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Challenging others when posting misinformation: a UK vs. Arab cross-cultural comparison on the perception of negative consequences and injunctive norms

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ABSTRACT

This study investigates the factors influencing the willingness to challenge misinformation on social media across two cultural contexts, the United Kingdom (UK) and Arab countries. A total of 462 participants completed an online survey (250 UK, 212 Arabs). The analysis revealed that three types of negative consequences (relationship cost, negative impact on the person being challenged, futility) and also injunctive norms influence the willingness to challenge misinformation. Cross-cultural comparisons using t-tests showed significant differences between the UK and the Arab countries in all factors except the injunctive norms. Multiple regression analyses identified differences between the UK and Arab participants concerning which of the factors predicted the willingness to challenge misinformation. The findings suggest that participants' self-reported injunctive norms play a significant role in shaping their willingness to engage in corrective actions across both cultural contexts. Moreover, UK participants' reporting of how others perceive negative impact on the person being challenged and injunctive norms were significant predictors, while for the Arabs, only the perceived relationship costs emerged as a significant predictor. This study has important implications for policymakers and social media platforms in developing culturally sensitive interventions encouraging users to correct misinformation.

1. Introduction

Recently, misinformation and its dissemination have received considerable attention, especially in the context of social media. This issue not only challenges the design and functionality of social media platforms but also raises critical questions about user engagement and behaviour in these digital environments. While users of social media platforms can spread misinformation, there is also the opportunity for users to rectify the misinformation. Walter and Murphy's (2018) research has shown the effectiveness of social corrections for misinformation. Interventions designed with the end user in mind, such as digital countermeasures, are a promising way to deal with misinformation (Hartwig, Doell, and Reuter 2023). Additionally, understanding the role of cultural differences in how people act online, especially when spreading and correcting misinformation, as explored in studies by Li, Rho, and Kobsa (2020) and Song, Cramer, and Park (2019), is crucial for creating more culturally adaptive and effective digital

countermeasures for misinformation. This focus on cultural nuances and user-centred design is essential because the impact of misinformation extends beyond digital platforms, influencing real-world decisions and actions.

Misinformation can have serious consequences when people believe and act on it, particularly when it pertains to high-risk situations. One example of the impact of misinformation is seen in the alteration of US voting behaviour, where individuals may vote for a political party or candidate that does not align with their beliefs (Kuklinski et al. 2000). Misinformation is not a novel problem and can affect a range of societal domains, including those that have high relevance and impact, such as spreading misinformation for political gains and supporting certain agendas (Kuklinski et al. 2000) and those related to advising on health and medication that misleads the public (Lewandowsky et al. 2012). It can spread through traditional media, face-to-face communication, and social media, the latter of which has greatly exacerbated the issue by enabling instant posting

and sharing with a broad audience (Del Vicario et al. 2016; Vosoughi, Roy, and Aral 2018).

Repeated exposure to misinformation, owing to its rapid spread and broad dissemination once it enters the social media ecosystem, can increase the likelihood of individuals believing in it (Lewandowsky et al. 2012; Pan, Liu, and Fang 2021). This is known as the 'truth by repetition' effect, where people tend to believe repeated statements more than novel statements (Morgan and Cappella 2023). While the amount of misinformation on public social media platforms as a whole may be relatively small, thanks to advances in artificial intelligence and fact-checking, its presence in closed online groups and communities, e.g. on messaging services, can lead to an expedited spread and increased influence due to factors like trust and shared beliefs. This necessitates social approaches based on peer-to-peer fact-checking and constructive challenges. Efforts to correct believed misinformation can be challenging, as research has shown that corrections often fail to change people's beliefs (Thorson 2015). Consequently, developing effective strategies to combat misinformation is crucial before it can cause harm (Bode and Vraga 2015; Nyhan and Reifler 2010).

Several strategies have been proposed to counter misinformation, including automating the detection and the correction of misinformation, removing malicious accounts that propagate it (Choraś et al. 2021), teaching users fact-checking strategies such as lateral reading to independently verify information sources (Brodsky et al. 2021), and empowering social media users to correct misinformation by responding with accurate information and facts (Bode and Vraga 2017). Among these approaches, user corrective attempts have proven effective in combating misinformation (Walter and Murphy 2018). Lewandowsky et al. (2012) explored how technology-based solutions can leverage the understanding of individuals' responses to misinformation and their efforts to correct it to create impactful interventions. According to a recent systematic review, interventions that are designed with the end user in mind, such as digital countermeasures (e.g. educational modules teaching users to critically evaluate content and real-time fact-checking tools), are a promising way to deal with misinformation (Hartwig, Doell, and Reuter 2023).

However, despite the effectiveness of user interventions in reducing the spread of misinformation (Walter and Murphy 2018), studies have shown that social media users are often reluctant to take a prosocial action to correct misinformation or challenge the person posting them when they encounter it, even when they recognise it as such (Tandoc, Lim, and Ling 2020). According to Gurgun et al. (2022), the barriers to not challenging

misinformation online are similar to those found in offline environments, such as fear of being viewed negatively, damaging relationships, fear of the consequences of expressing ideas, and desire to protect others from embarrassment. In addition, injunctive norms, which refer to individuals' perceptions of others' attitudes towards the acceptability of behaviour (Berkowitz 2003), play a significant role in the reluctance to challenge misinformation, which is often perceived as uncommon and unacceptable behaviour (Gurgun et al. 2023), as people tend to engage in behaviours they believe are widely accepted and to avoid such perceived as unacceptable. Injunctive norm regarding a behaviour is interconnected with all other barriers but pertains to the overall judgement of whether a behaviour is socially perceived as acceptable, irrespective of the underlying reasons. However, it is worth noting that the injunctive norms, including challenging misinformation norms, vary across different communities, cultures, and contexts (Matsumoto 2001; Shaver 2015). In the survey used in this paper, the injunctive norm questions focused on how people reported their perception of the acceptability of a behaviour, both in terms of their own perception and that of others, i.e. whether it is considered a norm. We do not assume that the acceptance or rejection of social correction behaviour itself constitutes a norm. As the barriers to taking action to correct misinformation are social in nature, cultural factors may play a role in determining the extent to which individuals are willing to challenge those who post misinformation.

Recently, researchers have adopted a cross-cultural approach to understand online behaviour and its variances due to cultural differences (Li, Rho, and Kobsa 2020; Song, Cramer, and Park 2019), including the consumption and combating of misinformation (Dinev et al. 2009; Fletcher et al. 2018; Hsu et al. 2015). For example, Yue and Stefanone's (2021) cross-cultural study included 336 American and 236 Singaporean participants revealed that attachment anxiety was positively associated with selfie-capturing frequency in both cultures. Similarly, Dabbous, Aoun Barakat, and de Quero Navarro (2022) conducted a cross-cultural study with 257 Spanish and 254 Lebanese participants and found that individuals with higher education and information skills are more inclined to identify online misinformation. However, most of the studies were carried out with WEIRD (western, educated, industrialised, rich, and democratic) samples (Henrich, Heine, and Norenzayan 2010). They may not accurately represent how individuals from other cultures, such as Arab societies, interact with and respond to misinformation. In this article, we investigated the cultural differences in the behaviour of challenging misinformation

concerning users' perceptions of negative consequences and injunctive norms between Arab and UK social media users.

We define culture as 'the collective programming of the mind which distinguishes the members of one group or category of people from another' (Hofstede, Hofstede, and Minkov 2010, 6). Culture can play role in whether and how people challenge others including the context of correcting misinformation. Arab societies exhibit distinct cultural norms and beliefs compared to Western societies, which could lead to differences in how misinformation is addressed. For instance, Arabs tend to exhibit higher levels of collectivism (Agourram 2014; Hofstede 2001) and to emphasise maintaining the harmony within social groups (Buda and Elsayed-Elkhouly 1998), which could impact individuals' willingness to challenge the misinformation shared by others. Additionally, the tendency in Arab societies to use ambiguous and indirect forms of communication as strategies to preserve harmony between interlocutors (Panina and Kroumova 2015) may further contribute to their reluctance to correct misinformation. Therefore, it is crucial to extend research on willingness to challenge misinformation through corrective actions to include the Arab context to understand the role of cultural differences in shaping individuals' responses.

