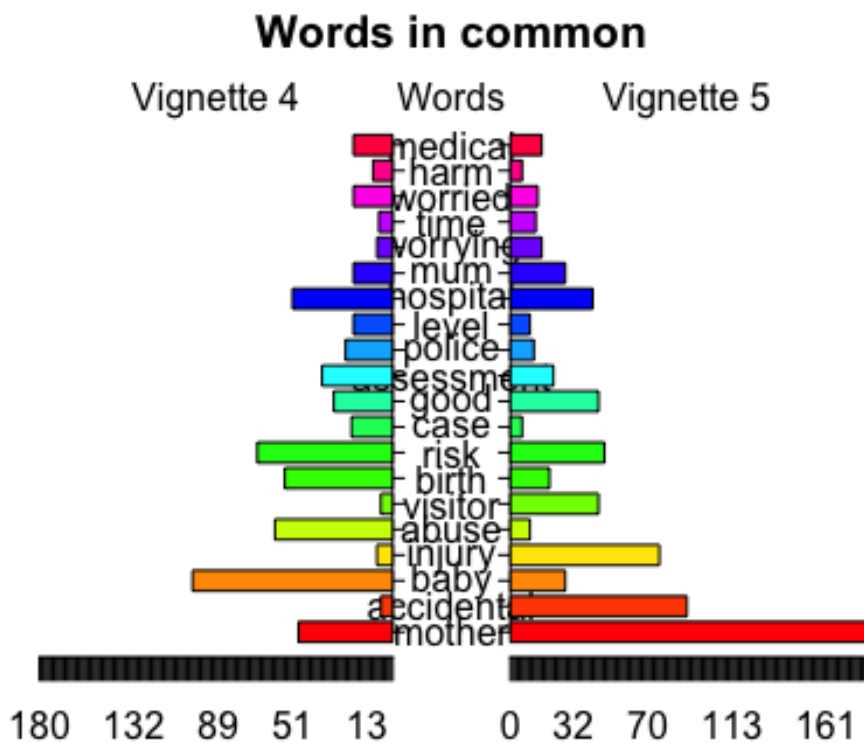
```

Common Words between Vignette_4 and Vignette_5

```

left <- 4
right <- 5
size <- 20
labels <- c("Vignette 4", "Words", "Vignette 5")
pyramid(left, right, size, labels)

```



```
## 210 210
```

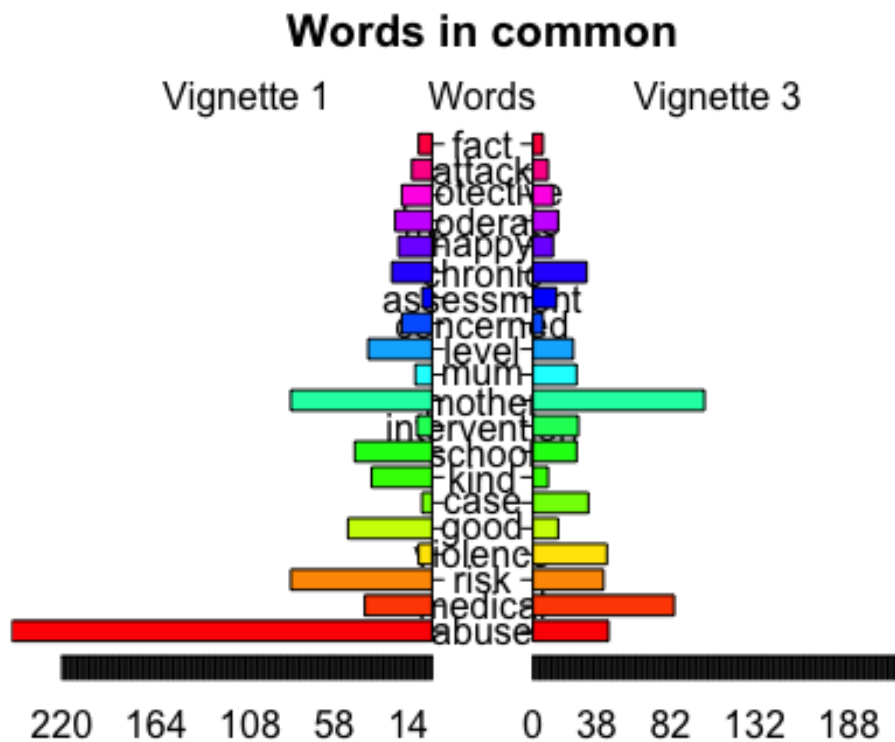
```
## [1] 5.1 4.1 4.1 2.1
```

Common Words between Vignette_1 and Vignette_3

```

left <- 1
right <- 3
size <- 20
labels <- c("Vignette 1", "Words", "Vignette 3")
pyramid(left, right, size, labels)

```

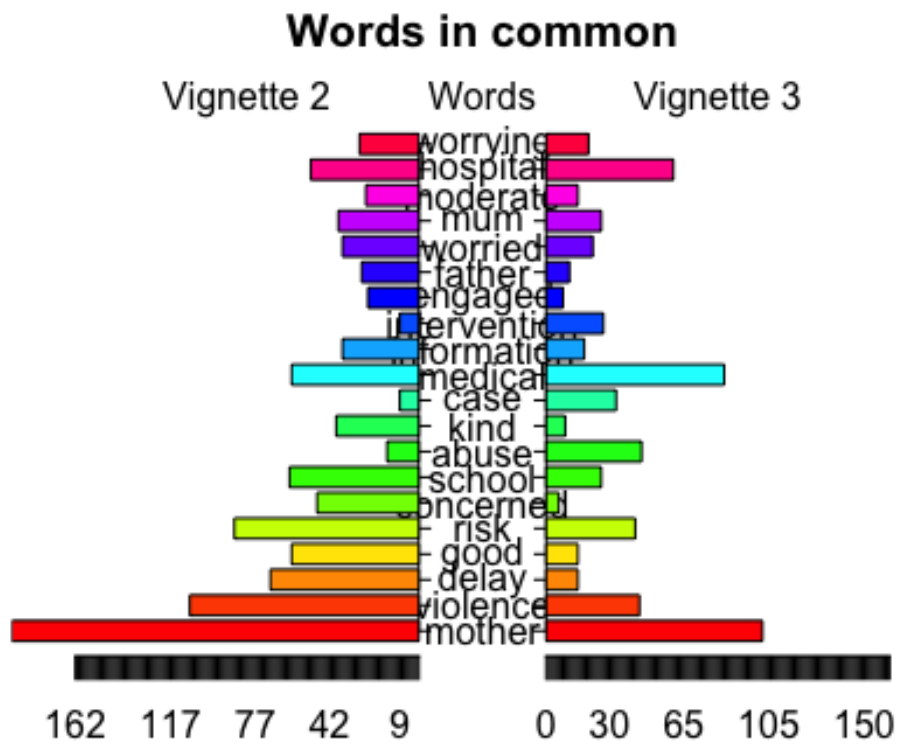


```
## 250 250
```

```
## [1] 5.1 4.1 4.1 2.1
```

Common Words between Vignette_2 and Vignette_3

```
left <- 2
right <- 3
size <- 20
labels <- c("Vignette 2", "Words", "Vignette 3")
pyramid(left, right, size, labels)
```

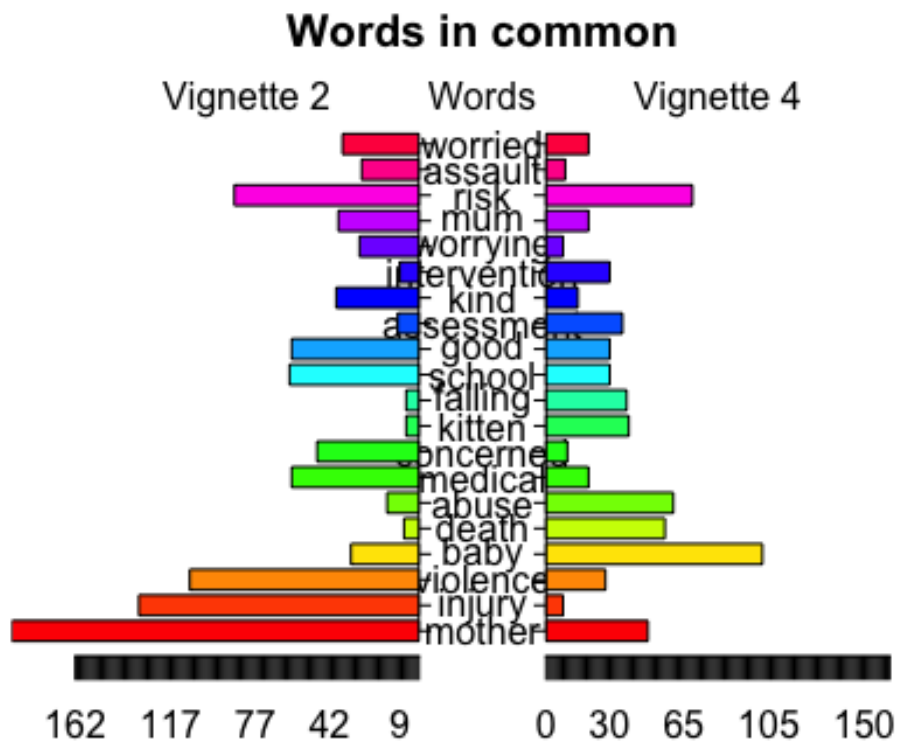



```
## 192 192
```

```
## [1] 5.1 4.1 4.1 2.1
```

Common Words between Vignette_2 and Vignette_4

```
left <- 2
right <- 4
size <- 20
labels <- c("Vignette 2", "Words", "Vignette 4")
pyramid(left, right, size, labels)
```

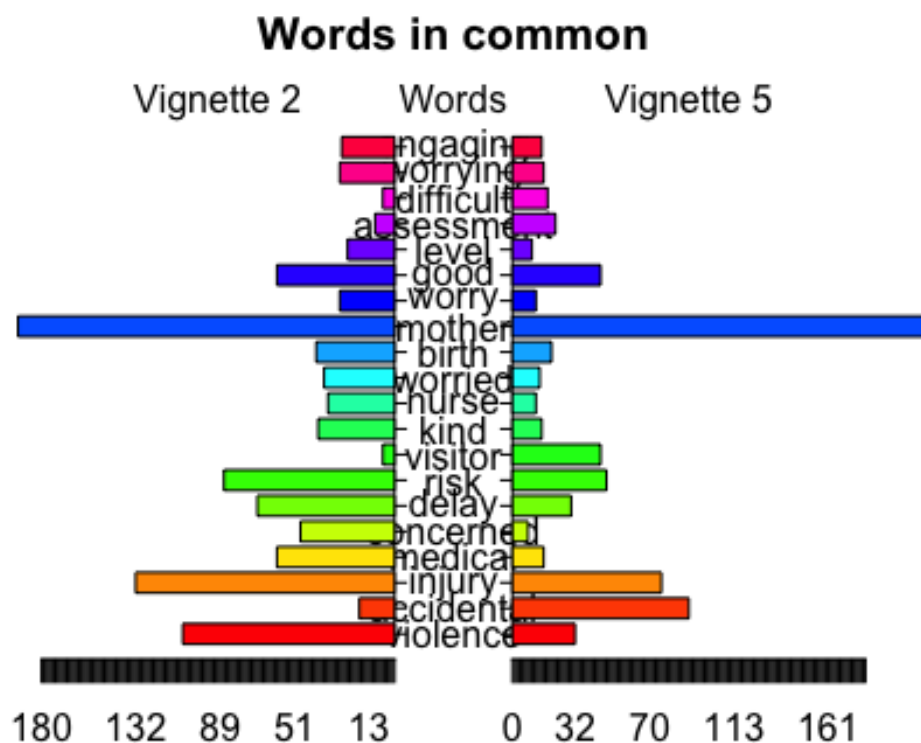


```
## 192 192
```

```
## [1] 5.1 4.1 4.1 2.1
```

Common Words between Vignette_2 and Vignette_4

```
left <- 2
right <- 5
size <- 20
labels <- c("Vignette 2", "Words", "Vignette 5")
pyramid(left, right, size, labels)
```



```
## 210 210
```

```
## [1] 5.1 4.1 4.1 2.1
```

9.4.21 Case and Participant Characteristics

9.4.21.1 Create a correspondence analysis of expertise, initial and final risk

Create dataframe

```
# Create a dataframe for Initial Risk and expertise
```

```
vign <- "Vignette_1"
```

```
df <- risks %>%
```

```
  filter(vignette == vign) %>%
```

```
  dplyr::select(doc_id, InitialRisk)
```

```
df2 <- human_values %>%
```

```
  dplyr::select(doc_id, expertise)
```

```
df <- merge(df, df2, by = "doc_id", all.x = TRUE)
```

```
df <- df[complete.cases(df), ]
```

```
# Create pivot for expertise and initial risk
```

```
df <- df %>%
```

```
  group_by(expertise) %>%
```

```
  count(InitialRisk)
```

```
df <- df[!grepl("NA", df$InitialRisk),]
```

```

IR <- pivot_wider(df, names_from = InitialRisk,
                 values_from = n)
colnames(IR) <- c("Characteristic", "I-High", "I-Low", "I-Moderate", "I-Severe")
ca <- as.data.frame(IR)
IR <- ca[,-1]
rownames(IR) <- ca[,1]

# Create a dataframe for final Risk and expertise
df <- risks %>%
  filter(vignette == vign) %>%
  dplyr::select(doc_id, FinalRisk)
df2 <- human_values %>%
  dplyr::select(doc_id, expertise)
df <- merge(df, df2, by = "doc_id", all.x = TRUE)
df <- df[complete.cases(df), ]

# Create pivot for expertise and initial risk
df <- df %>%
  group_by(expertise) %>%
  count(FinalRisk)
df <- df[!grepl("NA", df$FinalRisk),]
FR <- pivot_wider(df, names_from = FinalRisk,
                 values_from = n)
colnames(FR) <- c("Characteristic", "F-High", "F-Low", "F-Moderate", "F-Severe")
ca <- as.data.frame(FR)
FR <- ca[,-1]
rownames(FR) <- ca[,1]

# Merge the two dataframes
ca <- cbind(IR, FR)
ca[is.na(ca)] <- 0

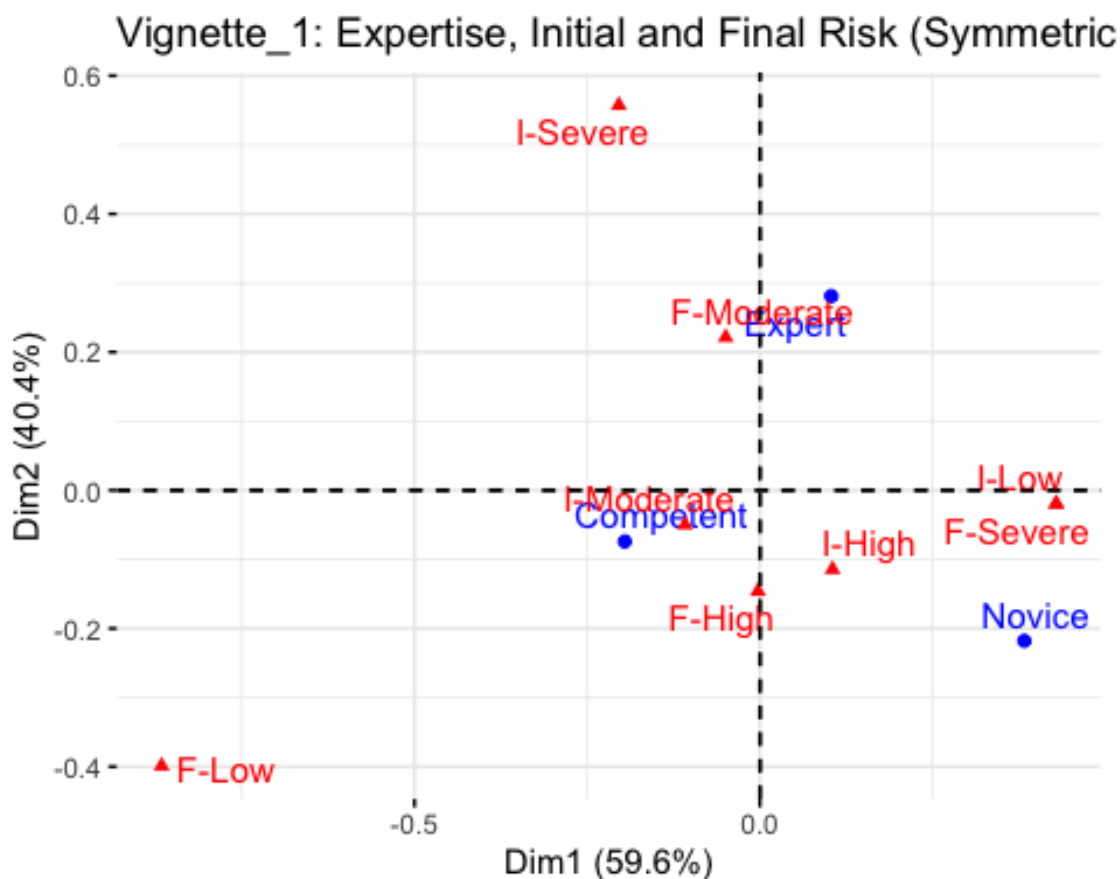
```

Create a correspondence plot

```

res.ca <- CA(ca, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symmetric", repel = TRUE,
              title = paste(vign, ": Expertise, Initial and Final Risk (Symmetric)"
                          , sep = ""))

```



```
# Clean up
rm(ca, FR, IR, df2)
```

9.4.21.2 Create a correspondence analysis of initial, final risk and vignette

```
# Create a dataframe for Initial Risk and vignette
df <- risks %>%
  dplyr::select(vignette, InitialRisk)
df <- df[complete.cases(df), ]

# Create pivot for expertise and initial risk
df <- df %>%
  group_by(vignette) %>%
  count(InitialRisk)
df <- df[!grepl("NA", df$InitialRisk),]
IR <- pivot_wider(df, names_from = InitialRisk,
  values_from = n)
colnames(IR) <- c("Vignette", "I-High", "I-Low", "I-Moderate", "I-Severe")
ca <- as.data.frame(IR)
IR <- ca[,-1]
rownames(IR) <- ca[,1]

# Create a dataframe for final Risk and expertise
df <- risks %>%
  dplyr::select(vignette, FinalRisk)
df <- df[complete.cases(df), ]
```

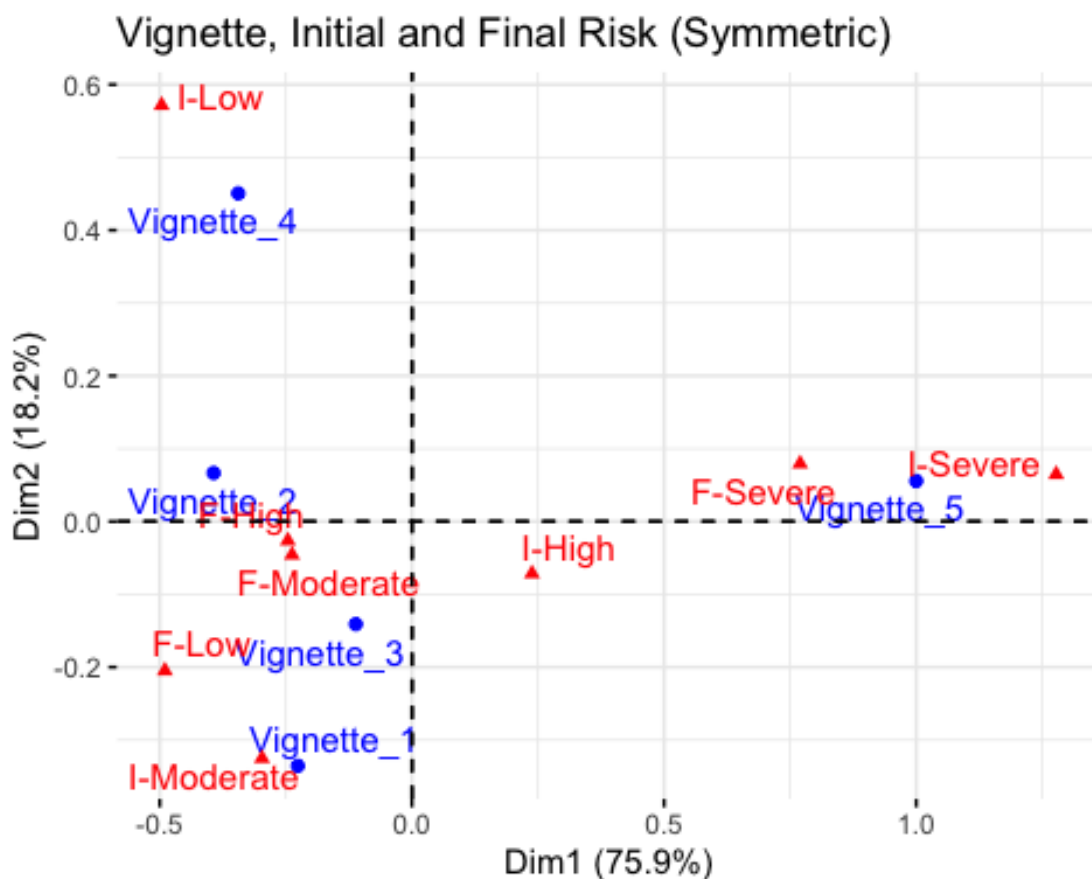
```

# Create pivot for expertise and initial risk
df <- df %>%
  group_by(vignette) %>%
  count(FinalRisk)
df <- df[!grepl("NA", df$FinalRisk),]
FR <- pivot_wider(df, names_from = FinalRisk,
  values_from = n)
colnames(FR) <- c("Vignette", "F-High", "F-Low", "F-Moderate", "F-Severe")
ca <- as.data.frame(FR)
FR <- ca[,-1]
rownames(FR) <- ca[,1]

# Merge the two dataframes
ca <- cbind(IR, FR)
ca[is.na(ca)] <- 0

# Create a correspondence plot
res.ca <- CA(ca, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symmetric", repel = TRUE,
  title = "Vignette, Initial and Final Risk (Symmetric)")

```



```

# Clean up
rm(ca, FR, IR, df)

```

9.4.22 Analyse Interventions, Expertise and Human Values for each vignette

```

# Create a dataframe that contains all relevant data
df1 <- risks %>%
  dplyr::select(doc_id, vignette, InitialRisk, FinalRisk)
df2 <- intervention %>%
  dplyr::select(intervention)
df <- cbind(df1, df2)
df1 <- human_values %>%
  dplyr::select(doc_id, expertise, HVS_Cluster)
df <- merge(df, df1, by.x = "doc_id", all.x = TRUE)
# Ensure only complete cases are included
df <- df[complete.cases(df), ]
df <- df[!grepl("NA", df$intervention),]
decisions <- df
rm(df1, df2)

```

9.4.22.1 Generate Barplot for Vignette and Expertise

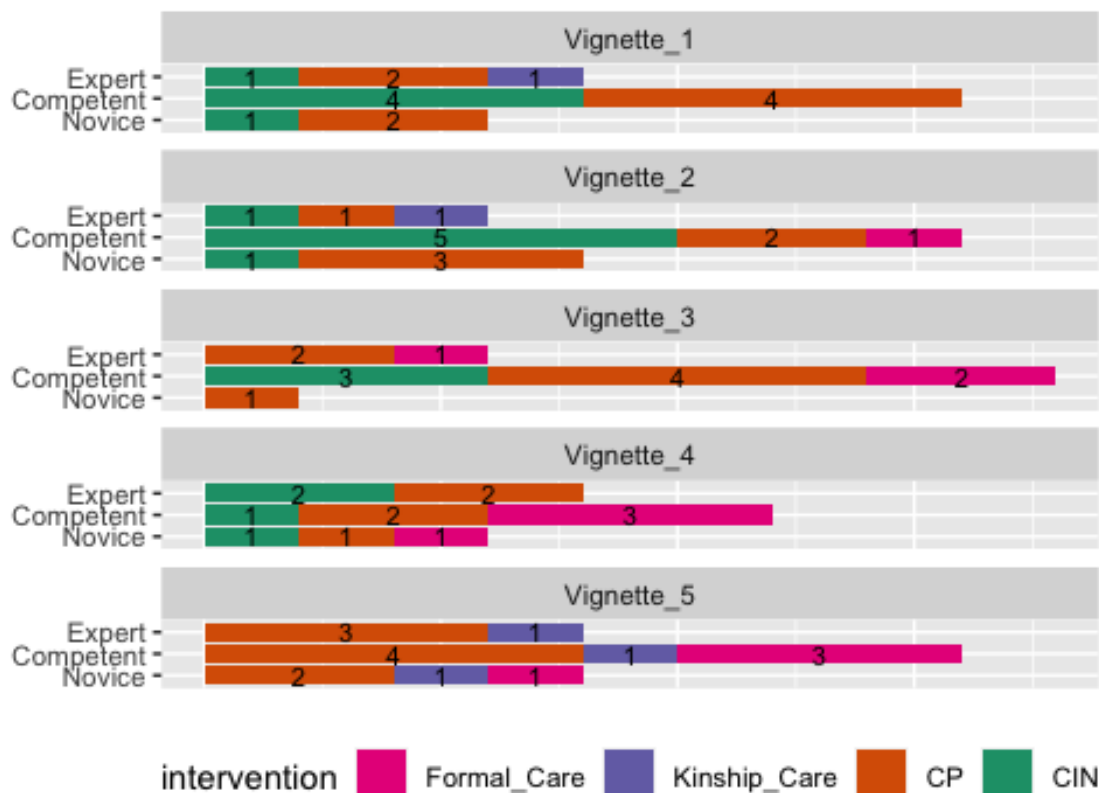
```

# Create matrix for expertise
df <- dplyr::select(decisions, vignette, intervention, expertise)
df <- count(df, vignette, intervention, expertise)
df$intervention = factor(df$intervention,
  levels = c("Formal_Care", "Kinship_Care", "CP", "CIN"),
  ordered = TRUE)
df$expertise = factor(df$expertise,
  levels = c("Novice", "Competent", "Expert"),
  ordered = TRUE)
df_expertise <- df

# Create a barplot
ggplot(df, aes(factor(expertise), n, fill = intervention, label = n)) +
  geom_bar(stat="identity") + #, position = "dodge") +
  geom_text(size = 3, position = position_stack(vjust = 0.5)) +
  scale_fill_brewer(palette = "Dark2", direction = -1) +
  coord_flip() +
  ggtitle("Barplot of expertise and chosen interventions for each vignette") +
  theme(axis.title.x=element_blank(),
    axis.text.x=element_blank(),
    axis.ticks.x=element_blank(),
    axis.title.y=element_blank(),
    legend.position = "bottom") +
  facet_wrap(~vignette, nrow = 5)

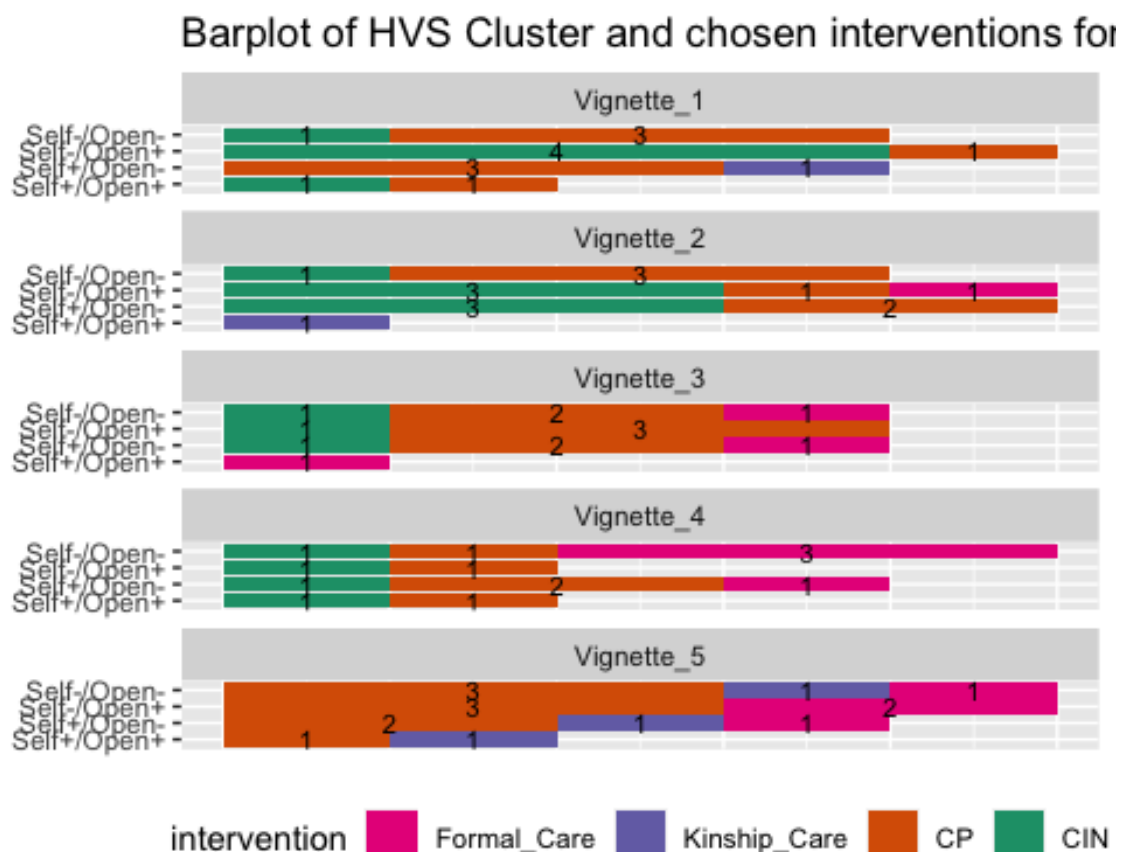
```

Barplot of expertise and chosen interventions for each vignette



9.4.22.2 Generate Barplot for Vignette and HVS

