

# “I figured her feeling a little bit bad was worth it to not spread that kind of hate”: Exploring how UK families discuss and challenge misinformation

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## ABSTRACT

Misinformation has become a regular occurrence in our lives with many different approaches being sought to address it. One effective way to combat misinformation is for trusted individuals (e.g., family members) to challenge the misinformed person. However, less is known about how these conversations between trusted individuals occur, and how they may impact on relationships. We look to address this gap by conducting semi-structured interviews with family members in the UK who have experienced misinformation within their family networks. We identify several barriers individuals face when challenging misinformed family members, such as the misinformed person’s personality and the extent that pre-conceptions influence beliefs. We also find individuals developing strategies to overcome these barriers, and to cope with difficulties that arise through these conversations. Despite technology being the main driver for misinformation spread, we find it has limitations when used to facilitate or mediate conversations for challenging misinformation between family members.

## CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in HCI**.

## KEYWORDS

Misinformation; Disinformation; Propaganda; Family

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## 1 INTRODUCTION

Misinformation is a worldwide digital epidemic and was recently declared a terrorist threat by the US Department of Homeland Security [27] as there is a growing body of knowledge highlighting the significant negative effects it can have on national civil discourse [61], and on health [55]. Misinformation proliferates through social networking platforms, word of mouth, and traditional media. Research also suggests that misinformation is spread through online messaging platforms such as WhatsApp [48], and in particular within friend [17] and family group chats [21]. Messaging platforms have looked to reduce the spread of misinformation through their platforms. For example, WhatsApp now limits the number of times a message can be forwarded which may slow the spread but is unlikely to stop it [18].

Other attempts have been made to address misinformation, with most research focusing on ways to prevent or counter misinformation, and the beliefs that form through exposure. Interventions typically take the form of either prevention (proactive) or cure (reactive). For example, digital inoculation tools such as the Fake News game [50] act as preventative interventions. Similar to a viral vaccine, these tools are designed to expose individuals to a controlled amount of misinformation or misinforming tactics to help them develop resistance. Other preventative interventions include organisations creating their own, non-misinforming content [40] and targeted messaging by doctors over instant messaging platforms to counter health misinformation [30]. Similarly, cure-type interventions have been explored such as companies responding to misinformed tweets with and without external sources to support them [65, 66].

What most interventions have in common is their need to persuade people of the inaccuracies in the information to which they are exposed. Research has shown that an effective way to do this is to involve individuals who share a close personal tie [7, 44], or are perceived to have a shared identity [14], such as a family member. HCI research has already utilised families to investigate areas such as socio-political discussions in the home [16]. The unique position of family members in the context of misinformation offers opportunities to both combat misinformation that is spread within family messaging groups, and to involve family members in challenging misinformation beliefs outside of these groups.

Prior work focusing on the relationship between family and misinformation highlights significant challenges around family members challenging misinformation. Within some cultures, there are strict family hierarchies that can make challenging misinformed family members difficult. For instance, the concept of ‘face’ within certain cultures means challenging behaviours need to be carefully considered to avoid being disrespectful [37, 38]. Therefore, to design effective interventions and tools that incorporate family, we need to understand how misinformation is discussed within these networks, and how misinformation affects family relationships. In developing this understanding, we hope to contribute to the development of effective and responsible family-based misinformation interventions.

To better understand interactions between misinformed family members, we interviewed 10 UK residents who had experienced misinformation spread within their family networks. Our findings extend prior research exploring barriers that individuals experience when challenging misinformation [37]. Although family hierarchy and the role of family members is recognised as a challenge in misinformation correction [37, 45, 58], our findings indicate that family members in a higher authoritative role are also an effective resource to support the challenging of misinformed beliefs. Our work supports prior work which finds people preferring to hold misinformation conversations offline as opposed to online [45]. However, we also identify a number of strategies that assist individuals in challenging misinformation, which are similar to techniques used in misinformation correction in asynchronous online social media platforms [7, 65, 66]. Finally, we report multiple coping mechanisms used by misinformation challengers to help them deal with their experiences during these conversations.

## 2 BACKGROUND AND RELATED WORK

This section starts by exploring different types of misinformation and methods of addressing its impact and spread. As our research is interested in interventions involving families, we review research on misinformation interventions and then focus on research on how misinformation affects families, and how misinformation may be challenged within family networks.