Additionally, one of the key aspects that could relate to cultural differences in confronting misinformation is conflict avoidance. People have various motivations for avoiding conflict. The dual-concern model posits that individuals opt for conflict avoidance when they exhibit low concern for their own interests and those of the other party (Rahim 1983). This model also suggests that people avoid conflicts if they believe that there is no benefit in engaging in them. However, research studies indicated that the dual-concern model may predominantly apply to Western environments (Oetzel, Dhar, and Kirschbaum 2007), while individuals in Eastern cultures might avoid conflict for other reasons, such as preserving relationships. Consequently, scholars have begun to recognise that conflict avoidance motivations differ across cultures (Cai and Fink 2002; Oetzel, Dhar, and Kirschbaum 2007). Distinct preferences for conflict avoidance have been observed across various cultural contexts. For example, Chinese individuals tend to prefer avoiding conflict more strongly (Tjosvold and Sun 2002), whereas Westerners are more inclined to adopt direct and confrontational strategies (Friedman, Chi, and Liu 2006). However, it is essential to acknowledge the spectrum of conflict avoidance behaviours within and between cultural contexts and be cautious about generalisations. Moreover, the dynamics of online interactions, characterised by heightened anonymity and the presence of disinhibition, might significantly influence online behaviours, including conflict avoidance, make it different from face-to-face interactions (Clark-Gordon et al. 2019). This cultural difference in conflict avoidance could impact how individuals from Arab (Eastern) and UK (Western) societies address misinformation.

Research comparing the willingness of Arab social media users to challenge misinformation to those in Western countries is lacking. Therefore, the present study aims to investigate the cross-cultural differences and the similarities in challenging misinformation behaviour concerning users' perceptions of negative consequences and injunctive norms between Arab and UK social media users. These two cultural contexts are diverse in terms of environmental and social characteristics. This study adds to the limited research on challenging social media misinformation behaviours across different cultural and environmental backgrounds.

2. Theoretical background and research questions

2.1. Negative consequences and injunctive norms of challenging misinformation

Misinformation on social media is a prevalent issue. The problem can be exacerbated when users, despite recognising misinformation, hesitate to challenge it. This section explores various factors that contribute to individuals' reluctance to challenge misinformation that they encounter and recognise as misinformation, as well as the role of injunctive norms in shaping these behaviours. One factor that influences people's willingness to challenge misinformation is the potential impact on their relationships. Social media platforms, such as Facebook, are primarily used for initiating and maintaining relationships (Di Capua 2012; Nadkarni and Hofmann 2012). In this context, individuals may avoid expressing dissenting opinions or challenging others due to concerns about damaging relationships (Cialdini and Trost 1998). They may overestimate the relational costs of challenging misinformation, believing that doing so will result in negative responses and can harm their relationships. Consequently, this avoidance can contribute to the spread of misinformation.

Another factor that limits individuals' willingness to challenge misinformation is the anticipated negative impact on the person being challenged. Users may avoid publicly correcting misinformation sharers because they fear causing embarrassment or damaging the sharer's reputation (Rohman 2021; Steen-Johnsen and Enjolras 2016; Tandoc, Lim, and Ling 2020). This desire to avoid causing harm to others may lead

individuals to abstain from challenging misinformation, even when they recognise it as false (Hoffman 1981; O'Connor et al. 2002). Additionally, a sense of futility may deter individuals from challenging misinformation. The belief that one's efforts will not make a difference, as changing a person's opinion is difficult, can discourage corrective action (Brookover et al. 1978; Milliken, Morrison, and Hewlin 2003; Tandoc, Lim, and Ling 2020). However, since users see the sharing of misinformation as a potential reputational risk (Altay, Hacquin, and Mercier 2022), they may appreciate corrections that ultimately protect their reputation.

Injunctive norms are the perceptions of others' attitudes regarding the acceptability or appropriateness of specific behaviours within a social context (Lapinski and Rimal 2005). One approach to understanding this is that people act like naive social scientists to make sense of the world around them (Eveland et al. 1999). In line with the theory of reasoned action (Ajzen 1985), injunctive norms are considered crucial antecedents of behaviour in various contexts, including individuals' reluctance to challenge misinformation. Consequently, it is essential to consider the role of injunctive norms, which indicate how people would typically react and do, in shaping individuals' intentions to challenge misinformation. If people consider challenging misinformation as socially unacceptable, they may refrain from doing so to avoid negative social consequences. By focusing on how people commonly react to misinformation, researchers can better understand the factors that drive corrective actions and develop interventions that promote the acceptance of challenging misinformation as a positive act in different cultural contexts.

In summary, the decision to challenge misinformation is influenced by various factors, including the potential impact on relationships, the anticipated harm to the person being challenged, and a sense of futility. Moreover, injunctive norms play a critical role in shaping individuals' perceptions of the social acceptability of challenging misinformation. Examining how the social media users report these factors about themselves, referred to as 'self-report' in this paper, and their perceptions of others, referred to as 'perceived', can provide valuable insights into strategies for combating the spread of misinformation on social media. Surprisingly, the perception of factors affecting the willingness to challenge misinformation among individuals who do not live in Western countries has not been previously examined. Accordingly, we address this lapse through analysis of survey data that primarily engages the following research question.

RQ1: How do self-reported and perceived negative consequences and injunctive norms differ between UK and Arab social media users being challenged for spreading misinformation?

2.2. The culture impact on challenging misinformation

According to Hofstede (1991), culture is defined as shared perceptions of rules, values, and norms that differentiates one group of people from another. It shapes the behaviour, interaction, and relation building of individuals (Gudykunst et al. 1996; Hofstede 2001). Hofstede's (1991) model of cultural dimensions is one of the most widely known conceptualisations. It has five different dimensions: power distance (the extent to which members within a society admit and accept unequal power distribution), uncertainty avoidance (the extent to which a society is willing to tolerate uncertainty and risk in various situations), masculinity-femininity (the extent to which a society values masculine traits, such as wealth, accomplishments, and assertiveness compared to feminine traits, such as nurturing, quality of life, and relationships), long- versus short-term orientation (cultural values that emphasise Confucian principles, such as personal stability, perseverance, and respect for tradition, and how society prioritises long-term goals and planning over immediate gratification or short-term gains), and individualism-collectivism (the extent to which people in a society prioritise individual needs and goals over those of the group).

Prior research studies have contributed to our understanding of misinformation processing, but most conclusions are derived from studies conducted primarily in WEIRD countries (Henrich, Heine, and Norenzayan 2010), which may not represent how individuals from other cultures interact with and react to misinformation (Schapals 2018). Recently, researchers have adopted a cross-cultural approach to gain a better understanding of online misinformation consumption and to identify potential behavioural variances related to it due to cultural differences (Dinev et al. 2009; Fletcher et al. 2018; Hsu et al. 2015). For instance, Dinev et al. (2009) discovered that online information consumption, including true and fake news, can be influenced by cultural differences. Examples of cultural dimensions that can affect how people process and act upon online information include individualism-collectivism and long- versus short-term orientation. In individualistic societies, like the United States, innovation, progress, and personal achievements are valued, whereas in collectivistic societies, like South Korea, group interests and stability are prioritised (Kim, Sohn, and Choi 2011). Similarly, Hsu et al. (2015) found significant differences in social media behaviours even when controlling for

socioeconomic status. They found that information seeking was more strongly associated with continuance intention for users from individualistic cultures, while socialisation and self-presentation had a stronger influence on users from collective cultures. These findings suggest that cultural differences play a significant role in shaping social media behaviours, though they are certainly not the only factors at work. This comparative analysis can be broadened to encompass both Arabic and UK cultures, as Arab societies display unique cultural norms and beliefs that differ from those in Western societies. These differences could potentially result in distinct approaches to handling misinformation.

The Hofstede (Hofstede 2001) model's cultural dimensions scores for Arab and UK cultures reveal significant differences that might influence the way individuals in these cultures interact with and react to misinformation on platforms like Facebook. In Arab culture, a collectivist orientation with a strong emphasis on group cohesion might discourage individuals from openly challenging misinformation, while the individualist nature of UK culture may encourage people to be more vocal in questioning and refuting misleading information (Triandis et al. 1988). Furthermore, the legal and the societal frameworks surrounding freedom of speech and expression in both cultures contribute to different approaches towards addressing misinformation. For example, in the UK, there is a strong tradition of protecting freedom of speech and expression (Barendt 2009), fostering an environment that encourages public discourse and debate around controversial topics, including misinformation. Conversely, in some Arab countries, there are perceived and actual restrictions on the extent to which one can argue and oppose the opinions of majorities, established institutions, or other authority figures (Repucci 2020). Our goal is to explore how cultural factors like this affect the individual's willingness to openly confront and correct misinformation in these contexts. In this paper, the term 'negative consequences' encompasses three factors: (a) relationship cost, (b) the negative impact on the person posting misinformation, and (c) futility of the act of correction. Additionally, the term 'injunctive norms' refers to the perception of the social acceptability of the act of challenging misinformation.

We, therefore, pose the following research questions:

RQ2: Is there a difference in the willingness to challenge misinformation on social media platforms between UK and Arab users?

RQ3: What is the relationship between the user's perceptions regarding negative consequences and injunctive norms and individuals' likelihood of challenging misinformation on social media platforms for UK versus Arab users?

