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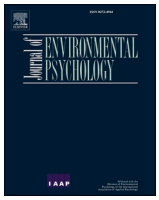

A thematic synthesis of the experiences and perceptions of everyday wayfinding

Victoria Goldenberg [a,*], Jan Wiener [a], Chantel Cox [b], Doug Hardman [a]

[a] School of Psychology, Bournemouth University, UK
[b] Faculty of Health, Environment and Medical Sciences, Bournemouth University, UK

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ABSTRACT

Wayfinding is an important everyday activity, which can be conceived as a dynamic process of spatial problem solving. Existing research has significantly increased our understanding of the underlying mechanisms of wayfinding but has necessarily minimised the importance of ecological factors. Therefore, in this study we conducted a thematic synthesis of 54 articles, investigating an important yet minimised factor: the experiences and perceptions of wayfinding in everyday settings. Our findings suggest that people's experiences and perceptions are an integral part of everyday wayfinding, which manifests most explicitly in how landmarks are selected and utilised, how individuals' wayfinding experiences and strategies are idiosyncratic, and how wayfinding can be conceived as a dynamic, collective and socially-situated activity. These findings, we suggest, can act as a catalyst for an expansion of wayfinding research towards more ecologically sound approaches with diverse methodologies.

1. Introduction

Wayfinding – the planning and decision-making involved in the execution of a route from point A to point B – is an important everyday activity, which can be conceived as a dynamic process of spatial problem solving (Arthur & Passini, 2002). The concept of wayfinding is commonly conceived as situated under an umbrella term of spatial cognition – how people perceive and represent spatial information (Shah & Miyake, 2005). Instances of wayfinding occur regularly in peoples' lives, such as when making a daily commute to work, learning and finding one's way in a new environment, or searching for a specific location inside an unfamiliar building. Wayfinding is a complex cognitive activity involving multimodal sensory inputs, reasoning, transient and enduring spatial memories, and imagination (Wolbers & Hegarty, 2010).

Montello (2005) defines wayfinding as one of two components of the broader concept of spatial navigation, with the other, locomotion, referring to the coordinated bodily movement through space in response to sensorimotor input (steering, obstacle avoidance, etc.). Although in most cases of navigation wayfinding and locomotion constitute an integrated system, wayfinding refers specifically to aspects of navigation involving decision-making and planning. The importance of wayfinding is particularly evident when it goes wrong, consequently causing stress, frustration and even isolation (Aguirre & Esposito, 1999; Arthur & Passini, 2002; Miller et al., 2017; Miller & Lewis, 2000).

Wayfinding can be further categorised into aided wayfinding (involving signage, maps and other navigation assistance), and unaided wayfinding (involving no assistance). The latter includes both undirected wayfinding (e.g., exploration, roaming, cruising, etc.) and directed wayfinding, which subsumes search and target approximation (Wiener et al., 2009). Although much navigation research has focussed on unaided wayfinding – in part because it has traditionally been conceived as more cognitively demanding and is easier to align with animal models of spatial cognition – aided wayfinding is the increasingly dominant paradigm of everyday wayfinding. In any case, many important wayfinding processes and mechanisms are integral to both aided and unaided wayfinding.

The two main navigation mechanisms are path integration and landmark-based navigation. Path integration refers to the process of keeping track of position and orientation during travel, by continuous integration of perceived self-motion which supports learning the layout of unfamiliar environments (Anastasiou et al., 2023; McNaughton et al., 2006). In landmark-based navigation, by contrast, spatial orientation is informed by identifiable and salient features in the environment (Chan

* Corresponding author. School of Psychology, Talbot Campus, Bournemouth University, Fern Barrow, Poole, BH12 5BB, UK.
E-mail address: vgoldenberg@bournemouth.ac.uk (V. Goldenberg).

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et al., 2012). Landmarks serve as reference points and navigational aids, which support determining location and the effective movement through complex environments (Waller & Lippa, 2007).

Existing wayfinding research has significantly increased our understanding of the underlying neural and psychological mechanisms of wayfinding (Burgess, 2008; Coutrot et al., 2018; Epstein et al., 2017; Hegarty et al., 2006; Lester et al., 2017; Maguire et al., 2006; Spiers et al., 2023; Spiers & Maguire, 2006). In addition, there has been substantial research on the impact of individual differences on wayfinding (and spatial cognition more generally). Such research has largely been conducted using traditional testing paradigms, such as pen and pencil tests (Hegarty & Waller, 2005), computer-based tests (van der Ham et al., 2020), and virtual reality (Coutrot et al., 2018). Such paradigms have the advantage of testing large populations and exploring purportedly generalisable factors of spatial cognition performance. These methods are argued to be ecologically valid and similar to performance in real life (Coutrot et al., 2019). However, evidence from studies comparing wayfinding using screen-based tests (no proprioceptive feedback) with immersive virtual reality (allowing free movement), demonstrated significant differences in participants' performance (Hill et al., 2024; Iggena et al., 2023). This suggests that the different methodologies are not entirely interchangeable and thus raises questions about how individual differences in wayfinding manifest in the real-life settings where wayfinding actually occurs.

More broadly, although the dominance of extant wayfinding research – largely laboratory and virtual reality based – has been integral to the development of the field, it has necessarily minimised the impact and importance of a series of ecological factors, which are crucial for understanding everyday wayfinding. Namely, the role of personal experiences (Newcombe et al., 2023), other people (Dalton et al., 2019; Symonds et al., 2017), cultural differences (Singer & Bickel, 2015), specific environments and niches (Heft, 2013), and the dynamic interaction of these factors (Hutchins, 1995a).

Despite the dominant focus of extant wayfinding research on underlying neural and psychological mechanisms, and population level individual differences, there is a not insubstantial body of more ecologically oriented research that focusses on the important ecological factors that go beyond such an individualistic focus. For example, a study of wayfinding in a nursing home for people with Alzheimer's disease highlights a disparity between residents' and staff's use of a reference point – a wall clock – as a wayfinding aid (Passini et al., 2000). Another mixed method study assessing wayfinding in a hospital highlights that while most hospital visitors reported hospital signage being easy to follow, over half of new and a third of returning hospital visitors still asked for verbal directions (Ford et al., 2020). Most famously, Hutchins' (1995a) study of naval navigation found that the processes involved in wayfinding were best understood as distributed across material artifacts, the environment and even other people. In other words, Hutchins' research suggests that there are not necessarily underlying wayfinding processes that can be specified and abstracted from their natural setting in order to be studied in the laboratory, but that the specific natural setting is *integral to* the very processes and strategies themselves. This account is further supported by a recent study in which an extant laboratory search task was recreated in a real-world setting (Alcock et al., 2024). Results of this study suggest that search behaviour is critically dependent on environmental features and that the simplistic search strategies that manifest in a laboratory (or simplistic virtual reality) setting do not translate directly to the real world. Ecologically oriented studies such as these highlight the problem that, given the specific environment is so integral to wayfinding processes and strategies, the assumption that we can abstract from this and study wayfinding solely in the laboratory is questionable.

Although there is an increasing, albeit still marginal, body of ecologically oriented research on wayfinding, what is currently lacking are overviews and syntheses of such research. Therefore, in this study we conducted a synthesis of research on one important yet minimised factor: the experiences and perceptions of the processes and strategies of wayfinding in everyday settings. Such everyday settings include realistic wayfinding tasks people engage in throughout their lifespan (e.g. going to school and work, visiting shops and restaurants, going for a hike or a cycle ride, etc.) as opposed to minimalist, computer-based exercises conducted in a psychology laboratory.

Given the conceptual and methodological diversity of such literature, we conducted an abductive mixed-research synthesis, in which findings from both qualitative and mixed-method studies are qualitatively synthesised into a coherent interpretation (Pluye & Hong, 2014; Sandelowski et al., 2012). Our synthesis was guided by the following research question: what are people's experiences and perceptions of wayfinding in everyday settings? Our aims are to: synthesise existing knowledge on the personal experiences and perceptions of everyday wayfinding; understand the processes, expectations, and strategies involved in everyday wayfinding; understand the barriers to and facilitators for everyday wayfinding practices; and develop guidance on future directions in wayfinding research.

2. Methods

An abductive mixed-research synthesis follows the principle of research synthesis by configuration (Pluye & Hong, 2014; Sandelowski et al., 2012). As such, rather than grouping and aggregating the findings from the studies included in the review, diverse findings are developed into new and coherent narratives, which can help to answer the research question (Hardman & Bishop, 2018). This theoretical stance was best suited for our review, due to both the methodological heterogeneity of relevant studies and the conceptual disagreement in current wayfinding research. Although within an abductive approach to synthesis, preregistration has questionable epistemological sense, the protocol for this review was nonetheless developed according to the PRISMA statement and is preregistered on OSF.

2.1. Methodology

Given the breadth of our research question and the heterogeneous nature of everyday wayfinding practices, we operationalised our mixed-research synthesis using the methodology of thematic synthesis. Thematic synthesis was developed as a methodology for synthesizing qualitative research studies in a systematic and rigorous way, while also being flexible enough to be applied to studies with diverse methodologies (Thomas & Harden, 2008). As Thorne et al. (2004) note, such a synthesis, unlike a traditional narrative review, entails integrations of the underlying studies that go beyond them to offer novel interpretations of findings. Since its development, thematic synthesis has been widely used in a range of disciplines, including healthcare, social sciences, and education, and has been recognised as a valuable approach both for synthesizing qualitative research and in mixed-research syntheses.

Table 1
Inclusion and exclusion criteria.

	Inclusion criteria	Exclusion criteria
Population	Human participants (healthy and with pathologies, no age restrictions).	Humans with visual impairments, animals.
Phenomena of interest	Lived experiences and perceptions of wayfinding or spatial navigation.	Technology testing.
Context	Wayfinding on land. Wayfinding in everyday settings.	Specialised navigation, e.g. sailing; piloting aircraft. Laboratory settings.
Study design	Qualitative or mixed methods.	Grey literature.

2.2. Inclusion and exclusion criteria

Inclusion and exclusion criteria are summarised in Table 1, using the PICO framework adapted for qualitative synthesis whereby "**I**" stands for "area of **I**nterest" rather than "intervention" (Hosseini et al., 2024). We excluded grey literature and focused only on published peer-reviewed studies with an intent to maintain quality. Additionally, only articles published in English were included.

2.3. Search strategy

Systematic literature searches, with no date limits, were conducted in November 2025. Our overall strategy reflects guidance on literature searching for qualitative syntheses (Dixon-Woods et al., 2005; Thomas & Harden, 2008). We searched four specialised and general electronic databases relevant for answering the research question – SCOPUS, PsychInfo, MEDLINE, Art & Architecture Complete, and Web of Science – using the following search terms: ("qualitative research" or "qualitative study" or "qualitative method" or interview or ethnography or "thematic analysis" or "focus group" or "participant observation" or "grounded theory" or "discourse analysis" or phenomenology AND wayfinding or "spatial orientation" or "route learning" or "spatial navigation" or "navigational strategy" or "topographical memory" or "place learning" or "spatial cognition" or "spatial disorientation").[1] We used truncation to include variations in endings and spelling. The electronic database searches were supplemented by four additional techniques: citation chaining (scanning reference lists of key sources); forward chaining (searching for more recent research which cited a relevant source); key author searches (scanning the list of all publications by a key author); and seeking expert opinion.

2.4. Screening and selection

After removing duplicates using the in-built function of NVivo Pro 20 (Release 1.6), all studies were screened by title and abstract by the lead reviewer (VG), with secondary reviewers (JW, CC and DH) each screening a 10 % sample. Suitable studies were then screened by full text, using the same approach. To ensure the reliability of the screening and selection process, all reviewers discussed decisions during regular meetings and resolved any disagreements.

2.5. Quality assessment

Studies were assessed using the 2018 version of the Mixed Method Appraisal Tool (MMAT) (Nha Hong et al., 2018), since the review included both qualitative and mixed method studies. In line with best-practice for qualitative syntheses, we did not exclude studies based on the quality assessment but integrated the results into the analysis (Boland et al., 2017; Tong et al., 2012).

2.6. Data extraction

VG extracted the following study characteristics of all included papers: author, year of publication, setting, participants, method of data collection, aims, and main findings.

2.7. Analysis and synthesis

We used an abductive approach to data analysis, whereby the reviewers aim to answer the research question by inferring the best possible explanation based on the existing data (Hardman & Bishop, 2018; Richardson & Kramer, 2006). The core techniques of thematic synthesis are inherited from meta-ethnography and grounded theory, such as the iterative approach to data analysis and the concepts of second and third level constructs. Primary data in their raw form, which are unavailable to reviewers, are considered the first level construct. Primary data in published studies, which has already been selectively presented, and the original authors interpretations of such data are together considered the second level construct, insofar as this represents the authors' interpretation; this is where our analysis is directed (Hardman & Bishop, 2018). The third level construct is our abductive analysis and synthesis, which takes the review beyond the findings of its constituent studies (Barnett-Page & Thomas, 2009; Thomas & Harden, 2008).

Data analysis was conducted primarily by VG, using NVivo Pro 20 (Release 1.6), with frequent discussions of the findings with the research team. Data synthesis occurred in three stages as proposed by Thomas and Harden (2008). First, *line-by-line coding*, wherein the findings from the studies under review were coded and annotated line by line. Second, *creating descriptive themes*, wherein the initial codes were analysed for meaning, enabling us to group them together and create a hierarchy of codes. Third, *creating analytical themes*, wherein the descriptive themes were analysed and discussed by the research team to develop overarching themes and lines-of-argument to answer the research question.

3. Results

3.1. Searches

Search results are presented in a PRISMA flowchart (Page et al., 2021), in Fig. 1.