### 2.1 Misinformation, Disinformation and Propaganda

Misinformation has proliferated through social media platforms with significant consequences. For example, it has led to a reduced belief in the efficacy of vaccinations [5] and associated uptake in the use of harmful medical remedies that have led to deaths [63] and played a role in manipulating political beliefs [24]. There is no agreed definition of misinformation, yet several definitions have been proposed, and most agree that definitions should refer to information that is incorrect. For instance, Vraga and Bode define it as information that is incorrect according to “the best available evidence from relevant experts at the time” [68]. However, this definition does not allow for specificity when compared to other types of information, as misinformation is often defined as being created without the intention of causing harm [34]. Due to this lack of specificity, misinformation is often used to describe different types of information, including disinformation and rumour [12].

One way to categorise misinformation types is to look at the effect they have on individuals and society as a whole. For example, disinformation harms both civil discourse and democracy, becoming more effective when public trust in institutions is low [47, 61], and when it is intentionally created with the goal of harming an individual, group or state [34]. Whereas propaganda is often considered a form of mis/disinformation and has played an important role in political elections and referendums [20, 47] and is thought to be particularly effective when its messaging aligns with people’s pre-existing ideologies, as believing in misinformation is driven by individual emotional and cognitive responses [61]. To differentiate between misinformation, disinformation and propaganda, the definition we use in this study is “incorrect information shared without harmful intent”, as this definition encompasses the false nature described by Vraga and Bode, and explicitly includes the lack of intent described by Madraki et al. [34].

Misinformation can affect a range of areas in day-to-day life, including personal health and wellbeing. The world witnessed this during the COVID-19 pandemic, where false information related to the virus was circulated [19, 28, 54], causing issues for both authorities and organisations. For example, in the UK during COVID-19 where trust in the UK Government’s handling of COVID-19 was low, more individuals turned to social media for COVID-19 related information [54], potentially encountering more misinformation, exacerbating the issue as individuals are more susceptible to false information when trust in institutions is low [63]. Misinformation can also affect identity [67], potentially increasing subsequent misinformation exposure as individuals engage with identity-relevant content on social media platforms. Information that aligns with a person’s identity is perceived as more credible by the reader [14]. Consuming and sharing misinformation also gives individuals a sense of belonging and community [69]; with misconceptions becoming more difficult to alter if they are part of someone’s identity [65].

### 2.2 Misinformation Interventions

Misinformation is now a common digital threat of the modern era and its resultant damage should be a cause for concern for HCI researchers, as it is interactions with digital tools that can expose users to misinforming content. HCI research has identified areas of misinformation spread from a corporate perspective [29], difficulties addressing misinformation in the media [41], and the impact of social status on influencing engagement with misinformation [62]. Empirical research into misinformation interventions typically falls into one of two main categories: prevention, or cure. Misinformation ‘inoculation’ interventions take a preventative approach and suggest that people can be inoculated against misinformation, analogous to how people are inoculated against disease [60]. These interventions range from game-style exposure to misinformation and the tactics of misinformation creators [35, 49, 50], warnings that discourage users from viewing misinforming content [11, 43, 51] to individually targeted messages comprising of certified facts so individuals are informed prior to their misinformation exposure [30, 59]. Research has demonstrated that the long-term effectiveness of inoculation is limited, with the highest efficacy being when individuals are inoculated at regular intervals (e.g., monthly) [35]. Preventative

measures have also been integrated into messaging platforms to restrict content sharing. However, research suggests that while this form of restrictive mechanism can slow the spread, it is unlikely to stop it completely [18].

Cure-based interventions have also been explored by researchers and social media platforms. These are typically built into online platforms and include: strategies to support users in correcting misinformation [58], and organisational factors affecting the correction of misinformation online [6, 64]. Researchers have started to explore the efficacy of these interventions. For example, research into misinformation warning flags suggests that they have limited effectiveness as interaction with misinforming posts reduces for only a short period after exposure [11], as people become desensitised to the flags [51]. Providing source labels is more effective than helping people undertake their own fact-checking processes [26]. Research has shown that, when correcting misinformation on social media platforms, the most effective misinformation intervention stems from friends and family members [7]. We know from the literature that heuristics and biases influence behaviour [1], and that traditional heuristics – or mental shortcuts – are often not relied upon when reading on social media [63]. As these heuristics are not present, individuals are more likely to view information that has been endorsed by a friend or family member, rather than information that aligns with their own values and identity [3], thus succumbing to in-group bias [42].

### 2.3 Misinformation within family and friend networks

Increased trust within family and friend groups mean individuals are more likely to deem information from these groups to be more trustworthy [7]. When a sample of UK residents was asked about the trustworthiness of six information sources (including television, radio, social media, family and friends, newspapers and podcasts), participants considered social media as the least trustworthy and family and friends as the most trustworthy source of information [63]. However, this does not mean that misinformation is not spread by family and friends. For example, 26% of a sample of 2244 UK residents had seen or heard COVID-19 anti-vaccination messages on social media, shared by friends and family [15].