3. Research design

3.1. Questionnaire design

We created this study's questionnaire using QualtricsTM (https://www.qualtrics.com), an online survey platform. We explained the terms 'Acquaintance', 'Challenging', and 'Misinformation' to ensure that the participants understood them clearly (Table 1). We intentionally asked about challenging acquaintances. This distinction was crucial because research indicates people may behave differently with acquaintances compared to strangers, potentially hesitating to challenge acquaintances due to the possible impact on their social relationships with them (Valenzuela, Kim, and Gil De Zúñiga 2012). We instructed participants to respond as if they were challenging an acquaintance. We provided this distinction in the survey and asked all participants to confirm that they understood the meaning of 'acquaintance' by checking a box. Our questions and challenges were primarily tailored for acquaintances. For example, injunctive norms are not intended for very close contacts like family members and close friends, nor for strangers of whom one has no prior knowledge. To avoid the impact of the different perceptions of what the term misinformation means, we provided the participants with a scenario featuring a widely shared misinformation news article about a potential asteroid collision with the Earth, originally published on CNN's iReport news hub in 2014 (Matyszczyk 2014). It served as a priming to the participants that the news has no political or social connotations. It was also our aim to show the participants that we are solely discussing news which are factually incorrect, rather than other forms of misinformation such as satire, fiction, and humour. We provided these specific clarifications to reduce potential misunderstandings or

Table 1. Clarifications of key terms presented to participants.

Term	Provided explanation
Misinformation	'**Misinformation**' is any news story or information that is false or inaccurate. People sometimes share misinformation intentionally or unintentionally. They sometimes encounter misinformation on the internet.
Challenging	When people encounter misinformation on Facebook, they respond differently. One of the responses is **challenging**. It means an attempt to question, dispute, or correct misinformation.
Acquaintance	In this research, **acquaintance** refers to connections in the territory between strangers and intimates on Facebook, such as former co-workers, neighbours, or someone you know from a group on Facebook.

ambiguities regarding the terms used in the survey questions. The questionnaire evaluated participants' attitudes and their perceptions about the attitudes of others regarding being challenged for sharing misinformation. The survey design is accessible on the Open Science Framework (OSF) (https://osf.io/cys8j/).

3.2. Pilot test

After finalising the questionnaire design, we conducted a pilot test to validate the clarity and understandability of the questions. The English version was evaluated by 19 native English speakers, whereas the Arabic version was assessed by five native Arabic speakers. Based on the participants' suggestions, we refined the language and grammar of the questionnaire to ensure that the questions were well understood.

3.3. Participants and procedure

A total of 462 participants were recruited for this study, consisting of 250 participants from the UK and 212 participants from the Arab countries of Egypt, Saudi Arabia, Iraq, Jordan, Syria, Bahrain, Lebanon, Oman, Palestine, Kuwait, Algeria, Morocco, Tunisia, Sudan, Yemen, and the United Arab Emirates. The Arabic countries are within the same grouping suggested by the World Values Survey, a large-scale cross-national study that explores many factors including the cultural and social values worldwide (Inglehart et al. 2023). The UK is situated in a different cultural group. In order to ascertain the appropriate sample size, we employed Green's (1991) formula, which posits that the minimum sample size required for conducting a linear regression analysis is $50 + 8*p$, where p denotes the number of independent variables. Therefore, a sample size of 82 participants in each cultural context is considered sufficient for assessing the impact of our four predictor variables on the outcome variable. However, the decision was made to gather data from a sample of 200 to 250 participants in each cultural context. This choice was based on previous research indicating that correlations of around $r = 0.3$ tend to become stable when the sample size is within the range of N = 200 to N = 250 (Schönbrodt and Perugini 2013). We assessed the suitability of the samples for factor analysis using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. The overall KMO measures for both samples exceeded the recommended value of 0.6, suggesting that data were appropriate for the factor analysis (Kaiser 1974). Regarding benchmarking, our sample size is also in line with that of other cross-cultural studies investigating online behaviour, such as (Dabbous,

Aoun Barakat, and de Quero Navarro 2022; Yue and Stefanone 2021).

The inclusion criteria for UK participants required them to be 18 years of age or older, fluent English speakers, active Facebook users with authentic identities, having encountered misinformation on Facebook, and based in the UK. Similarly, Arab participants were required to be 18 years or older, fluent Arabic speakers, active Facebook users with authentic identities, having encountered misinformation on Facebook, and residing in an Arab country. As our study focused on written misinformation posts on social media, it was enough that the participants were able to communicate in modern standard Arabic. As pre-selection criteria, all participants declared their age, language proficiency, Facebook usage frequency, Facebook use with authentic identity, and experience with misinformation. The survey design can be seen in the Supplementary Material of this paper. The survey also included open-ended questions which also served measuring participants' language proficiency and ability to express their thoughts in the survey language.

Participants were recruited through ProlificTM (www.prolific.co) and Cint (www.cint.com), both are well-established platforms for online recruitment in research studies. Participants were invited to take part in an online survey that explored the users' attitudes and perceptions of challenging misinformation on social media. Those who met the inclusion criteria were given the link to the anonymous questionnaire that did not ask for or collect any personally identifiable information (e.g. names, email addresses, IP addresses) after reading and consenting to the participant information sheet that provides an overview of the study's purpose, the selection criteria for participants, the estimated duration of participation, details about data usage and confidentiality, rights of the participants, and contact information for any queries or concerns. The information sheet, in both English and Arabic, is accessible on OSF (https://osf.io/cys8j/). The participants were informed that they had the option to stop at any time. There were three attention checks within the questionnaire. Participants who failed two or more of them were excluded from the analysis. Eligible participants were compensated for their participation. We used the standard compensation rates of the recruitment platforms Prolific and Cint. These platforms provide monetary incentives to participants, which can vary depending on the estimated time to complete the study, ensuring that participants receive fair compensation for their time and effort.

By recruiting participants from both the UK and Arab countries, this study aimed to provide a

comparative analysis of the behavioural outcomes of perceptions regarding the impact of challenging misinformation on social media platforms within these two distinct cultural contexts. This diverse sample allows for a more comprehensive understanding of the factors influencing individuals' likelihood of challenging misinformation across different linguistic and cultural backgrounds. The study was approved by the Research Ethics Committees of Bournemouth University in the UK and Hamad Bin Khalifa University in Qatar.

3.4. Measures

The survey was originally created in English and translated into Arabic by two bilingual individuals, ensuring comparability through a back-translation process (Brislin 1970). The questionnaire consisted of four sections. In the first section, the participants were asked about their demographic characteristics, including gender, age, education level, and country. The second part of the questionnaire assessed the participants' likelihood to challenge misinformation on social media platforms. Participants were asked to recall a specific time when they encountered misinformation on their Facebook feed, shared by an acquaintance in their network. They were then prompted to assess their likelihood of challenging the misinformation in a way that others could see. Participants rated their willingness to challenge misinformation on a 7-point scale, from (1) *Extremely unlikely* to (7) *Extremely likely* (Cohen et al. 2020; Tully, Bode, and Vraga 2020).

The third section focused on the perceived consequences of challenging misinformation when the participant is being challenged for spreading misinformation (i.e. self-reported) and the participant's perception of the others when they are being challenged (i.e. Perception of others). Table 2 summarises the measures adopted in this section. It includes measurements of the perceived relationship costs (Gurgun et al. 2023; Zhang, Zhang, and Wang 2011), the negative impact on the person being challenged (Altay, Hacquin, and Mercier 2022; Milliken, Morrison, and Hewlin 2003; Tandoc, Lim, and Ling 2020), and the futility of the act of challenging (Milliken, Morrison, and Hewlin 2003). Each item is rated on a 7-point Likert scale from (1) *Strongly disagree* to (7) *Strongly agree.*

The last part of the questionnaire assessed the participants' perceived injunctive norms. As shown in Table 2, participants were asked about their opinions on challenging others on Facebook when they share misinformation and how they believed a typical person from their Facebook network would view such challenges. The participants responded to each item on a 7-point scale, ranging from (1) *Very unacceptable* to (7) *Very acceptable.*

Appendix A provides more information about the measures used.

3.5. Data analysis

A combination of descriptive statistics, t-test, regression analysis, and factor analysis were used to answer the research questions effectively in the UK and Arab contexts. All sample variables exhibited skewness and kurtosis values within the range of ±2, suggesting that the data is normally distributed (Curran, West, and Finch 1996). Examination of the Q-Q plots further confirmed the normal distribution of the data (Q-Q plots and Skewness and Kurtosis analysis are accessible on the OSF link: https://osf.io/cys8j/). Accordingly, we adopted the parametric approach in data analysis. Descriptive statistics were used to provide an overview of the demographic characteristics of the participants, while Exploratory Factor Analysis (EFA) was carried out to determine whether the items related to different perceptions could be categorised into meaningful factors. Given these factors, we considered the differences

Table 2. Negative consequences and injunctive norms constructs and corresponding sources.