3.2. Study characteristics

The characteristics of the studies under review are presented in Table 2 (for the full version of the table including main findings see Appendix 2: Expanded study characteristics). The review included 54 articles from 19 countries. The articles were published between 1983 and 2025. In total, 1882 participants were included across the studies. A significant subset of articles focused on older participants' wayfinding in various settings: seven articles involved people living with different stages of dementia, six additional studies involved older adults as participants. Twenty seven out of 54 studies investigated wayfinding indoors (libraries, hospitals, care homes, and university campuses) with the remaining 18 investigating built environments (urban, suburban and rural).

3.3. Quality assessment

The results of the quality assessment were variable (see Appendix 1). Although most studies were well designed and executed, some had unrepresentative samples, inappropriate data analysis or a lack of discussion of primary qualitative data.

3.4. Review findings

Four main themes and twelve sub-themes were developed during the analysis of the included studies (see Table 3). The first theme, *experiencing landmarks,* highlights the role of objects and sites in people's everyday wayfinding. The second theme, *repetitive design,* explicates perceptions and expectations of the repetition of environmental features and design principles in the environment, and the circumstances in which repetition can be helpful or disorienting. The third theme, *it's all Greek to me,* foregrounds people's inability to use existing wayfinding systems and aids due to a lack of key underlying knowledge. The last

[1] Although the terms "wayfinding" and "navigation" are often used interchangeably, we decided to not include the term "navigation" on its own as a search term. This was due to the term being used in multiple contexts apart from "spatial navigation", such as navigation of websites or navigation of healthcare systems.

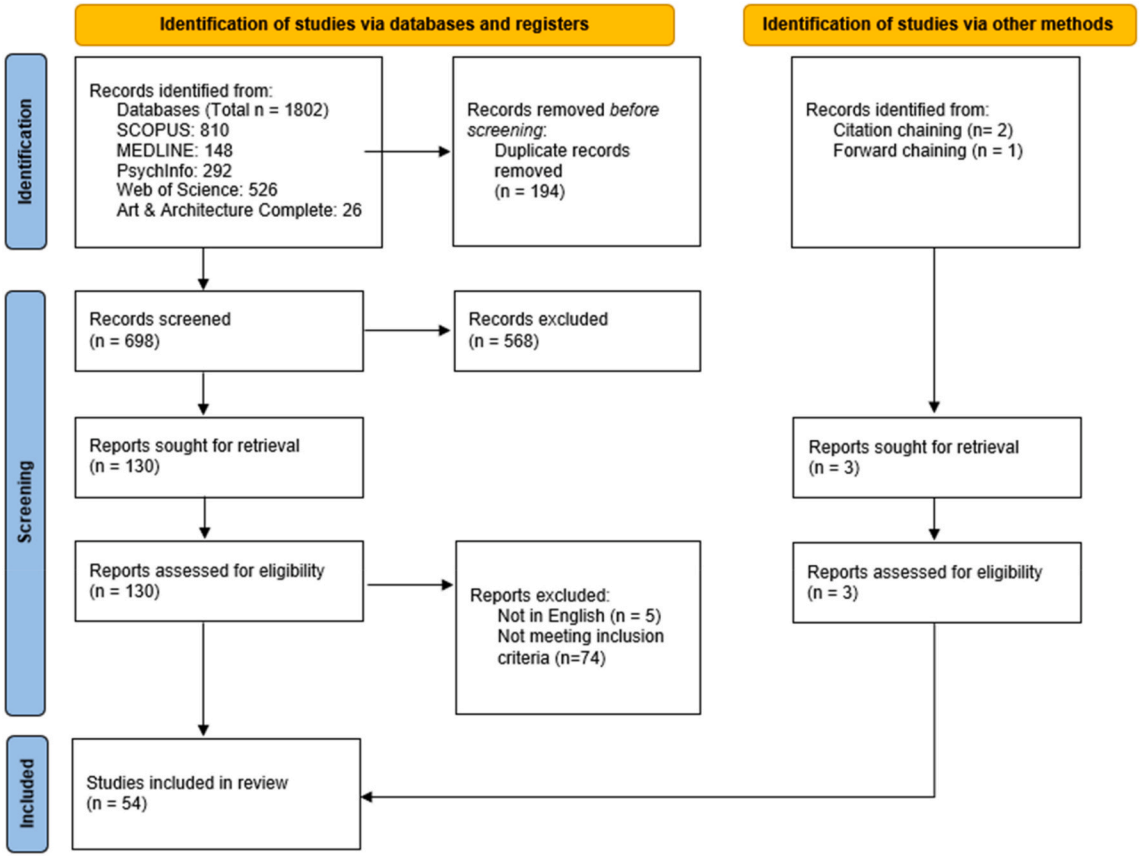

Fig. 1. PRISMA flowchart.

theme, *people as a wayfinding strategy,* addresses the role other people play in approaches to wayfinding.

3.4.1. *Experiencing landmarks*

The first main theme highlights the importance of landmarks in spatial navigation. Within this main theme, three sub-themes were developed: *an imperative aspect of navigation*, *emotive effects*, and *social history*.

3.4.1.1. An imperative aspect of navigation. Landmarks play a key role in spatial orientation and wayfinding, regardless of age and ability. Therefore, it was unsurprising that participants living with various disabilities *"emphasised landmarks as imperative aspects of their navigation"* (Gupta et al., 2020, p. 7). In a large and confusing environment, such as a hospital, landmarks are used as hubs for navigation, helping users to establish or confirm their bearings (Hughes et al., 2015).

A strategy mentioned both by younger and older participants consisted of remembering a sequence of landmarks along the sections of a route, as a way of recalling a known route or learning a new one (Biglieri & Dean, 2022; Gerber & Kwan, 1994; Marquez et al., 2017; O'Malley et al., 2018; Passini et al., 2000; Silva et al., 2019a, Silva et al., 2019b; Spencer & Darvizeh, 1983). For example, in two studies, the younger participants (10-12-year-old schoolchildren) represented their commute from home to school in their drawings as a string of individual landmarks such as buildings, bridges, trees, and traffic often connected by roads (Silva et al., 2019a, Silva et al., 2019b). Similarly, 12-year-old boys navigating a route in a semi-familiar environment relied heavily on their knowledge of local landmarks like the park and the school (Gerber & Kwan, 1994). Finally, nursery aged children in Iran and the UK described and walked a familiar route using well-known landmarks: *"We go down this way (gesture); cross the road; then turn down past the hospital, to the steps by the tank where we saw-a white car. Then there is the church"* (Spencer & Darvizeh, 1983, p. 28). In a similar vein, older participants living with dementia, also relied on following strings of landmarks acting *"like beacons, showing the way home"* (Biglieri & Dean, 2022, p. 10), demonstrating the important role of landmarks at different stages of life and cognitive capacity.

Some studies also showed that landmarks are a helpful reminder to maintain or change direction of one's route (O'Malley et al., 2022; Yu, 2025), or to underpin instructions to direct others, such as mentioning a piece of art placed in an otherwise monotonous hospital environment: *"Turn at the polar bear picture*" (Brown et al., 1997, p. 43).

Beyond the functional use of landmarks, objects and locations that people considered to be landmarks could vary greatly in their permanence and uniqueness. For example, one participant relied on a river's permanence saying, *"You can't go wrong with a river. They don't move. […] wonderful landmark"* (Biglieri & Dean, 2022, p. 10), whereas others relied on impermanent landmarks and reference points in their navigation, such as interesting front gardens (Biglieri & Dean, 2022), or even *"people sitting on street corners, potholes and cows"* used by the locals to support wayfinding in India (Ahmed, 2015).

Finally, in some studies included in the review, landmarks were shown to be used efficiently in conjunction with a map to find one's correct position and orientation. For example, 12-year-old students who *"oriented their map by these landmarks"* (Gerber & Kwan, 1994, p. 274). Similarly, an adult student in an orienteering club noted that they *"spotted a dotted line on the map; therefore, I expect to come across a ditch on the right […] and there bing! I see the ditch in the terrain"* (Mottet et al., 2016, p. 231).

3.4.1.2. Emotive effects. Mundane and ordinary parts of the environment are sometimes perceived as landmarks due to their emotional context, which manifested in a number of different studies included in the review. For example, an older participant living with dementia

Table 2
Characteristics of eligible studies.

No	Source article	Setting	Participants (n)	Methods of data collection	Aims	Main findings related to wayfinding experiences
1	Ahmed (2015) India	Outdoor (built environments); familiar.	Delivery personnel, drivers, repair technicians (15)	Interviews	To understand wayfinding habits, use of existing solutions and conditions under which these have failed.	Knowing who to ask for directions and who to trust is very important as it is the main/preferred navigational strategy.
2	Ahmed et al. (2022) Nigeria	Indoor (hospital); familiar	Quantitative (98) Qualitative (24)	Questionnaire; semi-structured interviews	To investigate the impact and barriers of visual accessibility on wayfinding in hospital buildings.	Wayfinding in hospital is supported by appropriate signage, lighting and visibility; while crowded corridors were perceived as barriers.
3	Alcock et al. (2024) UK	Outdoor (built up area), unfamiliar	Students (36)	Experiment; walking interview	To explore the cognitive strategies and environmental factors involved in searching for targets in an unfamiliar and complex real-world environment.	Searching in complex real-world settings depends on an interplay of different search strategies and the situations in which they are deployed; presence of other people and aesthetic considerations are importantly entangled with the process of searching
4	Almeida and Tidal (2022) USA	Indoor (library); unfamiliar	ESOL (English as second language) students (12)	Wayfinding task with think aloud protocol; Web screen capture; video and audio capture; interview.	To explore wayfinding obstacles of ESOL students.	Inconsistent terminology and lack of information literacy and familiarity with the library were wayfinding obstacle for ESOL students. Participants tended to prefer asking other students or library assistants for help rather than librarians.
5	Bedi and Webb (2017) Canada	Indoor (library); un/familiar	Students (27)	Photo-elicitation interview	To investigate user experiences in library spaces.	Inconsistent terminology, design of signage and library jargon are barriers in library wayfinding. Library users feel awkward asking for help.
6	Biglieri and Dean (2022) Canada	Outdoor (suburban); familiar	People living with dementia (7)	Walk-along interviews; GPS tracking diary	To explore environment barriers and supports to mobility in familiar neighbourhoods for people living with dementia.	People with different diagnoses had largely similar wayfinding experiences with encountered landmarks described as wayfinding enablers. Increased safety and comfort concerns when crossing busy roads.
7	Brown et al. (1997) USA	Indoor (hospital); familiar	Hospital staff (66) Visitors (47); Inpatients (11); parents (3).	Interviews; diaries; observations; traces; cognitive maps.	To assess how often the staff were asked for directions, their attitude to direction-giving and suggestions for improvement.	Hospital staff reported being asked very often for directions which was distracting, while hospital floor plan was very complex and difficult to navigate. Hospital architects and administrators need help seeing the facilities through the visitors' eyes.
8	Buuren et al. (2025) Netherlands	Indoor (nursing home corridors), familiar	Elderly people with dementia (8)	Observation, behavioural mapping	To describe wayfinding behavioural patterns of people with advanced stages of dementia just walking in two nursing home corridors.	The most frequent wayfinding behavioural patterns observed were “movements” followed by “looking at”, “stops on the route”, and “verbal navigational cues”.
9	Caspi (2014) USA	Indoor/outdoor (assisted living residence); familiar	Assisted living residents (12) Staff members (13)	Observation of residents; semi-structured interviews with staff	To describe the spectrum of spatial disorientation and wayfinding difficulties experienced by residents with Alzheimer's disease and related dementias in assisted living residences.	People with ADRD have profound difficulties reaching destinations including their own rooms. All staff members, irrespective of their specialty, directed and led residents to their destination.
10	Chee (2023) Malasia	Indoor (senior living facilities), familiar	Older adults (28, 14 male)	Semi-structured interviews, observations	To explore the lived experiences of older adults coping with spatial disorientation and wayfinding in senior living facilities.	Effective wayfinding and orientation cues in a senior living facility could help older adults maintain independence and control over their lives.
11	Everhart and Escobar (2018) USA	Indoor (library); un/familiar	Male students (2)	Video observation (GoPro camera); think aloud protocol; and retrospective think aloud protocol.	To investigate supports and services academic libraries currently provide that assist patrons on the autistic spectrum.	Students' use of prior knowledge, signage and maps, library website and asking library staff were both enablers and barriers in their library navigation.
12	Faith et al. (2015) UK (NI)	Indoor (care home); familiar	Care home residents (14)	Observation, video observation, semi-structured interviews; descriptive quantitative data	To explore the role of the design of the physical environment in supporting wayfinding for people with dementia.	Wayfinding is assisted by views of the outside spaces and distinctive interior design according to functionality of the room. Disorientation is caused by symmetric layouts and areas that appeared “restricted”.