```
# Create matrix for HVS Clusters
df <- dplyr::select(decisions, vignette, intervention, HVS_Cluster)
df <- count(df, vignette, intervention, HVS_Cluster)
df$intervention = factor(df$intervention,
  levels = c("Formal_Care", "Kinship_Care", "CP", "CIN"),
  ordered = TRUE)
df$HVS_Cluster = factor(df$HVS_Cluster,
  levels = c("Self+/Open+", "Self+/Open-",
    "Self-/Open+", "Self-/Open-"),
  ordered = TRUE)
df_HVS <- df
# Create a barplot for HVS Clusters and Intervention for each vignette
ggplot(df, aes(factor(HVS_Cluster), n, fill = intervention, label = n)) +
  geom_bar(stat="identity") + #, position = "dodge") +
  geom_text(size = 3, position = position_stack(vjust = 0.5)) +
  scale_fill_brewer(palette = "Dark2", direction = -1) +
  coord_flip() +
  ggtitle("Barplot of HVS Cluster and chosen interventions for each vignette") +
  theme(axis.title.x=element_blank(),
    axis.text.x=element_blank(),
    axis.ticks.x=element_blank(),
    axis.title.y=element_blank(),
    legend.position = "bottom") +
  facet_wrap(~vignette, nrow = 5)
```

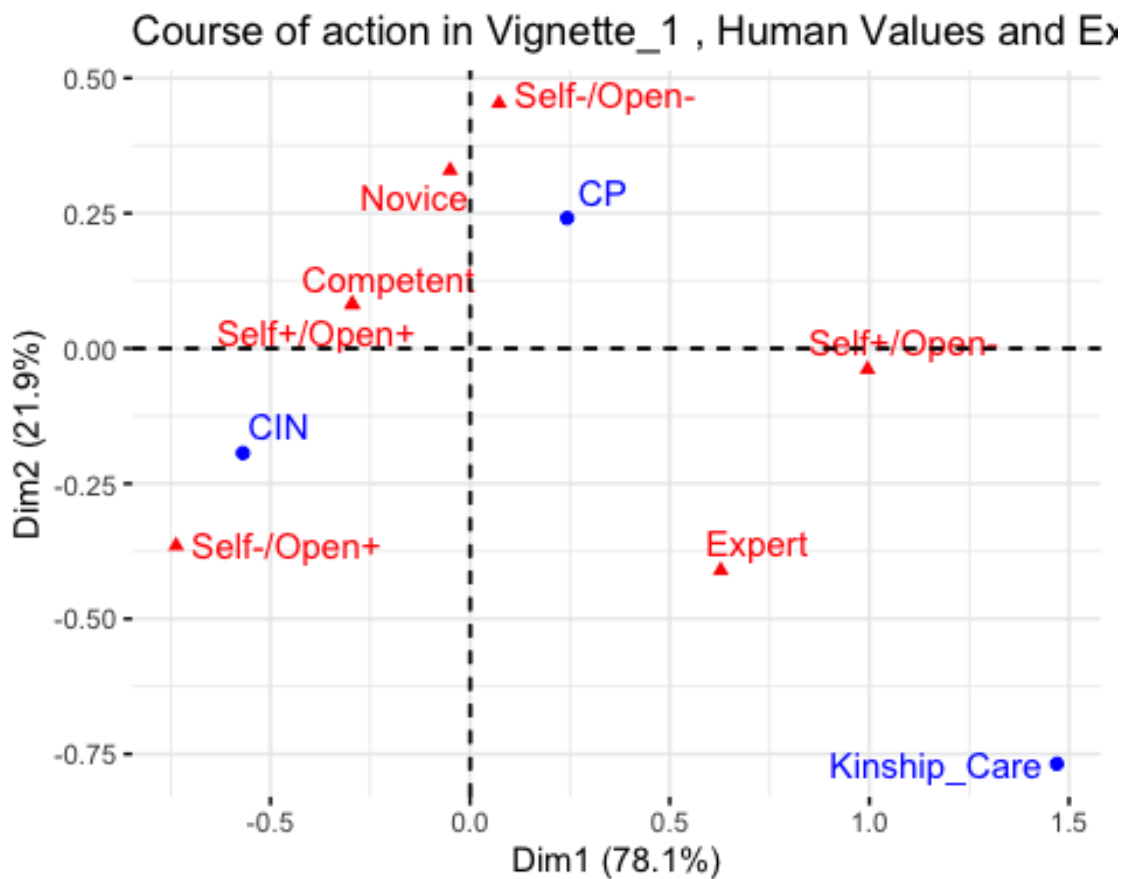
9.4.22.3 Create Correspondence Analysis for Interventions, HVS Cluster and Expertise

```
# Define a function
CA_Expertise_HVS_Interventions <- function(vign) {
  # Generate crosstable for expertise and Interventions
  expertise_ca <- df_expertise %>%
    filter(vignette == vign) %>%
    dplyr::select(expertise, intervention, n)
  expertise_ca <- pivot_wider(expertise_ca, names_from = expertise,
    values_from = n)
  expertise_ca[is.na(expertise_ca)] <- 0
  expertise_ca <- expertise_ca %>%
    remove_rownames %>%
    column_to_rownames(var="intervention")
  # Generate cross table for HVS Cluster and Interventions
  HVS_ca <- df_HVS %>%
    filter(vignette == vign) %>%
    dplyr::select(HVS_Cluster, intervention, n)
  HVS_ca <- pivot_wider(HVS_ca, names_from = HVS_Cluster,
    values_from = n)
  HVS_ca[is.na(HVS_ca)] <- 0
  HVS_ca <- HVS_ca %>%
    remove_rownames %>%
    column_to_rownames(var="intervention")
  # Merge the two cross tables
  expertiseHVS_ca <- cbind(expertise_ca, HVS_ca)
}
```

```
# Calculate CA
res.ca <- CA(expertiseHVS_ca, graph = FALSE)
# Plot CA
fviz_ca_biplot(res.ca, geom = c("point","text"), map = "symetric", repel = TRUE,
  title = paste(
    "Course of action in",
    vign,
    ", Human Values and Expertise (Symmetric)",
    sep = " ")
}
```

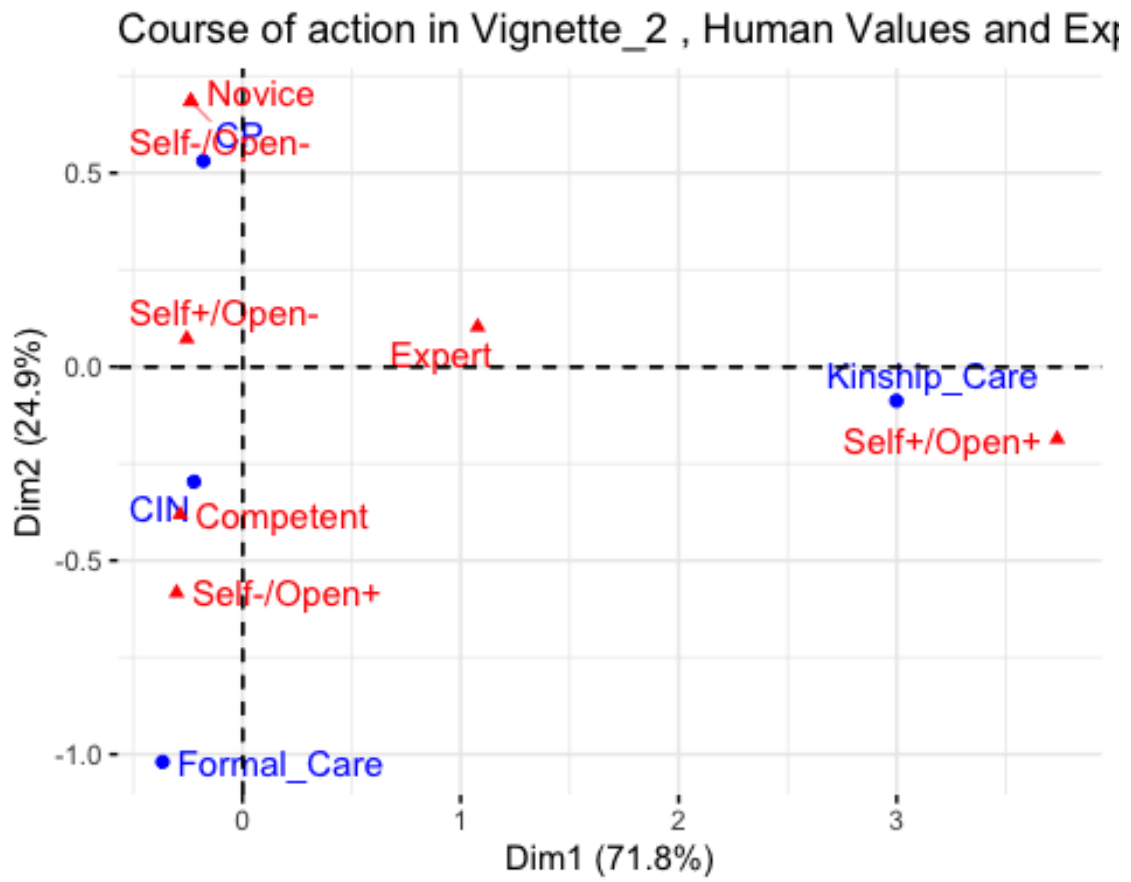
Correspondence Analysis: Vignette 1

```
CA_Expertise_HVS_Interventions("Vignette_1")
```



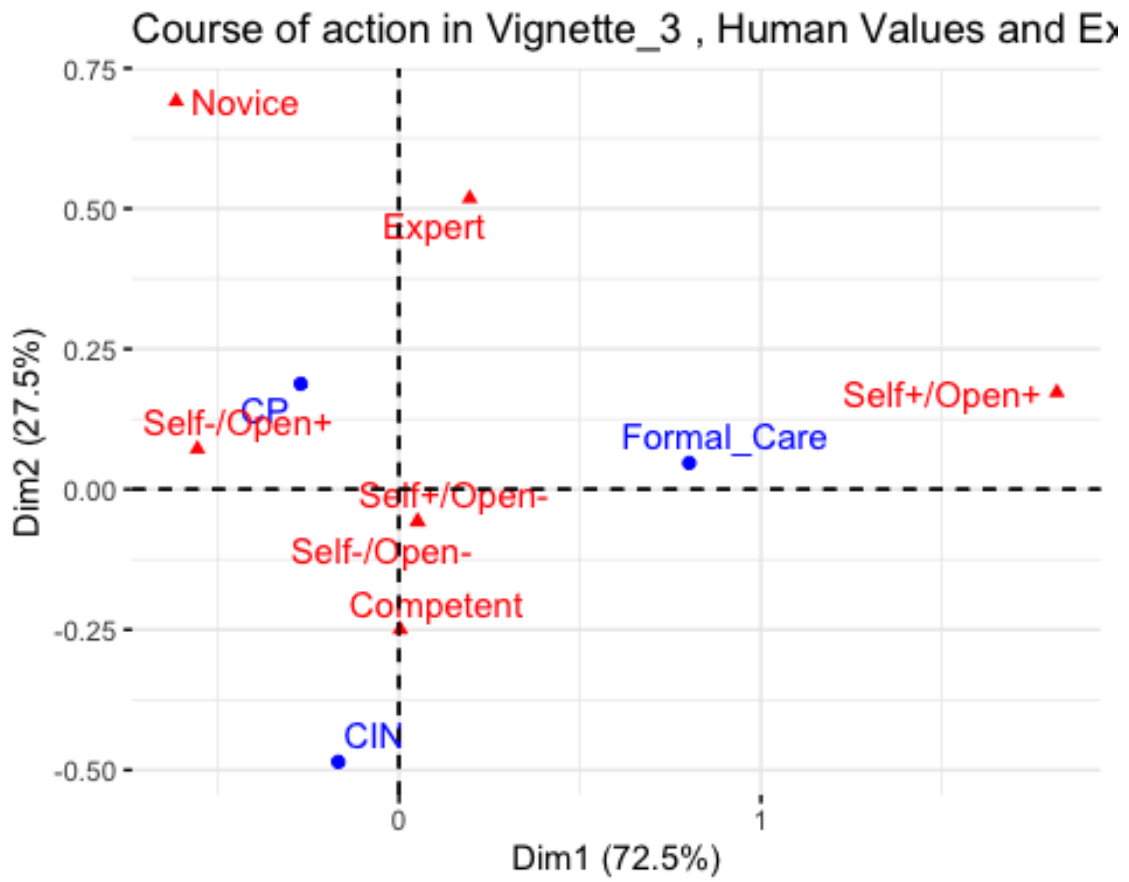
Correspondence Analysis: Vignette 2

CA_Expertise_HVS_Interventions("Vignette_2")



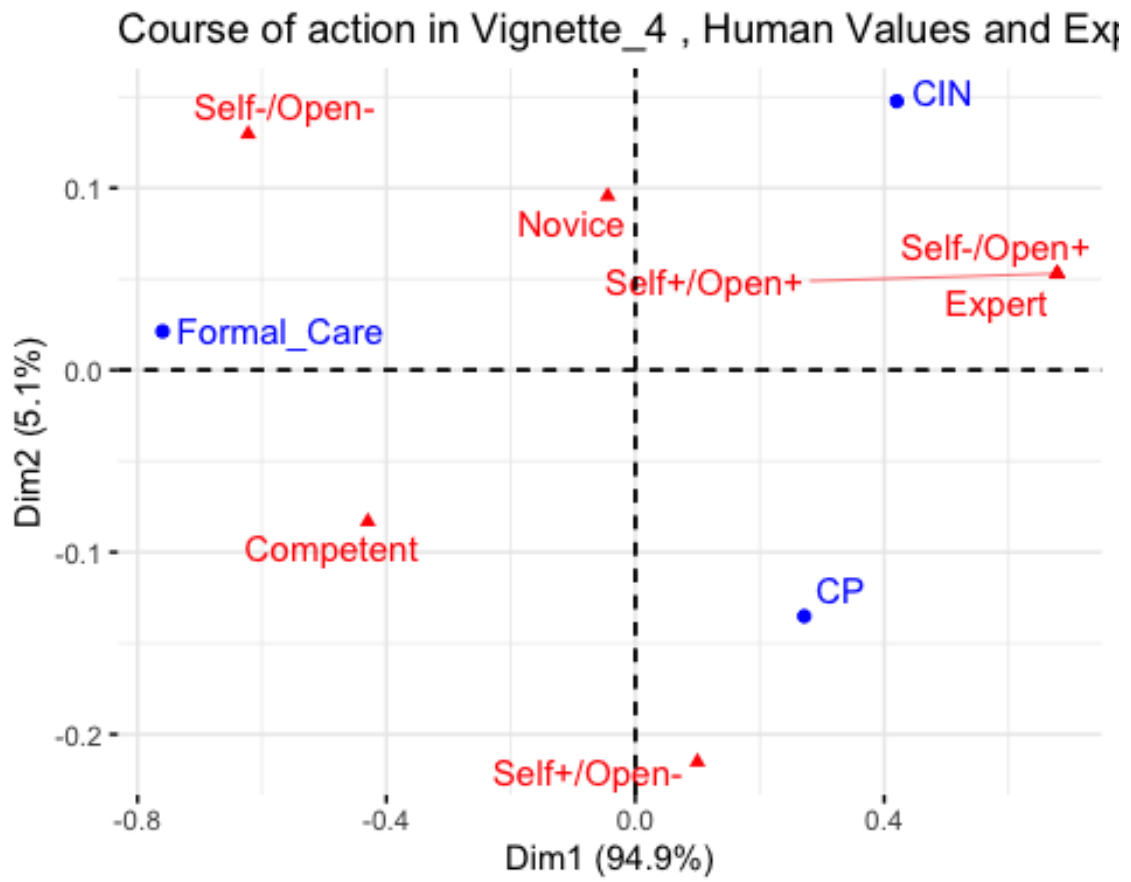
Correspondence Analysis: Vignette 3

CA_Expertise_HVS_Interventions("Vignette_3")



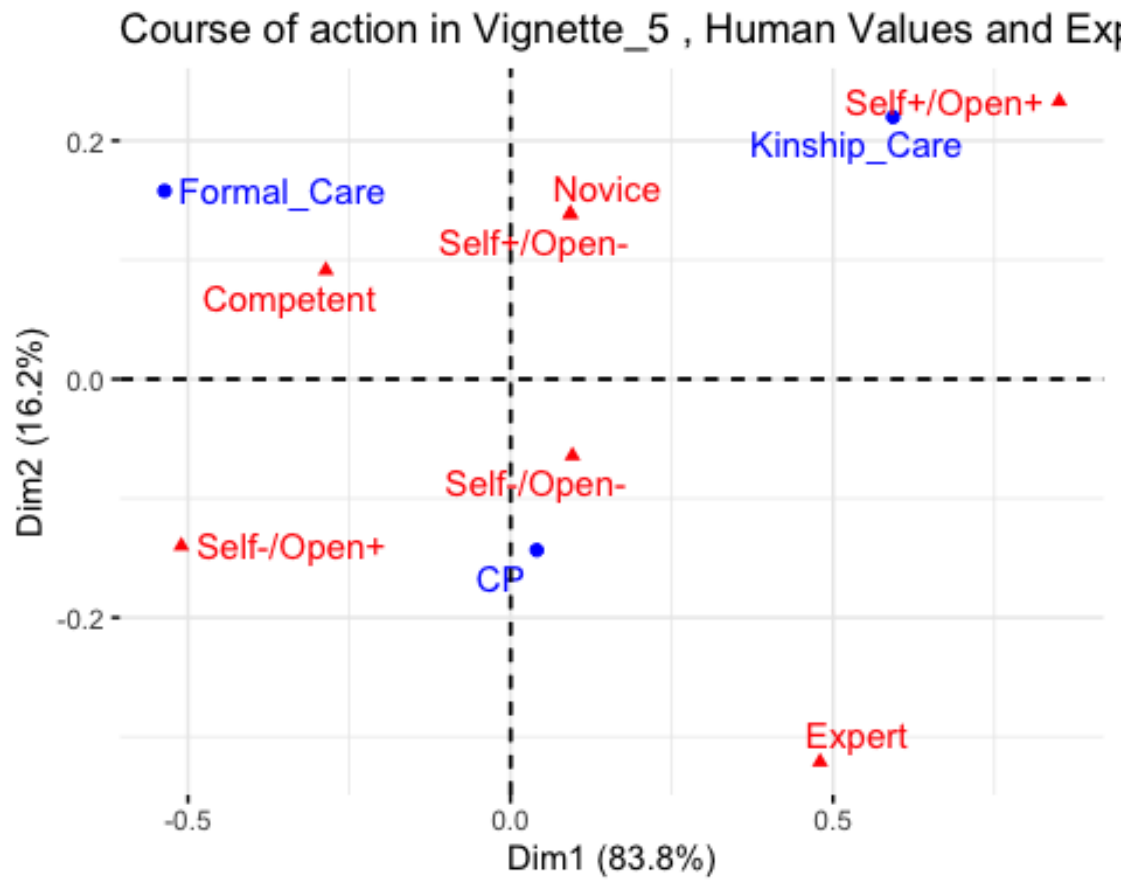
Correspondence Analysis: Vignette 4

CA_Expertise_HVS_Interventions("Vignette_4")



Correspondence Analysis: Vignette 5

CA_Expertise_HVS_Interventions("Vignette_5")



9.5 R Script Analyse Reasoning

9.5.1 Defining the Environment

9.5.1.1 Load relevant libraries

```
# Analyse Reasoning
# Set Environment #####
## Load libraries #####
library(tm) #load text mining library
library(magrittr)
library(dplyr)
library(qdap)
library(tidytext)
library(data.table)
library(parallel)
library(ggrepel)
library(gggraph)
library(igraph)
library(ggthemes)
library(magrittr)
library(tidyverse)
library(syuzhet)
library(SentimentAnalysis)
library(janitor)
library(knitr)
library(kableExtra)
library(factoextra)
library(FactoMineR)
```

9.5.1.2 Define key variable(s)

```
numCores <- detectCores() #How many cores for parallel processing?
```

9.5.1.3 Define function to clean up text.

```
clean_data <- function(text) {
  text <- iconv(text, "utf-8", "ASCII", sub = "")
  text <- str_replace_all(text, "[\r\n]", " ") #Remove CR
  text <- tolower(text) #Set text to lower
  text <- removeNumbers(text) #Remove numbers
  #Remove english stopwords
  text <- removeWords(text, stopwords("english"))
  #Remove additional words defined in table imported in the following chunk
  text <- removeWords(text, removal_words)
  # Remove punctuation
  text <- removePunctuation(text)
}

#Define function to remove blanks
blank.removal <- function(x) {
  #Separate text to be cleaned where there is a blank
  x <- unlist(strsplit(x, ' '))
  #Subset text vector and loose all points where there is a blank space
  x <- subset(x, nchar(x)>0)
```

```
#Bring text vector together with one space between words
x <- paste(x,collapse=' ')
}
```

9.5.1.4 Load data

```
## Load Human Values Questionnaire ####
human_values <- readRDS(file =
  "/Users/stefan_kleipoedzus/Documents/@Promotion/R Analysing Transcript/HumanValuesDMChar.RDS")
## Load Nvivo coded textfiles ####
#### Load Nvivo textfiles with combined reasoning transcripts ####
# Create list of text files for overall reasoning
mypath <-
  "/Users/stefan_kleipoedzus/Documents/@Promotion/R Analysing Transcript/Reasoning"
setwd(mypath)
removal_words <- c("coverage", "reference", "s", "m",
  "im", "shes", "dont", "id", "yeah", "doesnt",
  "hes", "weve", "information", "assessment", "risk",
  "ive", "level", "view")

# Create list of text files
txt_files_ls = list.files(path=mypath, pattern="*.txt")
# Read the files in, assuming CR separator
df <- lapply(txt_files_ls, function(x)
  {read.table(file = x, header = F, sep = "\r")})
# Read filenames
all_filenames <- txt_files_ls %>%
  basename() %>%
  as.list()
# combine file content list and file name list
df <- mapply(c, df, all_filenames, SIMPLIFY = FALSE)
# unlist all lists and change column name
df <- rbindlist(df, fill = T)
# change column name
names(df)[2] <- "doc_id"
rm(all_filenames, txt_files_ls, mypath)
df <- df[!grepl("Coverage", df$V1),]
df$doc_id <- gsub(".txt", "", df$doc_id)

# Add consecutive id grouped by doc_id
df <- df %>%
  group_by(doc_id) %>%
  mutate(count = row_number())

# Clean the bag
df$tidy <- mclapply(df$V1, clean_data, mc.cores = numCores)
df$tidy <- unlist(df$tidy)
df$tidy <- mclapply(df$tidy, blank.removal, mc.cores = numCores)
df$tidy <- unlist(df$tidy)

# Create "master" dataframe
reasoning <- df
```



```

# Merge reasoning df with Human Values Data
reasoning <- merge(reasoning, human_values, by = "doc_id", all.x = TRUE)

# Create on "bag of words" for each participant
## This creates a column called "reasoning" required for NLP
words <- df %>%
  group_by(doc_id) %>%
  mutate(reasoning = paste0(V1, collapse = " ")) %>%
  slice(1) %>%
  ungroup() %>%
  dplyr::select(doc_id, reasoning) %>%
  mutate(sentiment = get_sentiment(reasoning, method = "syuzhet"))
words$reasoning <- unlist(words$reasoning)

# Create labels for three quantiles
words <- words %>%
  mutate(SentCat = ntile(sentiment, 2))
words$SentCat <- factor(words$SentCat,
  labels = c("Lower Half", "Upper Half"))

# Clean the bag
words$tidy <- mclapply(words$reasoning, clean_data, mc.cores = numCores)
words$tidy <- unlist(words$tidy)
words$tidy <- mclapply(words$tidy, blank.removal, mc.cores = numCores)
words$tidy <- unlist(words$tidy)

```

9.5.1.5 Load Nvivo textfiles with individual reasoning blocks

```

# Create list of text files for reasoning steps
mypath <-
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing Transcript/Reasoning/ReasoningSteps"
setwd(mypath)
removal_words <- c("coverage", "reference", "s", "m",
  "im", "shes", "dont", "id", "yeah", "doesnt",
  "hes", "weve", "information", "assessment", "risk",
  "ive", "level", "view")

# Create list of text files
txt_files_ls = list.files(path=mypath, pattern="*.txt")
# Read the files in, assuming CR separator
df <- lapply(txt_files_ls, function(x)
  {read.table(file = x, header = F, sep = "\r")})
# Read filenames
all_filenames <- txt_files_ls %>%
  basename() %>%
  as.list()
# combine file content list and file name list
df <- mapply(c, df, all_filenames, SIMPLIFY = FALSE)
# unlist all lists and change column name
df <- rbindlist(df, fill = T)
# change column name
names(df)[2] <- "doc_id"
rm(all_filenames, txt_files_ls, mypath)
df <- df[!grepl("Coverage", df$V1),]
df$doc_id <- gsub(".txt", "", df$doc_id)

```

```

# Create new column for toumlin's reasoning codes
df$toumlin <- df$doc_id
# Clean up doc_id and toumlin
df$doc_id <- gsub("_.*", "", df$doc_id)
df$toumlin <- gsub(".*_", "", df$toumlin)
# Add consecutive id grouped by doc_id
df <- df %>%
  group_by(doc_id, toumlin) %>%
  mutate(count = row_number())

# Clean the text
df$tidy <- mclapply(df$V1, clean_data, mc.cores = numCores)
df$tidy <- unlist(df$tidy)
df$tidy <- mclapply(df$tidy, blank.removal, mc.cores = numCores)
df$tidy <- unlist(df$tidy)

# Store data in dataframe
toumlin_scheme <- df
toumlin_scheme <- ungroup(toumlin_scheme)

# Merge toumlin df with Human Values Data
toumlin_scheme <- merge(toumlin_scheme, human_values,
  by = "doc_id", all.x = TRUE)

# Create bag of words for each toumlin category and doc_id
t_claims <- toumlin_scheme %>%
  dplyr::select(doc_id, V1, toumlin) %>%
  filter(toumlin == "Claims") %>%
  group_by(doc_id) %>%
  mutate(Claims = paste0(V1, collapse = " ")) %>%
  slice(1) %>%
  ungroup() %>%
  dplyr::select(doc_id, Claims)
t_claims$Claims <- unlist(t_claims$Claims)

t_warrants <- toumlin_scheme %>%
  dplyr::select(doc_id, V1, toumlin) %>%
  filter(toumlin == "Warrant") %>%
  group_by(doc_id) %>%
  mutate(Warrants = paste0(V1, collapse = " ")) %>%
  slice(1) %>%
  ungroup() %>%
  dplyr::select(doc_id, Warrants)
t_warrants$Warrants <- unlist(t_warrants$Warrants)

t_backups <- toumlin_scheme %>%
  dplyr::select(doc_id, V1, toumlin) %>%
  filter(toumlin == "Backup") %>%
  group_by(doc_id) %>%
  mutate(Backups = paste0(V1, collapse = " ")) %>%
  slice(1) %>%
  ungroup() %>%
  dplyr::select(doc_id, Backups)
t_backups$Backups <- unlist(t_backups$Backups)

```

```

t_qualifiers <- toumlin_scheme %>%
  dplyr::select(doc_id, V1, toumlin) %>%
  filter(toumlin == "Qualify") %>%
  group_by(doc_id) %>%
  mutate(Qualifiers = paste0(V1, collapse = " ")) %>%
  slice(1) %>%
  ungroup() %>%
  dplyr::select(doc_id, Qualifiers)
t_qualifiers$Qualifiers <- unlist(t_qualifiers$Qualifiers)

t_rebuttals <- toumlin_scheme %>%
  dplyr::select(doc_id, V1, toumlin) %>%
  filter(toumlin == "Rebuttal") %>%
  group_by(doc_id) %>%
  mutate(Rebuttals = paste0(V1, collapse = " ")) %>%
  slice(1) %>%
  ungroup() %>%
  dplyr::select(doc_id, Rebuttals)
t_rebuttals$Rebuttals <- unlist(t_rebuttals$Rebuttals)

t_evidence <- toumlin_scheme %>%
  dplyr::select(doc_id, V1, toumlin) %>%
  filter(toumlin == "Data") %>%
  group_by(doc_id) %>%
  mutate(Evidence = paste0(V1, collapse = " ")) %>%
  slice(1) %>%
  ungroup() %>%
  dplyr::select(doc_id, Evidence)
t_evidence$Evidence <- unlist(t_evidence$Evidence)

# Merge all tables into a dataframe with each bag of words as a column
Toumlin_Wordbags <- merge(t_backups, t_claims,
  by = "doc_id", all = TRUE)
Toumlin_Wordbags <- merge(Toumlin_Wordbags, t_evidence,
  by = "doc_id", all = TRUE)
Toumlin_Wordbags <- merge(Toumlin_Wordbags, t_qualifiers,
  by = "doc_id", all = TRUE)
Toumlin_Wordbags <- merge(Toumlin_Wordbags, t_rebuttals,
  by = "doc_id", all = TRUE)
Toumlin_Wordbags <- merge(Toumlin_Wordbags, t_warrants,
  by = "doc_id", all = TRUE)