Construct	Items	Self-Report (*Perceptions*) item description	Source
Relationship Costs	RC1	It would offend me (*them*)	Zhang, Zhang, and Wang (2011)
	RC2	I (*They*) would think that they are (*I am*) aggressive	
	RC3	I (*They*) would think that they are (*I am*) unfriendly	
	RC4	I (*They*) would think that they are not (*I am not*) empathetic	
	RC5	The relationship between us will deteriorate	
	RC6	We will interact less frequently afterwards	
Negative Impact	NI1	I (*They*) would feel embarrassed or upset	Altay, Hacquin, and Mercier (2022); Milliken, Morrison, and Hewlin (2003); Tandoc, Lim, and Ling (2020)
	NI2	I (*They*) would feel that I will be viewed as untrustworthy by other social contacts	
Futility	F1	It would change my (*their*) mind that the information I shared is true	Milliken, Morrison, and Hewlin (2003)
	F2	It would make me (*them*) delete the post	
Injunctive Norms	IN1	How do you (*would a typical person*) find challenging others on Facebook when they share misinformation?	Gurgun et al. (2023)

Table 3. Participants demographics.

		UK (N = 250)		Arab (N = 212)	
		Frequencies	%	Frequencies	%
Gender	Male	143	57.20	140	66.04
	Female	104	41.60	72	33.96
	Non-binary	3	1.20	0	0.00
Age	18–24	44	17.60	31	14.62
	25–34	94	37.60	113	53.31
	35–44	45	18.00	18	8.49
	Over 45	67	26.80	50	23.58
Education	University degree	157	62.80	169	79.72
	College degree	57	22.80	26	12.26
	Secondary and under	36	14.40	17	8.02

Table 4. EFA results of perceived negative consequences and injunctive norms.

	Self-Report				Perceived			
	1	2	3	4	1	2	3	4
Factor 1: Relationship Costs								
RC1	0.69				0.68			
RC2	0.80				0.82			
RC3	0.91				0.91			
RC4	0.82				0.85			
RC6	0.64				0.56			
Factor 2: Negative impact on the person being challenged								
NI1		0.67				0.75		
NI2		0.83				0.59		
Factor 3: Futility								
F1			0.75				0.69	
F2			0.66				0.71	
Factor 4: Injunctive Norms								
IN1				0.91				0.94

between the two cultures using independent-samples t-test. Multiple regressions were conducted to see if there were any differences in the relationships between the identified factors and the willingness to challenge misinformation in both cultural groups and how they explained its variance. The analysis was conducted using JASP software version 17.

4. Results

4.1. Participants demographics

A total of 462 participants completed the online survey, including 250 from the UK and 212 from Arab countries. The demographic breakdown revealed that 176 females (38.10%), 283 males (61.26%), and 3 non-binary individuals (0.64%) participated. In terms of age, 75 (16.23%) were 18–24 years, 207 (44.81%) were 25–34, 63 (13.64%) were 35–44, and 117 (25.32%) were over 45 years of age. Most respondents (326, 70.56%) held at least a university degree, 83 (17.97%) had a college degree, and 53 (11.47%) had secondary education. Detailed demographic information for each cultural group is shown in Table 3.

4.2. Factor analysis of the perceived negative consequences and injunctive norms variables

To determine whether a smaller number of variables could explain the 11 items associated with perceived negative consequences and injunctive norms (Appendix B provides descriptive statistics about the items), an Exploratory Factor Analysis (EFA) was conducted on the data from the 462 participants. Table 4 shows the results of the four-factor varimax rotation analysis. We eliminated one item (i.e. RC5) due to cross-loading with a difference lower than 0.20 between its primary and alternative factor loadings (Howard 2016). We assessed the suitability of the data for factor analysis using the Kaiser-Meyer-Olkin (KMO) measure of

sampling adequacy. The overall KMO measure for both the perceived and the self-report datasets was 0.87, respectively, which is considered good or 'meritorious' according to Kaiser's classification of measure values (Kaiser 1974). Additionally, Bartlett's test of sphericity for both datasets was statistically significant ($p < .001$), indicating that self-report and perceived data were likely factorisable. For both the self-report and the perceived datasets, our EFA extracted four components, accounting for 68% and 67% of the variance, respectively. Visual inspection of the scree plots, a method introduced by Cattell (1966) to determine the number of components to retain, revealed that four components should be retained (Appendix C provides the scree plot figures). Furthermore, the four-component solution satisfied the interpretability criterion. Consequently, four components were retained. Varimax orthogonal rotation was employed to enhance interpretability. The factor loadings for these items were .56 or above. In the Self-Report analysis, the four factors were identified as Factor 1: Relationship Costs (33.6% of the total variance), Factor 2: Negative Impact on the Person Being Challenged (14.7%), Factor 3: Futility (10.8%), and Factor 4: Injunctive Norms (8.9%). Similarly, for the perception of others analysis, the factors were labelled as Factor 1: Relationship Costs (32.8% of total variance), Factor 2: Negative Impact on the Person Being Challenged (14.8%), Factor 3: Futility (9.9%), and Factor 4: Injunctive Norms (9.3%). The component loadings for the rotated solutions can be found in Table 4.

4.3. (RQ1) perception of negative consequences and injunctive norms differences

Given these factors, an independent-samples t-test was used to examine the differences between the two

Table 5. Comparisons in perceived negative consequences and injunctive norms between UK and the Arab countries.

	UK (N = 250)	SD	Arab (N = 212)	SD	t-value	p
Self-Report						
Relationship Costs	3.73	1.49	3.16	1.58	3.95	<.001
Negative impact on the person being challenged	4.74	1.49	4.04	1.87	4.38	<.001
Futility	3.46	1.41	2.59	1.43	6.53	<.001
Injunctive Norms	4.95	1.43	4.74	1.80	1.39	.166
Perception of Others						
Relationship Costs	4.47	1.30	3.79	1.57	5.05	<.001
Negative impact on the person being challenged	4.59	1.27	4.23	1.50	2.79	.006
Futility	3.95	1.22	3.12	1.22	7.28	<.001
Injunctive Norms	4.29	1.34	4.39	1.55	−0.79	.427

cultural contexts to answer RQ1. The t-test was calculated based on the differences in the self-reported and perceived negative consequences and injunctive norms when challenged for spreading misinformation within each culture. The assumption of normality was not violated, as assessed by a normal Q-Q plot for all analyses. The results shown in Table 5 revealed that relationship costs, negative impact on the person being challenged, and futility were significantly higher in the UK than in the Arab context for both self-reported evaluations with significant t-values of 3.95 ($p < .001$), 4.38 ($p < .001$), and 6.53 ($p < .001$), respectively. Similarly, for the perceived evaluations, the relationship costs, the negative impact on the person being challenged, and the futility were significantly higher in the UK than in the Arab context with significant t-values of 5.05 ($p < .001$), 2.79 ($p = .006$), and 7.28 ($p < .001$), respectively. However, there were no significant differences detected for the injunctive norms in both contexts.

4.4. (RQ2) willingness to challenge misinformation difference

Regarding the willingness to challenge misinformation, the Arab group (M = 4.70, SD = 1.80) demonstrated a higher willingness than the UK group (M = 3.30, SD = 1.94). A normal Q-Q plot demonstrated that the data

were normally distributed. An independent samples t-test revealed a statistically significant difference between the Arab and UK groups in their self-reported willingness to challenge misinformation with t-value of −8.01 ($p < .001$) which indicates that Arabs are more likely to challenge misinformation.

4.5. (RQ3) predictors of social media users' willingness to challenge misinformation

To better understand the factors underlying the willingness to challenge misinformation, we conducted multiple regression analyses to investigate how the four categories of negative consequences and injunctive norms, the independent variables, explain variation in the dependent variable, the willingness to challenge misinformation. No outliers were observed in the data. Pearson's correlation was also used to analyse the associations between variables (Tables 6 and 7). All assumptions of linearity, normality, homoscedasticity, and multicollinearity were satisfied.

Regression analysis models used the willingness to challenge misinformation as a dependent variable. We estimated every model independently for self-reported and perceived attitudes in each group. Table 8 presents the results and significance levels for each beta coefficient. Based on self-reported data, regression analysis for the UK sample significantly predicted willingness to challenge misinformation, with F = 11.37, $p < .001$, $R^2 = 0.16$, and adjusted $R^2 = 0.14$. Within this model, injunctive norms emerged as the sole significant predictor of the willingness to challenge misinformation ($\beta = 0.29$, $p < .001$). Similarly, for the Arab sample, the regression analysis also significantly predicted willingness to challenge misinformation, with F = 6.2, $p < .001$, $R^2 = 0.11$, and adjusted $R^2 = 0.09$. In the Arab context, injunctive norms were the only significant predictor as well ($\beta = 0.33$, $p < .001$). These findings indicate that injunctive norms play a crucial role in shaping the willingness to challenge misinformation in both the UK and the Arab countries, as evidenced by their significant predictive power in the respective regression analyses.