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Table 2 (*continued*)

No	Source article	Setting	Participants (n)	Methods of data collection	Aims	Main findings related to wayfinding experiences
13	Ferri and Popp (2023) Germany	Outdoor/indoor (public transport); partially familiar	Munich residents (12)	Destination-Task activity; walk-along interviews; survey.	To examine navigational practices within public transit systems.	The more participants used mobile apps to navigate, the less they relied on physical wayfinding cues. Participants found it difficult to confirm their direction on a bus or overground train.
14	Findlay and Southwell (2004) UK	Outdoor (forest recreation sites), un/familiar	Adult forest visitors (68)	Semi-structured interviews, route analysis, signage audit	To consider whether users could find their way to recreational sites and locate useful wayfinding information at the site entrances.	Problems with wayfinding were more related to the context and location of sighs, rather than the materials and details of sign design.
15	Ford et al. (2020) UK	Indoor (hospital), un/familiar	Hospital users (329)	Questionnaire; mobile eye-tracking; semi-structured interviews	To explore the difficulties experienced in trying to navigate the Leicester Royal Infirmary; to make recommendations to improve the wayfinding experience.	Questionnaire and interview produced different/conflicting findings. Mobile eye-tracking study findings: overhead placement, bold font and contrasting colours of signage seem to be most effective.
16	Gerber and Kwan (1994) Australia	Outdoor (suburban environment); partially unfamiliar	Male students (16)	Observation; interviews	To investigate the approaches that a group of young Australian adolescents used to find their way around a prescribed suburban route using a map.	12-year-olds have a great variability in their navigational ability affecting the level of their independence. Landmarks were used more the weaker the knowledge of the environment and/or map reading skills.
17	Gupta et al. (2020) USA	Indoor/outdoor (urban), familiar	Older people and/or with various disabilities (27)	Semi-structured interviews	To examine the urban navigational experiences and preferences of individuals with different disabilities, both indoors and outdoors.	Many mobility needs and preferences were shared between people with diverse disabilities while some disability-specific needs are divergent and conflicting.
18	Hahn and Zitron (2011) USA	Indoor (library); partially familiar	First-year students (16)	Observation; think-aloud protocol; interviews.	To identify what exactly helps students find items in the library, and what are the fail points in navigating to the location of books on the shelf after they have a call number.	Library jargon (e.g. call number) is not clear to the students. Asking for librarians' help was not straightforward for some students.
19	Heward et al. (2022) UK	Indoor/outdoor (care home); familiar	Care home managers (12)	Semi-structured interviews	To explore care home managers' perceptions and experiences of supporting the orientation and navigation of residents living with dementia.	Care home managers are aware of the many spatial and reality orientation challenges their residents experience. They mostly rely on instinct and experience in addressing residents' wayfinding needs.
20	Hughes et al. (2015) UK	Indoor (hospital); familiar	Hospital users (11)	Semi-structured interviews	To understand the environment in which a new wayfinding system must operate and the gaps in provision left by existing navigation aids.	Hospital users, and, consequently, their abilities and needs, are much more nuanced than just staff and patients. Among suggested solutions human helpers were mentioned by almost all participants while technology was only mentioned a couple of times.
21	Iftikhar and Luximon (2022) China	Outdoor (university campus); unfamiliar	Students (12)	Wayfinding task; interview.	To investigate the user's wayfinding behaviour in acquiring environmental information.	On a complex campus, participants found indoor signage more useful that outdoor. Participants struggled to match the digital map to the real world.
22	(Jamshidi & Pati, 2024), USA	Indoor (university campus)	Adults (11, 6 female, 18–33 years)	Think-aloud protocol, digital video recording	To determine the environmental elements and attributes that contribute to the wayfinding process indoors.	Environmental elements that contributed to wayfinding were landmarks, corridors, nodes, regions, stairs, central spaces, courtyards, entrances, connecting halls, voids, doors, interior windows, and outdoor views
23	Kevdzija (2022) Germany	Indoor/outdoor (hospital compound); un/familiar	Stroke patients (70)	Observation, interviews	To provide insights into stroke patients' real-life wayfinding behaviour in rehabilitation clinics.	Wayfinding challenges did not depend on mobility levels of the stroke patients. Asking staff for directions or retracing steps were the most frequent wayfinding strategies. Complexity and repetitive design likely enhanced wayfinding barriers.
24	Khotbehsara et al. (2023) Iran	Indoor (hospital); un/familiar	Adults (11, 5 male)	Semi-structured interviews; observation; space syntax analysis	To investigate the impact of the COVID-19 pandemic on hospital visitors' wayfinding procedure.	Visitors were significantly confused and hesitant throughout their wayfinding process. Spatial accessibility and legibility were not found to be adequate for facilitating the wayfinding of the visitors.

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Table 2 (*continued*)

No	Source article	Setting	Participants (n)	Methods of data collection	Aims	Main findings related to wayfinding experiences
25	Kinsley et al. (2016) USA	Indoor (library); unfamiliar	Library users (24)	Video ethnography; think aloud protocol; observation; debriefing survey.	To evaluate and improve how our users navigate library spaces.	Participants who received good quality help/instructions from library staff were the most successful in their library search. Library directory was not a popular of helpful tool to search for items. Improving signage was the most frequent improvement suggestion.
26	Kwon et al. (2025) USA	Indoor (university campus); unfamiliar	Students (24, 18–25 years)	Mobile eye tracking, concurrent think-aloud protocols, and schematic mapping	To examine visual attention patterns during predefined navigation tasks performed by first-time visitors.	Wayfinding effectiveness in unfamiliar environments depends on both cognitive efficiency and emotional comfort.
27	Mandel (2013) USA	Indoor (library); familiar	Library users (16)	Observation, document review, interviews.	To investigate library user wayfinding behaviour within the entry area of a medium-sized public library facility"	Library patrons had different trajectories while using the library. Whether they were alone or with a companion (e.g. a child) influenced their route. Observed behaviours differed from participants' own descriptions.
28	Mandel (2018) USA	Indoor (library); familiar	Library users (16)	Observation, document review, interviews.	Presenting selected findings from a multi-method case study into public library user wayfinding behaviour.	See Mandel, 2013.
29	Marquez et al. (2017) USA	Outdoor (built up area); familiar	Older adults (35)	Neighbourhood audit, in-person interviews, and community walks	To identify the strategies and wayfinding aids and cues preferred and utilised by a community of ethnically diverse older adults.	Highlighted the role of landmarks as wayfinding and orientation tools as well as relying on help from others in unfamiliar areas. Street name signs considered important for wayfinding.
30	Meurer et al. (2018) Germany	Outdoor (built up area); familiar	Young older adults (15)	Interviews	To identify everyday way-finding practices of older population and how they can these supported by mobility assistance ICTs.	Typical wayfinding practices of older adults are wayfinding towards familiar or unfamiliar places; ridesharing; special destinations; and favourite places. Discussing the options of using ICT to support older people's wayfinding.
31	Mohamad and Said (2018) Malaysia	Outdoor (built up area); un/familiar	Pedestrians (230)	Questionnaire, interviews	To identify the factors that influence pedestrian familiarity, familiar or unfamiliar, in their wayfinding.	Landmarks and other prominent elements in the built-up environment helped pedestrians recognise their location. Among the barriers were repetitive architectural design, approaching familiar locations from a new angle; landmarks that look similar.
32	Mottet et al. (2016) France	Outdoor (park); unfamiliar	Men (8)	Audio-visual record; self-confrontation interviews.	To characterize novice orienteers' location judgement.	Orienteers' main task is to continually establish if they are on the right track. More disoriented orienteers used the map and terrain features less and relied more on other features like their internal judgement of movement, previous experience, and compass.
33	Neil et al. (2019) Australia	Indoor (Hospital); unfamiliar	Patients (3)	Wayfinding interview; written document review.	To identify health literacy barriers and enablers from an Elective Surgery Access Unit (ESAU) consumer perspective.	Wayfinding-related barriers were limited parking, medical jargon on signage, unclear visual cues. Wayfinding enablers: distinctive pathways, identifiable reception point, verbal directions.
34	Noone (2021) Canada, UK, USA	Outdoor (built up areas); familiar	Not reported	Observation, interview	To investigate street-level wayfinding as an embodied information practice.	Pathways, transmitters, and markings are types of urban forms that help guide navigation.
35	Olsson et al. (2021) Sweden	Outdoor (built up environment); familiar	Individuals with Alzheimer's disease (5)	Walk-along observation and interview	To describe the wayfinding strategies of people with Alzheimer's disease during repeated outdoor walks.	Landmark use was the most popular wayfinding strategy as well as to stop and take time to think.
36	(O'Malley et al., 2018) UK	Indoor (retirement home); familiar	Older adults (13)	Semi-structured interviews	To explore the wayfinding experiences of older adults living in a communal retirement development, and to explore their design preferences.	Identified disorientation causes: repetitive design, long distance between locations, dissociation between the main building of the care home and the annex, having one's apartment a long way from communal areas.
37	O'Malley et al. (2022) UK	Indoor (retirement development); unfamiliar	Older adults (32)	Route learning task; open-ended survey.	To explore older adults' experiential accounts of navigating within an unfamiliar environment.	Healthy older adults were able to use a range of strategies and representations to learn a new route. Verbalising and using visual cues,

(*continued on next page*)

Table 2 (*continued*)

No	Source article	Setting	Participants (n)	Methods of data collection	Aims	Main findings related to wayfinding experiences
						such as landmarks and signage, were the most used strategies.
38	Passini et al. (2000) Canada	Indoor (nursing home); familiar	Staff members (10) Residents with Alzheimer's disease (6)	Interviews with staff; wayfinding experience of care home residents with AD	To identify wayfinding abilities as well as wayfinding difficulties in advanced dementia patients residing in a typical nursing home.	Staff's assessment of patients' mobility varied greatly. Even patients with severe deterioration were able to solve some wayfinding tasks. Elevator presented especial difficulty for people with AD. Architectural layout of the care home played a major role in wayfinding success.
39	Prescott et al. (2021) Canada	Outdoor (university campus); unfamiliar	Wheeled mobility device users (14)	Questionnaire, wheeling interview, video (GoPro), wayfinding skills test.	To improve our understanding of the challenges people using wheeled mobility devices face navigating the pedestrian environment.	Wheeled mobility device users have restricted access to visual cues due to lower height when sat down. Manual wheelchair users focus more on wayfaring which distracts them from wayfinding activities (e.g. maintaining orientation and heading).
40	Schmitt et al. (2019) Australia	Outdoor (urban, public transport); un/familiar	General public (30)	Semi-structured interviews	To understand the process of undertaking unfamiliar and familiar transit travel; and the process of habituation from unfamiliar to familiar route travel.	Lack of information about a new mode of transport/route causes stress. Consistent and reliable wayfinding attributes (like maps, signage and labelling, and on-board announcements) has a potential to reduce stress for new users of public transport. Drivers and conductors were valued for providing assistance.
41	Schulze (2021) Austria	Outdoor (built up areas); unfamiliar	Adults with a disability (5, 3 male, 32–62 years)	Interviews (online, moving, reflection)	To comprehend wheelchair navigation as an experience of moving through space.	For wheelchair users, in addition to wayfinding, accessibility of the route and road safety are major considerations during navigation.
42	Seetharaman et al. (2021) USA	Outdoor (urban); unfamiliar	People with mild-moderate dementia (5) Partners (5)	Focus groups; photovoice method; qualitative survey	To explore the saliency of neighbourhood landmarks from an emic perspective (i.e., through the insights of persons living with dementia).	Objects of public art and heritage structures are seen as salient landmarks due to their distinctiveness and meaningfulness, including personal and emotional significance.
43	Silva et al. (2019a) Portugal	Outdoor (urban); familiar	Children (70)	Drawings, survey, interviews	To explore children's perceptions of urban landscapes.	Children seem to be drawn to landmarks that are new, culturally meaningful, significant infrastructure and road safety elements, and ephemeral (ice-cream truck, traffic, the sun).
44	Silva et al. (2019b) Portugal	Outdoor (urban); familiar	Children (27)	Drawings, survey, interviews	To capture children's perceptions of mobility and wayfinding.	Children's representation of a map (drawing) is based heavily on depicting memorable landmarks and other environment features that are of personal interest to them.
45	Singer and Bickel (2015) Israel	Outdoor (urban); familiar	Residents of Jerusalem (34)	Mental maps; questionnaires with open and closed questions.	To explore how material and ideological forms of social exclusion manifest at the borders of Ultra-Orthodox Jewish neighborhoods in Jerusalem and play out in the walking patterns of surrounding (non-Ultra-Orthodox) populations.	The choice of routes depended on: participant's religion, what clothes the female participant wears (modesty); personal safety, previous incident of aggression towards the participant, the gender of the participant, the route being interesting or historically significant.
46	Singh et al. (2025) India	Indoor (train station); un/familiar	Adults (30, 17 male, average age 30 years)	Experiment, survey, interview	To identify and address the navigational challenges faced by passengers at Indian railway stations.	Poor signage and/or inability to read signage (due to illiteracy) were barriers to wayfinding while participants' education level had little impact.
47	Skagerlund et al. (2012) USA	Outdoor (university campus); unfamiliar	Adults (17, 8 female, 20–58 years old)	Experiment, observation, interview	To study how maps are used and how their use might differ depending on people's preferred navigation strategies	Participants with worse sense of direction avoided taking shortcuts and preferred straight lines; they tended to rotate the map to match their surroundings.
48	Spencer and Darvizeh (1983) Iran, UK	Outdoor (built up areas); familiar	Children (40, 3–5 years old)	Interviews, drawing tasks, route-finding task	To compare British and Iranian children's route knowledge of their local neighbourhood.	Iranian children and British children showed distinct stylistic differences in the ways they reported and represented these routes to a stranger.

(*continued on next page*)

Table 2 (*continued*)

No	Source article	Setting	Participants (n)	Methods of data collection	Aims	Main findings related to wayfinding experiences
49	van Lierop et al. (2020) Netherlands	Outdoor (rural/ urban); un/familiar	General public (12)	Observation, ride-along videos, semi-structured interviews.	To assess what kind of wayfinding signage is the most effective for cycle highway users in the Netherlands.	Signage for cyclists needs to be "bicycle scale": at eye height for cyclists; high contrast, easy to read font; placed in advance before the decision points.
50	Wattne et al. (2025) Norway	Outdoor (mixed); un/familiar	Adults (12, 3 male)	Observations, interviews, digital ethnography, surveys	To study the case of wayfinding and applicable navigation information and behaviours along the pilgrim paths.	Confirms the applicability of established wayfinding frameworks in the context of pilgrim paths.
51	Wozniak et al. (2025) Poland	Outdoor (built up areas); familiar	Adults (18, 20–42 years old, 7 male)	Walking task, in-depth interviews	To study configurational factors and urban elements impacting route choice behaviour.	Pedestrians' route decisions often depend on geometric and topological information, distribution of urban elements across the urban space, and dynamic elements, such as weather condition, time of day, crowd, noise, pedestrian traffic, and personal associations (emotions, past memories).
52	Yan (2025) Thailand	Outdoor/indoor (built up areas); familiar	Public transport users (120)	Interviews, think-aloud protocols, observational studies	To explore the complex interplay between psychological resilience and wayfinding behaviour in transit systems.	Psychological accessibility factors shape wayfinding performance more than the removal of physical barriers.
53	Yu (2025) China, Australia, Netherlands	Outdoor (parks); unfamiliar	Older adults with mild cognitive impairment (45)	Field observation, semi-structured interviews, and sensory mapping techniques	To explore how individuals with MCI perceive and respond to different sensory landscape features in real-world settings.	Participants perceived and responded most positively to sensory features that were emotionally familiar and spatially distinct; auditory and olfactory anchors most effectively supported navigation.
54	Zaugg et al. (2016) USA	Indoor (library); un/familiar	Students (43)	Video recordings of wayfinding tasks; interview; observation.	To identify key differences in the wayfinding strategies used by the novice and expert groups.	Previous experience is the most used wayfinding strategy in the library; while maps, signs and service desks were the most frequently used tools.