# Add decision maker characteristics
df <- dplyr::select(human_values, doc_id, expertise, HVS_Cluster)
Toumlin_Wordbags <- merge(Toumlin_Wordbags, df, by = "doc_id", all.x = TRUE)
rm(t_backups, t_claims, t_evidence, t_qualifiers, t_rebuttals, t_warrants)

```

9.5.2 Word Frequencies

9.5.2.1 Overall word frequencies - All reasoning steps

```

df <- dplyr::select(words, doc_id, tidy)
df <- tibble(df)
rm_words <- c("child", "protection", "moderate")
df$tidy <- removeWords(df$tidy, rm_words)

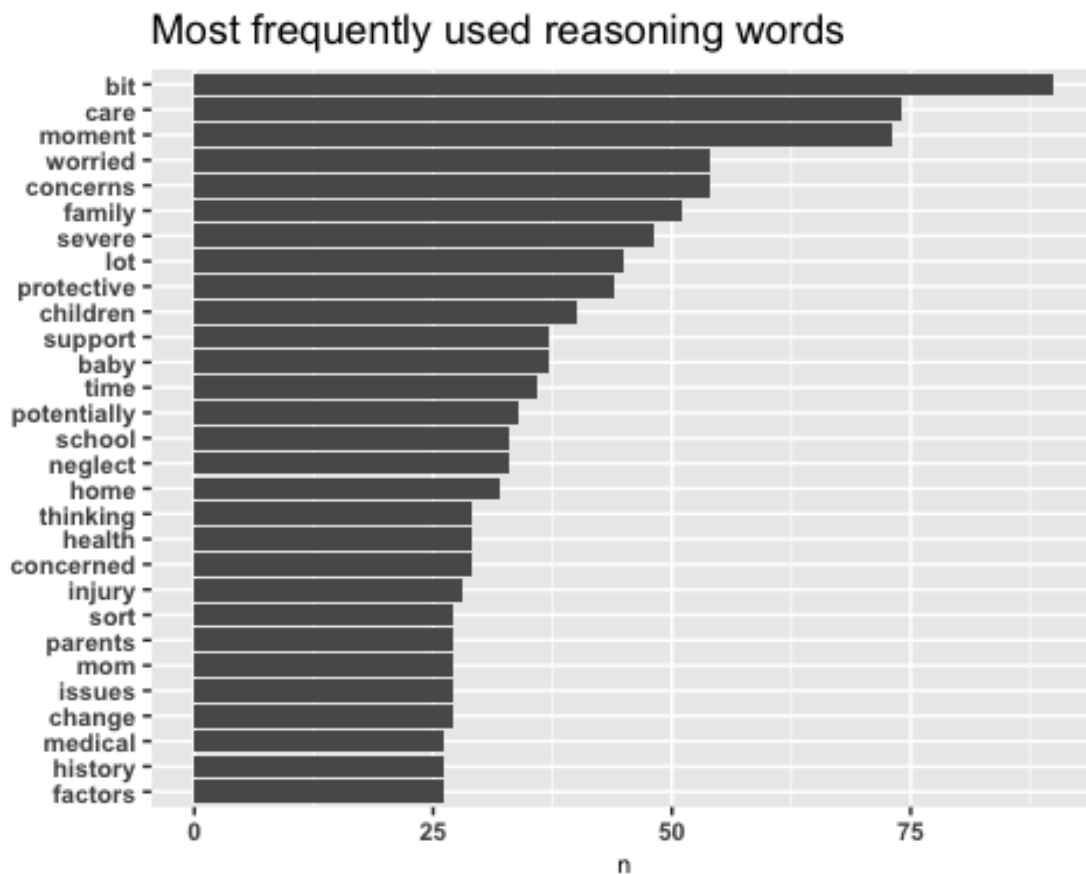
```

```

# Create one-token-per-unit-per-row, remove stop words and count remaining words
wordcounts <- df %>%
  unnest_tokens(word, tidy) %>%
  anti_join(stop_words)

# Plot most frequent words
wordcounts %>%
  count(word, sort = TRUE) %>%
  filter(n>25) %>%
  mutate(word = reorder(word, n)) %>%
  ggplot(aes(n, word)) +
  geom_col() +
  ggtitle("Most frequently used reasoning words") +
  labs(y=NULL) +
  theme(axis.text=element_text(size=8, face="bold"),
        axis.title=element_text(size=8))

```



9.5.2.2 Overall word frequencies - Toulmin

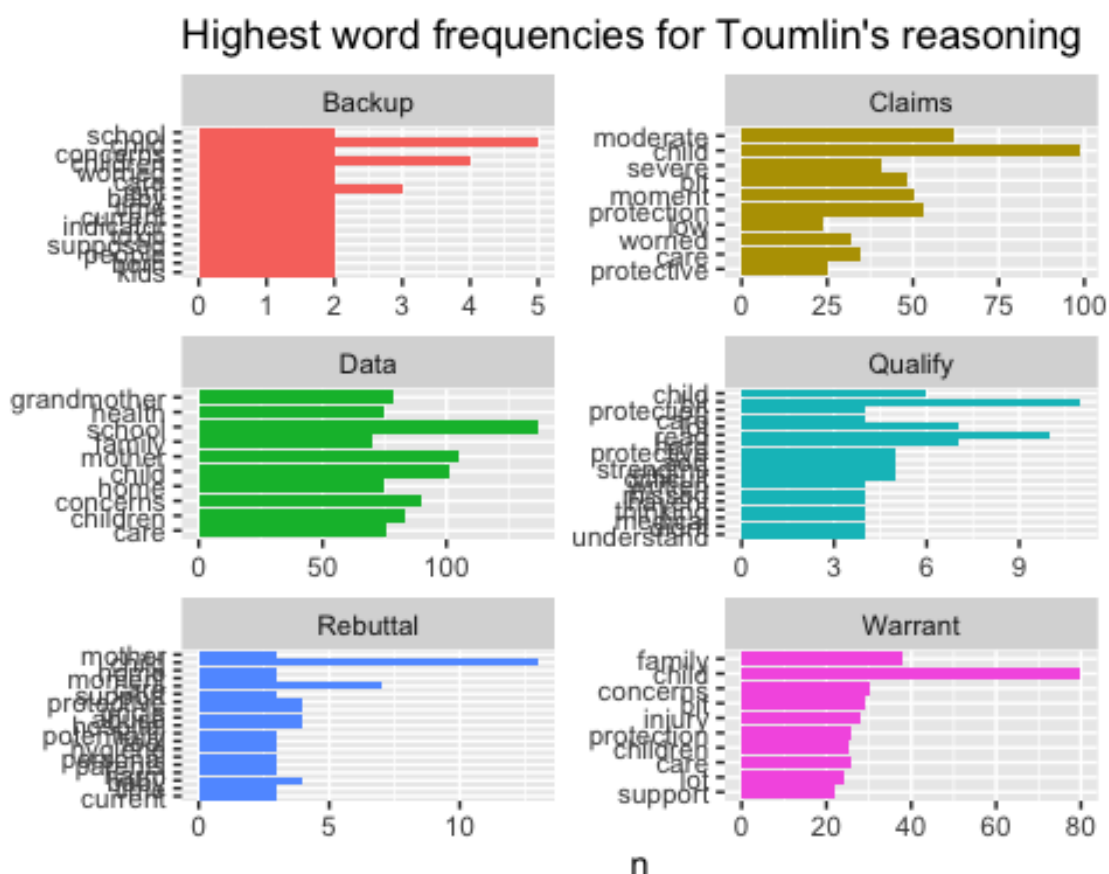
```

df <- dplyr::select(toumlin_scheme, toumlin, tidy)
# Create one-token-per-unit-per-row, remove stop words and count remaining words
wordcounts <- df %>%
  unnest_tokens(word, tidy) %>%
  anti_join(stop_words) %>%
  count(word, toumlin, sort = FALSE) %>%
  group_by(toumlin) %>%
  bind_tf_idf(word, toumlin, n) %>%

```

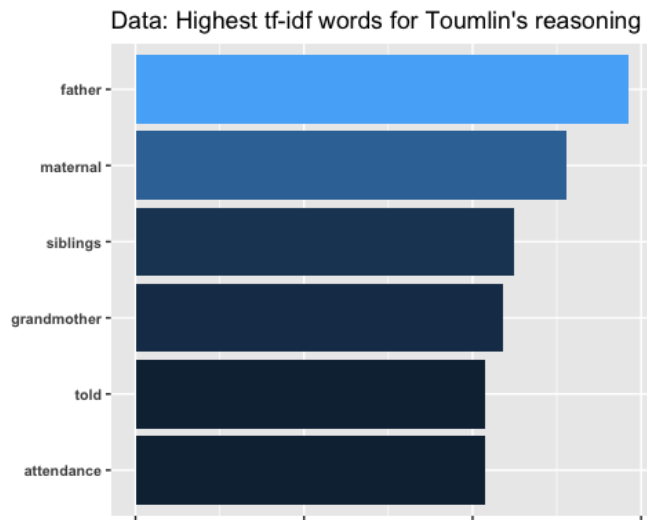
```
mutate(word = reorder(word, tf_idf))

# Plot highest tf-idf words (Facet wrap)
wordcounts %>%
  group_by(toumlin) %>%
  slice_max(n, n = 10) %>%
  ungroup() %>%
  ggplot(aes(n, fct_reorder(word, n), fill = toumlin)) +
  geom_col(show.legend = FALSE) +
  ggtitle("Highest word frequencies for Toumlin's reasoning") +
  facet_wrap(~toumlin, ncol = 2, scales = "free") +
  labs(x = "n", y = NULL)
```

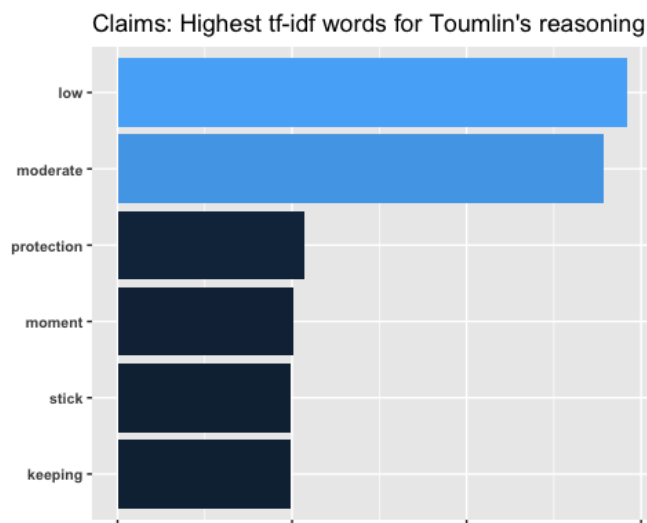


```
# Plot highest tf-idf words per vignette
# Create a function to avoid repetition
plWordCounts <- function(argument) {
  wordcounts %>%
  filter(toumlin == argument) %>%
  slice_max(tf_idf, n = 5) %>%
  ungroup() %>%
  ggplot(aes(tf_idf, fct_reorder(word, tf_idf), fill = tf_idf)) +
  geom_col(show.legend = FALSE) +
  ggtitle(paste (argument,
    ": Highest tf-idf words for Toumlin's reasoning",
    sep = "")) +
  labs(x = "tf-idf", y = NULL) +
  theme(axis.text=element_text(size=8, face="bold"),
    axis.title=element_text(size=8),
```

```
axis.text.x=element_blank(),  
axis.title.x=element_blank()  
}  
pIWordCounts("Data")
```

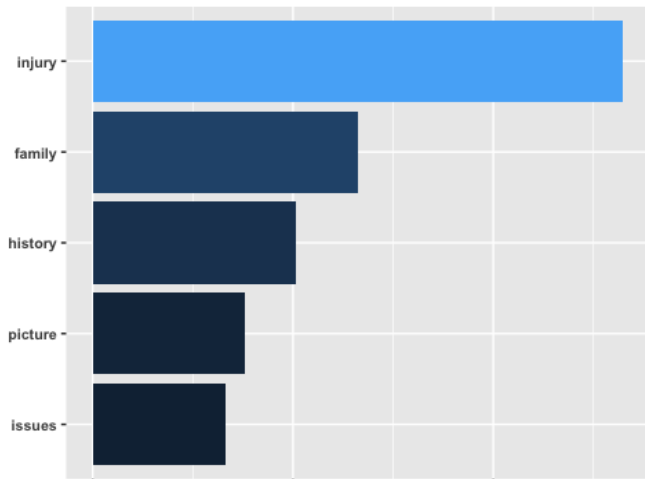


```
pIWordCounts("Claims")
```



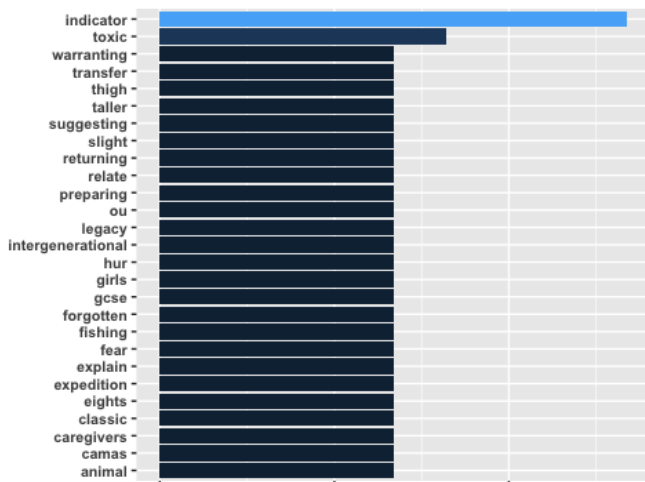
```
pIWordCounts("Warrant")
```

Warrant: Highest tf-idf words for Toumlin's reasoning



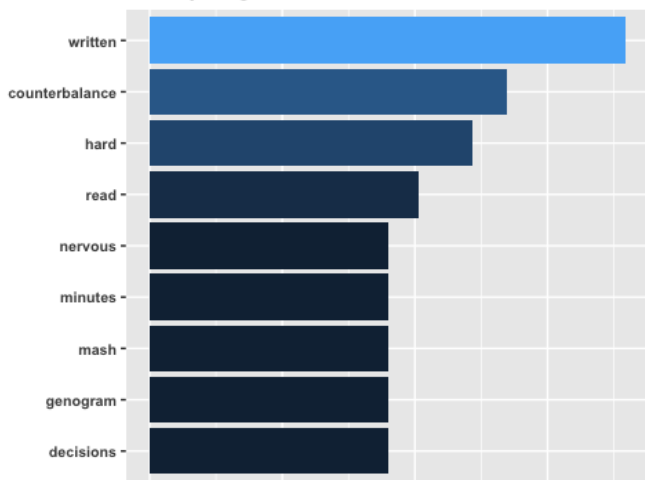
piWordCounts("Backup")

Backup: Highest tf-idf words for Toumlin's reason

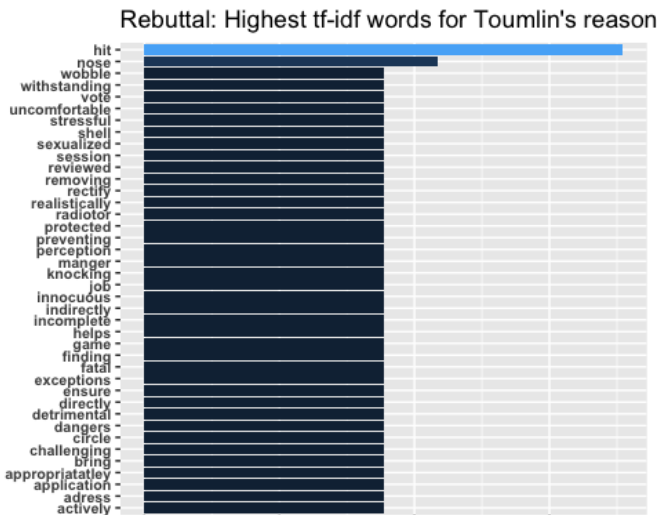


piWordCounts("Qualify")

Qualify: Highest tf-idf words for Toumlin's reasonir



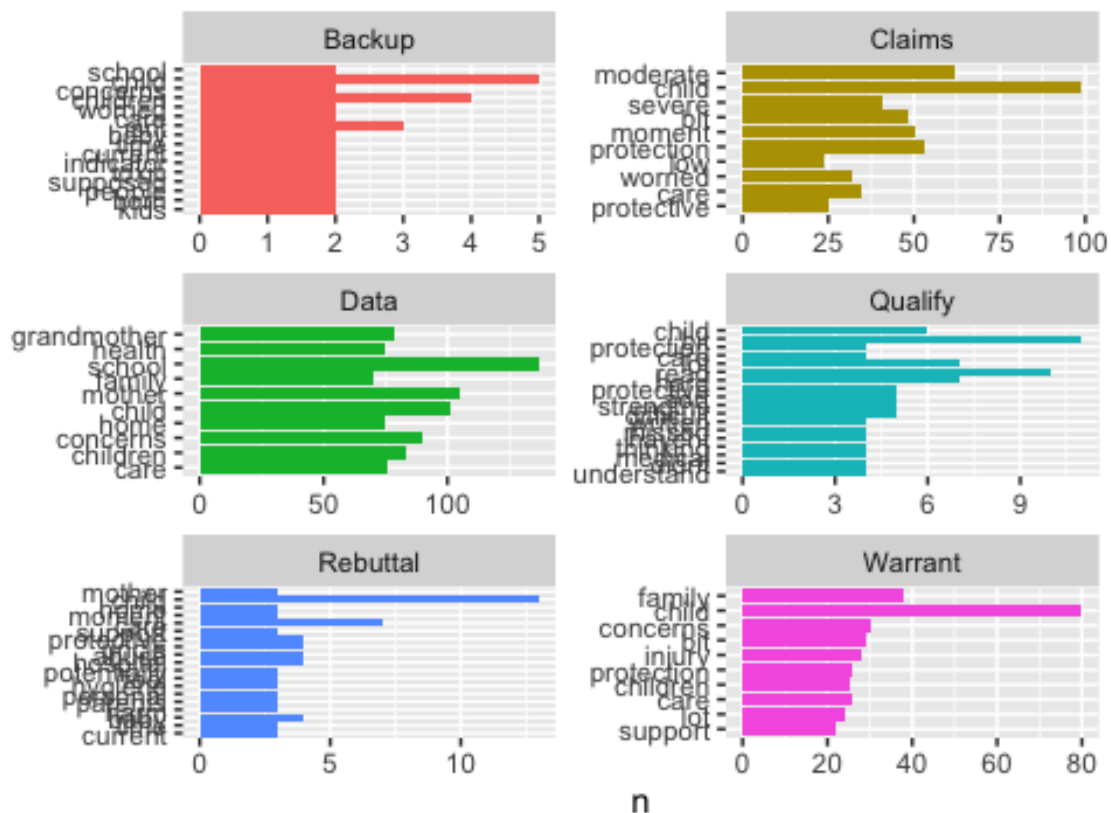
piWordCounts("Rebuttal")



Plot most frequently used words

```
wordcounts %>%
group_by(toumlin) %>%
slice_max(n, n = 10) %>%
ungroup() %>%
ggplot(aes(n, fct_reorder(word, n), fill = toumlin)) +
geom_col(show.legend = FALSE) +
ggtitle("Most frequently used words for Toumlin's reasoning") +
facet_wrap(~toumlin, ncol = 2, scales = "free") +
labs(x = "n", y = NULL)
```

Most frequently used words for Toumlin's reasoning




```

difference <- abs(common.words[, left] - common.words[, right])
common.words <- cbind(common.words, difference)
common.words <- common.words[order(common.words[, 7],
                                   decreasing = TRUE), ]
top25.df <- data.frame(x = common.words[1:size, left],
                      y = common.words[1:size, right],
                      labels = rownames(common.words[1:size, ]))
pyramid.plot(top25.df$x, top25.df$y,
             labels = top25.df$labels,
             gap = 14,
             top.labels = labels,
             main = "Words in common", laxlab = NULL,
             raxlab = NULL, unit = NULL)
}

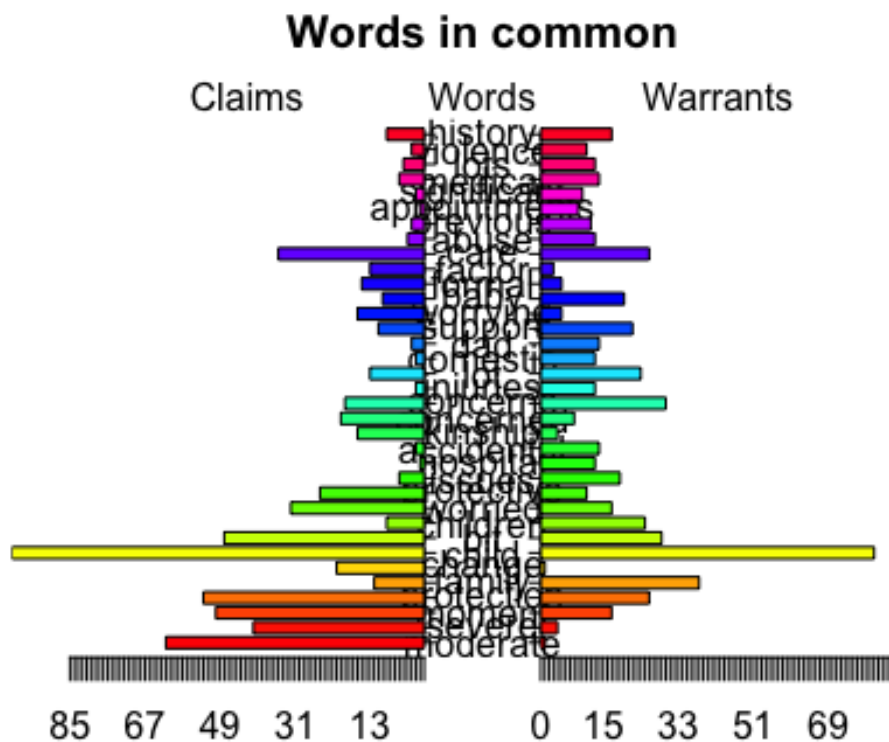
```

9.5.3.2 Common Words between Claims and Warrants

```

left <- 3 # Claims
right <- 4 # Warrants
size <- 35
labels <- c("Claims", "Words", "Warrants")
pyramid(left, right, size, labels)

```



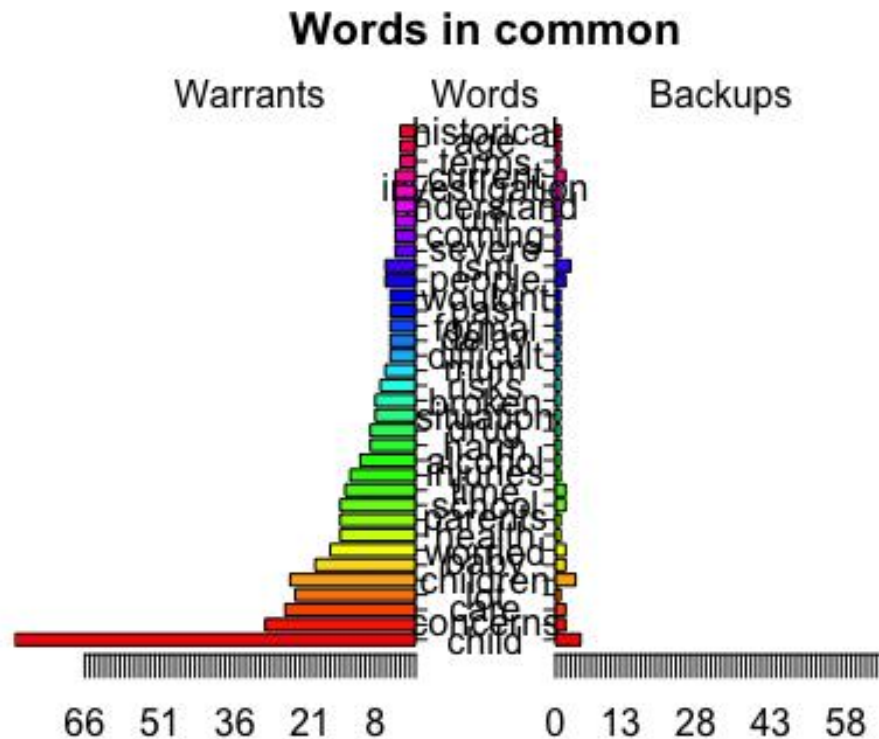
```

## 99 99
## [1] 5.1 4.1 4.1 2.1

```

9.5.3.3 Common Words between Backups and Warrants

```
left <- 4 # Warrants
right <- 6 # Backups
size <- 35
labels <- c("Warrants", "Words", "Backups")
pyramid(left, right, size, labels)
```

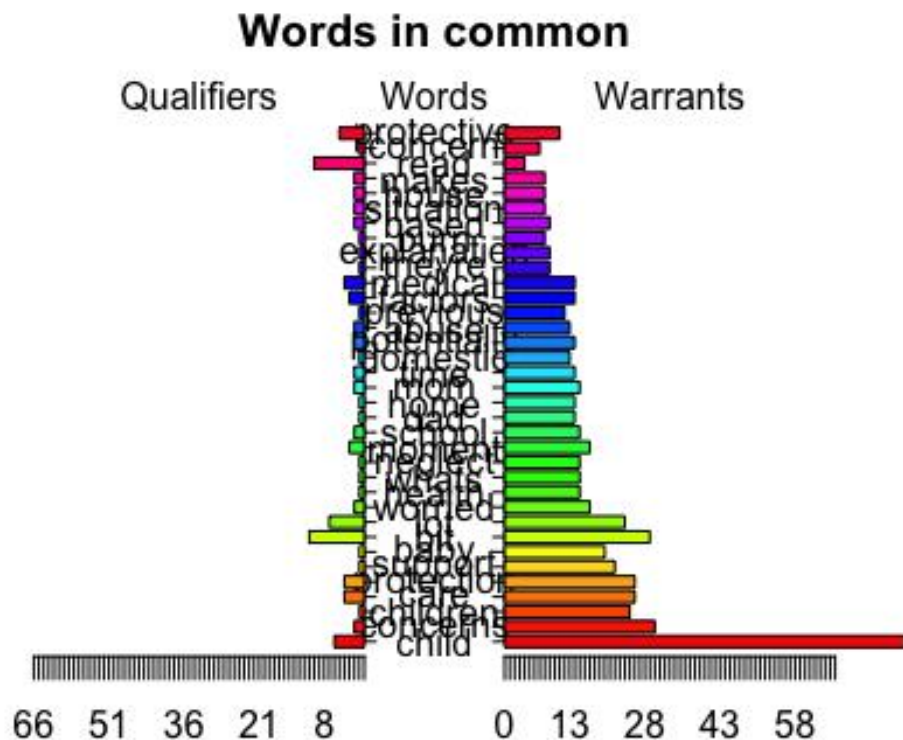


```
## 80 80
```

```
## [1] 5.1 4.1 4.1 2.1
```

9.5.3.4 Common words between Qualifiers and Warrants

```
left <- 2 # Qualifiers
right <- 4 # Warrants
size <- 35
labels <- c("Qualifiers", "Words", "Warrants")
pyramid(left, right, size, labels)
```



```
## 80 80
## [1] 5.1 4.1 4.1 2.1
```

9.5.4 Correspondence Analysis: Toulmin Reasoning Codes from Nvivo Coding Matrix

```
# Read Toulmin Codes and decision maker characteristics from CSV files exported from Nvivo
toum_codes <- read.csv(
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing Transcript/Reasoning/Queries/Toumlin Codes and Characteristics.csv",
  header = TRUE)
toum_codes <- tibble(toum_codes)
toum_codes <- column_to_rownames(toum_codes, "X")
colnames(toum_codes) <- c("High_Autonomy", "Low_Autonomy", "Medium_Autonomy",
  "Competent", "Expert", "Novice",
  "Self+/Open+", "Self+/Open-", "Self-/Open+",
  "Self-/Open-", "High_Influence", "Low_Influence",
  "Medium_Influence", "CIN", "CP", "Formal_Care",
  "Kinship_Care")
toum_codes_full <- toum_codes
toum_codes <- toum_codes[-c(2), ] # Delete Evidence column as default
# Read Nvivo CSV file for qualifiers and decision maker characteristics
toum_qualifiers <- read.csv(
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing Transcript/Reas
```