Where close ties share misinformation on social media, research shows how disagreement over the veracity of information can result in a disconnect between family and friends, leading to conflicts, frustration or arguments [33]. This is similar to arguments that stem from political differences [13]. Subsequently, when faced with misinformation spread, individuals can be discouraged from correcting information online to prevent conflict with friends and family [65]. There is often a preference for these conversations to be held face-to-face as it allows individuals to reduce the risk of conflict by being more responsive to emotional cues [45].

Cultural values can also impact misinformation correction behaviours within family networks. Malhotra and Pearce’s investigations into misinformation intervention in Indian families address Malhotra’s previous hypothesis that high levels of respect for elders may impact people’s willingness to challenge misinformation [36]. Although challenges do occur within Indian family networks,

emphasis is placed on the avoidance of being disrespectful and questioning the competency of individuals who are higher in the family hierarchy [37, 45]. Their study showed that strategies and coping mechanisms were utilised, such as bringing up the broader misinformation topic rather than directly correcting the misinformation to preserve politeness and reduce the appearance of challenging. Individuals did this by correcting the ideology that underpinned the misinformation, rather than addressing the specific piece of misinformation itself, a strategy that required additional effort for their participants [37]. This indicates that the role of relationships shown within this study is present in wider-reaching society, and should be considered when exploring inter-personal misinformation correction. Similar behaviours have been shown within Kenyan culture, where elders also play a vital role in family dynamics [58]. These cultural implications, in addition to the risk of conflict, may cause further difficulties when addressing misinformation within families. As misinformation correction on social media has been shown as more effective when conducted by family members [67], more insights are needed into misinformation correction between family members, outside of a social media feed, to explore how these interactions take place in practice and what role technology currently plays in these interactions.

In summary, prior research highlights the potential for close family ties to act as a resource for reducing the spread of misinformation and the formation of misinformation beliefs as a result of this spread. Prior work also highlights family networks as being a source for misinformation spread, through online social and messaging platforms, but has not shown how this misinformation spread impacts family relationships. If families are to be used as a resource to tackle the spread and impact of misinformation, we must first better understand how misinformation is currently challenged within these networks. This is important especially for HCI research, as creating this better understanding will help later inform how to design preventative and corrective interventions within families specifically. Additionally, as most of the previous research regarding misinformation intervention and correction has explored this through surveys, experiments, or simulated platform use, what is lacking is a rich qualitative understanding of how family members challenge misinformation and the role that digital resources can have in challenging misinformation where individuals share a close tie. To guide our data collection and analysis, we ask the following research questions:

*RQ1: What effect can misinformation have on family relationships?*

*RQ2: What factors contribute to family members challenging one another on misinformation?*

*RQ3: How does the communication method influence misinformation challenging in a family network?*

## 3 METHOD

We conducted semi-structured interviews with 10 UK participants. We used a semi-structured interview approach to benefit from the in-depth casual-style conversation to obtain a large amount of data [2, 25], allowing us to investigate the literature gap in detail. Each interview was conducted online by the first author using Microsoft Teams between February and April 2022. Interviews

lasted between 30 and 60 minutes with each participant being remunerated with a £10 voucher. The interview covered background information including how the individual usually communicated with their family and whether they shared values. We also explored participants' definitions of (and views about the effects of) misinformation. Finally, we explored participants' experiences of when they (or a family member) addressed the misinformed views of a family member. During the interview the audio was recorded, automatic transcription was used and notes were taken. The questions posed as part of this interview can be viewed in the supplementary materials.

### 3.1 Ethical considerations

Due to the nature of this study, there were a number of ethical considerations. The conflicts surrounding misinformation spread could be mentally traumatic to participants and so it was important that data collection was conducted to consider potential upset that could occur through participants reliving these experiences. To help address this, resources to specific support organisations were sent to all participants at the end of each interview which provided them with a pathway to support if they needed it. In addition to this, the data collection and analysis were concurrent. This was done to ensure that once no new insights were being learnt from participants, recruitment ceased. This meant no interviews were conducted unnecessarily. This study is based on a research project approved by the ethics committee of the [anonymised] with reference [anonymised].