NB: The following articles derived from one study: Mandel (2013, 2018).

conceived of a monument in her community as *"a middle finger to the world. [It is about] living life to the [fullest and enjoying] every second that I've got left"* (Seetharaman et al., 2021, p. 1203).

Contrary to some extant definitions, landmarks may not be unique or universally meaningful but nevertheless carry a special meaning to the individuals using them. For example, a 10-year-old boy included a tree drawing on his map because *"I really like this tree. I find it fun because it has the shape of a pear …"* (Silva et al., 2019a), while a study participant chose a specific walking route *"because … it looked more interesting and colourful"* (Alcock et al., 2024, p. 15). A little family-owned restaurant may not be salient enough to be a landmark to an outsider, but for the locals who regularly meet there for community events, this restaurant is a special, memorable place (Marquez et al., 2017).

The emotive effects of landmarks also manifested when participants used photographs or pictures framed on a wall as landmarks for indoor wayfinding. In one example, residents of an assisted living development strongly preferred *"pictures which were taken in the local town as these were most meaningful to them"* (O'Malley et al., 2018, p. 1804) to pictures of abstract or impersonal nature which fail to resonate with their memories and emotions.

3.4.1.3. Social history. Landmarks, as objects of great familiarity and personal importance, also represent the passing of social history and the personal history associated with them. In one study, a girl who reproduced a mural of a blue whale in her 'mental map' picture

> … followed the progress of the painting as she passed by the artwork's location every day to get to school. The creative process of installing a piece of street art was embedded in her mobility and subsequent mental image. (Silva et al., 2019a, p. 764)

For a resident of the city of Jerusalem, appreciation of the history of her city led her to choose the historic walking route, despite the threat of aggression from local ultra-orthodox residents and visitors to the area. The woman said, *"I pick the routes that are pretty and interesting; if the route traverses a historical or ancient neighbourhood that's even better"*. In another example, a woman described the look of the trees lining her local walking route that she remembers from her past walks: *"the lovely trees … you know the ones that have such pretty leaves in the fall"* (Olsson et al., 2021, p. 510).

The emotive effect of landmarks was notably salient for older participants, who may struggle to orient when landmarks are replaced, instead having to learn to use new ones that appear in their place (Seetharaman et al., 2021). Even more troubling for older participants, some landmarks simply vanish, giving them an increasing feeling of being *"left out or like strangers to their own city"* (Meurer et al., 2018, p. 48).

3.4.2. Repetitive design

The second main theme explores the influence of environmental features which are either deliberately designed to be identical or simply appear to be similar. Within this main theme, three sub-themes were developed: *ambiguous and disorientating*, *logical and consistent*, and *meaningful spaces*.

3.4.2.1. Ambiguous and disorienting. Indoor environments are often comprised of symmetric or repetitive designs, which may be easier and more cost-effective to build but have elements that are difficult to distinguish; for example, identical corridors, repetitive decoration on different floors, or symmetric wings of the same building (Alcock et al., 2024; Faith et al., 2015; Kevdzija, 2022; O'Malley et al., 2018; O'Malley et al., 2022; Passini et al., 2000; Wozniak et al., 2025). Such difficulties are specifically noticed by older participants and are especially problematic when learning a new environment, such as after one participant moved to an assisted retirement accommodation:

> When I first came I found it very awkward … Because they [the corridors] all look the same. (O'Malley et al., 2022, p. 1799)

Table 3
Themes and sub-themes with definitions (and number of contributing articles).

Themes	Sub-themes	Definitions	Contributing articles[a]
Experiencing landmarks (31)	An imperative aspect of navigation (27)	Use of landmarks as a key wayfinding strategy	1, 2, 3, 6, 7, 13, 14, 16, 17, 20, 21, 22, 29, 31, 32, 34, 35, 36, 37, 38, 42, 43, 44, 48, 50, 51, 53
	Emotive effect (16)	Selecting landmarks based on emotional connection or a special event	3, 6, 12, 22, 29, 30, 31, 34, 35, 36, 42, 43, 44, 48, 51, 53
	Social history (8)	Experiencing past and present landmarks as a manifestation of social history	1, 6, 30, 35, 42, 43, 44, 45
Repetitive design (29)	Ambiguous and disorienting (14)	Being disoriented as a result of repetition found in indoor and outdoor environments	2, 3, 9, 10, 12, 21, 22, 23, 26, 31, 36, 37, 38, 51
	Logical and consistent (16)	Repetitions in indoor and outdoor environments which are helpful for wayfinding	4, 5, 6, 7, 15, 17, 18, 20, 25, 29, 33, 36, 38, 46, 49, 52
	Meaningful spaces (11)	Recognising the function of spaces based on a repeated general idea	8, 9, 10, 19, 20, 22, 33, 36, 38, 52, 54
It's all Greek to me (35)	Lacking the key knowledge (32)	Recognising the presence of a wayfinding system but lacking the key knowledge to benefit from it	1, 2, 4, 5, 6, 7, 9, 10, 11, 13, 15, 16, 18, 20, 23, 25, 26, 28, 29, 30, 33, 35, 36, 37, 38, 39, 40, 41, 44, 46, 52, 54
	Ignoring existing aids (9)	Not seeing/ recognising current wayfinding aids as useful or relevant	13, 15, 18, 20, 28, 38, 46, 49, 54
	Lost in translation (14)	Inability to translate one's wayfinding knowledge into instructions which fit the needs and abilities of another person	1, 4, 5, 7, 9, 10, 17, 19, 20, 25, 29, 38, 40, 54
People as a wayfinding strategy (31)	Asking for help (28)	Relying on other people to provide information and verbal directions	1, 4, 7, 8, 10, 11, 15, 16, 17, 18, 19, 20, 23, 25, 27, 28, 29, 30, 32, 33, 34, 35, 38, 40, 46, 51, 52, 54
	You can't ask just anybody (14)	Making decisions about an appropriate person to ask for help/directions	1, 4, 11, 17, 18, 20, 23, 25, 28, 29, 32, 34, 40, 54
	Others as cues (12)	Using other people as landmarks and mobile wayfinding cues	6, 8, 9, 10, 17, 28, 30, 32, 35, 39, 50, 52

[a] Numbers correspond to those allocated in Table 2.

Difficulties navigating repetitive and monotonous environments where *"everything looks the same"* can result in situations where people *"often don't know in which corridor I am"* (Kevdzija, 2022, p. 5). This can lead people to follow a wrong path, resulting in disorientation.

When navigating larger outdoor environments, elements such as whole buildings, streets or green recreational spaces can appear to be identical and confusing, giving a false sense of being oriented (i.e. misoriented): "*Both* buildings *in this area look similar to me. So, no differences if I walking here [walkway] or there [walkway of another building]"* (Mohamad & Said, 2018, p. 205); or simply overwhelmed by the number of similarly looking buildings: *"This road is narrow and there are tall buildings all around. It is overwhelming"* (Wozniak et al., 2025, p. 1262). However, although homogeneous or unambiguous spaces can cause disorientation, in some studies included in the review, repetition was seen as beneficial and even conceived as a wayfinding tool or strategy.

3.4.2.2. Logical and consistent. In contrast to the findings noted previously, repetitive elements of the environment can be helpful for wayfinding by making it easier to quickly recognise and process familiar patterns. Cyclists, for example, appreciate the ease of spotting identical signage graphics which reduces their need to slow down to read signs:

> I find them clearly recognizable now. Because of that red background with a white bicycle on it. (van Lierop et al., 2020, p. 9)

A user of a transit system also relied on a consistent signage design:

> The consistent use of color makes me feel in control, even in unfamiliar stations. (Yan, 2025, p. 9)

The benefits of logical and consistent signage also manifested in studies focussed on internal wayfinding. For example, the logic of systematic numbering of wards in a hospital makes it easier to navigate the complex building: *"the wards are numbered in such a way that you know what floor they're on"* (Hughes et al., 2015, p. 4). Conversely, a breakdown in logical, intuitive numbering is disorienting, as experienced by this passenger looking for a train platform in a train station, "*I got into foot-overbridge seeing the platform 2- 3-4-5 are moving forward, thinking the 6–7 will be after that. But it got to know it at the end of the bridge"* (Singh et al., 2025, p. 990).

Beyond signage, a logical, grid-like layout of an entire city can boost residents' confidence and thus their mobility (Biglieri & Dean, 2022; Marquez et al., 2017). For example, the grid-like layout of Chicago is so logical and predictable that, in one study, researchers were surprised by the readiness and the confidence of their participants (older Chicago residents) to venture far beyond their neighbourhood, in part due to being able *"to describe, with precision, how to get to an address they had never visited before, simply by drawing upon the very logical and transparent Chicago street-naming system"* (Marquez et al., 2017, p. 227). Conversely, a loss of confidence and disorientation can happen when a system promises logic and consistency but fails to deliver. While following a system of signs, people can get disoriented if they stop abruptly and do not always *"carry on"* (Ford et al., 2020, p. 114), or if the same destination is referred to by similar, but not identical, terms in signage and verbal directions, as in this example:

> […] PICU, Pediatric ICU, Pediatric Intensive Care Unit, and ICU. […] NICU, NCCS, Neonatal Intensive Care Unit, Neonatal Critical Care Services, Newborn Intensive Care, and ICU. (Brown et al., 1997, p. 47)

3.4.2.3. Meaningful spaces. The Goldilocks principle of design is to have a space or wayfinding system with enough similarity to be easily recognised from its function and layout but different enough to be unambiguous. For example,

> … it's set up as a reception point and we're so used to what a reception point is to look at, you don't have to have a label on a dog to know it's a dog. (Neil et al., 2019, p. 4)

Having experienced many receptions before, this participant had no issues recognising another one and even thought that the sign labelling it was redundant. Interestingly, depending on circumstances, the same architectural element can provide both meaning and confusion. Compare a participant in one study who was looking for stairs and, having seen the elevators, correctly assumed, "… where there are elevators, there are stairs" (Jamshidi & Pati, 2024, p. 131) with other participants in the same study who had difficulties distinguishing

between different staircases with similar design.

The skill of orienting oneself based on a recognisable, meaningful function of a room becomes a life-long skill that seems to persist even into old age (Buuren et al., 2025; Caspi, 2014; Passini et al., 2000). For example, in one study a dementia care home resident, who lost most of his ability to navigate independently, could still recognise the dining room as a place to eat lunch even if he could not identify the correct one of the two available rooms:

> A CNA notices that Mr. Green is searching for his table in the wrong dining room and tells him: "Oh … the other side.'' [while pointing to the direction of the other dining room where Mr. Green usually has his lunch]. (Caspi, 2014, p. 436)

An environmental design that "makes sense" can be easier to navigate even if it is less familiar than other monotonous or ambiguous spaces one uses daily (Buuren et al., 2025; Passini et al., 2000). This is perhaps why assisted accommodation residents prefer to orient using meaningful, personalised landmarks, such as photographs of the local town, over institutional-looking signage (O'Malley et al., 2018). And, moreover, why managers of care homes adapt the environment to feel more meaningful, personal and "homely" (Heward et al., 2022).

3.4.3. It's all Greek to me

The third main theme highlights how, despite the best efforts of builders, designers and managers to create meaningful, easy-to-navigate spaces and wayfinding systems, these systems can still seem foreign and unintelligible. Within this main theme, three sub-themes were developed: *lacking key knowledge*, *ignoring existing aids*, and *lost in translation.*

3.4.3.1. Lacking key knowledge. When people lack the specialised knowledge required to decipher a wayfinding system, they can get confused trying to make sense of it and, possibly, misinterpret it. One of the most obvious reasons for such a barrier is not speaking the language used on the signs and thus missing the most essential information (Almeida & Tidal, 2022; Chee, 2023; Schmitt et al., 2019; Singh et al., 2025). These issues manifested most explicitly in the studies included in the review focussed on navigating library spaces. A library has an organisational system which guides patrons' wayfinding. Visiting a library to borrow an item requires knowing how to read the item's "address" (the call number) and then using it to find the item on the shelves (the stacks). Although perfectly clear to library staff, such a system is not always obvious to a patron (Bedi & Webb, 2017; Everhart & Escobar, 2018; Kinsley et al., 2016). *"What does the number stand for?"* (Hahn & Zitron, 2011, p. 32), asked a first-year student about the call number at the beginning of their library task. In a different study, a participant admits getting lost due to being confused by the library jargon:

> … then I got lost and I wasn't sure where I was anymore. And to be honest […] I don't know what stacks means … (Bedi & Webb, 2017, p. 23)

Even participants who have previous experience of using a (different) library can get lost due to misinterpreting the system: *"The call number system was misidentified as the Dewey Decimal system instead of the Library of Congress system"* (Zaugg et al., 2016, p. 78).