Table 6. Correlation between willingness to challenge misinformation and self-reported independent variables.

	UK					Arab				
Self-reported	1	2	3	4	5	1	2	3	4	5
1. Willingness to challenge misinformation	–					–				
2. Relationship Costs	−0.27***	–				−0.07	–			
3. Negative impact on the person being challenged	−0.21***	0.51***	–			−0.02	0.64***	–		
4. Futility	0.02	0.11	−0.32***	–		0.03	0.01	−0.21**	–	
5. Injunctive Norms	0.36***	−0.38***	−0.2 0 **	−0.01	–	0.32***	−0.30***	−0.17*	−0.11	–

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 7. Correlation between willingness to challenge misinformation and perceived independent variables.

	UK					Arab				
Perceived	1	2	3	4	5	1	2	3	4	5
1. Willingness to challenge misinformation	–					–				
2. Relationship Costs	−0.12	–				−0.23**	–			
3. Negative impact on the person being challenged	−0.17**	0.58***	–			−0.11	0.69***	–		
4. Futility	0.01	−0.13*	0.28***	–		−0.06	−0.06	−0.26***	–	
5. Injunctive Norms	0.18**	−0.28***	−0.19**	0.04	_	0.18**	−0.19**	−0.1 0	−0.21**	_

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 8. Multiple regression analysis for predicting willingness to challenge misinformation.

	UK				Arab			
Self-Reported	R^2	Adjusted R^2	F	p	R^2	Adjusted R^2	F	p
	0.16	0.14	11.37	< .001	0.11	0.09	6.20	< .001
Predictors	β	t	p		β	t	p	
Relationship Costs	−0.10	−1.35	.177		0.00	−0.05	.959	
Negative impact on the person being challenged	−0.10	−1.34	.183		0.06	0.65	.515	
Futility	0.00	0.03	.974		0.08	1.09	.274	
Injunctive Norms	0.29	4.72	<.001		0.33	4.82	<.001	

	UK				Arab			
Perceived	R^2	Adjusted R^2	F	p	R^2	Adjusted R^2	F	p
	0.06	0.039	3.54	0.008	0.08	0.06	4.2	0.003
Predictors	β	t	p		β	t	R^2	
Relationship Costs	0.04	0.43	.667		−0.25	−2.68	.008	
Negative impact on the person being challenged	−0.18	−2.13	.034		0. 08	0.75	.457	
Futility	0.06	0.87	.385		−0.03	−0.42	.672	
Injunctive Norms	0.15	2.33	.021		0.13	1. 89	.059	

In the perception of others' attitudes data, the regression analysis for the UK sample significantly predicted willingness to challenge misinformation, with F = 3.54, $p = .008$, $R^2 = 0.05$, and adjusted $R^2 = 0.04$. In this model, a negative impact on the person being challenged ($\beta = −0.18$, $p < .05$) and injunctive norms ($\beta = 0.15$, $p < .05$) were significant predictors of the willingness to challenge misinformation. In the Arab sample, regression analysis significantly predicted willingness to challenge misinformation, with F = 4.2, $p = .003$, $R^2 = 0.08$, and adjusted $R^2 = 0.06$. In this model, only relationship costs emerged as a significant predictor ($\beta = −0.25$, $p < .01$).

5. Discussion

Our study examined factors of perception of negative consequences and injunctive norms within social media related to an important issue that has been long affecting social media users: Misinformation. Misinformation on social media is a serious issue that warrants a deeper understanding that extends beyond individual factors. We did a cross-cultural study to examine how the self-reported and perceived factors are associated with an individual's willingness to challenge misinformation within different cultural contexts. The cross-cultural comparisons of the samples in this study revealed intriguing differences between the UK and the Arab

contexts. Relationship cost, negative impact on the person being challenged, and futility factors were found to be significantly higher in the UK than in the Arab context for both self-reported and perceived. However, injunctive norms did not show a significant difference between the two contexts. This finding provides valuable insights into how culture might influence individuals' perceptions and attitudes toward challenging misinformation on social media.

In light of studies on collectivist cultures that indicate a heightened sensitivity to group harmony and cohesion (Markus and Kitayama 1991; Triandis 1995), we initially hypothesised that individuals from these cultures might be more likely to perceive the negative consequences of potentially disruptive actions, such as challenging misinformation on social media, to be higher than those from individualistic cultures. However, our results reveal a contrary trend where UK participants, who came from a more individualistic culture, exhibited higher levels of perceived negative consequences when compared to Arab participants, who came from a more collectivist culture.

Interestingly, injunctive norms did not show significant differences between the two cultural contexts. This suggests that both UK and Arab participants may have similar perceptions regarding the social norms surrounding challenging misinformation on social media. According to Hampton et al. (2011), social media have

played a significant role in transforming how individuals and societies communicate, share information, and interact. With the growing popularity and power of social networking sites such as Facebook, the number of social media users continues to rise globally (Valkenburg and Piotrowski 2017). As a result, the impact of social media on communication speed and interactivity, ease of information sharing, and shaping cultural norms have become increasingly apparent (Van Dijck 2013). Previous research indicated that social media platforms, such as Twitter and Facebook, have implemented various policies and tools to promote responsible online behaviour and content sharing (Gillespie 2018). This may lead to establishing shared standards and expectations for online behaviour including the norms of correcting misinformation that transcends cultural differences.

Building on the comparison between the factors affecting the willingness to challenge misinformation discussed earlier, the regression analysis provided further insights into the factors that influence the willingness to challenge misinformation on social media. The results revealed that some identified factors predicted willingness to challenge, with distinct patterns emerging between the UK and the Arab samples. For self-reported evaluation, injunctive norms were identified as a significant predictor in both the UK and Arab contexts. This finding suggests that across both cultural contexts, individuals' perceptions of social norms regarding challenging misinformation play a crucial role in shaping their willingness to engage in corrective actions on social media. The observed influence of injunctive norms on individuals' willingness to challenge misinformation is consistent with prior research on the impact of social norms on various behaviours, including physical activity (Fitzgerald, Fitzgerald, and Aherne 2012), marijuana use (Neighbors, Geisner, and Lee 2008), and donation intentions (Smith and McSweeney 2007).

Regarding the perceptions of others' attitudes toward the negative consequences and the injunctive norms, regression analysis identified two significant predictors of individuals' willingness to challenge misinformation in the UK sample: the negative impact on the person being challenged and the injunctive norms. This finding is consistent with the values of individualism that are more prevalent in Western cultures, where personal autonomy and self-expression take precedence (Markus and Kitayama 1991). For instance, people in individualistic societies, like the UK, might be more inclined to confront misinformation when they perceive that the negative consequences for the person being challenged are minimised, and when social norms

support such actions. Conversely, for the Arab sample, only one significant predictor emerged, which is the relationship costs. This outcome highlights the collectivism and valuing of interpersonal relationships in Arab culture (Yousef Obeidat, Shannak, and Mohammed Al-Jarrah 2012). This supports the notion that preserving group cohesion and avoiding conflict with others may be more important in the Arab societies, resulting in a lower likelihood of challenging misinformation. These findings highlight the importance of understanding how the cultural values may shape people's attitudes and behaviours when confronting misinformation.

The Arab group demonstrated a higher willingness to challenge misinformation than the UK group. This finding can be examined in more depth by considering the cultural differences between the two groups. The UK, as an individualistic culture, values personal freedom of choice, which may lead to a lower willingness to challenge others, even in the context of misinformation. This reluctance can be linked to the notion of freedom of speech, which sometimes results in the spread of misinformation, particularly during sensitive times such as elections (Allcott and Gentzkow 2017). In such instances, people might assume that others possess sufficient maturity to discern the truth and may not feel the need to correct them. On the other hand, Arabs, hailing from a relatively collectivist culture, place more emphasis on personal accountability and the well-being of society as a whole (Yousef Obeidat, Shannak, and Mohammed Al-Jarrah 2012). This cultural perspective may lead to a greater willingness to challenge misinformation, as Arabs might consider it their duty to ensure that the community adheres to and engages in rightful behaviour. This sense of obligation can also be linked to religious beliefs, a dominant variable affecting the Arabic culture (KalZiny and Gentry 2012), which emphasises the importance of preventing harm and removing it whenever possible.