```

oning/Queries/Toulmin_Qualifiers_DMChars.csv",
  header = TRUE)
toum_qualifiers <- tibble(toum_qualifiers)
toum_qualifiers <- column_to_rownames(toum_qualifiers, "Codes")
colnames(toum_qualifiers) <- c("High_Autonomy", "Low_Autonomy", "Medium_Auto
nomy",
      "Competent", "Expert", "Novice", "Self+/Open+",
      "Self+/Open-", "Self-/Open+", "Self-/Open-",
      "High_Influence", "Low_Influence", "Medium_Influence",
      "CIN", "CP", "Formal_Care", "Kinship_Care", "Total")
toum_qualifiers <- head(toum_qualifiers,-1)
toum_qualifiers <- toum_qualifiers[1:(length(toum_qualifiers)-1)]
toum_qualifiers <- rbind(toum_codes, toum_qualifiers)
toum_qualifiers <- toum_qualifiers[-c(1, 2, 3, 5), ]

```

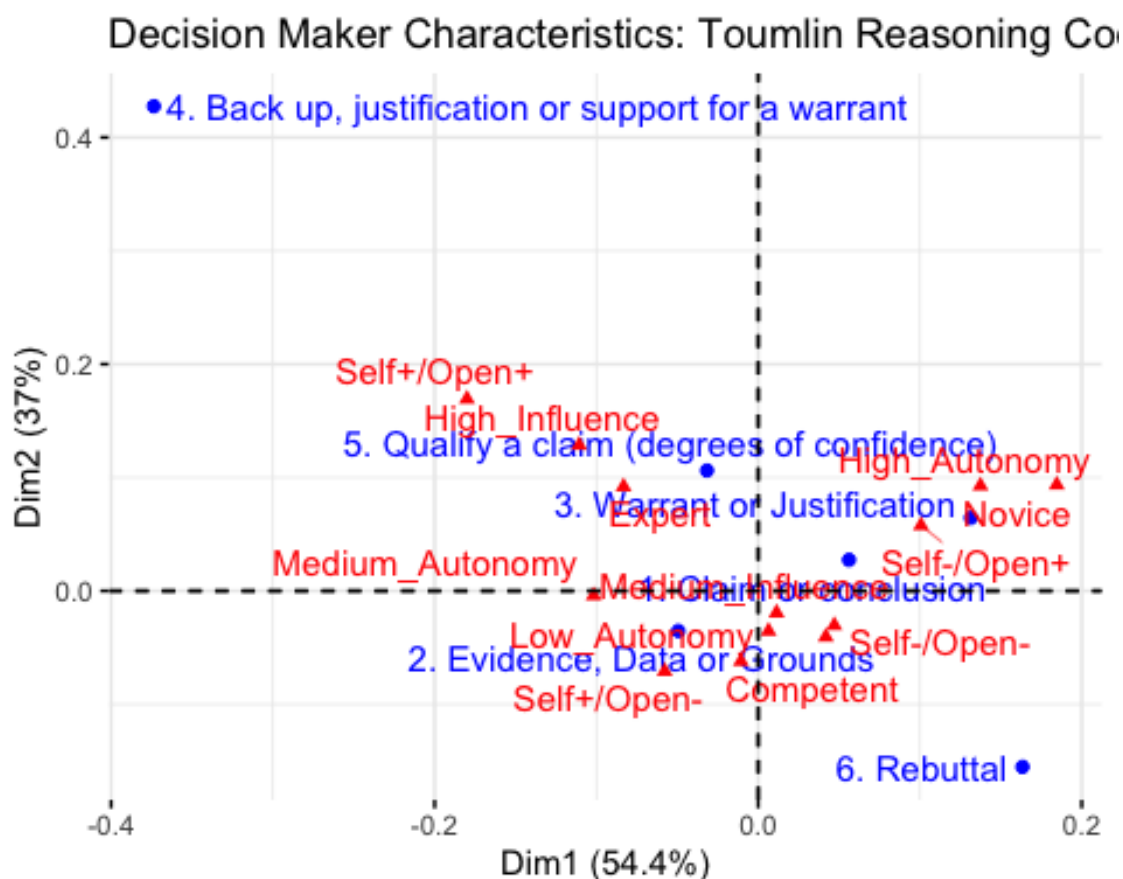
9.5.4.1 Create different CAs for different characteristics

CA for all characteristics

```

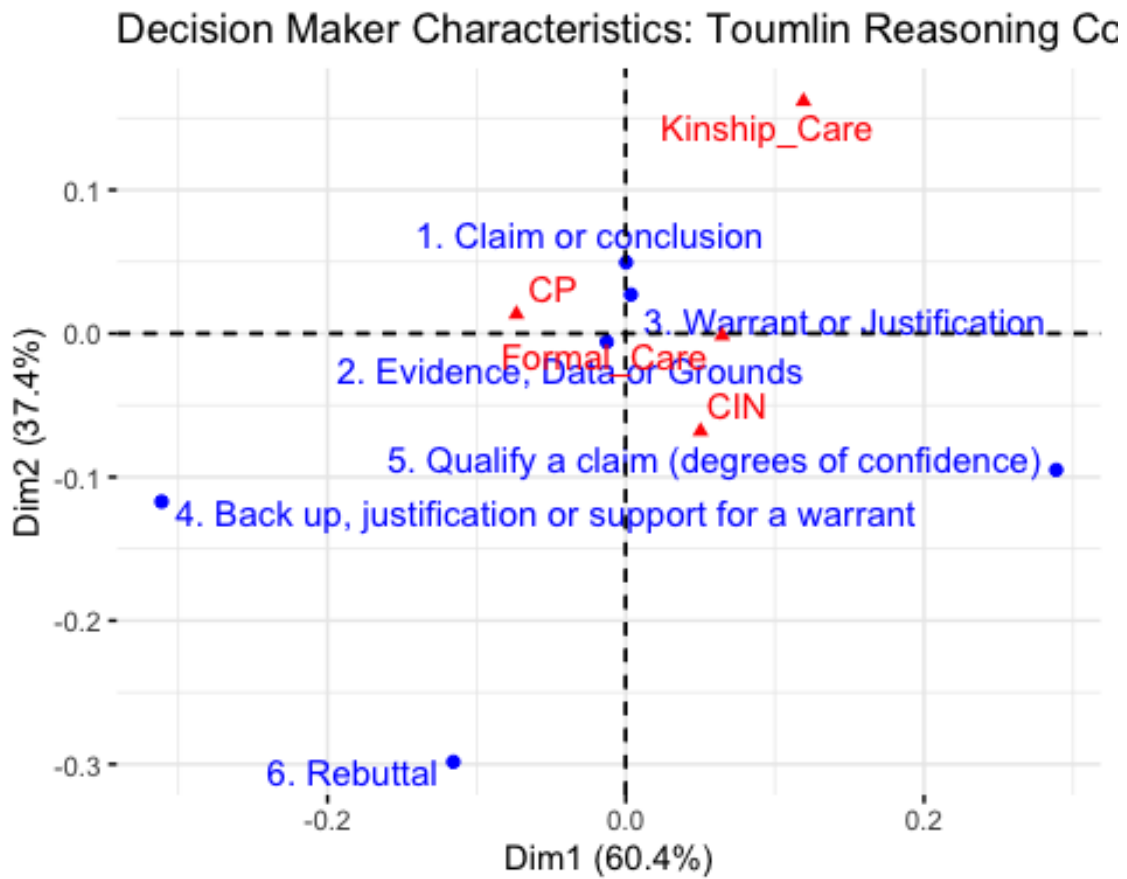
df <- dplyr::select(toum_codes_full, 1:13)
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symmetric", repel = TRUE,
  title = "Decision Maker Characteristics: Toumlin Reasoning Codes (Symme
tric)")

```



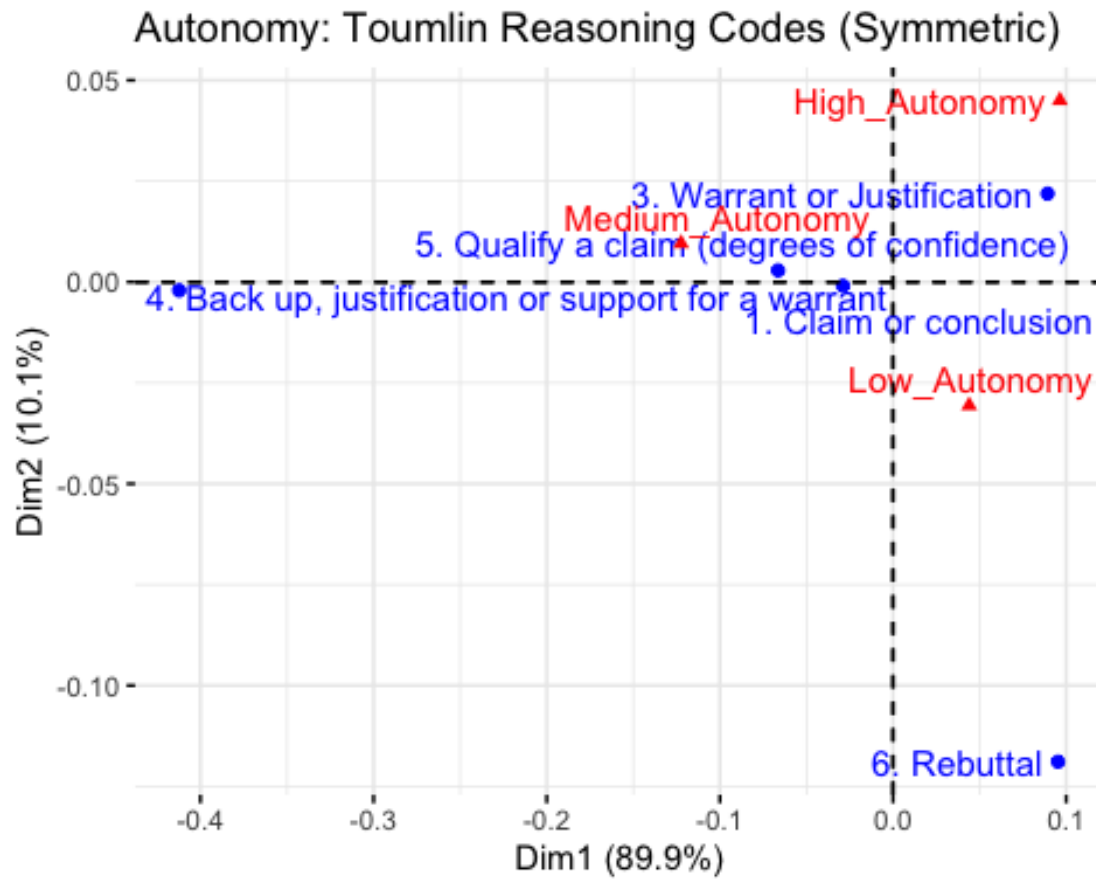
CA for interventions

```
df <- dplyr::select(toum_codes_full, 14:17)
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symmetric", repel = TRUE,
               title = "Decision Maker Characteristics: Toumlin Reasoning Codes (Symmetric)")
```



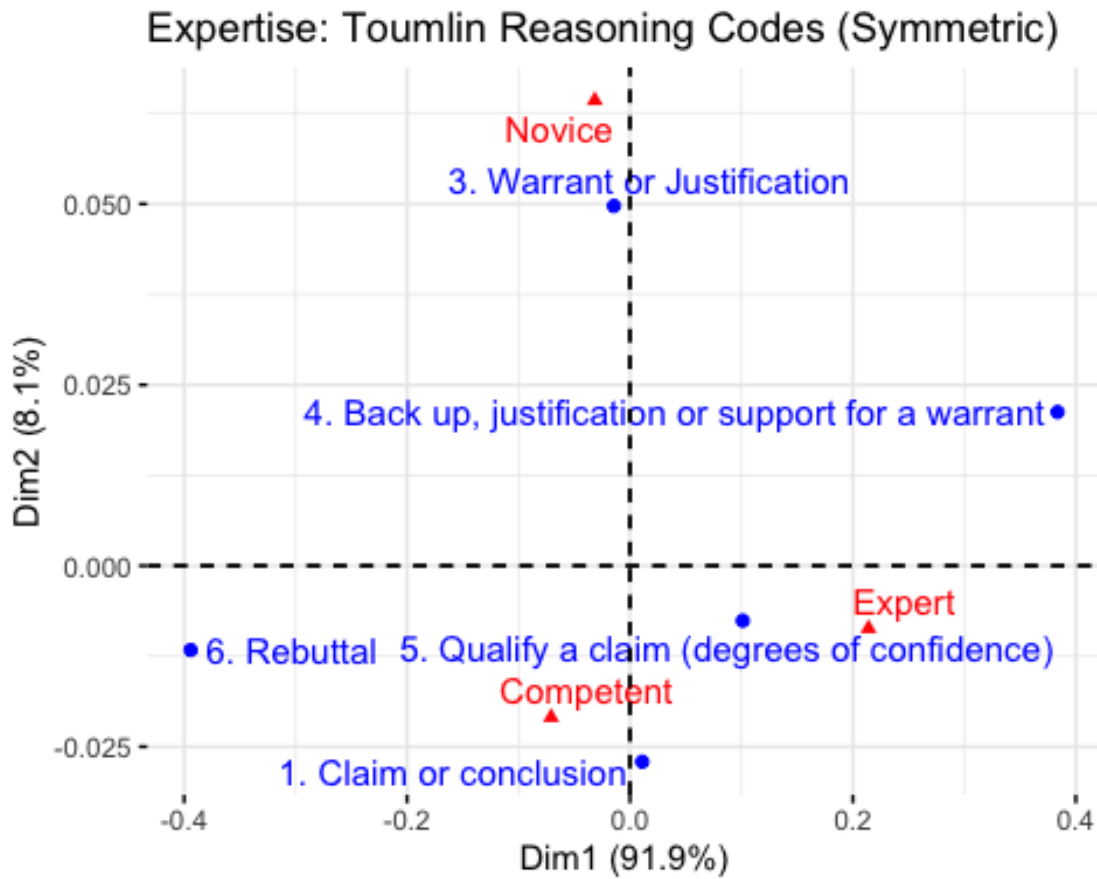
CA for autonomy

```
df <- dplyr::select(toumlin_codes, 1:3)
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symmetric", repel = TRUE,
  title = "Autonomy: Toumlin Reasoning Codes (Symmetric)")
```



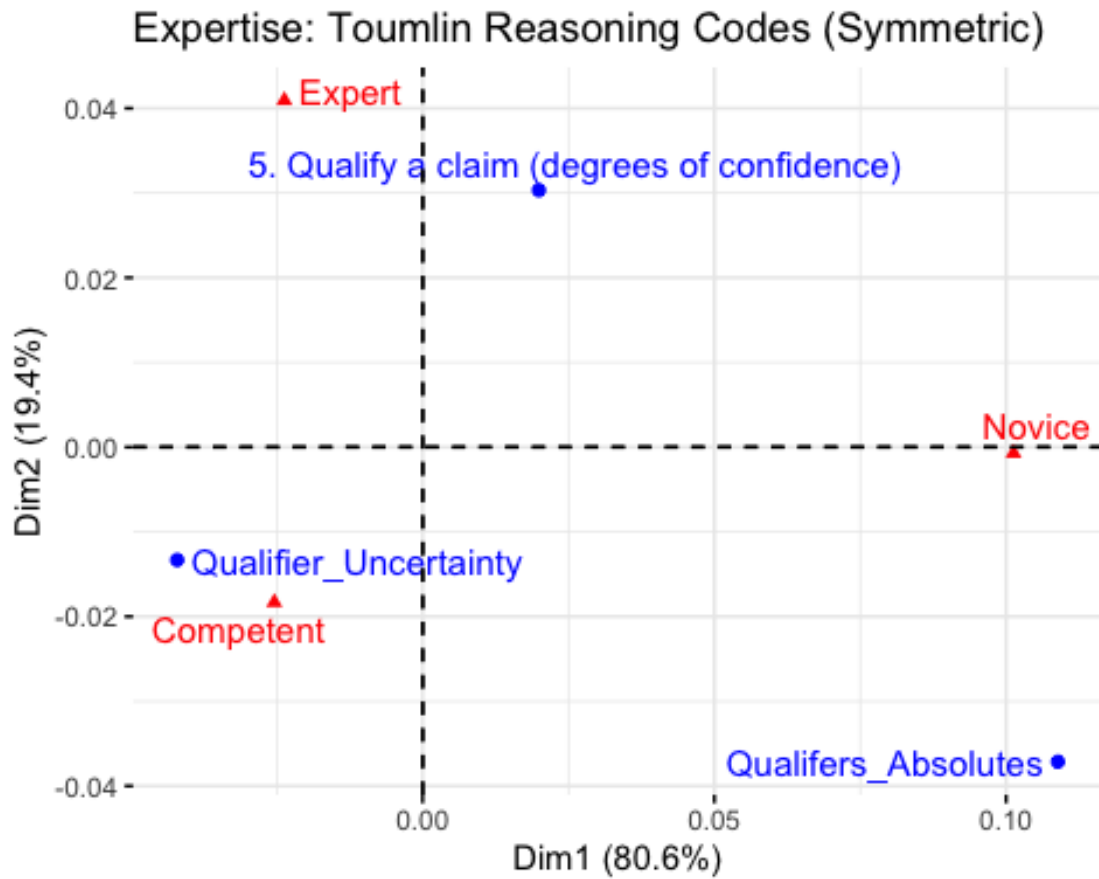
CA for expertise

```
df <- dplyr::select(toum_codes, 4:6)
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symmetric", repel = TRUE,
               title = "Expertise: Toumlin Reasoning Codes (Symmetric)")
```



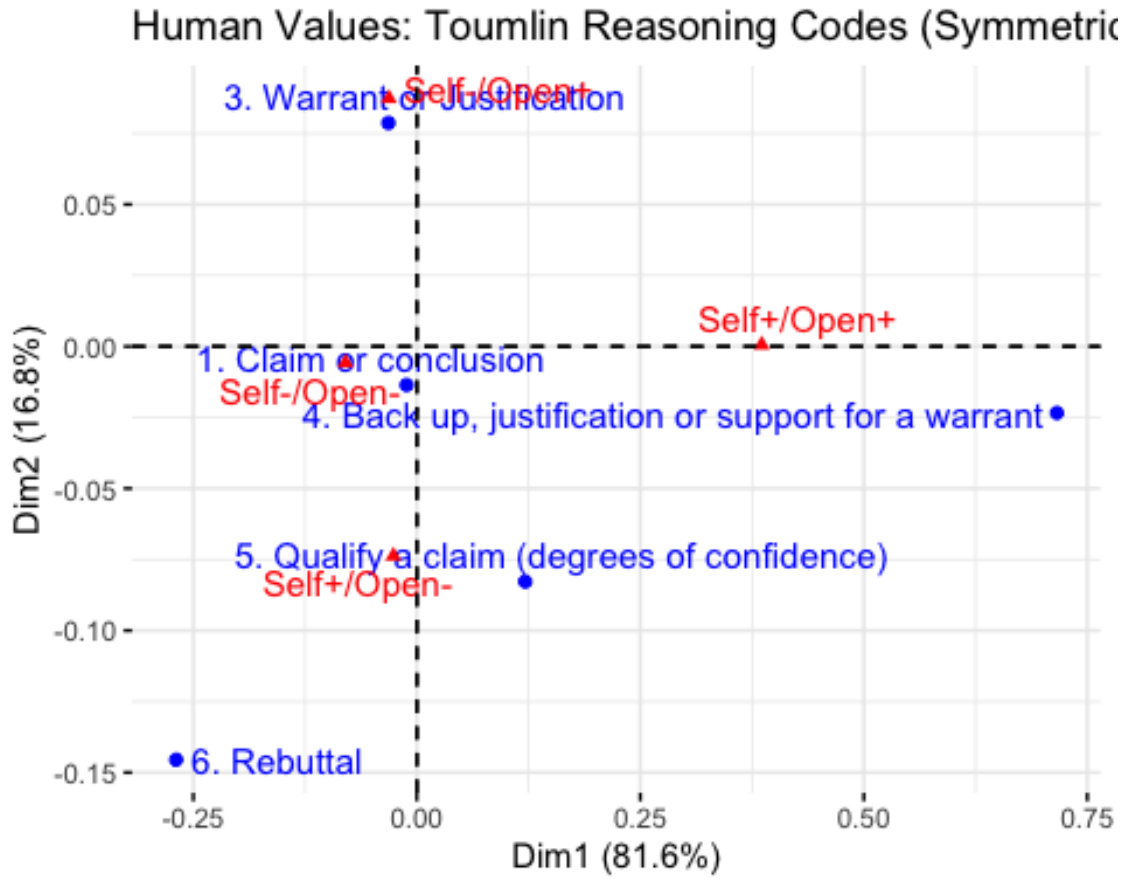
CA for qualifiers and expertise

```
df <- dplyr::select(toum_qualifiers, 4:6)
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symmetric", repel = TRUE,
  title = "Expertise: Toumlin Reasoning Codes (Symmetric)")
```



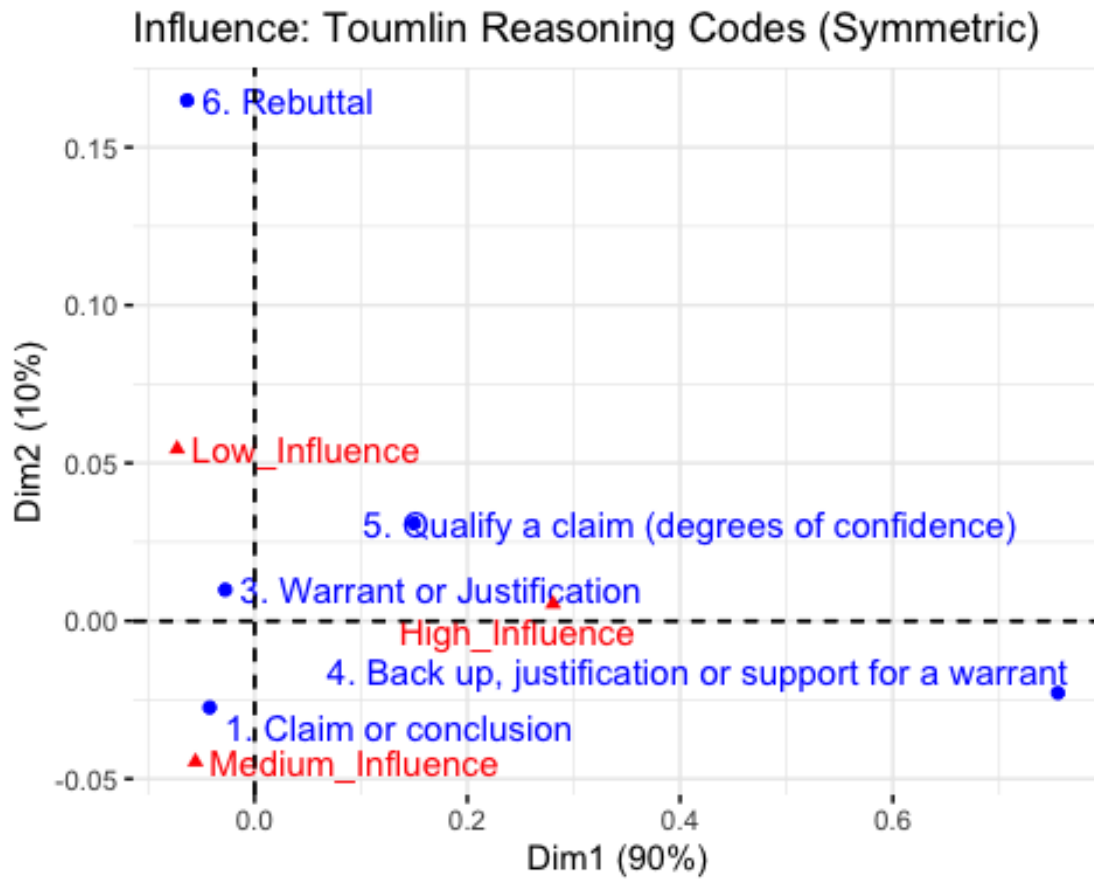
CA for Human Values

```
df <- dplyr::select(toum_codes, 7:10)
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symmetric", repel = TRUE,
               title = "Human Values: Toumlin Reasoning Codes (Symmetric)")
```



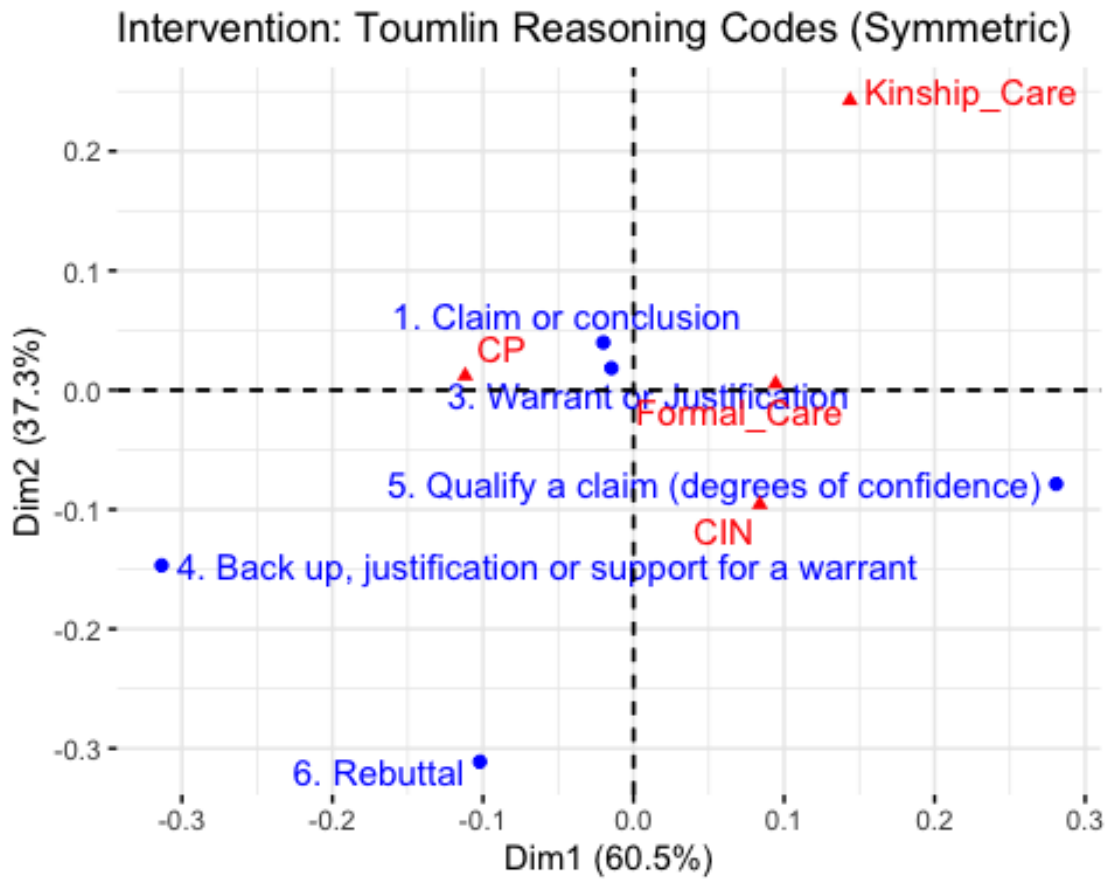
CA for Influence

```
df <- dplyr::select(toum_codes, 11:13)
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symmetric", repel = TRUE,
  title = "Influence: Toumlin Reasoning Codes (Symmetric)")
```



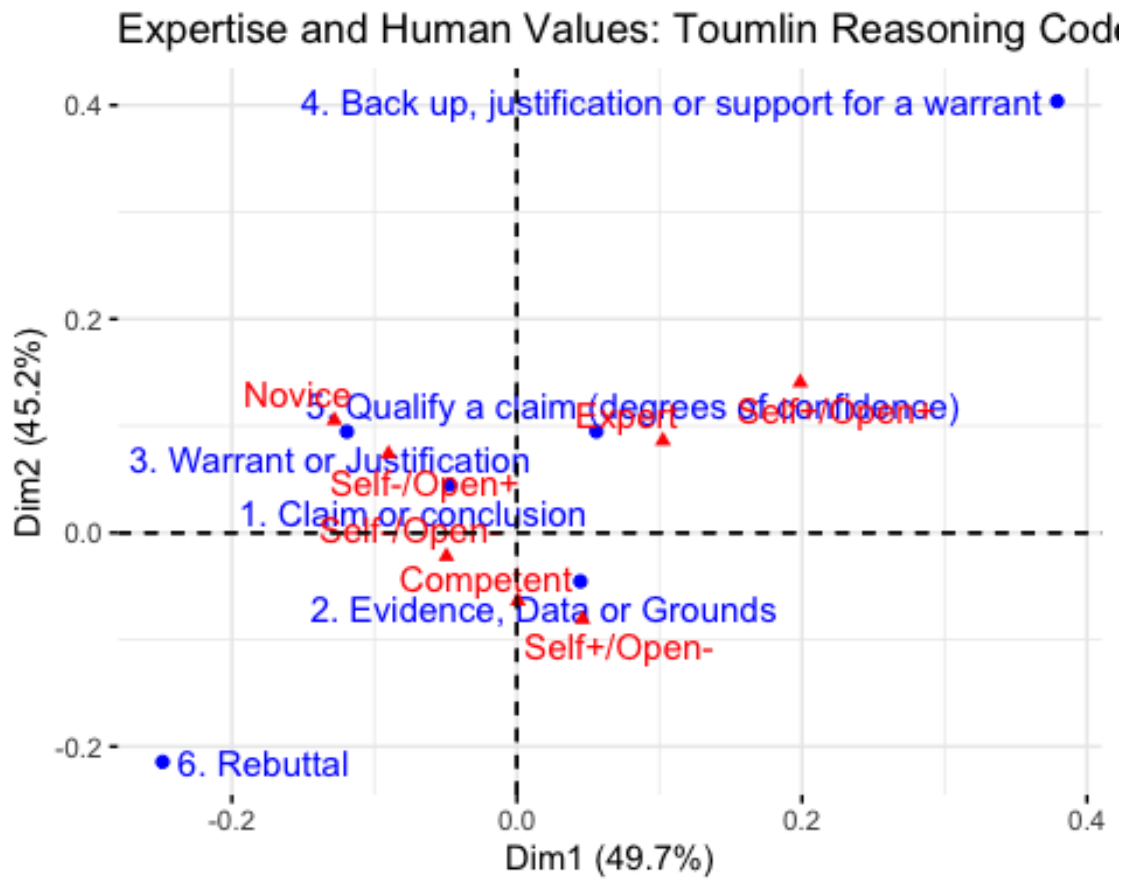
CA for Intervention