Beyond the narrow scope of library navigation, hospitals are another common type of complex building with a wayfinding system that people need to interpret. However, they may find that they lack the knowledge of, for example, how to apply the colour coded lines (Ford et al., 2020), how to decipher the signage in general (Kevdzija, 2022) and how to understand the medical jargon included in it (Brown et al., 1997; Neil et al., 2019). A systematic labelling system in a hospital may seem like a straightforward wayfinding solution, but without user instruction it may just cause more confusion:

> … the name gives no clue as to the specialty of the department. Meaning can also be given to names where no meaning or another meaning was intended, for example 'E12' being taken to mean 'east 12' rather than 'floor E, room 12'. (Hughes et al., 2015, p. 4)

More generally, findings from the reviewed studies demonstrate that, although maps are a common and useful wayfinding aid if used proficiently (Mottet et al., 2016), without map-reading skills they can mislead (Gerber & Kwan, 1994; Prescott et al., 2021). In particular, using non-oriented maps inside buildings is particularly problematic (Zaugg et al., 2016).

Poor quality wayfinding systems can further complicate things. To an unexperienced wayfinder, an indoor layout can already seem like a maze (Ahmed et al., 2022; Ferri & Popp, 2023; Kwon et al., 2025; O'Malley et al., 2018) and a street pattern may appear "all squiggly" (Gerber & Kwan, 1994). Therefore, poorly designed and placed wayfinding cues can make the wayfinding task even more confusing and complicated (Brown et al., 1997).

3.4.3.2. Ignoring existing aids. When navigating an unfamiliar environment, people seek available clues to help them find their way. However, many of the studies included in the review suggest that existing cues – such as signage, colour coding and maps – are often missed and/or ignored (Ford et al., 2020; Singh et al., 2025). Although, in many instances, this can be partly attributed to an overload of information (Findlay & Southwell, 2004), the mental effort of using unfamiliar resources can also deter people from paying proper attention. Perceiving the design and the wayfinding system as too complex, unusable and daunting results in people ignoring aids, or regarding them as unhelpful or irrelevant (Ford et al., 2020; Hahn & Zitron, 2011; Mandel, 2018; Passini et al., 2000; Silva et al., 2019b):

> It's too complicated. I would have to think a lot. […] they're part of the background, like the art … You see them *[signs]*, but you don't really … notice. (Mandel, 2018, p. 27)

Aids such as colour-coded floors in a nursing home (Passini et al., 2000), a green line demarcating a cycle route (van Lierop et al., 2020), and signs in a library explaining call numbers' relation to a genre (Hahn & Zitron, 2011) have been developed to improve wayfinding, but are often not recognised as such and, therefore, are not utilised. However, some studies suggest that repeated exposure to the system can mitigate this issue, as is the case with the hospital staff using colour coded routes more confidently than visitors (Hughes et al., 2015).

3.4.3.3. Lost in translation. One way to understand an unfamiliar environment and its complicated wayfinding system, is to ask the locals (such as staff) for help. However, while helping the information seeker, instructions might get lost in translation (Chee, 2023; Gupta et al., 2020). In such cases, the directions can be incomplete or even inadequate, such as sending a wheelchair user down an inaccessible route, pointing to a destination for a visually impaired person (Gupta et al., 2020), missing key points when guiding a new library user (Kinsley et al., 2016), or sending an incomplete set of directions in a hospital appointment letter (Hughes et al., 2015).

There may be further complications in receiving correct information if the seeker's request is not clear in the first instance. This was the case in a US study with English for speakers of other languages (ESOL) students who were repeatedly misdirected and misinformed by library staff who struggled to understand their needs and requests (Almeida & Tidal, 2022). Such difficulties in adapting one's wayfinding knowledge to other's needs might arise from a lack of relevant lived experience (Chee, 2023; Gupta et al., 2020), or simply from being so familiar with the environment that gaps in the system are no longer noticed (Bedi & Webb, 2017; Kinsley et al., 2016).

3.4.4. People as a wayfinding strategy

The final main theme foregrounds the involvement of other people in participants' wayfinding experiences and strategies. Within this theme, three sub-themes were developed: *asking for help*, *you can't ask just anybody*, and *others as cues*.

3.4.4.1. Asking for help. When facing an unfamiliar environment or a particularly challenging task, asking other people for help is a strategy that many participants preferred over other wayfinding aids or strategies. This is suggested by their sentiments that receiving help from other people is deeply appreciated (Hahn & Zitron, 2011; Hughes et al., 2015; Kevdzija, 2022; Schmitt et al., 2019; Yan, 2025):

> The use of humans for guidance through verbal directions, transport (portering) services or escort to the destination was by far the most popular form of navigation aid mentioned by the participants. (Hughes et al., 2015, p. 3)

> The majority of participants who utilized staff to help them locate items mentioned them specifically as helpful. (Hahn & Zitron, 2011, p. 32)

Other people's help can be indispensable during a complicated task of route planning (Marquez et al., 2017; Noone, 2021), especially if one's current wayfinding aids are inadequate or difficult to use, such as having *"only a paper map"* while trying to *"figure out the right [train] connection"* (Meurer et al., 2018, p. 46) or if *"The signs were not clear, and I had to ask for assistance to find my coach" (*Singh et al., 2025*, p. 991)*.

For some people, asking for help is such an intrinsic strategy that they feel compelled to interact with others, even if instructed otherwise by researchers in a study:

> Despite the fact that they were instructed not to, seven of the eleven participants needed to ask for directions to finish their assigned route. (Ford et al., 2020, p. 112)

Some even bypassed the rules of an orienteering club:

> … on some occasions when orienteer A had an experience of being unable to locate himself, a meeting with another orienteer was seen as an opportunity to get help, even if orienteering regulations forbid competitors to communicate with one another during a race. (Mottet et al., 2016, p. 237)

The last example is especially curious, since the observed participants – members of an orienteering club – had both the tools (map and compass) and knowledge to use them efficiently. Nevertheless, when disoriented and under time pressure, they ignored the rules of the competition and sought help by consulting other competitors.

Despite the purported intrinsic nature of asking for help, however, some people will try to apply their own abilities first and only ask for help "*as a last resort*" (Almeida & Tidal, 2022; Gupta et al., 2020; Mandel, 2018) and/or if they feel like they have wasted enough of their own and others' time on the wayfinding task (Everhart & Escobar, 2018; Zaugg et al., 2016). Notably, in the case of participants living with various disabilities, most of them preferred relying on technology to navigate, due to the embarrassment and discomfort of asking for help (Gupta et al., 2020).

3.4.4.2. You can't ask just anybody. Several reviewed studies highlighted the importance of making the right choices when asking someone for help. As one participant said, you *"can't ask just anybody"* (Marquez et al., 2017, p. 225) if you want to receive reliable help and useful directions. When asking for help inside an institution, a straightforward choice seems to be asking people acting in a professional capacity, such as library staff (Almeida & Tidal, 2022; Everhart & Escobar, 2018; Hahn & Zitron, 2011; Kinsley et al., 2016; Mandel, 2018; Zaugg et al., 2016), hospital or care home employees (Buuren et al., 2025; Chee, 2023; Hughes et al., 2015; Kevdzija, 2022; Marsh et al., 2008), police (Marquez et al., 2017), and public transport workers (Schmitt et al., 2019). There is a caveat, however, that not all employees appear available to help, such as when a busy-looking librarian is not making eye contact with the shy library patron (Almeida & Tidal, 2022), or if a visitor feels it inappropriate to interrupt a member of clinical hospital staff who might be busy caring for patients (Hughes et al., 2015).

Choosing an appropriate helper is a skill that one develops over time, as evidenced by inexperienced high school library users who would *"randomly stop anyone and ask for help in addition to asking at service desks"* (Zaugg et al., 2016, p. 77). Occasionally, the tactic of selecting a staff member can fail through no fault of the information seeker. This happens if the employee in question is new, temporary or transient and has not yet acquired the relevant knowledge (Almeida & Tidal, 2022; Hughes et al., 2015). When selecting helpers outside institutions with people in uniforms, some categories of people are considered more suitable than others. For example, older and well-dressed people are seen as safer and more reliable than teenagers, who can give deliberately wrong directions as a prank; while women may prefer to ask other women (Ahmed, 2015). Having had an unfortunate experience of receiving inadequate help and directions, people with various disabilities and/or needs prefer to ask those who know them well and are guaranteed to produce meaningful directions (Chee, 2023; Gupta et al., 2020).

3.4.4.3. Others as cues. Using others for navigation does not necessarily mean asking for verbal directions. Sometimes it involves merely observing other people's behaviour in the environment (Wattne et al., 2025; Yu, 2025). For example, for an older gentleman in an early stage of Alzheimer's disease, a couple who often sit on their balcony are a defining orienting feature on his route home (Biglieri & Dean, 2022). If one is unsure about which route to take to reach their destination, it may be helpful observing how other people use the same space and then *"be an optimist and go this way"* (Prescott et al., 2021, p. 8). Moreover, just knowing that there are other people within reach, who may be able to help, boosts wayfinding confidence and the feeling of safety: *"I chose a route where there are people, so that I would feel safe"* (Wozniak et al., 2025, p. 1263) *"so getting lost is no big deal"* (Olsson et al., 2021, p. 509; also, in Gupta et al., 2020). Being aware that other people can serve as cues and sources of information, leads people to choose crowded places over deserted ones, or routes going through clearly inhabited neighbourhoods.

4. Discussion

Our thematic synthesis of people's experiences and perceptions of everyday wayfinding produced four main themes, focussed on landmarks, environmental design, prior wayfinding experience and ability, and the social aspects of wayfinding. Landmarks are described as both an important wayfinding strategy and a reflection of personal and social history. Experiences of the environmental design show that repetitiveness is both confusing (when it causes difficulties disambiguating different environments) and useful (when the systematic repetition of elements or concepts aids orientation). Those experiencing an environment for the first time are likely to ask other people for directions, but there are issues with people clearly expressing their needs and, consequently, being misunderstood. Despite potential difficulties with communicating instructions and directions, using other people's help (directly or indirectly) is a popular strategy. In what follows, we focus on three overarching concepts encompassing the findings from this review: the role of landmarks; the idiosyncrasy of wayfinding experiences; and the social and distributed nature of wayfinding. We conclude by suggesting some future implications for wayfinding research.

4.1. The role of landmarks

Given the dominance of landmarks in spatial cognition research (Chan et al., 2012; Stankiewicz & Kalia, 2007; Yesiltepe et al., 2021), it is not surprising that landmarks were also a dominant feature of the review, with some participants seeing them as central for supporting wayfinding (Alcock et al., 2024; Biglieri & Dean, 2022; Gupta et al., 2020; Singh et al., 2025). Our findings in part accord with the traditional definition of landmarks, conceived as persistent, salient, and informative (Stankiewicz & Kalia, 2007); for example, rivers (Biglieri & Dean, 2022), buildings and bridges (Silva et al., 2019a, Silva et al., 2019b), local parks and schools (Gerber & Kwan, 1994; Spencer & Darvizeh, 1983) and a ditch in the terrain matching the dotted line on a map (Mottet et al., 2016). Using Chan et al.'s (2012) classification of landmarks according to their role, participants in the studies reviewed here described using them as beacons guiding people home (Biglieri & Dean, 2022), as orientation and directional cues helping participants get their bearings (Alcock et al., 2024; Mottet et al., 2016; Silva et al., 2019a, Silva et al., 2019b), as associative cues reminding participants where to turn (Brown et al., 1997; Yu, 2025), and as frames of reference from which to continue the route (Biglieri & Dean, 2022; Gerber & Kwan, 1994).

However, our findings also suggest that people use landmarks very differently, depending on their experience, knowledge and culture. Thus, the saliency of landmarks was also described in terms of their personal and emotional meaning (Yesiltepe et al., 2021). In such instances, public art (Seetharaman et al., 2021), a funny-shaped tree (Silva et al., 2019a), or a family-owned restaurant (Marquez et al., 2017) were selected as landmarks for their specific, personal meaning to the participants. This suggests a process of landmark selection based on an individual's dynamic relationship with the environment, as opposed to mere perceptions of colour and contrast (Li, 2002). This accords with recent research suggesting that computational models of saliency based purely on landmarks' visual attributes are unable to predict participants' subjective choices of landmarks (Yesiltepe et al., 2020).

Our findings on the enduring role of landmarks has numerous practical implications. In line with existing approaches, they support the use of, for example, public art, landscaping and decorative improvements to strategically mark intersections and changes of route directions in urban environments. They also support the judicious use of landmarks in monotonous and disorientating indoor spaces, such as hospitals. In addition to these existing approaches, however, our findings foreground the role of non-visual aspects of landmarks, such as personal history and emotional response. This suggests that future wayfinding systems design could attempt to incorporate these wider aspects of landmark saliency, for example using a multimodal framework for design.

4.2. Idiosyncratic wayfinding experiences of individuals

Beyond diverse subjective experiences and approaches to the selection of landmarks, idiosyncrasy also manifested in other aspects of the review. Considering the review included studies from different countries with diverse participant samples, it predictably unveiled a vast array of wayfinding experiences, approaches and abilities (Hartig et al., 2024; Lloyd & Gifford, 2024; Spiers et al., 2023; Wolbers & Hegarty, 2010), informed by the dynamic and variable socio-cultural processes influencing participants' everyday wayfinding (Heft, 2013).

Various cultural discourses dictated how participants navigated their environments. For example, older Chicagoan residents are aware of its grid-like layout and consistent street signage, and are able to use them to their advantage to confidently plan trips beyond the area they are personally familiar with (Marquez et al., 2017). In India, people navigating rural areas include cows freely roaming the streets, potholes in the road, and other people sitting by the road as wayfinding cues (Ahmed, 2015; Spencer & Darvizeh, 1983). Participants in Canada or France seem more open to choosing a random passer-by as an environmental clue (Mottet et al., 2016; Prescott et al., 2021). Conversely, someone walking through the historic centre of Jerusalem needs to carefully consider their walking routes and who to engage with, depending on their own and others' religious practices (Singer & Bickel, 2015). In essence, people's understanding, perceptions and attitudes to wayfinding develop through a process of enculturation, whereby the specific local environment, traditions and beliefs shape people's wayfinding capacities (Fernandez-Velasco & Spiers, 2023; Heft, 2013).