The findings of this study have several practical implications for addressing willingness to challenge misinformation on social media. By assessing the factors influencing the willingness to challenge misinformation – relationship cost, negative impact on the person being challenged, futility, and injunctive norms – and understanding their varying importance in the UK and Arab contexts, policymakers and social media platforms can develop culturally-sensitive interventions to encourage users to correct misinformation. For example, social media platforms can develop culturally sensitive interventions to encourage users to correct misinformation by tailoring the design and the functionality of the platforms to cultural contexts and considering the factors related to challenging misinformation identified in the

UK and Arab samples. In line with our findings, Arab users could be approached with messages and interfaces that emphasise the importance of preserving group cohesion and valuing interpersonal relationships, which are central to their collectivist culture, through features such as group discussion tools, community voting or rating systems for content validity, culturally resonant visual cues, and a sensitive mechanism for reporting misinformation that minimises perceived conflict. This approach may help foster a sense of responsibility towards the community and encourage Arab users to challenge misinformation on social media platforms. On the other hand, UK users, coming from an individualistic culture that values personal autonomy and self-expression, can be approached with messages and interfaces highlighting the potential minimal negative consequences for the person being challenged and the support of social norms for taking corrective actions. Recognising the inherent variability of individual experiences within cultural contexts, we emphasise that this approach is based on generalised cultural tendencies, not specific individual predictions, and the efficacy of such strategies may vary based on the specifics of the situation and individuals involved. This approach may resonate with their cultural values and motivate UK users to confront misinformation on social media platforms. This approach aligns with the growing body of research in the field of cross-cultural human–computer interaction (HCI), which emphasises the importance of considering cultural factors when designing effective and usable user interfaces (Adnan, Wei, and Ghazali 2020; Reinecke and Bernstein 2011).

Furthermore, the absence of significant differences in injunctive norms between the two cultural contexts implies that shared global norms around correcting misinformation on social media may be emerging, transcending cultural boundaries. Recognising the importance of injunctive norms across cultures, social media platforms and policymakers can capitalise on these shared norms by fostering a sense of collective responsibility for combating misinformation. This highlights the potential for implementing interventions that promote the acceptance of correcting misinformation as a positive act and encourage the development of soft skills related to confronting misinformation. Enhancing the soft skills such as critical thinking, effective communication, and empathy remain universally valuable across varying contexts, and equipped individuals can harness these soft skills to effectively challenge and correct misinformation on social media. Studies have shown that enhancing soft skills can lead to positive changes in behaviour. For example, a study found that a leadership soft skills development programme based on critical reflection in the work context led to leaders having the potential to promote changing behaviour in management practices (Lemos and Brunstein 2023). Another study showed that enhancing information, motivation, and skills for diabetes self-management can lead to positive behaviour changes and improved health outcomes (Choi et al. 2014).

Addressing the specific factors that influence individuals' willingness to challenge misinformation in different cultural contexts, such as the negative impact on the person being challenged in the UK and the relationship costs in the Arab context, can further enhance the effectiveness of interventions designed to encourage users to challenge misinformation on social media. Understanding such cultural aspects is a user-centric approach as it helps in customising interventions and designs to fit the cultural framework to which a person belongs. Culture, as one of the main influencers on a user's attitudes and behaviour, necessitates an inclusive and universal design that considers the diversity of cultural backgrounds (Cyr 2011; Reinecke and Bernstein 2011). This approach becomes particularly crucial in addressing issues with a societal dimension, such as the spread of misinformation and the asocial act of stopping that spread.

6. Limitations and future research

Despite the insights offered by this study, it is important to acknowledge its limitations and potential sources of bias. Concerning sample size and representation, our research participants were primarily social media users who declared to be engaged in public discourse on social media platforms. As such, the findings may not be representative of more passive users or those who use social media infrequently, thereby limiting the generalisability of our findings. Although our sample size was in line with recommendations from prior research, expanding the sample size in future studies could provide more comprehensive insights and potentially enhance the robustness of our results. Therefore, our study should be viewed as exploratory rather than representative of the entire studied population. Moreover, we focused broadly on challenging misinformation in the context of Facebook acquaintances. We instructed participants to respond as if they were challenging an acquaintance, which refers to someone they are somewhat familiar with but not as close as a family member or a complete stranger. We provided this distinction in the survey and asked all participants to confirm that they understood the meaning of 'acquaintance' by checking a box. Still, the notion could include a range of relational closeness. However, we did not specifically

measure the impact of relational closeness on the reluctance to challenge misinformation. Future research should explore this topic more directly, examining the impact of both relational closeness and cultural context on the reluctance to challenge misinformation.

Furthermore, our study did not explicitly explore the different users' interpretations of what is considered to be misinformation, like the 'folk models' proposed by (Sharevski et al. 2022). These models conceptualise misinformation into different types, such as political argumentation and entertainment. Nonetheless, our findings may provide a context to show the challenge of these types of misinformation. For instance, misinformation perceived as political argumentation might be especially sensitive in both studied cultures. UK individuals, from an individualistic society, might refrain from challenging such misinformation due to concerns about the negative repercussions on the person being challenged. In contrast, Arab participants could be hesitant if they feel it might strain interpersonal relationships, reflecting the 'relationship costs'. On the other hand, misinformation is seen simply as entertainment that might not be challenged due to perceptions of its harmlessness or futility. The findings concerning injunctive norms, which did not significantly differ between the UK and Arab settings, hint at a shared global normative perception concerning challenging misinformation. This might imply that, regardless of which folk model they adopt, individuals from both cultures feel a somewhat equal sense of societal duty in countering misinformation. While our study has provided foundational insights into cultural nuances and their interplay with misinformation, the integration of folk models as a supplementary lens promises a more granular understanding. Future research endeavours could expand on this, shedding light on the multifaceted ways in which individuals from varied cultural backgrounds engage with and challenge misinformation online.

Another limitation is that self-reported measures are subject to social desirability and recall biases (Podsakoff et al. 2003). There is also bias related to the behaviour intention gap (Sheeran and Webb 2016), especially when asking about the willingness to challenge misinformation. Asking our participants about their perception of other's reactions when being corrected for posting misinformation would be an acceptable practice as it is less likely to change. Other studies related to social norms in the literature followed our approach, especially when the research was meant to be exploratory. For example, Perkins et al. (1999) examined college students' misperceptions of the frequency of drug use. They used a survey assessing students' own use attitude and behaviour as well as their perceptions of typical peer attitude and behaviour. Another study by Javier et al. (2013) employed a similar method to investigate the disparities between actual substance consumption rates and perceived rates among university students. In this study, participants were asked about their personal consumption and their perceptions of the average student's consumption. Nevertheless, our results should still be considered exploratory rather than confirmatory. In addition, concerns regarding the ecological validity of our study suggest that the conditions under which the research was conducted do not necessarily reflect the choices users may take in real-world conditions, potentially affecting the applicability and generalisability of our findings to broader contexts. Future research could use alternative methodologies, such as observational or experimental designs, to further validate our findings.

Moreover, our study focused on only two cultural contexts – the UK and the Arab societies – which may limit the generalisability of our findings to other cultures within the Eastern and Western countries. In choosing these cultural contexts, we aimed to capture a broad range of perspectives from multiple Arab countries and contrast them against one Western perspective represented by the UK. The choice to focus on the UK was driven by data accessibility and its different cultural setting compared to Arab countries. It is not necessarily true that the UK represents the entirety of the West. In addition, differences in culture may also exist within the UK's four constituent countries and different regions. Equally, there are distinct cultural variations within Arab countries and differences between Arabs and other Eastern cultures. Consequently, it is essential to conduct additional cross-cultural research at a more localised scale and involving diverse cultural groups, within the Arab countries and also the UK considering its four constituent countries and different regions, to gain a more comprehensive understanding of the factors influencing the willingness to challenge misinformation on social media. The study also did not account for various demographic factors, such as age, gender, and education level, which might influence individuals' perceptions and attitudes toward challenging misinformation. Future research could explore how these demographic factors intersect with cultural differences in shaping the willingness to challenge misinformation.

Another potential limitation is that our study represents a preliminary effort towards gaining a better understanding of how people perceive challenging misinformation in social media, with the formation of norms and the factors influencing these perceptions

still requiring extensive research. The rapidly evolving nature of social media platforms and their influence on communication and information sharing may result in changing norms and perceptions over time. Longitudinal studies could help track these changes and their implications for the willingness to challenge misinformation across different cultural contexts.