```
df <- dplyr::select(toum_codes, 14:17)
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symmetric", repel = TRUE,
               title = "Intervention: Toumlin Reasoning Codes (Symmetric)")
```



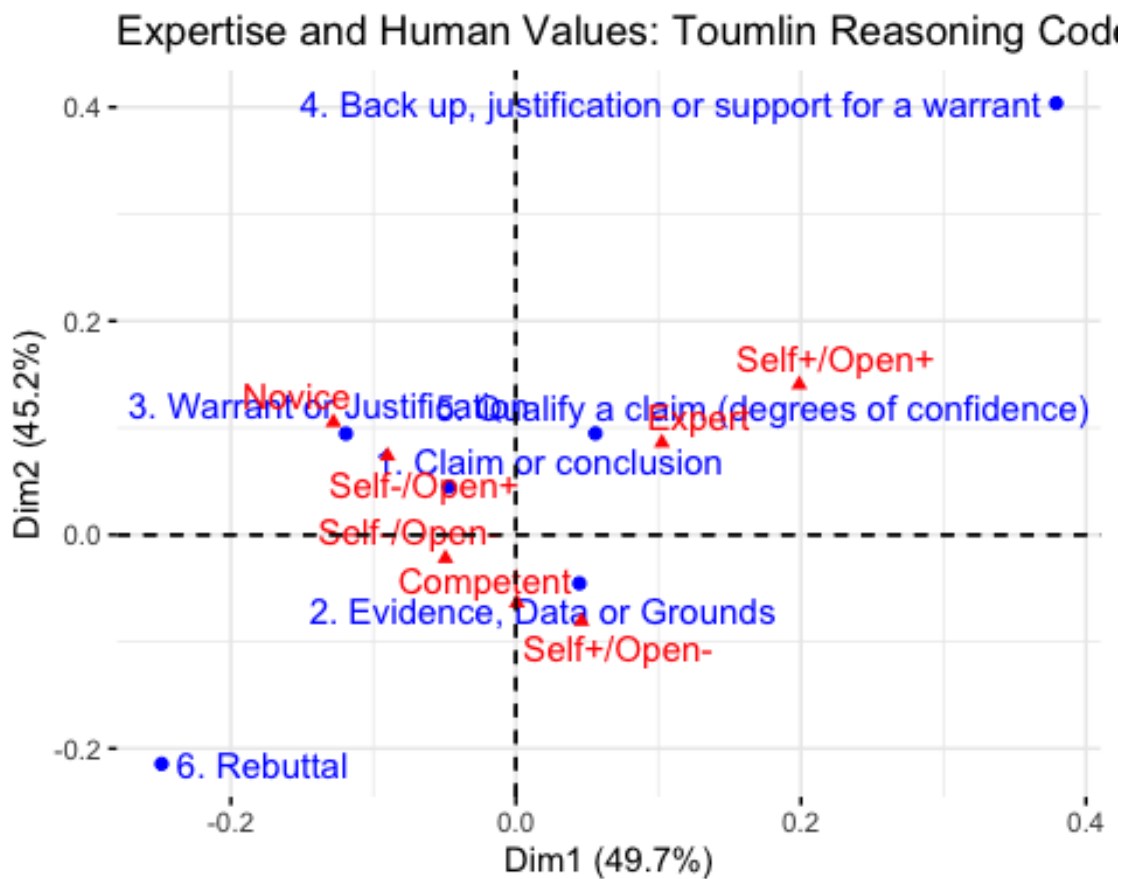
CA for Expertise and Human Values

```
df <- dplyr::select(toum_codes_full, 4:10)
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symmetric", repel = TRUE,
               title = "Expertise and Human Values: Toumlin Reasoning Codes (Symmetri
c)")
```



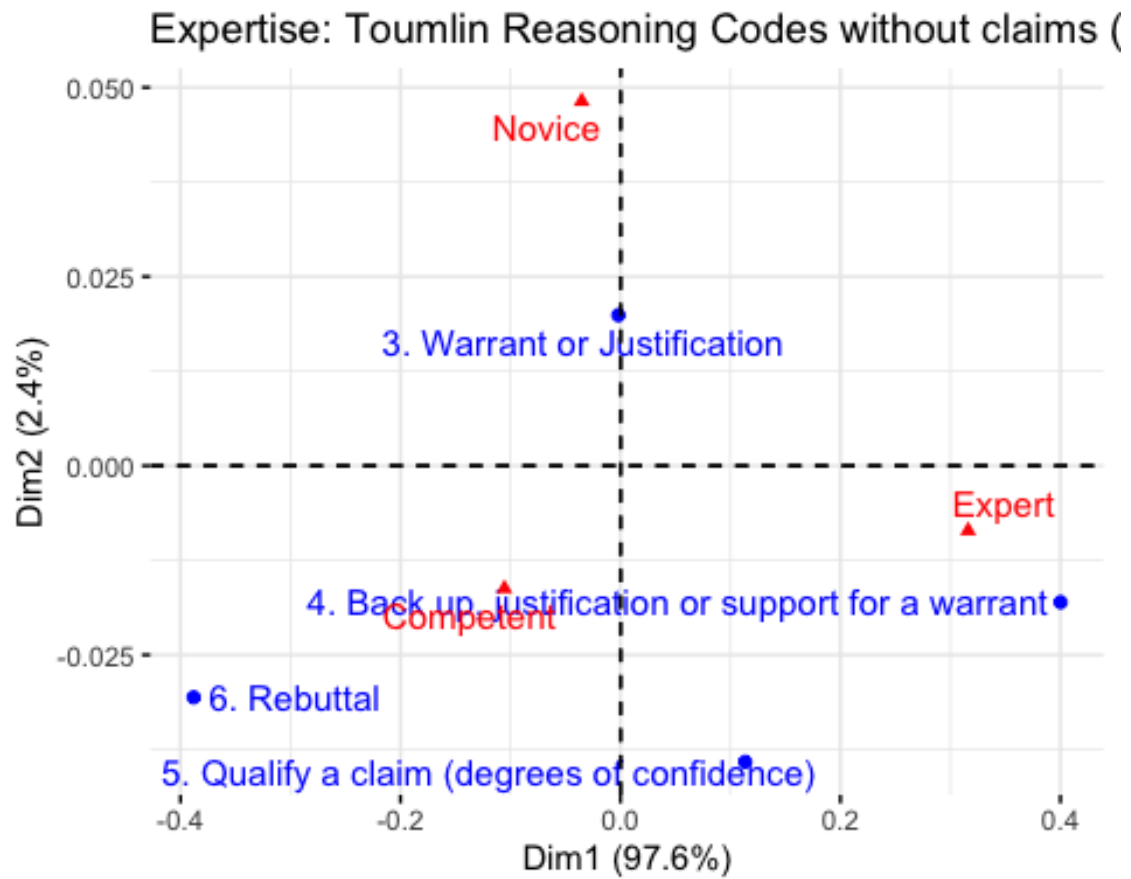
CA for Expertise and Human Values (including data)

```
df <- dplyr::select(toum_codes_full, 4:10)
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symmetric", repel = TRUE,
               title = "Expertise and Human Values: Toumlin Reasoning Codes with Data
(Symmetric)")
```



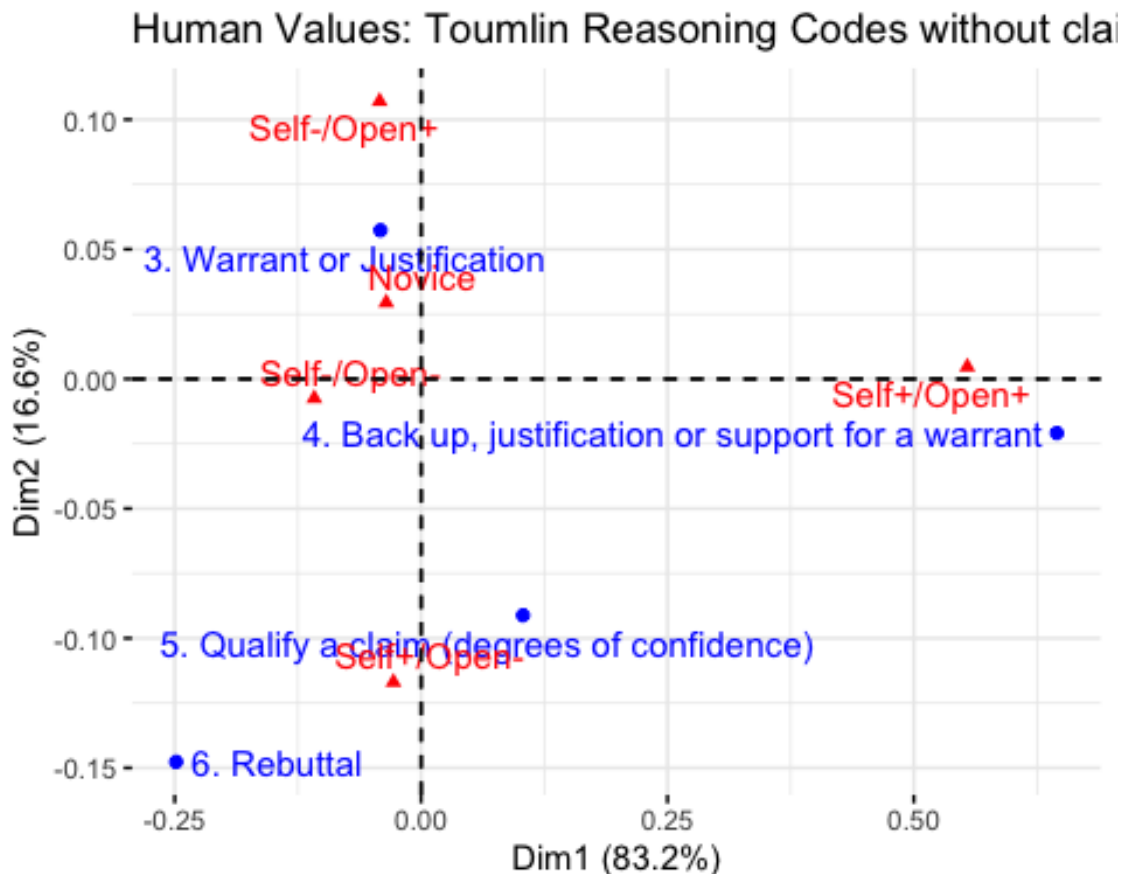
CA for Expertise and Toulmin Codes without Human Values

```
df <- dplyr::select(toumlin_codes, 4:6)
df <- df[-1, ]
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symmetric", repel = TRUE,
  title = "Expertise: Toumlin Reasoning Codes without claims (Symmetric)")
```



CA for Human Values and Toulmin Codes without Expertise

```
df <- dplyr::select(toum_codes, 6:10)
df <- df[-1, ]
res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symmetric", repel = TRUE,
               title = "Human Values: Toumlin Reasoning Codes without claims (Symmetric)")
```



9.5.5 Word Associations

Visualise bigrams

```
# A function to visualise word networks (Markov Chains)
visualize_bigrams <- function(q) {
  bigram_graph <- df %>%
    filter(n > q) %>%
    graph_from_data_frame()
  set.seed(2020)
  a <- grid::arrow(type = "closed", length = unit(.15, "inches"))
  ggraph(bigram_graph, layout = "fr") +
    geom_edge_link(aes(edge_alpha = n), show.legend = FALSE,
                  arrow = a, end_cap = circle(.07, "inches")) +
    geom_node_point(color = "lightblue", size = 5) +

    geom_node_text(aes(label = name), vjust = 1, hjust = 1) +
    theme_void()
}
```

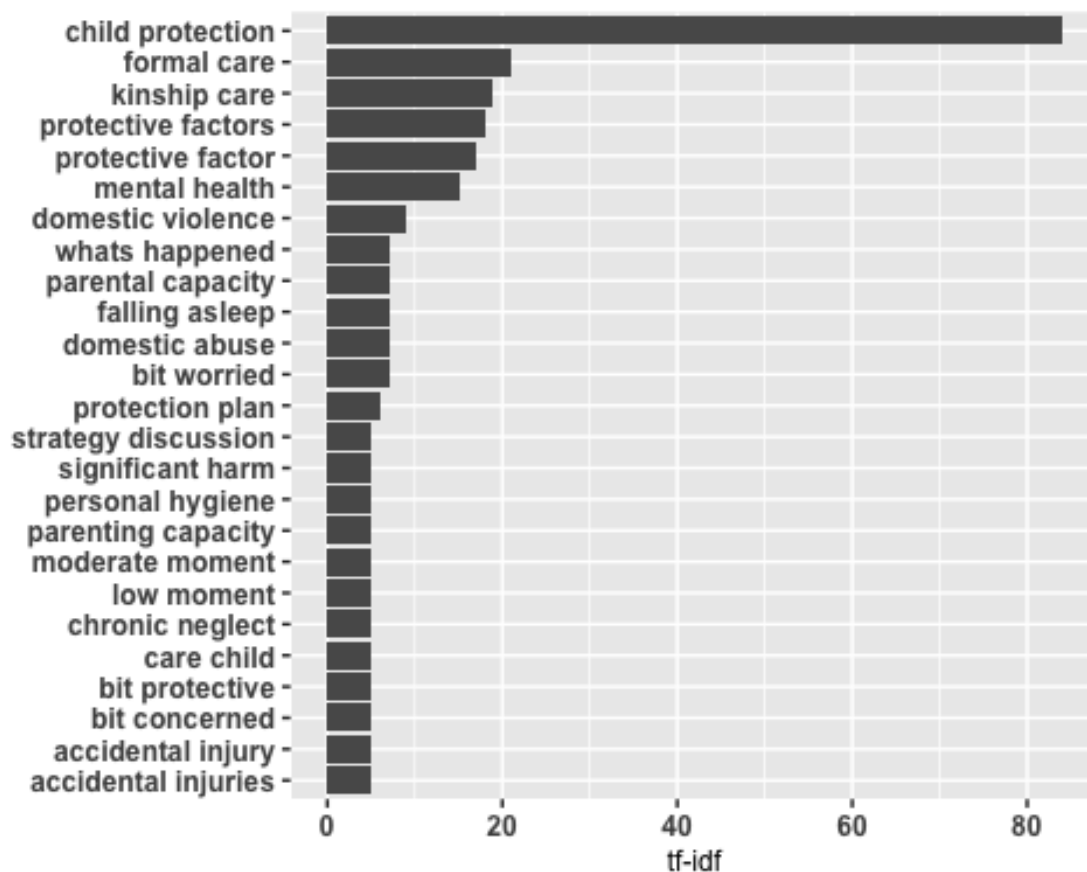


```

# Create a function to count bigrams
bigrams <- function(df){
  df <- df[!(df$tidy==""), ]
  df <- df %>%
    unnest_tokens(bigram, tidy, token = "ngrams", n = 2) %>%
    separate(bigram, c("word1", "word2"), sep = " ") %>%
    filter(!word1 %in% stop_words$word) %>%
    filter(!word2 %in% stop_words$word) %>%
    filter(!is.na(word1)) %>%
    filter(!is.na(word2)) %>%
    unite(bigram, word1, word2, sep = " ") %>%
    count(bigram) %>%
    # bind_tf_idf(bigram, group, n) %>%
    arrange(desc(n))
  return(df)
}

df <- dplyr::select(words, tidy)
#df$tidy <- removeWords(df$tidy, rm_words)
df <- bigrams(df)
df %>%
  slice_max(n, n = 25) %>%
  ggplot(aes(n, fct_reorder(bigram, n))) +
  geom_col(show.legend = FALSE) +
  #facet_wrap(~group, ncol=2, scales = "free") +
  labs(x="tf-idf", y = NULL) +
  theme(axis.text=element_text(size=9, face="bold"),
        axis.title=element_text(size=9))

```



9.5.6.1 Load language model

```
ud_model <- udpipe_load_model(
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing Transcript/engli
sh-ewt-ud-2.5-191206.udpipe")
# Create a dataframe with relevant variables from human values questionnaire and t
he reasoning word bag
df <- dplyr::select(human_values, doc_id, expertise, Autonomy, Influence, HVS_Clus
ter)
words <- merge(words, df, by = "doc_id")
```

9.5.6.2 Annotate reasoning by doc_id for dashboard

```
x_reasoning <- udpipe_annotate(ud_model,
  x = words$reasoning, doc_id = words$doc_id)
x_reasoning <- as.data.frame(x_reasoning)
saveRDS(x_reasoning, file = "/Users/stefan_kleipoedszus/Documents/@Promotion/
R Analysing Transcript/annot_reasoning_docID.RDS")
```

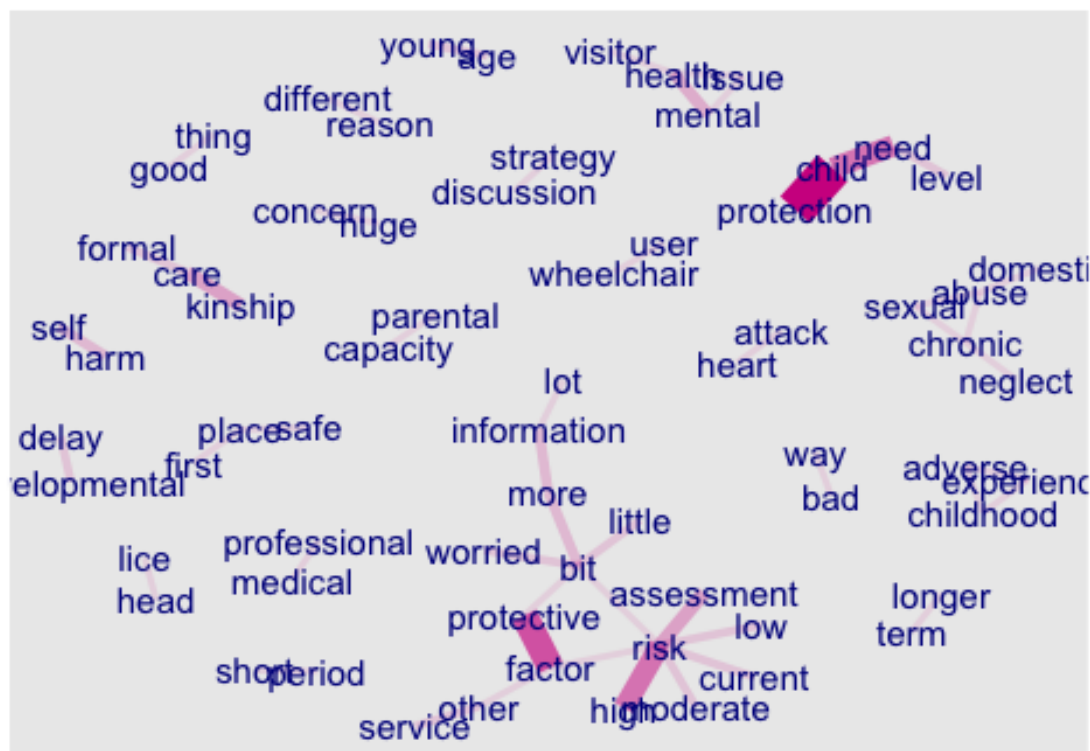
9.5.6.3 Co-occurrence maps of Human Value Clusters

```
x_reasoning <- udpipe_annotate(ud_model,
  x = words$reasoning, doc_id = words$HVS_Cluster)
x_reasoning <- as.data.frame(x_reasoning)

# Use annotated data from first part of this script
df <- filter(x_reasoning, doc_id == "Self+/Open-")
cocomap(df, 50, "Self+/ Open-")
```

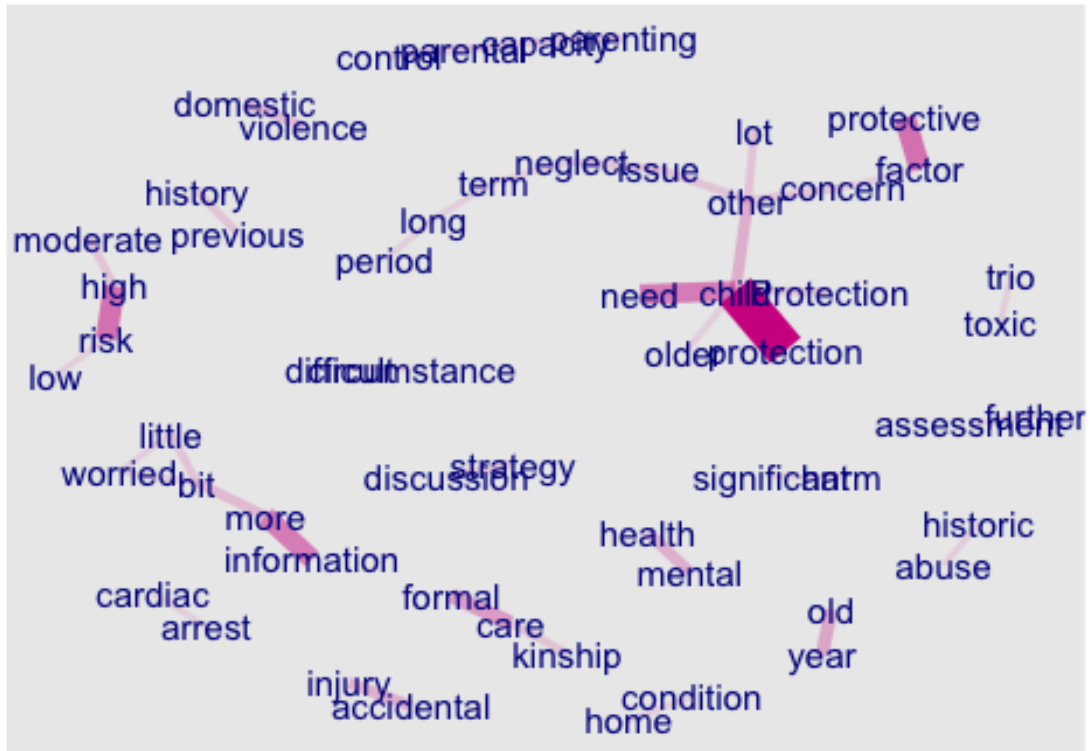
Cooccurrences within 2 words distance

Nouns & Adjective Phrases: Self+/ Open-



Cooccurrences within 2 words distance

Nouns & Adjective Phrases: Self-/ Open-



```
df <- filter(x_reasoning, doc_id == "Self-/Open+")
cocomap(df, 40, "Self-/ Open+")
```

Cooccurrences within 2 words distance

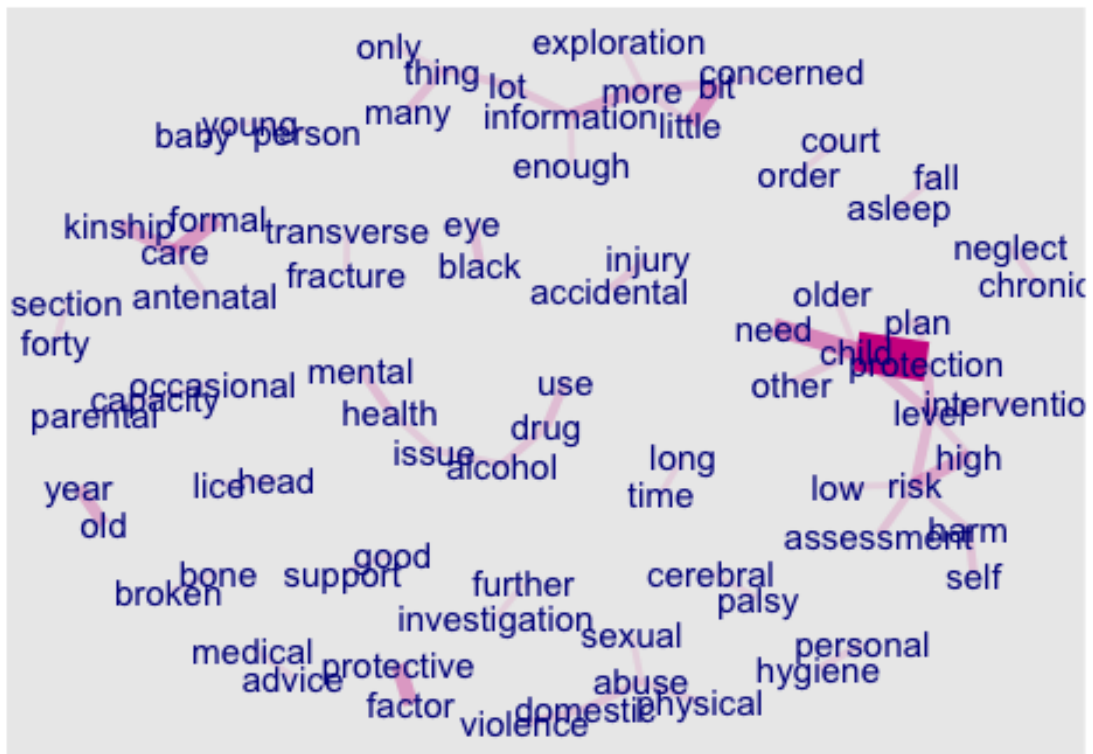
Nouns & Adjective Phrases: Self-/ Open+



```
df <- filter(x_reasoning, doc_id == "Self-/Open+" |
             doc_id == "Self+/Open+")
cocomap(df, 60, "Open to change")
```

Cooccurrences within 2 words distance

Nouns & Adjective Phrases: Open to change



```
df <- filter(x_reasoning, doc_id == "Self-/Open-" |
             doc_id == "Self+/Open-")
cocomap(df, 60, "Conservation")
```


Backups

```
df <- udpipe_annotate(ud_model,
  x = Toumlin_Wordbags$Backups,
  doc_id = Toumlin_Wordbags$HVS_Cluster)
df <- as.data.frame(df)
cocomap(df, 100, "Backups")
```

Cooccurrences within 2 words distance

Nouns & Adjective Phrases: Backups

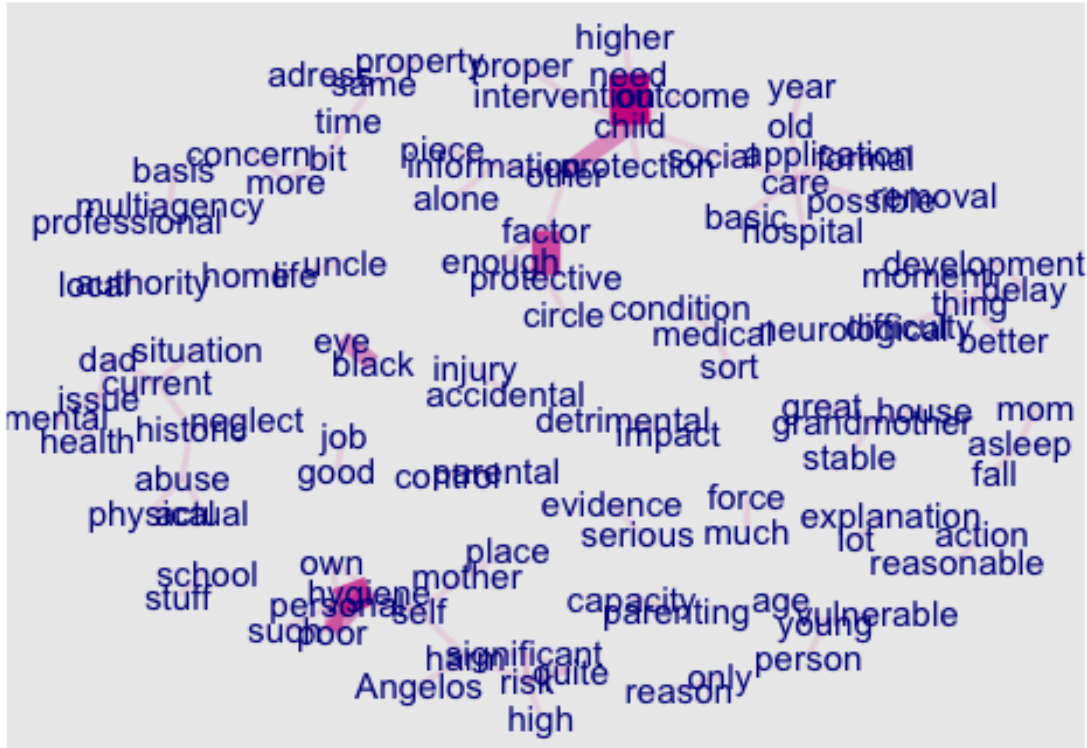


Rebuttals