Furthermore, our findings suggest that individual and embodied experiences also significantly influence route choices (Symonds et al., 2017). For example, some route decisions might be due to place attachment (Scannell & Gifford, 2017), with people pursuing nostalgic memories, a sense of belonging and improved mental health from seeing personally relevant places or even images of those places (Marquez et al., 2017; O'Malley et al., 2018). Additionally, the physical form and ability of one's body often dictates route choices due to, for example, limited physical ability and the need to look for an accessible route (Chee, 2023; Gupta et al., 2020; Prescott et al., 2021), keeping oneself safe (Olsson et al., 2021; Singer & Bickel, 2015; Wozniak et al., 2025), and being of younger age, lower height and with developing independent wayfinding skills (Gerber & Kwan, 1994; Silva et al., 2019a, Silva et al., 2019b; Spencer & Darvizeh, 1983).

4.3. Collective and distributed wayfinding

Finally, our findings suggest that people's lived wayfinding experiences are entangled with, and thus influenced by, the social environment. As social beings, we are inclined to treat other people as an integral part of an everyday wayfinding system, where asking and giving directions are inherent behaviours (Hill, 1987; Hutchins, 1995a). A significant proportion of analysed experiences involved people asking for directions and consequently following them; a behaviour Dalton et al. (2019) call strong asynchronous wayfinding. Many participants in the reviewed studies were grateful for the opportunity to ask for directions, rather than having to engage with maps or signage (Hahn & Zitron, 2011; Hughes et al., 2015; Schmitt et al., 2019; Singh et al., 2025). Seeking information from others (asking, accepting, or simply observing others' actions) is an instinctive strategy which, in some situations, surpasses strict instructions to limit such interaction (Ford et al., 2020; Mottet et al., 2016).

It seems that complete spatial knowledge of a given location is unnecessary if one has awareness of other people and the expertise they (may) possess (Hutchins, 1995b). For some, such awareness is an integral part of their wayfinding strategy, inasmuch as getting lost or disoriented is unproblematic if there are other people in the vicinity (Gupta et al., 2020; Olsson et al., 2021; Wozniak et al., 2025). Such an approach to wayfinding might not only boost the navigator's confidence, but also reduces their cognitive load (Hölscher et al., 2007) by outsourcing some, or all, of the complicated spatial computations to other members of the immediate community (Dalton et al., 2019).

When interacting with others, our findings suggest that the main barrier to effective wayfinding-related communication lies in people's markedly different levels of prior experience and their varying ability to translate their knowledge into useful and appropriate advice (Almeida & Tidal, 2022; Brown et al., 1997; Chee, 2023; Gupta et al., 2020). Indeed, previous research has also found that direction-giving is neither easy nor straightforward (He et al., 2015; Hölscher et al., 2011; Hund & Padgitt, 2010). Difficulties may arise because the direction-giver is too familiar with the environment and is thus no longer aware of gaps in the wayfinding system, such as lack of signage at some decision points (Bedi & Webb, 2017). People also tend to react and interact with the feature-packed real world in a dynamic way (Alcock et al., 2024), which means the route they choose to navigate can be different compared to the verbal route directions they produced before being exposed to the environment (Hölscher et al., 2011). Such constraints notwithstanding, our review suggests that despite the difficulties in communicating

spatial information or directions, seeking other's assistance is a prominent wayfinding strategy. This socially-enabled strategy seems to enrich (or in some cases even replace) other wayfinding strategies. These findings are in line with Hegarty et al. (2023) who argue that we need to expand our understanding of the causes of individual differences in wayfinding strategies beyond individual physiology, to more explicitly include environmental and experiential factors. Given the prominence of seeking other's attention as a wayfinding strategy, we suggest that wayfinding systems in complex, populated environments – such as hospitals – should be designed to make this strategy as efficient as possible, rather than seeking to eliminate it which, in practice, is unlikely to occur.

4.4. Future implications

This review presents everyday wayfinding as a situated, social, dynamic and idiosyncratic activity. As such, we argue that the situatedness of real-world wayfinding should be explicitly considered both when planning research and interpreting its implications (Alcock et al., 2024; Hardman, 2022). To paraphrase Symonds et al. (2017), exploring concepts *individually* allows one to discover valuable insights; however, one needs to remember that those new discoveries belong to the wider whole and do not exist in the real world as standalone factors (Dalton et al., 2019). Building on extant ecological approaches to wayfinding research, we encourage wayfinding researchers to examine their phenomena of interest "in the wild" in addition to controlling and manipulating researcher-created tasks in the laboratory (Lloyd & Gifford, 2024). Existing examples of such situated studies include Hutchins' (1995a) famous cognitive ethnography investigating military ship navigation and, more recently, Alcock et al.'s (2024) phenomenologically informed experiment exploring searching in an unfamiliar environment. These studies illustrate the possibility of embracing the situatedness of human spatial navigation while maintaining scientific rigour (Bercht et al., 2024; Lloyd & Gifford, 2024). Such future study designs could, among others, include cognitive ethnography, phenomenologically-informed experiments, ethnomethodological and conversation analytic studies of wayfinding interaction, and field-experiments.

4.5. Strengths and limitations of the review

The primary strength of this review is that the studies included in the review provided a varied, international participant sample and covered a broad range of research questions and methods. This supported triangulation of the data and resulted in more credible and transferable findings due to the large and varied combined participant sample (Gray, 2022). Nevertheless, the methodological heterogeneity of the included studies posed a challenge for interpreting and synthesizing the results. Furthermore, some mixed-methods studies presented their findings in such a way that did not clearly separate data derived from quantitative and qualitative methods of data collection, which created challenges when selecting appropriate material to be included in the review.

One further factor may have limited the scope of this review. Our decision to exclude studies focussed exclusively on visually impaired participants; although sighted people rely primarily on visual perception in their daily wayfinding tasks, visually impaired individuals follow auditory, olfactory or tactile cues to support wayfinding (Golledge, 1999). We identified a number of such studies, such as Afshary et al. (2018); Brunet et al. (2018); Passini et al. (1986), but concluded that, despite no doubt interesting and useful for developing an understanding of wayfinding, the unique experiences of such a population would benefit from a separate review.

5. Conclusion

Based on a thematic synthesis of 54 articles, we suggest that people's experiences and perceptions are an integral part of everyday wayfinding. This manifests most explicitly in how landmarks are selected and utilised, how individuals' wayfinding experiences and strategies are idiosyncratic, and how wayfinding can be conceived as a dynamic, collective and socially-situated activity. Given these factors are historically minimised in currently dominant, laboratory-based, wayfinding research programmes, this review can act as a catalyst for an expansion of wayfinding research towards more ecologically sound approaches with diverse methodologies.

CRediT authorship contribution statement

Victoria Goldenberg: Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **Jan Wiener:** Writing – review & editing, Supervision, Funding acquisition, Formal analysis, Conceptualization. **Chantel Cox:** Writing – review & editing, Supervision, Formal analysis. **Doug Hardman:** Writing – review & editing, Supervision, Methodology, Funding acquisition, Formal analysis, Conceptualization.

Consent to participate

Not applicable.

Ethical considerations

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Consent for publication

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jenvp.2026.102928.

Appendix 1. Quality assessment results

No	Study title	Lead author	Year	Comments	Criteria score (Y/N/C)					Overall score
1	Wayfinding behavior in India	Ahmed	2015	No primary data reported.	1.1	1.2	1.3	1.4	1.5	**
					Y	Y	N	N	N	
2	Visual accessibility and inclusive wayfinding design in hospital environment in Nigeria	Ahmed	2022	Title, abstract and conclusion mention inclusive design, however, this study had no participants with any special needs.	1.1	1.2	1.3	1.4	1.5	****
					Y	Y	Y	Y	Y	
					4.1	4.2	4.3	4.4	4.5	
					Y	Y	Y	C	Y	
					5.1	5.2	5.3	5.4	5.5	
					Y	Y	Y	Y	N	
3	Searching in an unfamiliar environment: A phenomenologically informed experiment	Alcock	2024	Well-designed and executed study	4.1	4.2	4.3	4.4	4.5	*****
					Y	Y	Y	Y	Y	
4	Library wayfinding and ESOL students: Communication challenges and empathy-based intervention	Almeida	2022	Data analysis method not clear; little primary data.	1.1	1.2	1.3	1.4	1.5	***
					Y	Y	C	C	Y	
5	Through the students' lens: Photographic methods for research in library spaces	Bedi	2017	Reporting preliminary results from two studies, neither of which is complete. Much more focussed on reporting their photo-elicitation method than the results.	1.1	1.2	1.3	1.4	1.5	***
					Y	Y	Y	N	N	
6	Fostering mobility for people living with dementia in suburban neighbourhoods though land use, urban design and wayfinding	Biglieri	2022	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	

No	Study title	Lead author	Year	Comments	Criteria score (Y/N/C)					Overall score
7	A post-occupancy evaluation of wayfinding in a pediatric hospital: Research findings and implications for instruction	Brown	1997	Data analysis methods not clear.	5.1	5.2	5.3	5.4	5.5	****
					Y	Y	Y	Y	N	
					71.1	1.2	1.3	1.4	1.5	
					Y	Y	C	Y	Y	
					4.1	4.2	4.3	4.4	4.5	
					Y	Y	Y	C	Y	
8	Wayfinding behavioral patterns of seniors with dementia: two exploratory case studies	Buuren	2025	Adequately designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
9	Wayfinding difficulties among elders with dementia in an assisted living residence	Caspi	2014	Well designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
10	Navigating the twilight years: Supporting older adults' orientation and wayfinding in senior living facilities	Chee	2023	Well designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
11	Conceptualising the information seeking of college students on the autism spectrum through participant viewpoint ethnography	Everhart	2018	Inappropriate recruitment strategy	1.1	1.2	1.3	1.4	1.5	****
					Y	N	Y	Y	Y	
12	Finding a way: Long-term care homes to support dementia	Faith	2015	Qualitative data analysis method not reported. Primary qualitative data not discussed.	5.1	5.2	5.3	5.4	5.5	***
					Y	Y	N	Y	N	
					1.1	1.2	1.3	1.4	1.5	
					Y	Y	N	Y	C	

No	Study title	Lead author	Year	Comments	Criteria score (Y/N/C)					Overall score
					4.1	4.2	4.3	4.4	4.5	
					Y	N	Y	Y	N	
13	Mind the gap: navigating the space between digital and physical wayfinding in public transit	Ferri	2023	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
14	'I just followed my nose': Understanding visitor wayfinding and information needs at forest recreation sites	Findlay	2004	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
15	Effective wayfinding adaptation in an older National Health Service hospital in the United Kingdom: insights from mobile eye-tracking	Ford	2020	No qualitative data analysis method or primary data reported.	5.1	5.2	5.3	5.4	5.5	***
					Y	Y	Y	Y	N	
					1.1	1.2	1.3	1.4	1.5	
					Y	Y	N	N	C	
					4.1	4.2	4.3	4.4	4.5	
					Y	Y	Y	N	Y	
16	A phenomenographical approach to the study of preadolescents use of maps in wayfinding exercise in a suburban environment	Gerber	1994	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
17	Towards more universal wayfinding technologies: navigation preferences across disabilities	Gupta	2020	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
18		Hahn	2011		1.1	1.2	1.3	1.4	1.5	**

No	Study title	Lead author	Year	Comments	Criteria score (Y/N/C)					Overall score
	How first-year students navigate the stacks. Implications for improving wayfinding			No primary data or number of participants reported.	Y	Y	N	C	C	
19	'We go for a homely feel… not the clinical dementia side': care home managers' experiences of supporting residents with dementia to orientate and navigate care environments	Heward	2022	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
20	Navigating in large hospitals	Hughes	2015	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
21	The syntheses of static and mobile wayfinding information: an empirical study of wayfinding preferences and behaviour in complex environments	Iftikhar	2022	Inaccurate/wrong data presented. No primary qualitative data.	5.1	5.2	5.3	5.4	5.5	**
					Y	Y	N	N	N	
					1.1	1.2	1.3	1.4	1.5	
					Y	Y	N	N	N	
					4.1	4.2	4.3	4.4	4.5	
					Y	N	N	Y	N	
22	Identifying Environmental Elements and Attributes that Contribute to Indoor Wayfinding: An Exploratory Study Utilizing Think-Aloud Protocol	Jamshidi	2024	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
23	"Everything looks the same": wayfinding behaviour and experiences of stroke inpatients in rehabilitation clinics	Kevdzija	2022	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	

. (*continued*).