7. Conclusion

Our study showed that according to self-reported evaluations, injunctive norms significantly influence users' willingness to engage in corrective actions on social media across both UK and Arab cultural contexts. Moreover, in the case of perceived evaluations, UK participants were more influenced by the negative impact on the person being challenged and the injunctive norms, whereas relationship costs primarily influenced the Arab participants. Despite these findings, it is important to consider the relatively small proportion of the variance explained by our regression models, which suggests that other variables may also play a crucial role in determining individuals' willingness to challenge misinformation. These variables may include the topic of misinformation, individuals' confidence in their knowledge of the topic, personal interest in the topic, interest in the audience receiving the information, and linguistic skills. Therefore, future research should investigate these potential factors to develop a more comprehensive understanding of the various influences on individuals' behaviour in relation to challenging misinformation on social media. By examining these additional factors and further exploring the cultural differences identified in this study, researchers will be better equipped to develop effective and culturally sensitive interventions that encourage users to confront and to correct misinformation in the digital space.

Our study represents a pioneering effort to explore the cross-cultural willingness to challenge misinformation, with a focus on self-reported and perceived negative consequences and injunctive norms. This research illuminates a critical and growing global issue that impacts social media users worldwide. A notable strength lies in its emphasis on populations from Arab countries, comparing them to those from the UK. This unique approach constitutes a significant contribution to the field, as most previous research on challenging misinformation has been scarce and predominantly centred on Western populations. In parallel to other social acts, such as donating or receiving vaccines, tailoring messages to different cultures has proven to lead to a higher response rate and positive outcomes (Siemens et al. 2020). By understanding and addressing the cultural aspects of misinformation, we can develop effective strategies that resonate with individuals from diverse backgrounds, ultimately leading to preventing or at least limiting the spread of misinformation.

Our study's findings are pivotal for the HCI domain, particularly in the context of social media interface design and user interaction strategies. The cultural differences we identified in challenging misinformation underscore the necessity for culturally adaptive user interfaces on social media platforms, a crucial consideration for HCI practitioners. This research aligns with the recent focus on innovative and user-centric technology solutions, presenting our study as not only an exploration of cross-cultural behaviours but also as a blueprint for advancing HCI design principles in combating the spread of misinformation on digital platforms. Furthermore, it opens avenues for future HCI research to investigate how variations in interface design can facilitate the challenging of misinformation across diverse cultural contexts. Our insights contribute to a richer understanding of user interactions in digital spaces, offering actionable guidance for HCI professionals in creating more engaging and culturally sensitive social media platforms.

Authors' contribution

MN was responsible for preparing the study for the Arab context, conducting data collection and analysis, interpreting the findings, and writing the paper. SG conceptualised the research, conducted the original study in the UK, assisted with data preparation and analysis, and contributed to the interpretation of the results. PN and KP reviewed the paper and provided feedback. RA was involved in all stages of the research and provided supervision. All authors have reviewed and approved the final version of the manuscript.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Appendices

Appendix A. List of scales

Demographic characteristics.

Question (Arabic)	Variable name	Scale type	Response options	Source
What gender do you identify with? (ما هو جنسك؟)	Gender	Open-ended response	Open-ended response	Standard demographic questions
How old are you? (ما هو عمرك؟)	Age	Numerical input	Integer value equal or greater than 0	
What is the highest education level you have attained? ما هو أعلى مستوى تعليمي حصلت) عليه؟)	Education level	Single Choice	1: Compulsory school education not completed; 2: Compulsory school education completed; 3: Vocational training; 4: College; 5: University degree; 6: Postgraduate qualification (e.g. MSc, PhD) لم أكمل التعليم الإلزامي، 2: أكملت التعليم الإلزامي، 3: تدريب مهني، 4: كلية، 5: 1:) درجة جامعية، 6: تحصيل متقدم كدرجة ماجستير أو دكتوراة)	
What is your main country? ما هو البلد الأساسي الذي تنتمي) إليه؟)	Main country	Open-ended response	Open-ended response	

Likelihood to challenge.

Question (Arabic)	Variable name	Scale type	Response options (Arabic)	Source
Think about a specific time when you saw misinformation on your Facebook feed, shared by an acquaintance in your Facebook network. How likely were you to challenge the misinformation in a way that others can see? فكر في مناسبة ما رأيت فيها معلومات خاطئة على فيسبوك قام) بمشاركتها أحد معارفك عليه. ما مدى احتمالية أنك تقوم بمواجهة تلك المعلومات الخاطئة بطريقة يمكن للآخرين رؤيتها؟)	Willingness_to_challenge	7-point (ordinal) Likert item	1: Extremely unlikely, 2: Unlikely 3: Somehow unlikely, 4: Neutral 5: Somehow Likely, 6: Likely 7: Extremely likely غير محتمل أبدًا، 2: غير محتمل، 3: غير (1:) محتمل إلى حد ما، 4: غير متأكد، 5: محتمل إلى حد ما، 6: محتمل، 7: من المحتمل بشكل كبير)	Cohen et al. (2020); Tully, Bode, and Vraga (2020)

Injunctive norms.
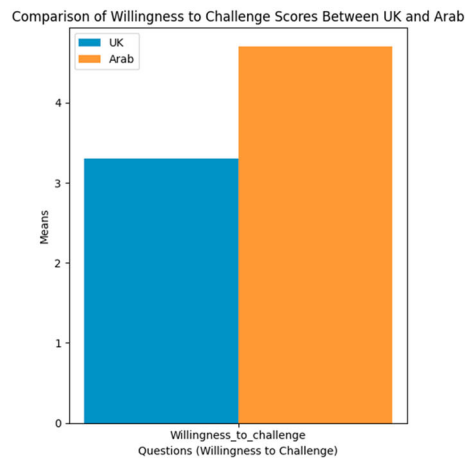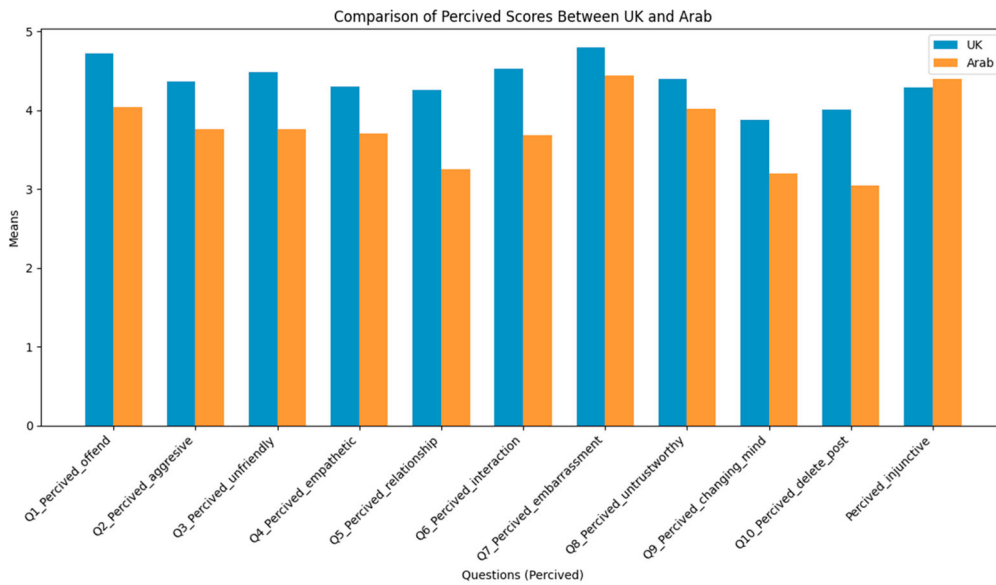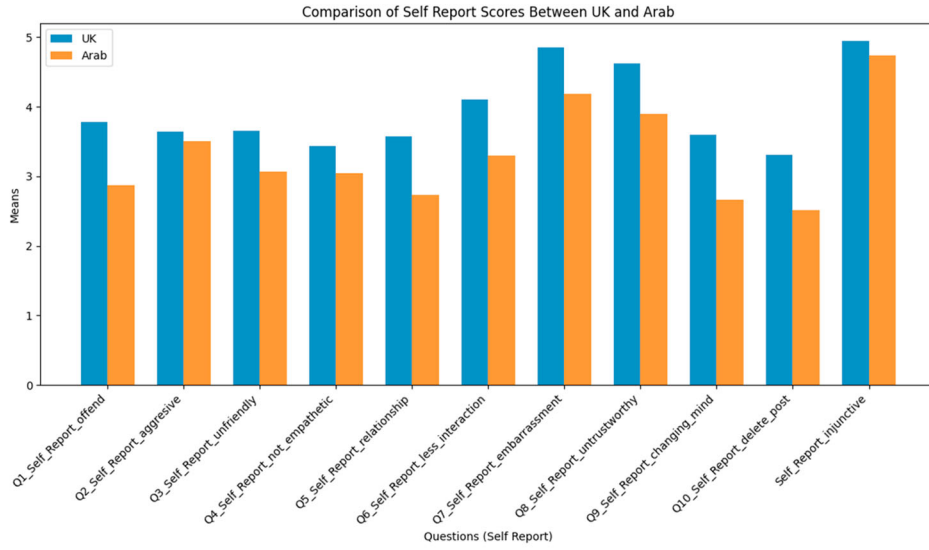
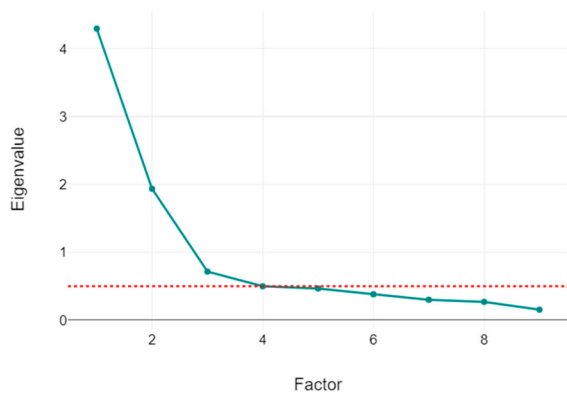| Question (Arabic)	Variable name	Scale type	Response options (Arabic)	Source
How do you find challenging others on Facebook when they share misinformation? كيف تجد قيامك بمواجهة الآخرين على فيسبوك عندما) يشاركون معلومات خاطئة؟)	Self_Report_injunctive	7-point (ordinal) Likert scale	1: Very Unacceptable, 2: Unacceptable, 3: Somehow Unacceptable, 4: Neutral, 5: Somehow Acceptable, 6: Acceptable 7: Very Acceptable	Gurgun et al. (2023)
How would a typical person from your Facebook network find challenging others when they share misinformation? كيف سيجد شخص اعتيادي من شبكة فيسبوك الخاصة بك) قيامه بمواجهة الآخرين عندما يشاركون معلومات خاطئة؟)	Percived_injunctive		غير مقبول على الإطلاق، 2: غير مقبول، 3: غير (1:) مقبول إلى حد ما، 4: غير متأكد، 5: مقبول إلى حد ما، 6: مقبول، 7: مقبول جدًا)	