### 3.2 Participant recruitment and sample description

We recruited participants using posters and online social media posts which stated that we were interested in investigating the effects of misinformation on family relationships and conflicts in the household. The adverts stated that we were looking to recruit people who: (a) had experienced misinformation spread within their family, (b) lived within the UK, and (c) were English speaking. Respondents were asked to complete a short screening survey, which could result in them being invited to an online interview, a copy of which can be found in the supplementary materials. Participant recruitment took place concurrently with the analysis of interview data allowing us to determine the richness of the data based on guidance from Braun and Clarke [9, 10, 39]. Once we were satisfied that we had collected enough data to address our research questions, we ceased recruitment in accordance with the ethical considerations outlined above. All 10 participants met our inclusion criteria which was determined through the screening survey where (in addition to demographic questions such as age, geographical location and ethnic background) potential participants were asked whether misinformation had been shared within their family. If it had, they were asked to describe the incident, whether they had discussed the misinformation with them, and what happened during the discussion. The participants then had time between the submission of the survey and the interview to reflect on their answers. Characteristics of the interview participants are presented in Table 1. Eight participants had discussed misinformation with their family members, while two (marked with an asterix) had

observed other family members challenging misinformed beliefs. Throughout the sample, there was a varying level of success in terms of changing views and beliefs, and varying levels of impact that the misinformation had on family members' lives.

Participants were asked to identify how misinformed their family member was at the time that the participant decided whether to challenge. They were shown a scale (Figure 1) and asked to identify where their family member was on the scale by stating either the title of the heading or the number they associated with it. This question took place mid-way through the interview, after determining their understanding of misinformation, and their relationship with their family. This question referred to their beliefs on the specific misinformation topic that was addressed during the challenge. Figure 1 presents the scale shown to participants annotated with participant responses.

Positioning participants along this scale shows that the majority believed that the impact of misinformation on their family members ranged from them having simply been exposed to misinformation all the way through to the misinformation altering part of their identity. Three participants (P4, P7, P8) believed that the misinformation had a significant impact on their family members, with two believing that the misinformation had become part of their identity (P4, P8). This greater level of impact is key, as misinformation when part of identity becomes significantly more difficult to challenge [65].

Across this sample, participants supplied many different definitions for misinformation, most of which differed from the definition outlined in section 2.1 as they included an intention behind the misinformation. All participants believed that misinformation has a negative impact on society, causing polarisation and an 'us and them' mentality (P6). The majority of definitions provided by participants included the intention to cause harm, drive an agenda or mislead opinions. Although participants included characteristics often linked to disinformation, understanding how participants conceptualised misinformation was valuable in understanding the context in which the challenge occurred.

### 3.3 Analysis

Interview transcripts were coded using an inductive thematic analysis approach [8, 10], and coded by the first author using NVivo to generate initial codes and to develop initial themes. Then, a collaborative approach with the second and last author was used to develop and review the themes. In this collaborative stage of the analysis, printed segments of transcripts were used to visualise and organise the data into groups that would later become candidate themes. We used post-it and whiteboard notes to develop and document the themes based on the discussions around how to group the data. After this step, the first author once again iterated through each transcript to refine the coding. Finally, the coded data and themes went through a final review to clarify the names of themes and refine the scope of any developed sub-themes. This process resulted in the development of five themes: (1) reasons for challenging, (2) barriers to challenging, (3) resources for challenging, (4) coping mechanisms, and (5) outcomes of inner-family misinformation challenges. In the next section, each of the developed themes will be presented and broken down into respective sub-themes.

**Table 1: Sample Characteristics and details of how the challenge took place**

Participant No.	Age	Summary of their Definition	Description of experience	Relation	Topic	Method for Challenging
1	25-34	False information deliberately intended to achieve a goal	Sister shared incorrect information about political party colours in the UK	Sister	Politics	Face-to-face
2	18-24	Information that is true but presented intentionally to benefit the author	P2 brought up examples of misinformation and their father agreed with the misinformation	Father	COVID-19	Face-to-face
3	25-34	Sharing incorrect information either accidentally or intentionally	Mother shared anti-transgender article on social media	Mother	LGBTQ+	Telephone
4	45-54	Information provided with a deliberately misleading context	Uncle repeatedly posted anti-vaccine COVID-19 misinformation on social media	Uncle	COVID-19	Instant messaging & social media comments
5*	25-34	Information shared with the intention of driving an agenda and someone trying to disguise opinion as fact	Aunt shared anti-vaccine COVID-19 misinformation through instant messaging	Aunt	COVID-19	By others — via instant messaging
6	18-24	Incorrect information gathering or disinformation information specifically designed to target a demographic about a certain subject	During a discussion about the news parents brought up their misinformed views on vaccinations	Both parents	Vaccinations	Telephone
7	18-24	Unconfirmed or false representation of facts	Mother was extremely reluctant not to get COVID-19 vaccination due to belief in misinformation	Mother	Vaccinations	Face-to-face
8	45-54	Individual or state actors misrepresenting news, making up facts, putting facts in the wrong context or outrageous lying	Mother shared incorrect care tips to avoid COVID-19 through instant messaging. Also had disagreements on Brexit propaganda	Mother	COVID-19 & Brexit	Telephone
9*	25-34	Share information that is false, likely to cause problems/disorder	Aunt shared an old video showing violent attack near the family home, believing it had occurred recently	Aunt	Violent attack	By others — via instant messaging
10	35-44	Misinformation is a way of developing the wrong opinion on something, aimed at people who are open-minded but also not knowledgeable	Mother and grandfather both disagreed with P10 on Brexit, due to propaganda	Mother and Grandfather	Brexit	Face-to-face