No	Study title	Lead author	Year	Comments	Criteria score (Y/N/C)					Overall score
					5.1	5.2	5.3	5.4	5.5	
					Y	Y	Y	Y	N	
24	The impact of COVID-19 on visitors' wayfinding within healthcare centers	Khotbehsara	2023	No qualitative raw data reported	1.1	1.2	1.3	1.4	1.5	****
					Y	Y	C	C	C	
					4.1	4.2	4.3	4.4	4.5	
					Y	Y	Y	Y	Y	
25	GoPro as an ethnographic tool: A wayfinding study in an academic library	Kinsley	2016	Data analysis method is not reported.	1.1	1.2	1.3	1.4	1.5	***
					Y	Y	N	N	Y	
26	Visualizing Spatial Cognition for Wayfinding Design: Examining Gaze Behaviors Using Mobile Eye Tracking in Counseling Service Settings	Kwon	2025	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
27	Finding their way: How public library users wayfind	Mandel	2013	No interview questions reported. Only one direct quotation from data.	1.1	1.2	1.3	1.4	1.5	**
					Y	Y	N	C	N	
28	Understanding and describing users' wayfinding behavior in public library facilities	Mandel	2018	Reported the same study as in Mandel (2013) with more detailed methodology and more primary data.	1.1	1.2	1.3	1.4	1.5	***
					Y	Y	Y	C	N	
29	Older adult strategies for community wayfinding	Marquez	2017	Inappropriate data analysis method	1.1	1.2	1.3	1.4	1.5	**
					Y	Y	N	C	N	
30		Meurer	2018	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****

No	Study title	Lead author	Year	Comments	Criteria score (Y/N/C)					Overall score
	Designing for way-finding as practices—A study of elderly people's mobility				Y	Y	Y	Y	Y	
					5.1	5.2	5.3	5.4	5.5	
					Y	Y	Y	Y	N	
31	Familiarity factors of street features in pedestrian wayfindings	Mohamad	2018	Adequately designed and executed study	1.1	1.2	1.3	1.4	1.5	****
					Y	Y	Y	Y	Y	
					4.1	4.2	4.3	4.4	4.5	
					Y	Y	Y	N	Y	
32	Navigation in outdoor environments as an embodied, social, cultural, and situated experience: An empirical study of orienteering	Mottet	2016	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
33	The health literacy environment of a regional Australian elective surgery access unit: Consumer perspectives from pre-admission to post-discharge	Neil	2019	Data analysis method not clear	1.1	1.2	1.3	1.4	1.5	****
					Y	Y	C	Y	Y	
34	Locating Embodied Forms of Urban Wayfinding: An Exploration	Noone	2021	Ethical considerations not discussed	1.1	1.2	1.3	1.4	1.5	***
					Y	Y	Y	C	C	
35	Strategies used by people with Alzheimer's disease for outdoor wayfinding: A repeated observational study	Olsson	2021	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
36	'All the corridors are the same': a qualitative study of the orientation experiences and design preferences of UK older adults living in a communal retirement development	O'Malley	2018	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
37		O'Malley	2022	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****

. (*continued*).

No	Study title	Lead author	Year	Comments	Criteria score (Y/N/C)					Overall score
	(Dis)orientation and Design Preferences Within an Unfamiliar Care Environment: A Content Analysis of Older Adults' Qualitative Reports After Route Learning				Y	Y	Y	Y	Y	
38	Wayfinding in a nursing home for advanced dementia of the Alzheimer's type	Passini	2000	No primary data reported	1.1	1.2	1.3	1.4	1.5	***
					Y	Y	N	C	Y	
39	An exploration of the navigational behaviours of people who use wheeled mobility devices in unfamiliar pedestrian environments	Prescott	2021	Well-designed and executed study.	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
40	Learning to use transit services: adapting to unfamiliar transit travel	Schmitt	2019	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
41	Exploring moving interviews: A three-step approach to researching how wheelchair users navigate	Schulze	2021	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
42	The saliency of geographical landmarks for community navigation: A photovoice study with persons living with dementia	Seetharaman	2021	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
43	See the world through the eyes of a child: Learning from children's cognitive maps for the design of child-targeted locative systems	Silva	2019	Data analysis method not clear	1.1	1.2	1.3	1.4	1.5	****
					Y	Y	C	Y	Y	
44	Towards locative systems for, and by, children: A cognitive map study of children's perceptions and design	Silva	2019	An appropriately designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
45		Singer	2015		5.1	5.2	5.3	5.4	5.5	***
					Y	Y	Y	Y	N	

No	Study title	Lead author	Year	Comments	Criteria score (Y/N/C)					Overall score
	Which way to go? Women's walking decisions and Ultra-Orthodox enclaves in Jerusalem			Sample not representative for quantitative data. Questionable reporting style.	1.1	1.2	1.3	1.4	1.5	
					Y	Y	Y	Y	Y	
					4.1	4.2	4.3	4.4	4.5	
					Y	N	Y	Y	N	
46	Finding the way: enhancing user experience through effective signages at crowded railway stations in India	Singh	2025	Quantitative sample not representative.	5.1	5.2	5.3	5.4	5.5	****
					Y	Y	Y	Y	N	
					1.1	1.2	1.3	1.4	1.5	
					Y	Y	Y	Y	Y	
					4.1	4.2	4.3	4.4	4.5	
					Y	N	Y	Y	N	
47	Maps in the Head and Maps in the Hand	Skagerlund	2012	Sample not representative. Qualitative methodology not described/justified.	5.1	5.2	5.3	5.4	5.5	***
					N	Y	N	Y	N	
					1.1	1.2	1.3	1.4	1.5	
					Y	Y	Y	Y	C	
					4.1	4.2	4.3	4.4	4.5	
					Y	N	Y	C	Y	
48	Young children's place-descriptions, maps and route-finding: a comparison of nursery school children in Iran and Britain	Spencer	1983	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
49		van Lierop	2020	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****

. (*continued*).

No	Study title	Lead author	Year	Comments	Criteria score (Y/N/C)					Overall score
	Wayfinding for cycle highways: Assessing e-bike users' experiences with wayfinding along a cycle highway in the Netherlands				Y	Y	Y	Y	Y	
50	Wayfinding and navigation behaviours among pilgrim tourists on the St. Olav ways in Norway	Wattne	2025	No primary qualitative data reported	1.1	1.2	1.3	1.4	1.5	**
					Y	Y	C	N	C	
51	What's your type? A taxonomy of pedestrian route choice behaviour in cities	Wozniak	2025	Well-designed and executed study	1.1	1.2	1.3	1.4	1.5	*****
					Y	Y	Y	Y	Y	
52	Psychological resilience and way finding behavior in barrier-free transit guidance systems: A mixed-methods study of Bangkok's pink line	Yan	2025	Well-designed and executed study	5.1	5.2	5.3	5.4	5.5	
					Y	Y	Y	Y	Y	
					1.1	1.2	1.3	1.4	1.5	
					Y	Y	Y	Y	Y	
					4.1	4.2	4.3	4.4	4.5	
					Y	Y	Y	Y	Y	
53	Way-Finding and Sensory Landscapes: Designing Navigable and Stimulating Outdoor Spaces for Older Adults with Mild Cognitive Impairment	Yu	2025	Well-designed and executed study	5.1	5.2	5.3	5.4	5.5	****
					Y	Y	Y	Y	N	
					1.1	1.2	1.3	1.4	1.5	
					Y	Y	Y	Y	Y	
					4.1	4.2	4.3	4.4	4.5	
					Y	Y	Y	Y	Y	
54	Comparing library wayfinding among novices and experts	Zaugg	2016	No clear definition of data analysis method; no primary data.	1.1	1.2	1.3	1.4	1.5	***
					Y	Y	N	C	Y	

Key

Criteria met (%)	Rating
100	*****
80	****
60	***
40	**
20	*
0	

Overall Score

No of studies	Percent	Rating
18	47	*****
6	16	****
9	24	***
5	13	**
0	0	*
0	0	

NB: 'Can't tell' (C) is scored as 'No' (N).

. (*continued*).

Appendix 2. Expanded study characteristics table

No	Source article, country	Setting	Participants (n)	Methods of data collection	Aims	Main findings related to wayfinding experiences
1	Ahmed (2015) India	Outdoor (built environments); familiar.	Delivery personnel, drivers, repair technicians (15)	Interviews	To understand wayfinding habits, use of existing solutions and conditions under which these have failed.	Knowing who to ask for directions and who to trust is very important as it is the main/preferred navigational strategy.
2	Ahmed et al. (2022) Nigeria	Indoor (hospital); familiar	Quantitative (98) Qualitative (24)	Questionnaire; semi-structured interviews	To investigate the impact and barriers of visual accessibility on wayfinding in hospital buildings.	Wayfinding in hospital is supported by appropriate signage, lighting and visibility; while crowded corridors were perceived as barriers.
3	Alcock et al. (2024) UK	Outdoor (built up area), unfamiliar	Students (36)	Experiment; walking interview	To explore the cognitive strategies and environmental factors involved in searching for targets in an unfamiliar and complex real-world environment.	Searching in complex real-world settings depends on an interplay of different search strategies and the situations in which they are deployed; presence of other people and aesthetic considerations are

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No	Source article, country	Setting	Participants (n)	Methods of data collection	Aims	Main findings related to wayfinding experiences
						importantly entangled with the process of searching
4	Almeida and Tidal (2022) USA	Indoor (library); unfamiliar	ESOL (English as second language) students (12)	Wayfinding task with think aloud protocol; Web screen capture; video and audio capture; interview.	To explore wayfinding obstacles of ESOL students.	Inconsistent terminology and lack of information literacy and familiarity with the library were wayfinding obstacle for ESOL students. Participants tended to prefer asking other students or library assistants for help rather than librarians.
5	Bedi and Webb (2017) Canada	Indoor (library); un/familiar	Students (27)	Photo-elicitation interview	To investigate user experiences in library spaces.	Inconsistent terminology, design of signage and library jargon are barriers in library wayfinding. Library users feel awkward asking for help.
6	Biglieri and Dean (2022) Canada	Outdoor (suburban); familiar	People living with dementia (7)	Walk-along interviews; GPS tracking diary	To explore environment barriers and supports to mobility in familiar neighbourhoods for people living with dementia.	People with different diagnoses had largely similar wayfinding experiences with encountered landmarks described as wayfinding enablers. Increased safety and comfort concerns when crossing busy roads.
7	Brown et al. (1997) USA	Indoor (hospital); familiar	Hospital staff (66) Visitors (47); Inpatients (11); parents (3).	Interviews; diaries; observations; traces; cognitive maps.	To assess how often the staff were asked for directions, their attitude to direction-giving and suggestions for improvement.	Hospital staff reported being asked very often for directions which was distracting, while hospital floor plan was very complex and difficult to navigate. Hospital architects and administrators need help seeing the facilities through the visitors' eyes.
8	Buuren et al. (2025) Netherlands	Indoor (nursing home corridors), familiar	Elderly people with dementia (8)	Observation, behavioural mapping	To describe wayfinding behavioural patterns of people with advanced stages of dementia just walking in two nursing home corridors.	The most frequent wayfinding behavioural patterns observed were “movements” followed by “looking at”, “stops on the route”, and “verbal navigational cues”.
9	Caspi (2014) USA	Indoor/outdoor (assisted living residence); familiar	Assisted living residents (12) Staff members (13)	Observation of residents; semi-structured interviews with staff	To describe the spectrum of spatial disorientation and wayfinding difficulties experienced by residents with Alzheimer's disease and related dementias in assisted living residences.	People with ADRD have profound difficulties reaching destinations including their own rooms. All staff members, irrespective of their specialty, directed and led residents to their destination.
10	Chee (2023) Malasia	Indoor (senior living facilities), familiar	Older adults (28, 14 male)	Semi-structured interviews, observations	To explore the lived experiences of older adults coping with spatial disorientation and wayfinding in senior living facilities.	Effective wayfinding and orientation cues in a senior living facility could help older adults maintain independence and control over their lives.
11	Everhart and Escobar (2018) USA	Indoor (library); un/familiar	Male students (2)	Video observation (GoPro camera); think aloud protocol; and retrospective think aloud protocol.	To investigate supports and services academic libraries currently provide that assist patrons on the autistic spectrum.	Students' use of prior knowledge, signage and maps, library website and asking library staff were both enablers and barriers in their library navigation.
12	Faith et al. (2015) UK (NI)	Indoor (care home); familiar	Care home residents (14)	Observation, video observation, semi-structured interviews; descriptive quantitative data	To explore the role of the design of the physical environment in supporting wayfinding for people with dementia.	Wayfinding is assisted by views of the outside spaces and distinctive interior design according to functionality of the room. Disorientation is caused by symmetric layouts and areas that appeared “restricted”.
13	Ferri and Popp (2023) Germany	Outdoor/indoor (public transport); partially familiar	Munich residents (12)	Destination-Task activity; walk-along interviews; survey.	To examine navigational practices within public transit systems.	The more participants used mobile apps to navigate, the less they relied on physical wayfinding cues. Participants found it difficult to confirm their direction on a bus or overground train.
14	Findlay and Southwell (2004) UK	Outdoor (forest recreation sites), un/familiar	Adult forest visitors (68)	Semi-structured interviews, route analysis, signage audit	To consider whether users could find their way to recreational sites and locate useful wayfinding information at the site entrances.	Problems with wayfinding were more related to the context and location of sighs, rather than the materials and details of sign design.
15	Ford et al. (2020) UK	Indoor (hospital), un/familiar	Hospital users (329)	Questionnaire; mobile eye-tracking; semi-structured interviews	To explore the difficulties experienced in trying to navigate the Leicester Royal Infirmary; to make recommendations to improve the wayfinding experience.	Questionnaire and interview produced different/conflicting findings. Mobile eye-tracking study findings: overhead placement, bold font and contrasting colours of signage seem to be most effective.