Self-Report (Perceptions).

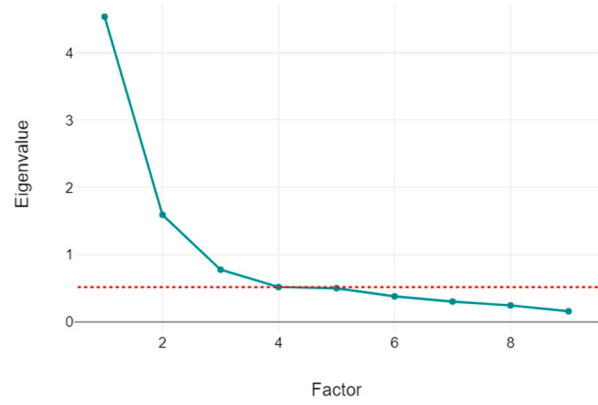| Question- Self-Report (perceived) [Arabic]	Variable name	Scale type	Response options (Arabic)	Source
It would offend me (*them*). [سأشعر (سيشعرون) بالإهانة]	Q1_Self_Report_offend *(Q1_Percived_offend)*	7-point (ordinal) Likert scale	1: Strongly disagree 2: Disagree, 3: Disagree somehow, 4: Neutral 5: Agree somehow, 6: Agree 7: Strongly agree (1 :أعارض بشدة، 2: أعارض، 3: أعارض إلى حد ما، 4: لا أوافق ولا أعارض، 5: أوافق إلى حد ما، 5: أوافق، 7: أوافق وبشدة)	Zhang, Zhang, and Wang (2011)
I (*They*) would think that they are (*I am*) aggressive. [سأفكّر أنهم عدائيّون (سيفكرون أني عدائي]	Q2_Self_Report_aggressive *(Q2_Percived_aggressive)*			
I (*They*) would think that they are (*I am*) unfriendly. [سأفكّر أنّهم غير وَدودين (سيفكّرون أني غير وَدود]	Q3_Self_Report_unfriendly *(Q3_Percived_unfriendly)*			
I (*They*) would think that they are not (*I am not*) empathetic. [سأفكّر أنهم أشخاص غير متعاطفين (سيفكرون أنني شخص غير متعاطف)]	Q4_Self_Report_not_empathetic *(Q4_Percived_not_empathetic)*			
The relationship between us will deteriorate. [ستتدهور العلاقة بيننا]	Q5_Self_Report_relationship *(Q5_Percived_relationship)*			
We will interact less frequently afterwards. [سنتفاعل مع بعضنا بوتيرة أقلّ بعد ذلك]	Q6_Self_Report_less_interaction *(Q6_Percived_less_interaction)*			
I (*They*) would feel embarrassed or upset. [سأشعر (سيشعرون) بالحرج أو الانزعاج]	Q7_Self_Report_embarrassment *(Q7_Percived_embarrassment)*	7-point (ordinal) Likert scale	1: Strongly disagree 2: Disagree, 3: Disagree somehow, 4: Neutral 5: Agree somehow, 6: Agree 7: Strongly agree (1 :أعارض بشدة، 2: أعارض، 3: أعارض إلى حد ما، 4: لا أوافق ولا أعارض، 5: أوافق إلى حد ما، 5: أوافق، 7: أوافق وبشدة)	Altay, Hacquin, and Mercier (2022)
I (*They*) would feel that I will be viewed as untrustworthy by other social contacts. سأشعر بأن المعارف الآخرين سينظرون إلي على أنني غير جدير بالثقة (سيشعرون بأن المعارف الآخرين سينظرون إليهم على أنّهم غير جديرين بالثقة)]	Q8_Self_Report_untrustworthy *(Q8_Percived_untrustworthy)*			
It would change my (*their*) mind that the information I shared is true. قد تساهم هذه المواجهة في تغيير رأيي فيما إذا كانت] المعلومة التي شاركتها صحيحة (قد تساهم هذه المواجهة في تغيير رأيهم فيما إذا كانت المعلومة التي شاركوها صحيحة)]	Q9_Self_Report_changing_mind *(Q9_Percived_changing_mind)*	7-point (ordinal) Likert scale	1: Strongly disagree 2: Disagree, 3: Disagree somehow, 4: Neutral 5: Agree somehow, 6: Agree 7: Strongly agree (1 : أعارض بشدة، 2: أعارض، 3: أعارض إلى حد ما، 4: لا أوافق ولا أعارض، 5: أوافق إلى حد ما، 5: أوافق، 7: أوافق وبشدة)	Milliken, Morrison, and Hewlin (2003)
It would make me (*them*) delete the post. قد تجعلني هذه المواجهة أحذف المنشور (قد تجعلهم هذه] المواجهة يحذفون المنشور)]	Q10_Self_Report_delete_post *(Q10_Percived_delete_post)*			

Appendix B. Items descriptive statistics

Comparison of Self Report Scores Between UK and Arab

Comparison of Percived Scores Between UK and Arab

Comparison of Willingness to Challenge Scores Between UK and Arab
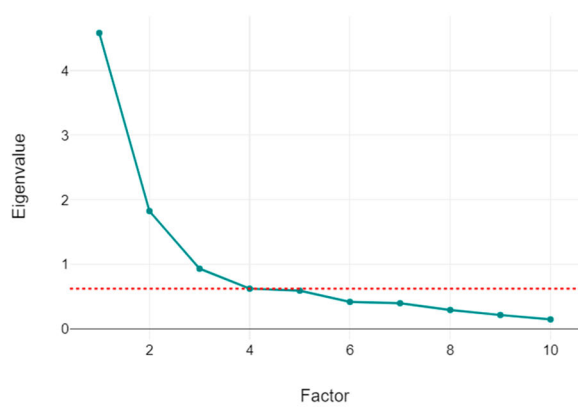
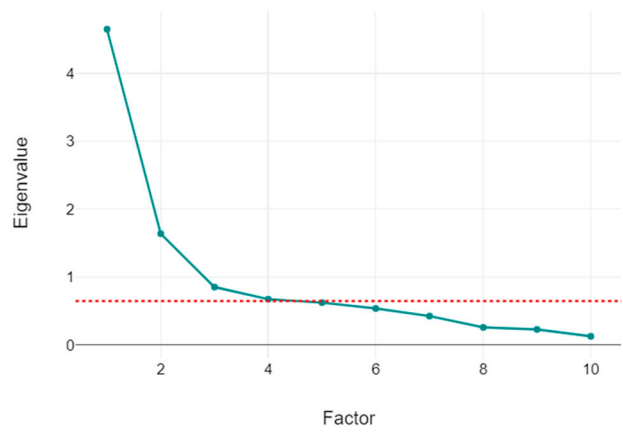## *Appendix C. Scree plots of exploratory factor analysis*

(a) UK sample- Self-reported data

(b) Arabic sample- Self-reported data

(c) UK sample- Perceived data

(d) Arabic sample- Perceived data