```
df <- udpipe_annotate(ud_model,  
  x = Toumlin_Wordbags$Rebuttals,  
  doc_id = Toumlin_Wordbags$HVS_Cluster)  
df <- as.data.frame(df)  
cocomap(df, 100, "Rebuttals")
```

Cooccurrences within 2 words distance

Nouns & Adjective Phrases: Rebuttals



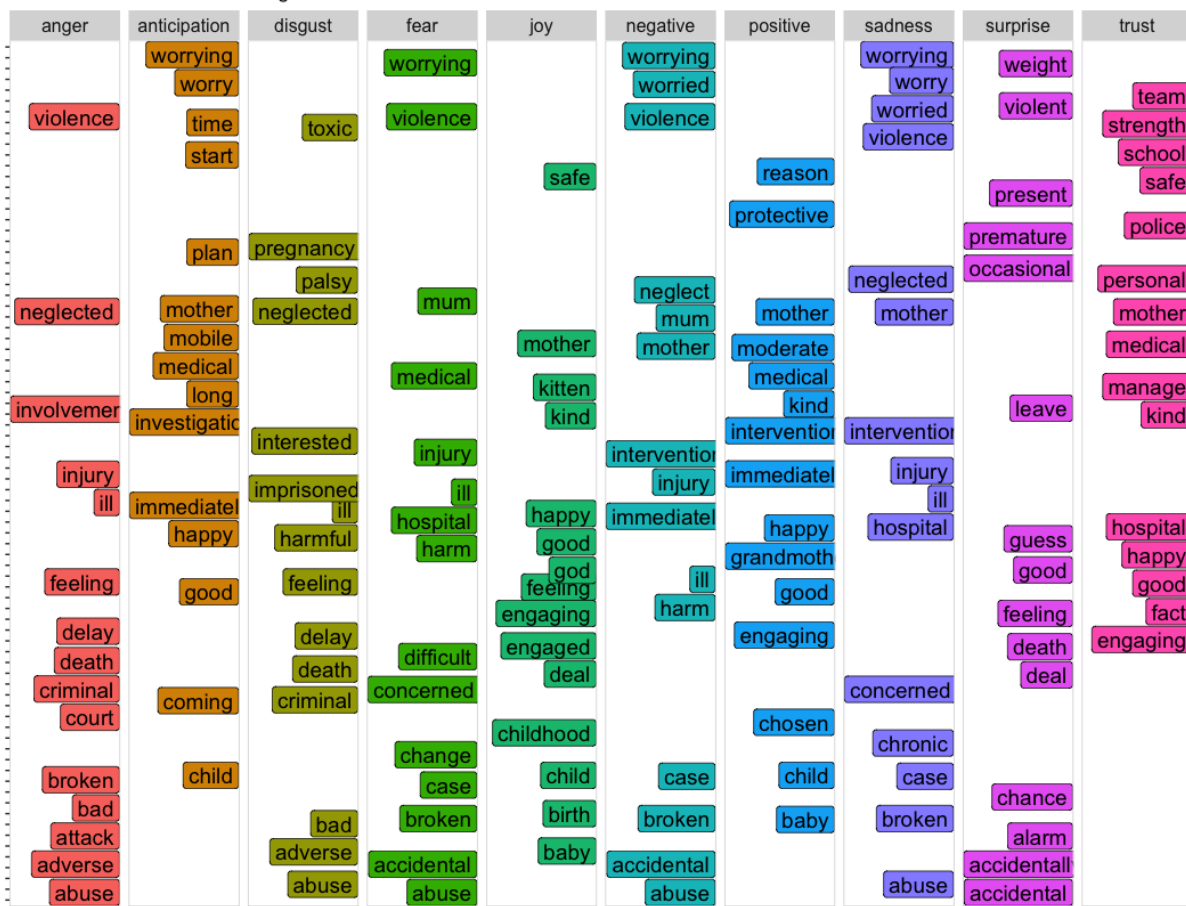

```

axis.title.x = element_text(size = 9),
legend.position = "none",
panel.grid = element_blank(), panel.background = element_blank(),
panel.border = element_rect("lightgray", fill = NA),
strip.text.x = element_text(size = 7)) +
xlab(NULL) + ylab(NULL) +
ggtitle(paste("NRC Sentiments for", title, sep = " ")) +
coord_flip()
print(p)
}

plot_words <- reasoning %>%
  unnest_tokens(word, tidy) %>%
  inner_join(get_sentiments("nrc")) %>%
  group_by(sentiment) %>%
  count(word, sort = TRUE) %>%
  arrange(desc(n)) %>%
  slice(seq_len(15)) %>%
  ungroup()
nrc_plot("Reasoning")

```

NRC Sentiments for Reasoning



9.5.7.2 Sentiment Timeline

```

reasoning$syuzhet <- get_sentiment(reasoning$V1, method="syuzhet")
# Create a function for plotting sentiments

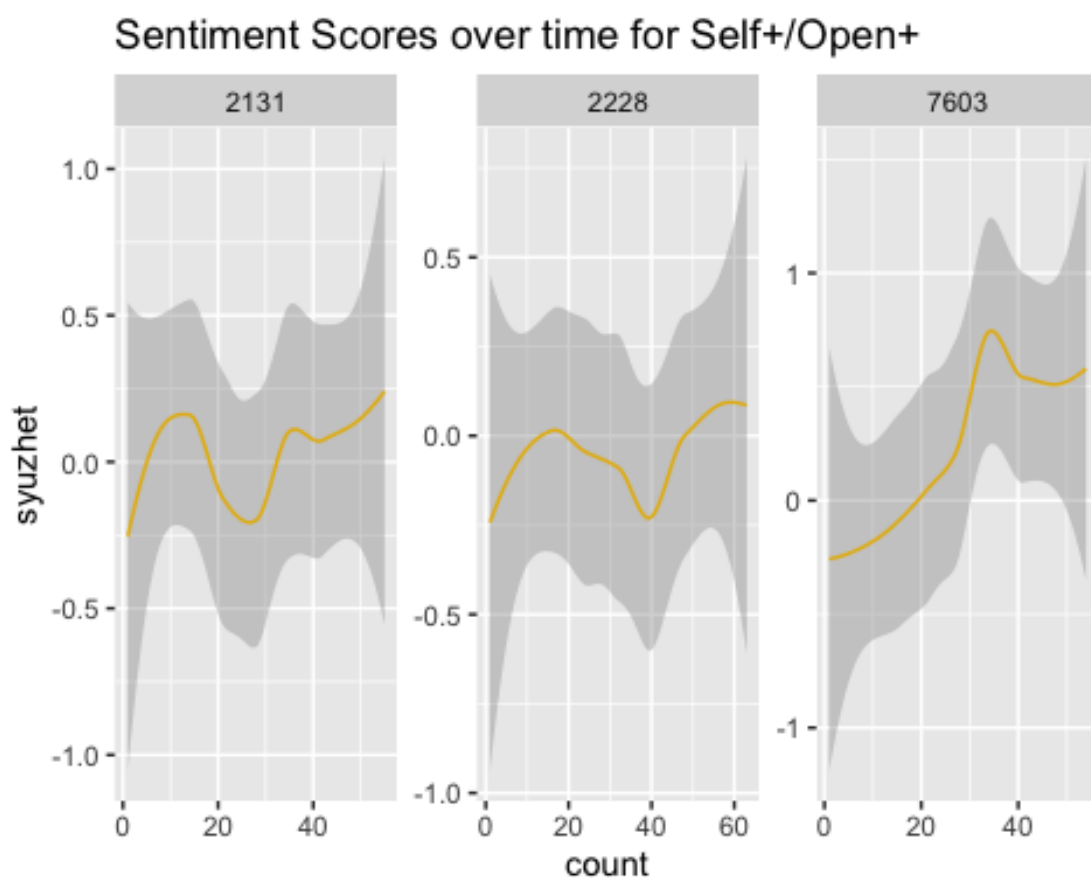
```

```
SentimentPlot <- function(df, group) {
  ggplot(data = df, aes(x = count, y = syuzhet, color = darkred))+
  geom_smooth(method = "loess", color = "#E7B803", size = 0.5) +
  ggtitle(paste("Sentiment Scores over time for", group, sep = " ")) +
  facet_wrap(~doc_id, scales = "free", ncol = 3) +
  theme(legend.position = "none")
}
```

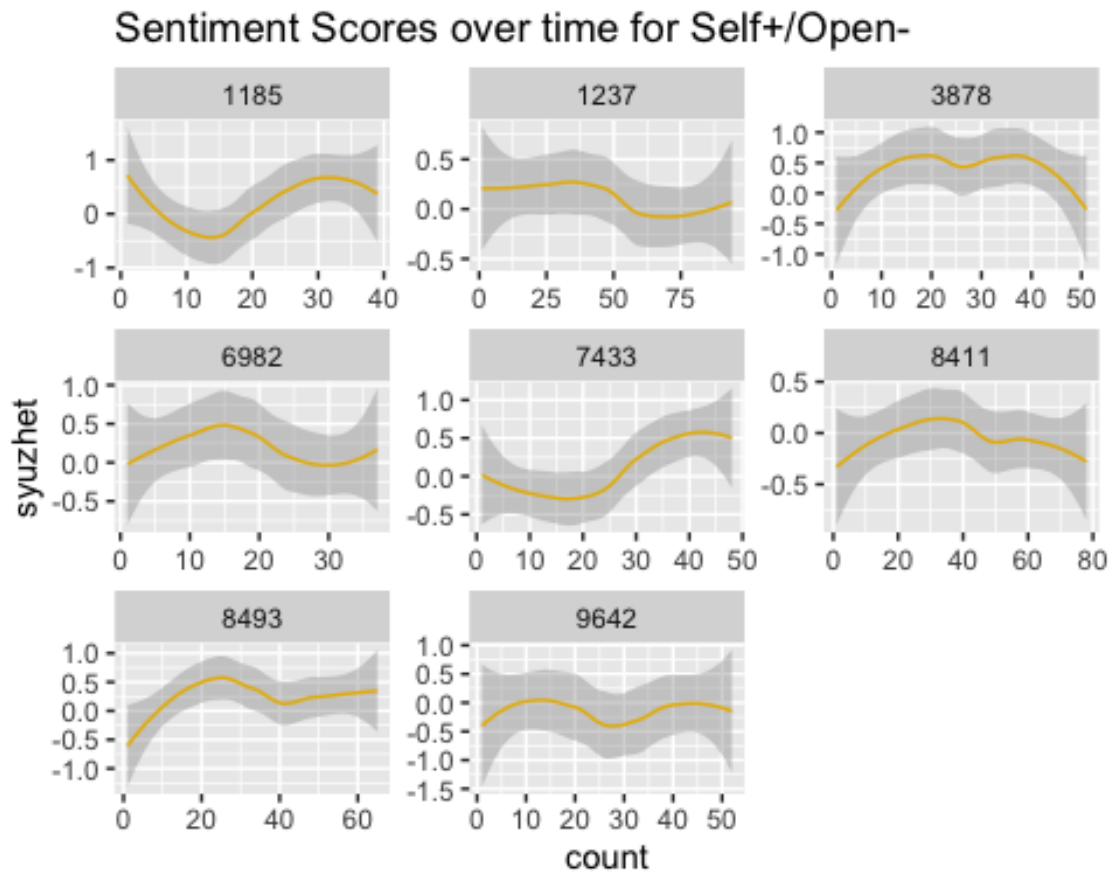
9.5.7.3 Create timeline for groups of participants

```
x <- unique(reasoning$doc_id)
df_simple <- dplyr::select(reasoning, doc_id, count, syuzhet, HVS_Cluster)

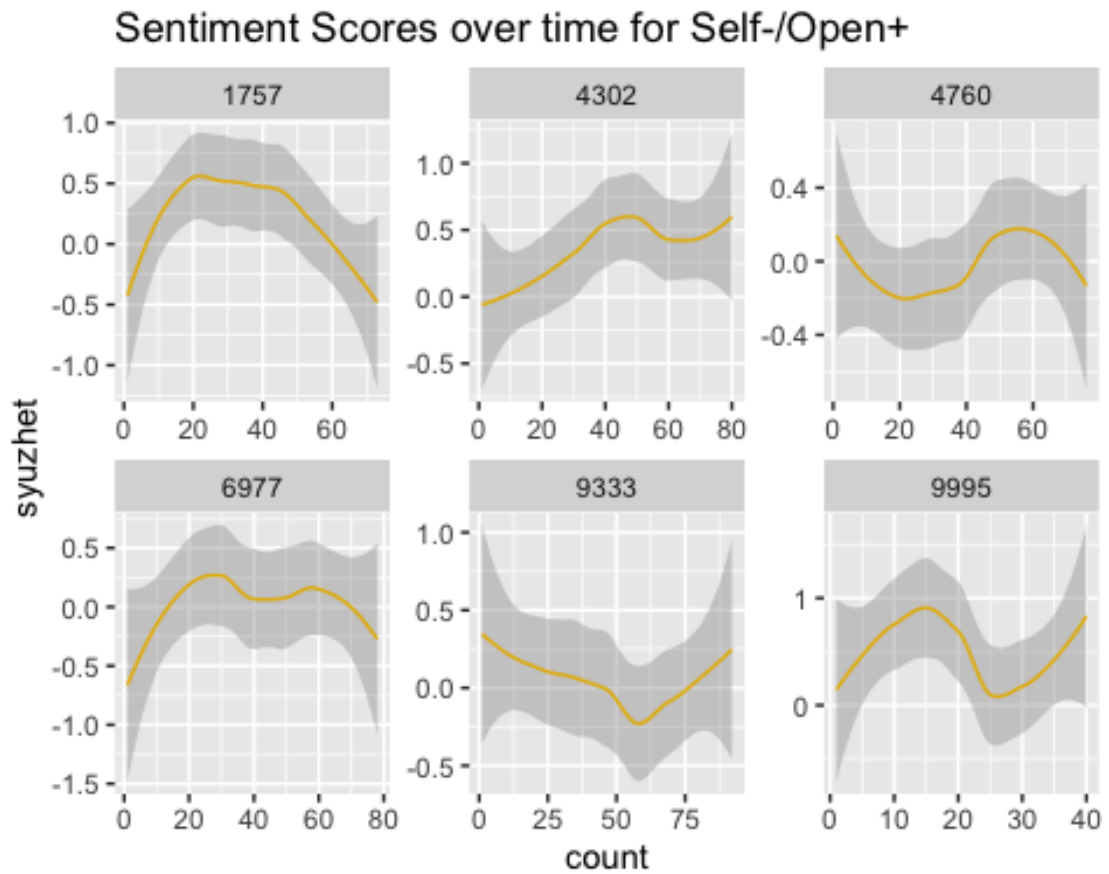
df <- dplyr::filter(df_simple,
  HVS_Cluster == "Self+/Open+")
SentimentPlot(df, "Self+/Open+")
```



```
df <- dplyr::filter(df_simple,
  HVS_Cluster == "Self+/Open-")
SentimentPlot(df, "Self+/Open-")
```



```
df <- dplyr::filter(df_simple,
  HVS_Cluster == "Self-/Open+")
SentimentPlot(df, "Self-/Open+")
```



```
df <- dplyr::filter(df_simple,  
                    HVS_Cluster == "Self-/Open-")  
SentimentPlot(df, "Self-/Open-")
```



```
saveRDS(reasoning, file = "/Users/stefan_kleipoedzus/Documents/@Promotion/R
Analysing Transcript/Reasoning.RDS")
```

9.5.7.4 Sentiments for Toulmin Reasoning

Create a dataframe with one token (word) per line and add nrc Sentiment

```
thinkAloudWords <- reasoning %>%
  unnest_tokens(word, tidy) %>%
  inner_join(get_sentiments("nrc"))

df <- dplyr::select(thinkAloudWords, doc_id, sentiment, expertise)
df <- df %>%
  group_by(expertise) %>%
  count(expertise, sentiment)
df <- as_tibble(df)
df <- df %>%
  pivot_wider(names_from = sentiment, values_from = n)
hvs <- df %>%
  dplyr::select(expertise)
df <- df %>%
  dplyr::select(-expertise)
df <- df / rowSums(df) * 100
df <- cbind(hvs, df)
df <- dplyr::select(thinkAloudWords, doc_id, sentiment, HVS_Cluster)
df <- df %>%
  group_by(HVS_Cluster) %>%
  count(HVS_Cluster, sentiment) %>%
```

```

pivot_wider(names_from = sentiment, values_from = n)
df <- column_to_rownames(df, "HVS_Cluster")

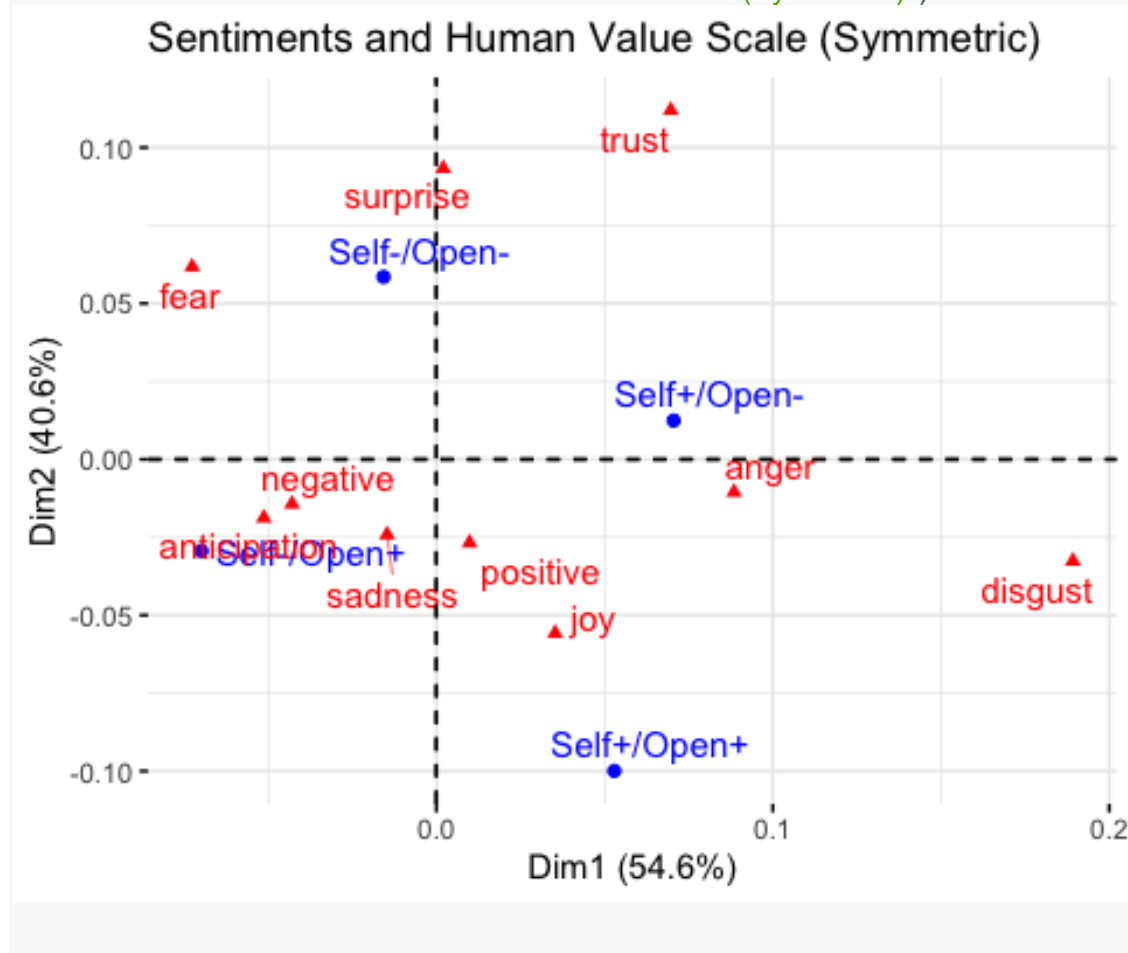
```

A correspondence analysis of NRC Sentiments in Reasoning

```

res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symetric", repel = TRUE,
  title = "Sentiments and Human Value Scale (Symmetric)")

```



9.6 The Shiny App

9.6.1 Server Logic

```
# This is the server logic of a Shiny web application. You can run the
# application by clicking 'Run App' above.
# Load libraries and data #####
library(magrittr)
library(shiny)
library(tm)
library(tidytext)
library(textmineR)
library(tidyverse)
library(antiword)
library(data.table)
library(tibble)
library(stringr)
library(formattable)
library(knitr)
library(kableExtra)
library(pbapply)
library(ggplot2)
library(parallel)
library(udpipe) # Needed for NLP
library(igraph)
library(ggraph)
library(DT)

# Load data #####
transcripts <- readRDS(
  "/Users/stefan_kleipoedzus/Documents/@Promotion/R Analysing
  Transcript/TranscriptData.RDS")
thinkAloudWords <- readRDS(
  "/Users/stefan_kleipoedzus/Documents/@Promotion/R Analysing
  Transcript/ThinkAloudWords.RDS")
human_values <- readRDS(
  "/Users/stefan_kleipoedzus/Documents/@Promotion/R Analysing
  Transcript/HVSDData.RDS")
x_docID <- readRDS(
  "/Users/stefan_kleipoedzus/Documents/@Promotion/R Analysing
  Transcript/annot_docID.RDS")
patterns <- readRDS(
  "/Users/stefan_kleipoedzus/Documents/@Promotion/R Analysing
  Transcript/KLPatterns.RDS")
reasoning <- readRDS(
  "/Users/stefan_kleipoedzus/Documents/@Promotion/R Analysing
  Transcript/Reasoning.RDS")
x_reasoning <- readRDS(
  "/Users/stefan_kleipoedzus/Documents/@Promotion/R Analysing
  Transcript/annot_reasoning_docID.RDS")
claims <- readRDS(
  "/Users/stefan_kleipoedzus/Documents/@Promotion/R Analysing
  Transcript/xClaims.RDS")
evidence <- readRDS(
  "/Users/stefan_kleipoedzus/Documents/@Promotion/R Analysing
  Transcript/xEvidence.RDS")
warrants <- readRDS(
  "/Users/stefan_kleipoedzus/Documents/@Promotion/R Analysing
  Transcript/xWarrants.RDS")
```



```

backups <- readRDS(
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing
  Transcript/xBackups.RDS")
qualifiers <- readRDS(
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing
  Transcript/xQualifiers.RDS")
rebuttals <- readRDS(
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing
  Transcript/xRebuttals.RDS")
x_docID_vignette <- readRDS(
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing
  Transcript/x_docID_Vignette.RDS")
toumlin_scheme <- readRDS(
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing
  Transcript/toumlin_scheme.RDS")
risks <- readRDS(
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing Transcript/risks.RDS")
intervention <- readRDS(
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing
  Transcript/intervention.RDS")
nvivo_analysis <- readRDS(
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing
  Transcript/nvivo_analysis.RDS")
x_nvivo <- readRDS(
  "/Users/stefan_kleipoedszus/Documents/@Promotion/R Analysing
  Transcript/x_nvivo.RDS")

# Define Functions #####
# Function to plot all keylog information and sentiment scores
pl_keylog <- function(df) {
  ggplot() +
    geom_line(data = df, aes(x = seconds, y = vignette), color = "#00AFBB", size = 2) +
    geom_point(data = df, aes(x = seconds, y = risks), color = "Blue", size = 2) +
    geom_point(data = df, aes(x = seconds, y = information), color = "Green", size = 2) +
    geom_point(data = df, aes(x = seconds, y = intervention), color = "Black", size = 2) +
    geom_line(data = df, aes(x = seconds, y = Sentiments), color = "#808080", size = 0.2) +
    geom_smooth(data = df, aes(x = seconds, y = Sentiments), color = "#E2E5DE", size =
0.4)
}

pl_sent <- function(df) {
  ggplot(data = df, aes(x = seconds, y = Sentiments, color = vignette))+
    geom_point(color = "#00AFBB", size = 1.5) +
    geom_line()+
    geom_smooth(method = "loess", color = "#E7B803", size = 2.5) +
    theme(legend.position="bottom")
}

# Create a function to plot NRC words for selected focus group or individual
library(ggrepel)
plotNRC <- function(){
  p <- NRC %>%
  # Set 'y = 1' to just plot one variable and use word as the label
  ggplot(aes(word, 1, label = word, fill = sentiment)) +
  # You want the words, not the points
  geom_point(color = 'transparent') +
  # Make sure the labels don't overlap
  geom_label_repel(force = 1, nudge_y = .5,
    direction = "y",
    box.padding = 0.04,

```

```

        segment.color = "transparent",
        size = 3) +
facet_grid(~sentiment) +
#theme_sentiments() +
theme(axis.text.y = element_blank(), axis.text.x = element_blank(),
      axis.title.x = element_text(size = 9),
      legend.position = "none",
      panel.grid = element_blank(), panel.background = element_blank(),
      panel.border = element_rect("lightgray", fill = NA),
      strip.text.x = element_text(size = 9)) +
xlab(NULL) + ylab(NULL) +
coord_flip()
print(p)
}

# Create a function for a co-occurrence map
cocomap <- function(df, n, Subtitle) {
  stats <- cooccurrence(x = df$lemma,
                      relevant = df$upos %in% c("NOUN", "ADJ", "VERB"),
                      skipgram = 1,
                      group = "doc_id")
  wordnetwork <- head(stats, n)
  wordnetwork <- graph_from_data_frame(wordnetwork)
  ggraph(wordnetwork, layout = "fr") +
  set.seed(1878) +
  geom_edge_link(aes(width = cooc, edge_alpha = cooc), edge_colour = "darkgreen") +
  geom_node_text(aes(label = name), col = "darkblue", size = 5) +
  theme(legend.position = "none") +
  labs(title = "Cooccurrences within 2 words distance",
       subtitle = Subtitle)
}

# Create Dataframe needed
df_simple <- dplyr::select(transcripts, doc_id, seconds, text, Sentiments,
                          vignette, risks, intervention, information)
df_simple <- df_simple[!duplicated(df_simple), ]

# Server Logic #####
## Think Aloud Plot #####
shinyServer(function(input, output) {
  output$thinkaloudPlot <- renderPlot({
    df <- dplyr::filter(df_simple, doc_id == input$participant)
    df[apply(df[, -1], 1, function(x) !all(x==0)),]
    pl_keylog(df)
  })
## Sentiment Plot #####
  output$sentiments <- renderPlot({
    df <- dplyr::filter(df_simple, doc_id == input$participant)
    df[apply(df[, -1], 1, function(x) !all(x==0)),]
    pl_sent(df)
  })
## NRC Words #####
  output$NRCwords <- renderPlot({
    # Select focus of plot
    NRC <- thinkAloudWords %>%
      filter(doc_id == input$participant) %>%
      group_by(sentiment) %>%
      count(word, sort = TRUE) %>%
      arrange(desc(n)) %>%
      slice(seq_len(10)) %>%

```

```

    ungroup()
  # Plot table
  ggplot(data = NRC, aes(word, 1, label = word, fill = sentiment)) +
  # You want the words, not the points
  geom_point(color = 'transparent') +
  # Make sure the labels don't overlap
  geom_label_repel(force = 1, nudge_y = .5,
                  direction = "y",
                  box.padding = 0.04,
                  segment.color = "transparent",
                  size = 3) +
  facet_grid(~sentiment) +
  #theme_sentiments() +
  theme(axis.text.y = element_blank(), axis.text.x = element_blank(),
        axis.title.x = element_text(size = 9),
        legend.position = "none",
        panel.grid = element_blank(), panel.background = element_blank(),
        panel.border = element_rect("lightgray", fill = NA),
        strip.text.x = element_text(size = 9)) +
  xlab(NULL) + ylab(NULL) +
  ggtitle("NRC Sentiments Words") +
  coord_flip()
})
## NRC Word Counts #####
output$NRCcounts <- renderPlot({
  df <- filter(thinkAloudWords, doc_id == input$participant)
  df <- as.data.frame(table(df$sentiment))
  ggplot(data=df,aes(x=Var1,y=Freq))+
  geom_bar(aes(fill=Var1),stat = "identity")+
  theme(legend.position="none")+
  xlab("Sentiments")+ylab("Scores")+
  ggtitle("Total sentiment based on scores")+
  theme(axis.text=element_text(size=14,face="bold"),
        axis.title=element_text(size=10),
        legend.position = "none",
        plot.title = element_text(size=22)) +
  ggtitle("NRC Sentiments Counts") +
  coord_flip()
})
## Plot Human Values #####
output$humanValues <- renderPlot({
  df <- dplyr::select(human_values,doc_id, Cpow, Cach, Ched, Csti, Cself, Cuni, Cben,
Ctra, Ccon, Csec)
  df <- filter(df, doc_id == input$participant)
  df <- gather(df, Value, Score, Cpow:Csec, factor_key=TRUE)
  ggplot(data = df, mapping = aes(x=Value, y=Score,
                                fill = rownames(df),
                                label = Score)) +

  geom_col() +
  theme(axis.title.x = element_blank()) +
  theme(axis.title.y = element_blank()) +
  theme(legend.position = "none",
        plot.title = element_text(size=24),
        axis.text = element_text(size=12))
})
## Higher Order Values #####
output$hvsHigherOrder <- renderPlot({
  df <- human_values
  highlight_df <- filter(df, doc_id == input$participant)
  df <- filter(df, doc_id != input$participant)

```

```

ggplot(df, aes(x= opendim, y= selfdim, label=doc_id))+
  geom_point() +
  geom_text(aes(label=doc_id),hjust=-0.3, vjust=0.7) +
  geom_point(data=highlight_df,
    aes(x= opendim, y= selfdim, label=doc_id),
    color='red',
    size=10) +
  geom_text(data=highlight_df,
    aes(x= opendim, y= selfdim, label=doc_id),
    color='red',
    size=10,
    hjust=1.2, vjust= 0.5) +
  xlab("Conservation vs Openness to change") +
  ylab("Self-transcendence vs Self-enhancement") +
  theme(plot.title = element_text(size=28),
    axis.text = element_text(size=15),
    axis.title=element_text(size=16,face="bold"))
})
## Infoboxes ####
### Participant ID ####
output$participant <- renderInfoBox({
  df <- dplyr::filter(human_values, doc_id == input$participant)
  infoBox(
    "Participant", df$doc_id, icon = icon("user", lib = "glyphicon"),
    color = "light-blue", fill = TRUE
  )
})
### HVS Cluster ####
output$HumanValueCluster <- renderInfoBox({
  df <- dplyr::filter(human_values, doc_id == input$participant)
  infoBox(
    "HVS Cluster", df$HVS_Cluster, icon = icon("tree-deciduous", lib = "glyphicon"),
    color = "yellow"
  )
})
### Expertise ####
output$expertise <- renderInfoBox({
  df <- dplyr::filter(human_values, doc_id == input$participant)
  infoBox(
    "Expertise", df$expertise, icon = icon("education", lib = "glyphicon"),
    color = "blue"
  )
})
### Autonomy ####
output$autonomy <- renderInfoBox({
  df <- dplyr::filter(human_values, doc_id == input$participant)
  infoBox(
    "Autonomy", df$Autonomy, icon = icon("eye-open", lib = "glyphicon"),
    color = "red"
  )
})
### Influence ####
output$influence <- renderInfoBox({
  df <- dplyr::filter(human_values, doc_id == input$participant)
  infoBox(
    "Influence", df$Influence, icon = icon("queen", lib = "glyphicon"),
    color = "green"
  )
})
### Sentiment Mean ####

```