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No	Source article, country	Setting	Participants (n)	Methods of data collection	Aims	Main findings related to wayfinding experiences
16	Gerber and Kwan (1994) Australia	Outdoor (suburban environment); partially unfamiliar	Male students (16)	Observation; interviews	To investigate the approaches that a group of young Australian adolescents used to find their way around a prescribed suburban route using a map.	12-year-olds have a great variability in their navigational ability affecting the level of their independence. Landmarks were used more the weaker the knowledge of the environment and/or map reading skills.
17	Gupta et al. (2020) USA	Indoor/outdoor (urban), familiar	Older people and/or with various disabilities (27)	Semi-structured interviews	To examine the urban navigational experiences and preferences of individuals with different disabilities, both indoors and outdoors.	Many mobility needs and preferences were shared between people with diverse disabilities while some disability-specific needs are divergent and conflicting.
18	Hahn and Zitron (2011) USA	Indoor (library); partially familiar	First-year students (16)	Observation; think-aloud protocol; interviews.	To identify what exactly helps students find items in the library, and what are the fail points in navigating to the location of books on the shelf after they have a call number.	Library jargon (e.g. call number) is not clear to the students. Asking for librarians' help was not straightforward for some students.
19	Heward et al. (2022) UK	Indoor/outdoor (care home); familiar	Care home managers (12)	Semi-structured interviews	To explore care home managers' perceptions and experiences of supporting the orientation and navigation of residents living with dementia.	Care home managers are aware of the many spatial and reality orientation challenges their residents experience. They mostly rely on instinct and experience in addressing residents' wayfinding needs.
20	Hughes et al. (2015) UK	Indoor (hospital); familiar	Hospital users (11)	Semi-structured interviews	To understand the environment in which a new wayfinding system must operate and the gaps in provision left by existing navigation aids.	Hospital users, and, consequently, their abilities and needs, are much more nuanced than just staff and patients. Among suggested solutions human helpers were mentioned by almost all participants while technology was only mentioned a couple of times.
21	Iftikhar and Luximon (2022) China	Outdoor (university campus); unfamiliar	Students (12)	Wayfinding task; interview.	To investigate the user's wayfinding behaviour in acquiring environmental information.	On a complex campus, participants found indoor signage more useful that outdoor. Participants struggled to match the digital map to the real world.
22	(Jamshidi & Pati, 2024), USA	Indoor (university campus)	Adults (11, 6 female, 18–33 years)	Think-aloud protocol, digital video recording	To determine the environmental elements and attributes that contribute to the wayfinding process indoors.	Environmental elements that contributed to wayfinding were landmarks, corridors, nodes, regions, stairs, central spaces, courtyards, entrances, connecting halls, voids, doors, interior windows, and outdoor views
23	Kevdzija (2022) Germany	Indoor/outdoor (hospital compound); un/familiar	Stroke patients (70)	Observation, interviews	To provide insights into stroke patients' real-life wayfinding behaviour in rehabilitation clinics.	Wayfinding challenges did not depend on mobility levels of the stroke patients. Asking staff for directions or retracing steps were the most frequent wayfinding strategies. Complexity and repetitive design likely enhanced wayfinding barriers.
24	Khotbehsara et al. (2023) Iran	Indoor (hospital); un/familiar	Adults (11, 5 male)	Semi-structured interviews; observation; space syntax analysis	To investigate the impact of the COVID-19 pandemic on hospital visitors' wayfinding procedure.	Visitors were significantly confused and hesitant throughout their wayfinding process. Spatial accessibility and legibility were not found to be adequate for facilitating the wayfinding of the visitors.
25	Kinsley et al. (2016) USA	Indoor (library); unfamiliar	Library users (24)	Video ethnography; think aloud protocol; observation; debriefing survey.	To evaluate and improve how our users navigate library spaces.	Participants who received good quality help/instructions from library staff were the most successful in their library search. Library directory was not a popular of helpful tool to search for items. Improving signage was the most frequent improvement suggestion.
26	Kwon et al. (2025) USA	Indoor (university campus); unfamiliar	Students (24, 18–25 years)	Mobile eye tracking, concurrent think-aloud protocols, and schematic mapping	To examine visual attention patterns during predefined navigation tasks performed by first-time visitors.	Wayfinding effectiveness in unfamiliar environments depends on both cognitive efficiency and emotional comfort.
27	Mandel (2013) USA	Indoor (library); familiar	Library users (16)	Observation, document review, interviews.	To investigate library user wayfinding behaviour within the entry area of a medium-sized public library facility"	Library patrons had different trajectories while using the library. Whether they were alone or with a companion (e.g. a child) influenced their route. Observed behaviours

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No	Source article, country	Setting	Participants (n)	Methods of data collection	Aims	Main findings related to wayfinding experiences
						differed from participants' own descriptions.
28	Mandel (2018) USA	Indoor (library); familiar	Library users (16)	Observation, document review, interviews.	Presenting selected findings from a multi-method case study into public library user wayfinding behaviour.	See Mandel, 2013.
29	Marquez et al. (2017) USA	Outdoor (built up area); familiar	Older adults (35)	Neighbourhood audit, in-person interviews, and community walks	To identify the strategies and wayfinding aids and cues preferred and utilised by a community of ethnically diverse older adults.	Highlighted the role of landmarks as wayfinding and orientation tools as well as relying on help from others in unfamiliar areas. Street name signs considered important for wayfinding.
30	Meurer et al. (2018) Germany	Outdoor (built up area); familiar	Young older adults (15)	Interviews	To identify everyday way-finding practices of older population and how they can these supported by mobility assistance ICTs.	Typical wayfinding practices of older adults are wayfinding towards familiar or unfamiliar places; ridesharing; special destinations; and favourite places. Discussing the options of using ICT to support older people's wayfinding.
31	Mohamad and Said (2018) Malaysia	Outdoor (built up area); un/familiar	Pedestrians (230)	Questionnaire, interviews	To identify the factors that influence pedestrian familiarity, familiar or unfamiliar, in their wayfinding.	Landmarks and other prominent elements in the built-up environment helped pedestrians recognise their location. Among the barriers were repetitive architectural design, approaching familiar locations from a new angle; landmarks that look similar.
32	Mottet et al. (2016) France	Outdoor (park); unfamiliar	Men (8)	Audio-visual record; self-confrontation interviews.	To characterize novice orienteers' location judgement.	Orienteers' main task is to continually establish if they are on the right track. More disoriented orienteers used the map and terrain features less and relied more on other features like their internal judgement of movement, previous experience, and compass.
33	Neil et al. (2019) Australia	Indoor (Hospital); unfamiliar	Patients (3)	Wayfinding interview; written document review.	To identify health literacy barriers and enablers from an Elective Surgery Access Unit (ESAU) consumer perspective.	Wayfinding-related barriers were limited parking, medical jargon on signage, unclear visual cues. Wayfinding enablers: distinctive pathways, identifiable reception point, verbal directions.
34	Noone (2021) Canada, UK, USA	Outdoor (built up areas); familiar	Not reported	Observation, interview	To investigate street-level wayfinding as an embodied information practice.	Pathways, transmitters, and markings are types of urban forms that help guide navigation.
35	Olsson et al. (2021) Sweden	Outdoor (built up environment); familiar	Individuals with Alzheimer's disease (5)	Walk-along observation and interview	To describe the wayfinding strategies of people with Alzheimer's disease during repeated outdoor walks.	Landmark use was the most popular wayfinding strategy as well as to stop and take time to think.
36	(O'Malley et al., 2018) UK	Indoor (retirement home); familiar	Older adults (13)	Semi-structured interviews	To explore the wayfinding experiences of older adults living in a communal retirement development, and to explore their design preferences.	Identified disorientation causes: repetitive design, long distance between locations, dissociation between the main building of the care home and the annex, having one's apartment a long way from communal areas.
37	O'Malley et al. (2022) UK	Indoor (retirement development); unfamiliar	Older adults (32)	Route learning task; open-ended survey.	To explore older adults' experiential accounts of navigating within an unfamiliar environment.	Healthy older adults were able to use a range of strategies and representations to learn a new route. Verbalising and using visual cues, such as landmarks and signage, were the most used strategies.
38	Passini et al. (2000) Canada	Indoor (nursing home); familiar	Staff members (10) Residents with Alzheimer's disease (6)	Interviews with staff; wayfinding experience of care home residents with AD	To identify wayfinding abilities as well as wayfinding difficulties in advanced dementia patients residing in a typical nursing home.	Staff's assessment of patients' mobility varied greatly. Even patients with severe deterioration were able to solve some wayfinding tasks. Elevator presented especial difficulty for people with AD. Architectural layout of the care home played a major role in wayfinding success.
39	Prescott et al. (2021) Canada	Outdoor (university campus); unfamiliar	Wheeled mobility device users (14)	Questionnaire, wheeling interview, video (GoPro), wayfinding skills test.	To improve our understanding of the challenges people using wheeled mobility devices face navigating the pedestrian environment.	Wheeled mobility device users have restricted access to visual cues due to lower height when sat down. Manual wheelchair users focus more on wayfaring which distracts them from wayfinding activities (e.g.

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No	Source article, country	Setting	Participants (n)	Methods of data collection	Aims	Main findings related to wayfinding experiences
						maintaining orientation and heading).
40	Schmitt et al. (2019) Australia	Outdoor (urban, public transport); un/familiar	General public (30)	Semi-structured interviews	To understand the process of undertaking unfamiliar and familiar transit travel; and the process of habituation from unfamiliar to familiar route travel.	Lack of information about a new mode of transport/route causes stress. Consistent and reliable wayfinding attributes (like maps, signage and labelling, and on-board announcements) has a potential to reduce stress for new users of public transport. Drivers and conductors were valued for providing assistance.
41	Schulze (2021) Austria	Outdoor (built up areas); unfamiliar	Adults with a disability (5, 3 male, 32–62 years)	Interviews (online, moving, reflection)	To comprehend wheelchair navigation as an experience of moving through space.	For wheelchair users, in addition to wayfinding, accessibility of the route and road safety are major considerations during navigation.
42	Seetharaman et al. (2021) USA	Outdoor (urban); unfamiliar	People with mild-moderate dementia (5) Partners (5)	Focus groups; photovoice method; qualitative survey	To explore the saliency of neighbourhood landmarks from an emic perspective (i.e., through the insights of persons living with dementia).	Objects of public art and heritage structures are seen as salient landmarks due to their distinctiveness and meaningfulness, including personal and emotional significance.
43	Silva et al. (2019a) Portugal	Outdoor (urban); familiar	Children (70)	Drawings, survey, interviews	To explore children's perceptions of urban landscapes.	Children seem to be drawn to landmarks that are new, culturally meaningful, significant infrastructure and road safety elements, and ephemeral (ice-cream truck, traffic, the sun).
44	Silva et al. (2019b) Portugal	Outdoor (urban); familiar	Children (27)	Drawings, survey, interviews	To capture children's perceptions of mobility and wayfinding.	Children's representation of a map (drawing) is based heavily on depicting memorable landmarks and other environment features that are of personal interest to them.
45	Singer and Bickel (2015) Israel	Outdoor (urban); familiar	Residents of Jerusalem (34)	Mental maps; questionnaires with open and closed questions.	To explore how material and ideological forms of social exclusion manifest at the borders of Ultra-Orthodox Jewish neighborhoods in Jerusalem and play out in the walking patterns of surrounding (non-Ultra-Orthodox) populations.	The choice of routes depended on: participant's religion, what clothes the female participant wears (modesty); personal safety, previous incident of aggression towards the participant, the gender of the participant, the route being interesting or historically significant.
46	Singh et al. (2025) India	Indoor (train station); un/familiar	Adults (30, 17 male, average age 30 years)	Experiment, survey, interview	To identify and address the navigational challenges faced by passengers at Indian railway stations.	Poor signage and/or inability to read signage (due to illiteracy) were barriers to wayfinding while participants' education level had little impact.
47	Skagerlund et al. (2012) USA	Outdoor (university campus); unfamiliar	Adults (17, 8 female, 20–58 years old)	Experiment, observation, interview	To study how maps are used and how their use might differ depending on people's preferred navigation strategies	Participants with worse sense of direction avoided taking shortcuts and preferred straight lines; they tended to rotate the map to match their surroundings.
48	Spencer and Darvizeh (1983) Iran, UK	Outdoor (built up areas); familiar	Children (40, 3–5 years old)	Interviews, drawing tasks, route-finding task	To compare British and Iranian children's route knowledge of their local neighbourhood.	Iranian children and British children showed distinct stylistic differences in the ways they reported and represented these routes to a stranger.
49	van Lierop et al. (2020) Netherlands	Outdoor (rural/urban); un/familiar	General public (12)	Observation, ride-along videos, semi-structured interviews.	To assess what kind of wayfinding signage is the most effective for cycle highway users in the Netherlands.	Signage for cyclists needs to be "bicycle scale": at eye height for cyclists; high contrast, easy to read font; placed in advance before the decision points.
50	Wattne et al. (2025) Norway	Outdoor (mixed); un/familiar	Adults (12, 3 male)	Observations, interviews, digital ethnography, surveys	To study the case of wayfinding and applicable navigation information and behaviours along the pilgrim paths.	Confirms the applicability of established wayfinding frameworks in the context of pilgrim paths.
51	Wozniak et al. (2025) Poland	Outdoor (built up areas); familiar	Adults (18, 20–42 years old, 7 male)	Walking task, in-depth interviews	To study configurational factors and urban elements impacting route choice behaviour.	Pedestrians' route decisions often depend on geometric and topological information, distribution of urban elements across the urban space, and dynamic elements, such as weather condition, time of day, crowd, noise, pedestrian traffic, and personal associations (emotions, past memories).

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No	Source article, country	Setting	Participants (n)	Methods of data collection	Aims	Main findings related to wayfinding experiences
52	Yan (2025) Thailand	Outdoor/indoor (built up areas); familiar	Public transport users (120)	Interviews, think-aloud protocols, observational studies	To explore the complex interplay between psychological resilience and wayfinding behaviour in transit systems.	Psychological accessibility factors shape wayfinding performance more than the removal of physical barriers.
53	Yu (2025) China, Australia, Netherlands	Outdoor (parks); unfamiliar	Older adults with mild cognitive impairment (45)	Field observation, semi-structured interviews, and sensory mapping techniques	To explore how individuals with MCI perceive and respond to different sensory landscape features in real-world settings.	Participants perceived and responded most positively to sensory features that were emotionally familiar and spatially distinct; auditory and olfactory anchors most effectively supported navigation.
54	Zaugg et al. (2016) USA	Indoor (library); un/familiar	Students (43)	Video recordings of wayfinding tasks; interview; observation.	To identify key differences in the wayfinding strategies used by the novice and expert groups.	Previous experience is the most used wayfinding strategy in the library; while maps, signs and service desks were the most frequently used tools.

Data availability

Not applicable.

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