```

output$sentimentMean <- renderInfoBox({
  df <- dplyr::filter(human_values, doc_id == input$participant)
  infoBox(
    "Sentiment Mean", df$MeanSentiment, icon = icon("heart-empty", lib = "glyphicon"),
    color = "orange"
  )
})
### Sentiment Category ####
output$SentCat <- renderInfoBox({
  df <- dplyr::filter(human_values, doc_id == input$participant)
  infoBox(
    "Sentiment Category", df$SentCat, icon = icon("heart", lib = "glyphicon"),
    color = "maroon"
  )
})
### Information looked at ####
output$InfoCount <- renderInfoBox({
  df <- dplyr::filter(human_values, doc_id == input$participant)
  infoBox(
    "Information looked at", df$Infocount, icon = icon("filter", lib = "glyphicon"),
    color = "lime"
  )
})
### Information Tertile ####
output$InfoCat <- renderInfoBox({
  df <- dplyr::filter(human_values, doc_id == input$participant)
  infoBox(
    "Information Tertile", df$InfoCat, icon = icon("filter", lib = "glyphicon"),
    color = "lime"
  )
})
### Changes to Risk assessment ####
output$RiskCount <- renderInfoBox({
  df <- dplyr::filter(human_values, doc_id == input$participant)
  infoBox(
    "Risk Changes", df$riskcount, icon = icon("scissors", lib = "glyphicon"),
    color = "teal"
  )
})
### Rating of Good Decisions ####
output$GdDcs <- renderInfoBox({
  df <- dplyr::filter(human_values, doc_id == input$participant)
  infoBox(
    "Good Decisions", df$GoodDcsMean, icon = icon("thumbs-up", lib = "glyphicon"),
    color = "aqua"
  )
})
### Rating of Bad Decisions ####
output$BdDcs <- renderInfoBox({
  df <- dplyr::filter(human_values, doc_id == input$participant)
  infoBox(
    "Bad Decisions", df$BadDcsMean, icon = icon("thumbs-down", lib = "glyphicon"),
    color = "aqua"
  )
})
## Table with Information patterns ####
output$InfoPattern <- renderTable({
  df <- dplyr::filter(patterns, doc_id == input$participant)
  df
})
## Word Frequencies ####

```

```

output$WordFreq <- renderPlot({
  # Select data to be analysed
  df <- dplyr::select(transcripts, doc_id, tidy, vignette)
  df <- tibble(df)
  freq <- dplyr::filter(df, doc_id == input$participant)
  # Create one-token-per-unit-per-row, remove stopwords and count remaining words
  freq <- freq %>%
    unnest_tokens(word, tidy) %>%
    anti_join(stop_words) %>%
    drop_na()
  # Plot most frequent words
  freq %>%
    count(word, sort = TRUE) %>%
    filter(n>5) %>%
    mutate(word = reorder(word, n)) %>%
    ggplot(aes(n, word)) +
    geom_col() +
    labs(y=NULL) +
    theme(axis.text=element_text(size=24))
})
## Reasoning Sentiments ####
output$reasonSentiments <- renderPlot({
  df <- dplyr::select(reasoning, doc_id, count, syuzhet)
  df <- tibble(df)
  df <- dplyr::filter(reasoning,
    doc_id == input$participant)
  ggplot(data = df, aes(x = count, y = syuzhet, color = darkred))+
    geom_smooth(method = "loess", color = "#E7B803", size = 0.5) +
    theme(legend.position = "none")
})
## Toumlin Word Frequencies ####
output$toumlinFrequencies <- renderPlot({
  ### Overall word frequencies - Toumlin ####
  df <- dplyr::select(toumlin_scheme, toumlin, tidy, doc_id)
  df <- filter(df, doc_id == input$participant)
  # Create one-token-per-unit-per-row, remove stopwords and count remaining words
  wordcounts <- df %>%
    unnest_tokens(word, tidy) %>%
    anti_join(stop_words) %>%
    count(word, toumlin, sort = FALSE) %>%
    group_by(toumlin) %>%
    bind_tf_idf(word, toumlin, n) %>%
    mutate(word = reorder(word, tf_idf))

  # Plot most frequently used words
  wordcounts %>%
    group_by(toumlin) %>%
    slice_max(n, n = 5) %>%
    ungroup() %>%
    ggplot(aes(n, fct_reorder(word, n), fill = toumlin)) +
    geom_col(show.legend = FALSE) +
    ggtitle(paste("Most frequently used words for Toumlin's reasoning for",
      input$participant, sep = " ")) +
    facet_wrap(~toumlin, ncol = 2, scales = "free") +
    labs(x = "n", y = NULL)
})
## Co-Occurrence Map of Reasoning ####
output$CoocMap <- renderPlot({

```

```

x_docID <- dplyr::filter(x_reasoning, doc_id == input$participant)
cocomap(x_docID, 60, paste("Reasoning of", input$participant, sep = " "))
})

## Co-Occurrence Map of Evidence #####
output$Evidence <- renderPlot({
  x_docID <- dplyr::filter(evidence, doc_id == input$participant)
  cocomap(x_docID, 60, paste("Evidence reviewed by", input$participant, sep = " "))
})

## Co-Occurrence Map of Claims #####
output$Claims <- renderPlot({
  x_docID <- dplyr::filter(claims, doc_id == input$participant)
  cocomap(x_docID, 60, paste("Claims made by", input$participant, sep = " "))
})

## Co-Occurrence Map of Warrants #####
output$Warrants <- renderPlot({
  x_docID <- dplyr::filter(warrants, doc_id == input$participant)
  cocomap(x_docID, 60, paste("Warrants made by", input$participant, sep = " "))
})

## Co-Occurrence Map of Backups #####
output$Backups <- renderPlot({
  x_docID <- dplyr::filter(backups, doc_id == input$participant)
  cocomap(x_docID, 60, paste("Backups made by", input$participant, sep = " "))
})

## Co-Occurrence Map of Qualifiers #####
output$Qualifiers <- renderPlot({
  x_docID <- dplyr::filter(qualifiers, doc_id == input$participant)
  cocomap(x_docID, 60, paste("Qualifiers used by", input$participant, sep = " "))
})

## Co-Occurrence Map of Rebuttals #####
output$Rebuttals <- renderPlot({
  x_docID <- dplyr::filter(rebuttals, doc_id == input$participant)
  cocomap(x_docID, 60, paste("Rebuttals by", input$participant, sep = " "))
})

## Co-Occurrence Map of Vignette, Information #####
output$docidvignette <- renderPlot({
  x_docID <- dplyr::filter(x_docID_vignette,
    information == input$Information,
    vignette == input$Vignette)
  cocomap(x_docID, 40, paste(input$Information, "in", input$Vignette, sep = " "))
})

## Co-Occurrence Map of Participant, Vignette, Information #####
output$docidvignetteinfo <- renderPlot({
  x_docID <- dplyr::filter(x_docID_vignette,
    doc_id == input$participant,
    information == input$Information,
    vignette == input$Vignette)
  cocomap(x_docID, 40, paste(input$Information, "in",
    input$Vignette, sep = " "))
})

## Toumlin: Nvivo File Analysis Co-occurrence #####
output$NvivoCooc <- renderPlot({

```

```

df <- filter(x_nvivo,
             doc_id == input$TDocID,
             vignette == input$TVign,
             Reasoning_Block == input$Treas_block)
title <- paste(input$Treas_block, "by", input$TDocID, "in", input$TVign, sep = " ")
cocomap(df, 50, title)
})

```

Toumlin: Nvivo File Analysis NRC Words

```

output$NvivoNRC <- renderPlot({
  df <- filter(nvivo_analysis,
              doc_id == input$TDocID,
              vignette == input$TVign,
              Reasoning_Block == input$Treas_block)
  title <- paste(input$Treas_block, "by", input$TDocID, "in", input$TVign, sep = " ")
  df <- df %>%
    unnest_tokens(word, tidy) %>%
    inner_join(get_sentiments("nrc")) %>%
    group_by(sentiment) %>%
    count(word, sort = TRUE) %>%
    arrange(desc(n)) %>%
    slice(seq_len(15)) %>%
    ungroup()

  # Plot table
  ggplot(data = df, aes(word, 1, label = word, fill = sentiment)) +
  # You want the words, not the points
  geom_point(color = 'transparent') +
  # Make sure the labels don't overlap
  geom_label_repel(force = 1, nudge_y = .5,
                  direction = "y",
                  box.padding = 0.04,
                  segment.color = "transparent",
                  size = 3) +
  facet_grid(~sentiment) +
  #theme_sentiments() +
  theme(axis.text.y = element_blank(), axis.text.x = element_blank(),
        axis.title.x = element_text(size = 9),
        legend.position = "none",
        panel.grid = element_blank(), panel.background = element_blank(),
        panel.border = element_rect("lightgray", fill = NA),
        strip.text.x = element_text(size = 9)) +
  xlab(NULL) + ylab(NULL) +
  ggtitle(paste("NRC Sentiments Words: ", title, sep = " ")) +
  coord_flip()
})

```

NVIVO NRC Word Counts

```

output$NVIVONRCcounts <- renderPlot({
  df <- filter(nvivo_analysis,
              doc_id == input$TDocID,
              vignette == input$TVign,
              Reasoning_Block == input$Treas_block)
  title <- paste(input$Treas_block, "by", input$TDocID, "in", input$TVign, sep = " ")
  df <- df %>%
    unnest_tokens(word, tidy) %>%
    inner_join(get_sentiments("nrc")) %>%
    group_by(sentiment) %>%
    count(word, sort = TRUE) %>%

```



```

    arrange(desc(n)) %>%
    ungroup()
df <- as.data.frame(table(df$sentiment))
ggplot(data=df,aes(x=Var1,y=Freq))+
  geom_bar(aes(fill=Var1),stat = "identity")+
  theme(legend.position="none")+
  xlab("Sentiments")+ylab("Scores")+
  ggtitle("Total sentiment based on scores")+
  theme(axis.text=element_text(size=14,face="bold"),
        axis.title=element_text(size=10),
        legend.position = "none",
        plot.title = element_text(size=22)) +
  ggtitle("NRC Sentiments Counts") +
  coord_flip()
})

## Nvivo Quotes ####
output$nvivoquotes <- DT::renderDataTable({
  df <- filter(nvivo_analysis,
              doc_id == input$TDocID,
              vignette == input$TVign,
              Reasoning_Block == input$Treas_block)
  df <- df %>%
  dplyr::select(V1)%>%
  unique()
  df
})

## Toumlin Quotes ####
output$toumlinquotes <- DT::renderDataTable({
  df <- get(input$Toumlin_Quotes) %>%
  filter(doc_id == input$participant) %>%
  dplyr::select(sentence)%>%
  unique()
  df
})

output$toumlinupos <- renderPlot({
  df <- get(input$Toumlin_Quotes) %>%
  filter(doc_id == input$participant) %>%
  filter(upos == input$upos) %>%
  dplyr::select(lemma) %>%
  as_tibble() %>%
  count(lemma, sort = TRUE) %>%
  group_by(lemma) %>%
  summarise(total = sum(n))
  set.seed(1234) # for reproducibility
  wordcloud(words = df$lemma, freq = df$total, min.freq = 1,
            max.words=200, random.order=FALSE, rot.per=0.35,
            colors=brewer.pal(8, "Dark2"))
})

## Co-Occurrence Map of Vignette
output$coocvignette <- renderPlot({
  x_docID <- dplyr::filter(x_docID_vignette,
                        vignette == input$Vignette)
  cocomap(x_docID, 40, paste("Co-Occurrence Map for", input$Vignette, sep = " "))
})

## NRC Words Vignettes ####

```

```

output$NRCVignettes <- renderPlot({
  # Select focus of plot
  NRC <- thinkAloudWords %>%
    filter(vignette == input$Vignette) %>%
    group_by(sentiment) %>%
    count(word, sort = TRUE) %>%
    arrange(desc(n)) %>%
    slice(seq_len(10)) %>%
    ungroup()
  # Plot table
  ggplot(data = NRC, aes(word, 1, label = word, fill = sentiment)) +
    # You want the words, not the points
    geom_point(color = 'transparent') +
    # Make sure the labels don't overlap
    geom_label_repel(force = 1, nudge_y = .5,
      direction = "y",
      box.padding = 0.04,
      segment.color = "transparent",
      size = 3) +
    facet_grid(~sentiment) +
    #theme_sentiments() +
    theme(axis.text.y = element_blank(), axis.text.x = element_blank(),
      axis.title.x = element_text(size = 9),
      legend.position = "none",
      panel.grid = element_blank(), panel.background = element_blank(),
      panel.border = element_rect("lightgray", fill = NA),
      strip.text.x = element_text(size = 9)) +
    xlab(NULL) + ylab(NULL) +
    ggtitle(paste("NRC Sentiments Words for ", input$Vignette, sep = " ")) +
    coord_flip()
})

### NRC Word Counts ####
output$NRCVignettecounts <- renderPlot({
  df <- filter(thinkAloudWords, vignette == input$Vignette)
  df <- as.data.frame(table(df$sentiment))
  ggplot(data=df,aes(x=Var1,y=Freq))+
    geom_bar(aes(fill=Var1),stat = "identity")+
    geom_text(aes(label = Freq),
      vjust = 0,
      hjust = 1.5,
      colour = "white") +
    theme(legend.position="none")+
    xlab("Sentiments")+ylab("Scores")+
    ggtitle("Total sentiment based on scores")+
    theme(axis.text=element_text(size=14,face="bold"),
      axis.title=element_text(size=10),
      legend.position = "none",
      plot.title = element_text(size=22)) +
    ggtitle(paste("NRC Sentiments Counts for", input$Vignette, sep = " ")) +
    coord_flip()
})

### Initial Risk Assessment for vignettes ####
output$InitialRisk <- renderPlot({
  df <- dplyr::select(risks, vignette, InitialRisk)
  df <- count(df, vignette, InitialRisk)
  df$InitialRisk = factor(df$InitialRisk,
    levels = c("Severe", "High", "Moderate", "Low"),
    ordered = TRUE)
})

```

```

df <- df[complete.cases(df$InitialRisk), ]
# Create a barplot
ggplot(df, aes(factor(vignette), n, fill = InitialRisk)) +
  geom_bar(stat="identity") + #, position = "dodge") +
  scale_fill_brewer(palette = "Dark2", direction = -1) +
  ggtitle("Barplot of Vignettes and initial assessment of risk") +
  theme(axis.text=element_text(size=14),
        axis.title.x=element_blank())
})
## Final Risk Assessments for Vignettes #####
output$FinalRisk <- renderPlot({
  df <- dplyr::select(risks, vignette, FinalRisk)
  df <- count(df, vignette, FinalRisk)
  df$FinalRisk = factor(df$FinalRisk,
                       levels = c("Severe", "High", "Moderate", "Low"),
                       ordered = TRUE)
  df <- df[complete.cases(df$FinalRisk), ]
  # Create a barplot
  ggplot(df, aes(factor(vignette), n, fill = FinalRisk)) +
    geom_bar(stat="identity") + #, position = "dodge") +
    scale_fill_brewer(palette = "Dark2", direction = -1) +
    ggtitle("Barplot of Vignettes and final assessment of risk") +
    theme(axis.text=element_text(size=14),
          axis.title.x=element_blank())
})
## Interventions for Vignettes #####
output$Interventions <- renderPlot({
  df <- dplyr::select(intervention, vignette, intervention)
  df <- count(df, vignette, intervention)
  df$intervention = factor(df$intervention,
                          levels = c("Formal_Care", "Kinship_Care", "CP", "CIN"),
                          ordered = TRUE)
  df <- subset(df, intervention != 'NA')
  # Create a barplot
  ggplot(df, aes(factor(vignette), n, fill = intervention)) +
    geom_bar(stat="identity") + #, position = "dodge") +
    scale_fill_brewer(palette = "Dark2", direction = -1) +
    ggtitle("Barplot of Vignettes and chosen interventions") +
    theme(axis.text=element_text(size=14),
          axis.title.x=element_blank())
})

## Correspondence Analysis of Sentiments and Vignettes #####
output$CA_Sentiments <- renderPlot({
  #### Create a correspondence analysis for NRC sentiment counts ####
  df <- thinkAloudWords %>%
    dplyr::select(vignette, sentiment) %>%
    #filter(vignette %in% c("Vignette_1")) %>%
    group_by(vignette) %>%
    count(sentiment, sort = TRUE) %>%
    arrange(desc(n)) %>%
    slice(seq_len(10)) %>%
    ungroup()
  df <- as.data.frame(df)
  df <- na.omit(df)
  df <- reshape(data=df, idvar="vignette", v.names = "n", timevar = "sentiment",
direction="wide")
  df2 <- df[,-1]
  rownames(df2) <- df[,1]
  df <- df2[-1,]

```

```
colnames(df) <- c("Negative", "Fear", "Trust", "Anticipation", "Positive",
  "Anger", "Surprise", "Sadness", "Joy", "Disgust")

res.ca <- CA(df, graph = FALSE)
fviz_ca_biplot(res.ca, geom = c("point", "text"), map = "symmetric", repel = TRUE,
  title = "Vignettes and NRC Sentiments (Symmetric)")
})
})
```

9.6.2 The User Interface

```
# Load Libraries #####

library(shiny)
library(shinydashboard)
library(ca)
library(factoextra)
library(FactoMineR)

doc_ids <- unique(transcripts$doc_id)
Tdocs <- unique(nvivo_analysis$doc_id)
TVigns <- unique(nvivo_analysis$vignette)
TREAS <- unique(nvivo_analysis$Reasoning_Block)

vigns <- c("Vignette_1",
  "Vignette_2",
  "Vignette_3",
  "Vignette_4",
  "Vignette_5")

infos <- c("Referral", "development", "parental_capacity", "interagency",
  "environment", "strengths")

UPOS <- c("ADJ", "NOUN", "VERB")

toumlin_tables <- c("evidence", "claims", "backups", "warrants", "qualifiers", "rebuttals")

# User Interface #####
## Sidebar #####
sidebar <- dashboardSidebar(
  sidebarMenu(
    menuItem("Participants", tabName = "dashboard", icon = icon("glyphicon glyphicon-user",
lib = "glyphicon")),
    menuItem("Reasoning", tabName = "reasoning", icon = icon("glyphicon glyphicon-
random", lib = "glyphicon")),
    menuItem("Case Characteristics", tabName = "id_vignette", icon = icon("glyphicon
glyphicon-briefcase", lib = "glyphicon")),
    menuItem("Nvivo Analysis", tabName = "nvivo", icon = icon("glyphicon glyphicon-
briefcase", lib = "glyphicon")),
    selectInput("participant", p("Select participant"),
      choices = doc_ids),
    selectInput("Vignette", p("CC: Select Vignette"),
      choices = vigns),
    selectInput("Information", p("CC: Select Information"),
      choices = infos),
    selectInput("Toumlin_Quotes", p("Reasoning: Select Reasoning Block"),
      choices = toumlin_tables),
    selectInput("upos", p("Reasoning: Select upos"),
      choices = UPOS),
```

```

selectInput("TDocID", p("Nvivo: Doc_ID"),
  choices = Tdocs),
selectInput("TVign", p("Nvivo: Vignette"),
  choices = TVigns),
selectInput("Treas_block", p("Nvivo: Reasoning"),
  choices = TREAS)
)
)
## Main Body of Dashboard #####
body <- dashboardBody(# Boxes need to be put in a row (or column)

#### Case Characteristics ####
tabItems(
  tabItem(tabName = "id_vignette",
    fluidRow(
      ##### Initial and Final Risk Assessments #####
      box(
        title = "Case Characteristics: Initial Risk Assessments",
        br(), status = "warning", solidHeader = TRUE,
        plotOutput("InitialRisk")),

      box(
        title = "Case Characteristics: Initial Risk Assessments",
        br(), status = "warning", solidHeader = TRUE,
        plotOutput("FinalRisk")),

      ##### Chosen Interventions #####
      box(
        title = "Case Characteristics: Interventions",
        br(), status = "warning", solidHeader = TRUE,
        plotOutput("Interventions")),

      ##### Vignettes Sentiments #####
      box(
        title = "Correspondence Analysis of Vignettes and Sentiments",
        br(), status = "danger", solidHeader = TRUE,
        plotOutput("CA_Sentiments")),

      box(
        title = "Case Characteristics: NRC Sentiment Words",
        br(), status = "danger", solidHeader = TRUE,
        plotOutput("NRCVignettes")),

      box(
        title = "Case Characteristics: NRC Sentiment Count",
        br(), status = "danger", solidHeader = TRUE,
        plotOutput("NRCVignettecounts")),

      ##### Vignettes and Information: Co-Occurrence Map #####
      box(
        title = "Vignette: Cooccurrences of Nouns and Adjectives",
        br(), status = "primary", solidHeader = TRUE,
        plotOutput("coocvignette")),

      box(
        title = "Vignette/ Information: Cooccurrences of Nouns and Adjectives",
        br(), status = "info", solidHeader = TRUE,
        plotOutput("docidvignette")),

```

```

        box(
            title = "Participant/ Vignette/ Information: Cooccurrences of Nouns and Adjectives",
            br(), status = "info", solidHeader = TRUE,
            plotOutput("docidvignetteinfo")),
    ),
),
### Reasoning ####
tblItem(tabName = "reasoning",
    fluidRow(
        #### Toumlin: Word Frequencies ####
        #### Toumlin Quotes ####
        box(
            title = "Toumlin Quotes",
            br(), status = "primary", solidHeader = TRUE,
            DT::dataTableOutput("toumlinquotes")),

        box(
            title = "Toumlin Reasoning: Word Frequencies", br(),
            status = "danger", solidHeader = TRUE,
            plotOutput("toumlinFrequencies")),

        #### Toumlin: Co-Occurrence Map ####
        box(
            title = "Toumlin Reasoning: Cooccurrence of Nouns and Adjectives",
            br(), status = "danger", solidHeader = TRUE,
            plotOutput("CoocMap")),
        #### Evidence: Co-Occurrence Map ####
        box(
            title = "Evidence: Cooccurrence of Nouns and Adjectives",
            br(), status = "info", solidHeader = TRUE,
            plotOutput("Evidence")),

        #### Claims: Co-Occurrence Map ####
        box(
            title = "Claims: Cooccurrence of Nouns and Adjectives",
            br(), status = "info", solidHeader = TRUE,
            plotOutput("Claims")),

        #### Warrants: Co-Occurrence Map ####
        box(
            title = "Warrants: Cooccurrence of Nouns and Adjectives",
            br(), status = "info",
            solidHeader = TRUE,
            plotOutput("Warrants")),

        #### Backups: Co-Occurrence Map ####
        box(
            title = "Backups: Cooccurrence of Nouns and Adjectives",
            br(), status = "info", solidHeader = TRUE,
            plotOutput("Backups")),

        #### Qualifiers: Co-Occurrence Map ####
        box(
            title = "Qualifiers: Cooccurrence of Nouns and Adjectives",
            br(), status = "info", solidHeader = TRUE,
            plotOutput("Qualifiers")),

        #### Rebuttals: Co-Occurrence Map ####

```

```

        box(
            title = "Rebuttals: Cooccurrence of Nouns and Adjectives",
            br(), status = "info", solidHeader = TRUE,
            plotOutput("Rebuttals")
        )
    ),
### Nvivo Analysis ####
tabItem(tabName = "nvivo",
    fluidRow(
        #### Nvivo Co-occurrence maps ####
        box(
            title = "Co-occurrence maps", br(), status = "primary", solidHeader = TRUE,
            plotOutput("NvivoCooc")),

        #### Nvivo NRC Sentiment Words ####
        box(
            title = "NRC Sentiment Words", br(), status = "primary", solidHeader = TRUE,
            plotOutput("NvivoNRC")),

        box(
            title = "NVivo: NRC Wordcounts", br(), status = "primary", solidHeader = TRUE,
            plotOutput("NVIVONRCcounts")),

        #### Nvivo Quotes ####
        box(
            title = "Nvivo Quotes",
            br(), status = "primary", solidHeader = TRUE,
            DT::dataTableOutput("nvivoquotes"))
    )
),
### Participant information ####
    tabItem(tabName = "dashboard",
        #### Infoboxes ####
        fluidRow(
            infoBoxOutput("participant", width = 3),
            infoBoxOutput("expertise", width = 3),
            infoBoxOutput("HumanValueCluster", width = 3),
            infoBoxOutput("autonomy", width = 3),
            infoBoxOutput("influence", width = 3),
            infoBoxOutput("sentimentMean", width = 3),
            infoBoxOutput("SentCat", width = 3),
            infoBoxOutput("GdDcs", width = 3),
            infoBoxOutput("BdDcs", width = 3),
            infoBoxOutput("InfoCount", width = 3),
            infoBoxOutput("InfoCat", width = 3),
            infoBoxOutput("RiskCount", width = 3),
            #### Centered Human Value Scores ####
            box(
                title = "Centered Human Value Scores", status = "warning", solidHeader = TRUE,
                plotOutput("humanValues")),
            #### Higher Order Values ####
            box(
                title = "Higher Order Values", status = "warning", solidHeader = TRUE,
                plotOutput("hvsHigherOrder")),
            #### Patterns of reviewed data ####
            box(
                title = "Patterns of reviewed data", br(), status = "success", solidHeader = TRUE,
                width = 12,
                tableOutput("InfoPattern")),
            #### Think Aloud Timeline and Sentiment Timeline ####

```

Appendices

```
    box(
      title = "Thinking Aloud - Keylog Data and Sentiments", br(), status = "primary",
      solidHeader = TRUE,
      plotOutput("thinkaloudPlot"),
      plotOutput("sentiments")),
#### NRC Sentiment Words ####
    box(
      title = "NRC Sentiments", br(), status = "danger", solidHeader = TRUE,
      plotOutput("NRCwords"),
      plotOutput("NRCcounts")),

#### Word Frequencies ####
    box(
      title = "Most used words", br(), status = "primary", solidHeader = TRUE,
      plotOutput("WordFreq")),
  )
)
))

dashboardPage(
  dashboardHeader(title = "Safeguarding Decisions in Social Work"),
  sidebar,
  body,
)
```


9.7 Case Vignettes

- Vignette 1 – Theresa
- Vignette 2 – Angelos
- Vignette 3 – Megan
- Vignette 4 – Baby E
- Vignette 5 - Naina

9.7.1 Vignette 1 - 2016 Theresa

Referrer details						
Name	Jane Kendrick	Role/Agency/Team/Department	Pastoral Support Worker			
Child's details (Please complete Section 1b for further children). Please gather this information if not known.						
Name of Child	Theresa Howell	Religion	Church of England	Ethnicity	White British	
Date of Birth	13.02.2003	Age	15	Gender	Female	
Education Provider/ Employer	Ormiston Academy	Does the Child have a disability?	Yes/ No	State diagnosis if known and any SEN statement if known	N/A	
Own Agency reference number	s340629X	Does the Child an Education, Health and Care Plan?	No			
Siblings and other related children's details						
Child's full name	DoB or EDD	Gender	Relationship to child referred	Ethnic Origin	Mother's Full Name	Father's Full Name

Brian Howell	28.10.2005	Male	Brother	White British	Sarah Cobb	Norman Howell
Frederick Howell	13.07.2007	Male	Brother	White British	Sarah Cobb	Norman Howell
Melissa Sims	24.11.2010	Female	Sister	White British	Sarah Cobb	Mark Sims
Jennifer Sims	03.05.2012	Female	Sister	White British	Sarah Cobb	Mark Sims
Brendan Newton	07.05.2000	Male	Brother	White British	Sarah Cobb	Gary Newton
Tony Newton	23.08.2001	Male	Brother	White British	Sarah Cobb	Gary Newton
Other significant adults details						
Adult's full name	DoB	Gender	Relationship to child referred?	Ethnic Origin		
Theresa Cobb	10.02.1968	Female	Maternal Grandmother	White British		
Gary Newton	28.09.1978	Male	Stepfather	White British		

Appendices

Laurie Cobb	18.10.1977	Female	Maternal Aunt	White British	
Sean Cobb	06.10.2001	Male	Maternal Uncle	White British	
Reasons for referral					
What are you and/or the family concerned about?	<p>Theresa told some trusted people at school about her previous experiences of abuse, and about her growing level of self-harm (severe cutting and two instances of self-poisoning).</p> <p>Previous week Theresa told the two teachers about her overdose of 8 Paracetamol tablets, adding that 'Pastoral' had telephoned NHS Direct and had been advised that this amount was 'within her daily limit' – the implication being that no specialist medical service was required.</p>				

9.7.1.1 Development of referred child

Theresa's early years were disrupted not only by a number of moves, but by her mother's changing partners, and chronic sexual abuse she suffered from her two older male siblings, beginning at a very young age and continuing for several years. It appears that she and her siblings experienced persistent neglectful care and abuse, exposure to domestic violence, a changing population of fathers/stepfathers, and continual moves – with the consequence that their education was badly affected.

Theresa moved to live with her grandmother. Theresa life in her grandmother's home is very different, by being both more caring and more structured: for example, her aunt told Theresa that she was expected to attend school 100% of the time and Theresa was determined to achieve this. Theresa was able to make impressive progress in both her academic studies and to enjoy and excel at creative subjects, especially music.

In Year 10 however, Theresa progress began to falter, and she became increasingly distressed and unable to cope with her life. Home had become less happy with the arrival of her uncle, not many years older than Theresa who was described by Theresa's aunt as controlling and aggressive towards all members of the household.

When Theresa arrived in Year 7, her academic attainment was very poor, and she was described as 'semi-literate'. The school are rightly proud of how they enabled Theresa to learn and achieve very highly in her academic work, and to develop her enjoyment of expressive activities such as music. The school became a haven, where she feels comfortable and safe with other pupils and staff. This view of the school's work with Theresa is echoed by her grandmother and aunt, who praise staff for supporting Theresa to flourish in all aspects of school life, and to achieve excellent exam results – including, poignantly top scores in her science GCSE exams.

Things gradually changed for Theresa in Year 10, a time of greater academic pressures and expectations on her (and all pupils). Staff noted that her good standards of work were slipping, and that she was no longer coping in the way she had hitherto. She began to rely very heavily on the attention and

support of two young teachers, one of whom had taught her and had also been her Learning Mentor.

In the second half of the year, Theresa revealed to these two teachers and to her Pastoral Manager that she had been self-harming by cutting herself, all over her body.

The Pastoral Manager did make a referral to the School Counsellor, because of concerns about both Theresa declining school performance, and her self-cutting.

9.7.1.2 Background

Theresa comes from a large family, whose life was characterised by continual moves around London and elsewhere in the country. Her early years were disrupted not only by these moves, but by her mother's changing partners, and the chronic sexual abuse she suffered from her two older male siblings, beginning at a very young age and continuing for several years. Child and Adolescent Mental Health Services (CAMHS) were offered and taken up briefly at this point.

At the age of 11, Theresa ran away from her mother's care, and chose to live instead with her maternal grandmother and an aunt who was in her early 20s, and thus not many years older than Theresa. From that point, Theresa had little contact with her mother, although parental responsibility remained with her, or her siblings.

9.7.1.3 Involvement of other services

Theresa's large family have been known to universal and targeted services, including CSC, for most of her early life (until her move to live with MGM). Currently there is no multi-agency working with Theresa and her family.

Child and Adolescent Mental Health Services (CAMHS) were offered and taken up briefly two years ago. Social care agencies were involved with the family over two decades, in relation to domestic violence, neglectful care and sexual abuse in the wider family, across and within generational groups

During Year 10, Theresa was supported by the school's pastoral and (latterly) counselling services, and has just become an out-patient of the local Child and Adolescent Mental Health Service (CAMHS) in Greenwich. Theresa

started seeing the school Counsellor in April 2015, but did not disclose the increasing severity of her self-harm. Theresa values her twice-weekly school counselling sessions. A referral to the School Nursing Service has been made at the point when Theresa self-cutting was first discovered.

9.7.1.4 Parental/ carer capacity

Theresa's parents experienced a number of separations and reconciliations and in 2008 Theresa's father moved with all of the children to live in the North West.

Theresa's mother had serious problems herself, including in her relationship with her current partner which impacted on Theresa's stability and on her mother's capacity to meet Theresa's emotional needs.

There were evidently tensions between Theresa, her mother and her mother's partner. Theresa's mother's mental health problems frequently impacted on Theresa.

Theresa's mother described variable moods, listlessness, and depression, thoughts of dying, periods of low energy and periods of energetic mood over the previous three to four years. This resulted in various possible diagnoses, including: manic depressive illness, hypomania, bi-polar disorder and cyclothymia.

Theresa's mother and her partner were never really challenged about the care they provided, how they would be able prioritise Theresa's emotional needs or to keep her safe.

9.7.1.5 What are the strengths/ protective factors?

Theresa life in her grandmother's home is very different, by being both more caring and more structured: for example, her aunt told Theresa that she was expected to attend school 100% of the time and Theresa was determined to achieve this. She herself wanted her life to change, and for there 'to be a new Theresa'. This was successful, in that her first years of secondary schooling. Theresa was able to make impressive progress in both her academic studies and to enjoy and excel at creative subjects, especially music.

All who know her feel she is a "very, very special girl", an "amazing" young woman, talented and bright. Her aunt says that, "whatever she puts her mind

to, she goes above and beyond to achieve it, and is often amazing at it". Aunt describes Theresa as "caring, kind and considerate – the most selfless person she knows". This is echoed by what school staff who say that Theresa is universally popular throughout the school community.

9.7.2 Vignette 2 - 2016 Angelos

Referrer details						
Name	Rachel Badett	Role/Agency/Team/Department	School Nurse			
Child's details (Please complete Section 1b for further children). Please gather this information if not known.						
Name of Child	Angelos Nolan	Religion	Jewish	Ethnicity	Spanish	
Date of Birth	24.8.2000	Age	8	Gender	Male	
Education Provider/ Employer	Hillcrest Academy	Does the Child have a disability?	Yes	State diagnosis if known and any SEN statement if known	cerebral palsy, profound neural deafness	
Own Agency reference number	W989382B	Does the Angelos Education, Health and Care Plan?	Yes			
Siblings and other related children's details						
Child's full name	DoB or EDD	Gender	Relationship to child referred	Ethnic Origin	Mother's Full Name	Father's Full Name
Mateos Nolan	03.04.2008	Male	Half-sibling	Spanish	Camilla Nolan	Santiago Nolan

Appendices

Sofia Nolan	10.05.2012	Female	Half-sibling	Spanish	Camilla Nolan	Santiago Nolan
Adelaide Nunn	16.10.2009	Female	Child of Stepfather	N/K	N/K	Brian Nunn
George Nunn	09.04.2006	Male	Child of Stepfather	N/K	N/K	Brian Nunn
Other significant adults details						
Adult's full name	DoB	Gender	Relationship to child referred?	Ethnic Origin		
Camilla Nolan	14.07.1977	Female	Mother	Spanish		
Matias Nolan	20.01.1973	Male	Father	Spanish		
Brian Nunn	14.12.1978	Male	Stepfather	English		
Isabella Garcia	30.10.1955	Female	Maternal Grandmother	Spanish		
Mateo Garcia	12.03.1954	Male	Step Maternal Grandfather	Spanish		
Reasons for referral						
What are you and/or the family concerned about?	<p>Angelos arrived at school with a burn to his foot. Mother recorded in the home school diary that he burnt his foot on the radiator the previous week. This explanation was passed to Father who later reported the same when he took his son to hospital.</p> <p>The school nurse was very concerned about the look of the injury, which was reported by her as swollen</p>					

and Angelos, when asked, said that it hurt. The nurse contacted Mother and asked her to take Angelos to hospital. She in turn asked Father to take Angelos and he arrived at school and he was taken to the hospital.

Angelos was medically assessed by a triage nurse who was a specialist in burns and plastic surgery, and a registrar. The outcome was that the injury was not considered medically serious, was considered to be consistent with the explanation provided by Mother and the delay in seeking medical attention understandable.

9.7.2.1 Development of referred child

Angelos was born prematurely at 30 weeks gestation when his Mother was in her teens and living at home with her Mother and Stepfather. Angelos has cerebral palsy, profound neural deafness and he is currently a wheelchair user.

Angelos has been known to the Disabled Children Team since birth. He was referred by medical staff to the hearing impairment advisory team at 4 months old. Angelos was assessed regarding special educational needs, and his Mother requested a place at a specialist school for pupils with physical and neurological disabilities.

The school and speech and language service have concerns regarding the equipment Angelos needs to hear and to communicate, which is often lost, broken or missing as well as worries about whether Mother is responding appropriately to the need to attend wheelchair service appointments.

Angelos attends school regularly, and the main area of concern is missing and lost equipment.

Two months ago school nurses noticed graze on Angelos's forehead which was healing, but there was no explanation in the home-school diary. Teacher phoned Mother who was not sure what had happened but thought he might have grazed his head on his bed.

9.7.2.2 Background

Angelos and his two siblings are living their Mother and Stepfather. It is not clear when Angelos's Mother met Stepfather, but their first child was born in 2008. They had a second child in 2012 (sibling 2). There were differing reports regarding their relationship, and Mother told some professionals that they were in a relationship, but did not live together, and told others that they lived together for part of the week, so he could help out with the care of the children. Stepfather had a brief relationship with another woman, and she had a baby in 2009. This baby was made subject to a child protection plan before its birth, because of Stepfather's domestic violence and this child is currently in care. He also has another older child with whom he has no contact.

Angelos's Father was in his late teens when Angelos was born. He did not have parental responsibility until recently. He told the reviewers that when Angelos was born he asked Mother about registration of the birth, he was told this had been done and that he was not named on the birth certificate. He was not able to challenge this in court for financial reasons.

Stepfather has a long criminal history, with offences for theft, violence to a partner, members of the public and the police. He also has long term alcohol and drug use, and he has misused heroin, crack cocaine and cannabis in the past. He is prescribed methadone, and he tested positive for class A drugs in the period under review. There has been a police marker regarding him for violence and mental health issues, but when assessed by a psychiatrist in the period just before this review he was said to have no diagnosed mental illness.

In December 2012 Mother gave birth to her third child, who was born prematurely and spent some time in special care. The Health Visitor saw only Mother and the new baby. Mother was described as welcoming and the house was appropriate for the needs of a new baby. Discussion covered feeding, safe sleeping and contraception. Mother was keen to attend clinic for baby weight checks. There were no concerns and Mother provided no information about the recent assessments.

9.7.2.3 Involvement of other services

He started at a school for physically and neurologically impaired young people in the September following his third birthday and support has been provided via the school ever since.

Angelos is in contact with a range of services since he was born. This includes social work, occupational therapy, school, and speech and language services. He attends a specialist school, and requires specialist equipment to enable him to participate fully in education, supported by speech and language therapy and the wheelchair service. Angelos has attended school regularly, and the main area of concern has been missing and lost equipment.

There are a large number of professionals involved and the focus of professional attention is divided between meeting Angelos's developmental

needs in the context of his disabilities, supporting his Mother who is trying her best in difficult circumstance and addressing the Stepfather's offending behaviour and drug and alcohol misuse.

Stepfather started to disengage from his contact with probation and the drug and alcohol agencies. He was recently seen by his new drug and alcohol team where he reported that he had ceased using heroin and crack cocaine, but smoked cannabis. Stepfather told his key worker at CRI reports that he is struggling with the methadone reduction programme, drinking excessively and he was unaware that he was due to attend the Drinkwise programme via probation. He reported that he was on a final warning because of non attendance.

The police received an anonymous call regarding an allegation that Stepfather had been drinking and smoking marijuana, and was riding a motorcycle along the street with a small child on the handlebars. The Police attended and Stepfather was arrested for drunk driving, it was noted that Mother was obstructive.

9.7.2.4 Parental/ carer capacity

There were no concerns regarding the care he received or family difficulties until March when his Mother was arrested for assault. The school has a reasonable working relationship with Mother.

His Stepfather was arrested and charged with endangering his own and Angelos when drink driving in September last year. An assessment was undertaken, but led to no further action.

When he was five, Angelos's mother was referred to a physical disabilities team because she was struggling with the physical care needs of Angelos and his 18 month old sibling 1. She had her own physical health difficulties, specifically a back injury which was exacerbated by the level of lifting and handling required to care for Angelos. At this time she was assessed as being entitled to Direct Payments of £90 per week, which she never claimed.

There are worries about whether Mother is responding appropriately to the need to attend wheelchair service appointments. These issues were addressed with Mother, she responded and there were short term changes,

however the problem remained and got worse in the longer term.

Angelos has been known to the Disabled Children Team (DCT) team from birth. Over an eight year period there were no concerns about the care that Angelos received from his Mother, but historically there were worries about how she was coping with the physical care of Angelos and a toddler. She was reluctant to make use of direct payments, social work services or Occupational Therapy support, and as a result a pattern of contact developed where Mother was telephoned by the allocated social worker (DCT) on a regular basis regarding practical matters. Angelos was never subject to any planning or review processes and he was not seen regularly, all of which was outside agreed standards of practice.

In March last year Angelos's Mother was arrested for the assault of a woman whilst both of them were under the influence of alcohol. Stepfather looked after Angelos and his siblings whilst Mother was held at the police station. Police report that Mother assaulted a woman because she believed the woman was seeing her boyfriend/Stepfather. Both were said to be drunk.

In August last year Stepfather was transferred to a new drug and alcohol agency and as part of the initial assessment of his needs he told the drug and alcohol worker that his partner was pregnant with their second child, he had a child who was in care, and another older child who he had no contact with.

Stepfather was arrested for driving a motorbike on the road whilst drunk, with sibling 1 on the handlebars. The Police responded immediately to an anonymous referral and Stepfather was arrested. Mother was noted to be angry and hostile to the Police Officer. Stepfather was charged with drunk driving offences having been twice over the legal limit and endangering a child.

The Drug and Alcohol Team reported that Stepfather had been free from class 'A' drugs since testing positive for crack cocaine in August last year. He also tested positive in the middle of September last year.

9.7.2.5 What are the strengths/ protective factors?

Angelos's Father has provided financial support every month since Angelos was born and that he has regular contact every weekend, with overnight stays

every other week. He was in contact with Angelos's school in the early days. Angelos attends a school which is equipped to meet his needs and where he is happy and progressing. The school holds regular in house planning meetings which brings together education staff, nursing care, speech and language and nutritional experts. Angelos has attended this school for a number of years, and is provided with high quality educational and physical support. The school had a reasonable working relationship with Mother, she attended school diary.

9.7.3 Vignette 3 - 2016 Megan

Referrer details						
Name	Mark Cox	Role/Agency/Team/Department	Early Help Team			
Child's details (Please complete Section 1b for further children). Please gather this information if not known.						
Name of Child	Megan Rowley	Religion	None Recorded	Ethnicity	White European	
Date of Birth	13.03.2003	Age	15	Gender	Female	
Education Provider/ Employer	The Ruth Gorse Academy	Does the Child have a disability?	No	State diagnosis if known and any SEN statement if known	N/A	
Own Agency reference number	S450210	Does the Child an Education, Health and Care Plan?	No			
Siblings and other related children's details						
Child's full name	DoB or EDD	Gender	Relationship to child referred	Ethnic Origin	Mother's Full Name	Father's Full Name
Tom Rowley	28.5.2006	Male	Sibling		Karen	David

Other significant adults details					
Adult's full name	DoB	Gender	Relationship to child referred?	Ethnic Origin	Comments
Karen Rowley	24.4.1980	Female	Mother	White European	
David Lamborne	08.08.1981	Male	Father	White European	Not living in family home
Gary Naquin	12.11.1970	Male	Stepfather	Salvadorian	Living in family home
Reasons for referral					
What are you and/or the family concerned about?	<p>Megan was admitted to the intensive care unit at hospital following a collapse at home. Megan was conveyed by ambulance in a state of peri-arrestiv to the resuscitation unit within the Emergency Department. Full cardiac arrest was prevented as she was put on a life support system. Megan has an extreme case of severe iron deficiency anaemia, which was life-threatening. At this time, her haemoglobin levels were 2.3 g/dl. Normal values for a girl of her age are 11.5 – 16.5 g/dl. It was difficult to establish the primary cause of Megan's medical condition. The Panel sought medical opinion regarding this and were advised that contributory factors could be heavy periods, chronic head lice or poor nutrition. Anyone with untreated iron deficiency anaemia are more susceptible to illness and infection, as a lack of iron in the body affects the immune system (the body's natural defence system).</p> <p>While in intensive care, it was evident that Megan's personal hygiene had been neglected as her body</p>				

	was dirty and she had head lice, which required intensive treatment. Megan was diagnosed with severe anaemia.
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9.7.3.1 Development of referred child

At the age of 5 Megan was referred to the Community Paediatrician regarding speech and language delay and poor co-ordination. The outcome of the assessment was that a 332 notification was made to support future educational needs. The initial health screening performed on school entry (universal screening delivered by school nursing service to all children on entry to school) was completed. This did not highlight any significant health concerns. In terms of her health needs, Megan was prescribed an iron supplement in her early childhood.

The first documented recording of head lice infestation appears when Megan was three years old, when her GP at the time prescribed head lice treatment. When Megan was eight years old, the school nurse records detail of a referral from the school regarding an ongoing concern with head lice infestation. It is not recorded as to whether face-to-face contact was made with Megan as a result. The records indicated that a standard letter and health promotion pack was sent to her parents.

The first indication of action about Megan's increasing weight was during GP consultations between the ages of nine and 12 years old. During this period, her weight increased from 42kgs to 80.7kgs. At this stage, health advice was given and a weight management diet was commenced. When she was 11 years old, Megan experienced shortness of breath due to a high BMI of 34.75. At this stage, the GP referred her to the MEND programme; an interactive health promotion programme which aims to reduce obesity in childhood by changing health behaviours. Throughout this period, although there were concerns about Megan's poor hygiene and social skills.

In the last few months Megan's condition deteriorated. The college manager, who saw Megan at college in June reported that she had seemed more relaxed than previously, was taking more pride in her appearance and was wearing lipstick. She next saw her in August and stated that she looked very ill.

Megan was identified as having a poor standard of personal hygiene in adolescence.

9.7.3.2 Background

Megan had her own bedroom before Gary moved in to the house and took over this room. Since then, Karen (mother) and Megan have shared Karen's bedroom. At the time of Megan's illness, she was sleeping on a mattress on the floor of her mother's bedroom. Tom has the third bedroom.

Two years ago a referral to Children Social Care was made. The concerns at this time were primarily about chronic neglect, domestic violence, housing eviction and the family needing financial support. When Megan was two years and her brother four months old, the children were on the Child Protection Register for neglect and physical abuse. What is known is that the family had been moved into temporary accommodation while their house was being refurbished,

In 2014, the Pupil Referral Unit expressed serious concerns about the home environment. A follow up home visit by Children's Social Care nine days later supported that the home environment was very unhygienic.

9.7.3.3 Involvement of other services

In common with all children, Megan received universal services from General Practice and the community children's services from birth until she left school in 2015.

Targeted services were involved when there began to be concerns regarding the ability of the parents to provide adequate parenting capacity for Megan from very early childhood. Community nursing records show that the health visitor made monthly and on occasions bi-monthly contact with the family, predominantly with the mother, to support maternal health and parenting of Megan and later of her sibling.

There was considerable input from agencies to support the needs of the children. The records show that the agreed action was for support with parenting to be provided by the Local Authority, Bluebell Parenting Centre Catch 22, a Family Support Service closed the case as Karen (mother) was noted as taking on full responsibility and needing little support. We also know, from a note of a meeting between Megan and her adviser at Connexions that Megan was not happy on her course at college and only attended 20% of the

sessions. During a home visit by her Connexions adviser in 14th November, she stayed in bed, as she felt ill.

School reported issues of the children's hygiene and impacted on their ability to make friends and being bullied.

9.7.3.4 Parental/ carer capacity

Megan's biological father was imprisoned for domestic violence in August 2010. Both Megan and Tom witnessed a number of serious domestic violence incidents throughout their mother's relationship with their father. They were reported to have resented their father and wanted no contact with him.

A report by a Family Centre worker records that the parents' commitment was superficial and they had no insight into why advice was being offered. This worker felt that change would not happen without priority being given to the children's needs. They identified a poor standard of hygiene during Megan's early childhood and that parenting support was needed.

Megan's mother did not take her to the MEND programme at this time, or following subsequent referrals.

The community health records indicate that there was a pattern of non-attendance of Megan at appointments often Megan did not attend appointments (DNA) offered by the school nurse, as she was absent from school on the days of the appointments.

There appears to be an acceptance that Megan's mother would take reasonable action to take her daughter to the GP.

Professionals observed the house to be cold and there was no heating or hot water. This assessment identified patterns of no sustained improvements when services ended.

9.7.3.5 What are the strengths/ protective factors?

The school Megan attends works proactively to develop friendship groups for Megan. The school also developed excellent working relationships with the Health Improvement Practitioner (HIP), part of the school nursing team, who worked with Megan on her personal health and relationship issues.

9.7.4 Vignette 4 - 2016 - Baby E

Referrer details						
Name	Rebecca Michaels	Role/Agency/Team/Department	Hospital Midwife			
Child's details (Please complete Section 1b for further children). Please gather this information if not known.						
Name of Child	Danso Abeasi	Religion	Christian	Ethnicity	Black African	
Date of Birth		Age		Gender	Female	
Education Provider/ Employer	N/A	Does the Child have a disability?	No	State diagnosis if known and any SEN statement if known	NA	
Own Agency reference number	HS244A	Does the Child Education, Health and Care Plan?	No			
Siblings and other related children's details						
Child's full name	DoB or EDD	Gender	Relationship to child referred	Ethnic Origin	Mother's Full Name	Father's Full Name
Gharam Gbeho	8	Male	Sibling	Black	Oheama	Kareem

Appendices

				African	Assan	Gbeho
Hilal Gbeho	7	Male	Sibling	Black African	Oheama Assan	Kareem Gbeho
Danso Abeasi		Female		Black African	Oheama Assan	Kojo Abeasi
Other significant adults details						
Adult's full name	Age	Gender	Relationship to child referred?	Ethnic Origin		
Oheama Assan	32	Female	Mother	Black African		
Kojo Abeasi	34	Male	Father of Danso	Black African		
Kareem Gbeho	NK	Male	Father of Hilal and Gharam	Black African		
Afi Assan	NK	Female	Maternal Grandmother	Black African		
Ekow Assan	NK	Male	Maternal Grandfather	Black African		
Reasons for referral						
What are you and/or	Danso was born yesterday, three weeks prematurely. Concerns are raised by the hospital Midwife in					

the family concerned about?	relation to Oheama falling asleep when feeding the baby and needing to be prompted to initiate these feeds.
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9.7.4.1 Development of referred child

There are concerns around the use of drugs of Ohema. The mother has failed to take up ante-natal care despite of concerns regarding her alcohol or substance abuse which is thought to be affecting the health of the expected baby.

9.7.4.2 Background

Children's Services records indicate the mother and the father of the older two siblings separated in 2007 as a result of physical assaults on Ohema, but Kareem appears to have remained in contact with Ohema and has had some contact with his children.

In August 2012, the two older children were involved in the deliberate death of a kitten. The police sent a Child Concern Notification (September 2014) to Children's Services. Following a visit the home conditions were considered to be satisfactory and Ohema said she was not taking drugs and she and her [new] partner only drank alcohol on special occasions. Ohema said she was well supported by family members.

School staff reported concerns about the children's behaviour and describe an incident where Gharam had claimed to have teeth knocked out by Hilal. This was backed up by bruises to body and eyes. School had concerns about the children being hungry, poor school attendance and lack of engagement with Ohema,

9.7.4.3 Involvement of other services

Over the last three years, Police, Probation and the Community Midwife all contacted, or made referrals to Children's Services to highlight their concerns about the children in the family. In response to these, two Initial Assessments were undertaken by Children's Services between 2008 and 2011 but these did not lead to any support or intervention.

In March 2012, a Midwife made a referral to Children's Services expressing concerns about Ohema's drug use during her 2nd pregnancy and referring to GB's recent discharge from hospital.

9.7.4.4 Parental/ carer capacity

Professional concerns include parental substance misuse, poor school

attendance and the behaviour of the two eldest children.

Kojo has a history of ongoing medical issues including mental ill health and alcohol and drug dependency. He has also a series of convictions for violent offences.

Between 2007 and 2012, the children received variable care from their parents; their lives were affected by exposure to their father's depressive episodes and severe mental health problems and they heard and witnessed violent outbursts.

At the end of the Summer Term 2012, despite the children attending school with bruises and conflicting stories about how they were sustained and with previous evidence of neglectful care (hungry and poorly clad in cold weather).

The children experience poor quality care within their family. Ohema has not been keeping medical appointments and continued to take drugs through the pregnancies of Hilal and Danso.

Concerns had been raised several times over a five-year period about domestic violence in the home, drug and alcohol abuse and the significant mental illness of Kareem, the father of the eldest siblings.

There were no safeguarding records in respect of Gharam or Hilal, yet notes held by a Teacher documented several concerns; the dead kitten; bruising to eyes and thighs of Hilal; 4 month old baby with nose bleed after falling from bed after being placed there by Gharam; the children often arriving late to school and being hungry.

School had evidence of poor school attendance, children being hungry and inappropriately dressed but none of these, together with the reported injuries were seen in the context of neglect.

9.7.4.5 What are the strengths/ protective factors?

None recorded.

9.7.5 Vignette 5 - 2016 - Naina

Referrer details						
Name	Mike Barnett	Role/Agency/Team/Department	Hospital Safeguarding Nurse			
Child's details (Please complete Section 1b for further children). Please gather this information if not known.						
Name of Child	Naina Dhariawal	Religion	Muslim	Ethnicity	Pakistani	
Date of Birth	03.04.2018	Age	1 year	Gender	Female	
Education Provider/ Employer	NA	Does the Child have a disability?	No	State diagnosis if known and any SEN statement if known	NA	
Own Agency reference number	W3234T6	Does the Child have an Education, Health and Care Plan?	NO			
Siblings and other related children's details						
Child's full name	DoB or EDD	Gender	Relationship to child referred	Ethnic Origin	Mother's Full Name	Father's Full Name
Sara Dhariawal	15.4.2012	Female	Sister	Pakistani		

Other significant adults details					
Adult's full name	DoB	Gender	Relationship to child referred?	Ethnic Origin	
Javeria Dhariawal	24	Female	Mother	Pakistani	
Abbas Dhariawal	25	Male	Father	Pakistani	
Nasreen Dhariawal			Paternal Grandmother		
Reasons for referral					
What are you and/or the family concerned about?	Naina was born in March last year. Today she was taken to hospital where she was found to have bruising to her body and a transverse fracture of her left femur; these injuries were considered to be non-accidental.				

9.7.5.1 Development of referred child

Naina is the second child of her Parents. Her parents struggled to care for her since she was born. Naina's early experience has been difficult. Although they made an effort at times they are not providing consistent safe care. Most of the child health appointments for Naina were missed or cancelled by the family, her immunisations are not up to date and Naina is living in poor home conditions for much of the time. Grandmother seemed to have found Naina particularly difficult. Naina was described as crying all the time both day and night. The Health Visitor recorded that Naina was not smiling and not happy or content.

9.7.5.2 Background

Mother seems to have had a series of difficult experiences in her life, including being subjected to domestic violence and suffering depression. Her own Mother died in 2011 but she kept in contact with her Father. Her relationship with Naina's Father included a period of separation for over a year when he asked her to leave their home.

Javeria and Abbas appear to have been in a relationship since 2010. Early in their relationship Javeria had a miscarriage at 20 weeks – both she and Abbas were clearly distressed about this. In 2012, they had Sara and initially managed well with her care.

Sara missed her nine-month development check and her immunisations. At the beginning of 2014, the Health Visitor was having difficulty in seeing Sara and there was a concern that she had some developmental delay; there were fifteen missed appointments. When Sara was seen, the house was damp and smelt of smoke; Sara had nappy rash and was not able to walk unaided.

Father decided that the couple should separate and Javeria left with the baby in April 2013. Mother and Sara were found temporary housing Javeria was rehoused in May 2013. Javeria was now in a new home but there were no carpets and there was a great deal of rubbish around.

In 2017 Javeria and Abbas were reconciled, but living apart and Javeria was 20 weeks pregnant with Naina.

9.7.5.3 Involvement of other services

The Health Visitor made a referral to the Paediatrician as there were some

concerns about Sara's development. A Family Support Worker started working with the family and a CAF was completed. Several Team around the Child/Family meetings were held from May to December 2014. Despite efforts to engage Javeria she did not respond and missed many appointments. The Paediatrician saw Sara in Summer 2014 when she found her to be developmentally delayed and under-stimulated; Sara was also not registered with a GP. During 2014, the family continued to miss appointments.

Both the Midwives and the Health Visitor struggled to get access to Mother and Naina.

9.7.5.4 Parental/ carer capacity

The children were living with Paternal Grandmother from February to August 2018. Grandmother struggled to look after the children – not least because there were already two other grand-children under four years in the household for whom she was responsible as a Special Guardian.

Mother did not engage with much of the professional help and support which was offered to her for the children. She smoked throughout her pregnancies. She was largely unsupported and her care of the children was inconsistent and did not meet their needs fully.

A few months after Naina's birth, Mother had two black eyes which she explained away as having been caused by the baby. After Naina's birth, Mother was diagnosed with a life threatening health issue which undoubtedly affected her capacity to look after the children. She did not always accept treatment and missed essential medical treatment and several other appointments.

After her separation from the Father, mother became increasingly difficult to engage which resulted in the children not receiving the health care they needed. Professionals sought to gain her confidence and to provide her with support but she avoided health appointments and did not fully engage with professionals. When spoken to she seemed to be coherent, cooperative and stated she was coping – even when she was really ill.

Father attended the antenatal booking appointment for Sara but not for Naina. He had very little contact with the professionals who were involved with Naina. Father and Mother both took Sara to nursery school and he was involved to

some degree with the care of the children.

9.7.5.5 What are the strengths/ protective factors?

Even though the paternal grandmother has struggled to look after all of her grandchildren at once she is committed to play an important part in the upbringing of Naina and Sara.