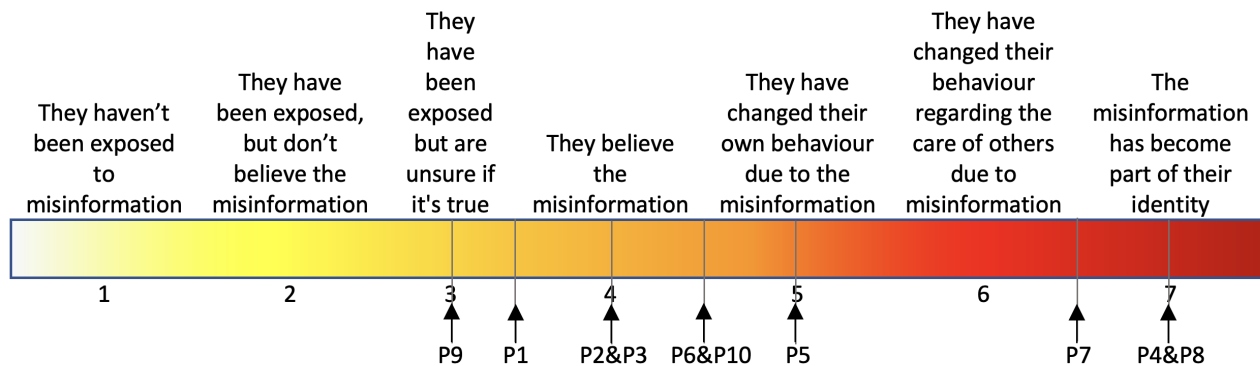


Figure 1: Annotated scale showing the extent participants' family members were misinformed pre-challenge

## 4 FINDINGS

### 4.1 Reasons for Challenging

Participants who discussed challenging their misinformed family members often highlighted specific reasons for doing so, which included educating their family members, reducing the spread of harm, or just wanting to understand their rationale. This theme also explores aspects of time and place in relation to the challenge and the reasons that conversation took place when and where they did. Our findings highlight differences between misinformation conversations and normal conversations, and how challenging misinformation is often difficult due to a range of barriers. Yet prior research suggests that misinformation challenges from trusted sources are an effective means for tackling misinformation beliefs [3, 7] and so it is important to understand the triggers that cause these conversations to occur.

*Preventing further harm and ideology spread.* Participants described their concerns about the impact misinformation was having on their families and broader society. Some of these related directly to the misinformation that was challenged by participants, such as health (P5, P8), safety (P9), and politics (P10). However, some participants expressed concern that the misinformation was causing wider harm, particularly to minority groups (P1, P2, P3, P5, P10) and in one case spreading racial hate (P1). Because of this, they would challenge their family member:

*"I figured her feeling a little bit bad was worth it to not spread that kind of hate [transphobic views]" ... "She would never wanna do anything harmful to other people" (P3)*

*"I think that I feared for people that will potentially not get vaccinated because of these message[s]. And I know that [...] I felt a little bit scared that [...] people could potentially die" (P5)*

In other cases, participants were less concerned about the effects of misinformation on wider society, and more concerned with protecting their family members from immediate harm. This led to attempts to educate family members on the inaccuracies within the

information they were using to form their beliefs. In some cases, this involved highlighting and contradicting elements of the misinformation that were detrimental to their health. For example, P8 spoke about a message shared by their family member containing harmful COVID-19 advice, allegedly written by an unnamed Spanish Hospital that included advice to avoid cold food and drinks, and to consume zinc-rich foods. The message also contained advice on regular hand washing, disinfecting surfaces with a bleach-water solution, and recipes to reduce tickly coughs. The inclusion of this additional information increases the difficulty in distinguishing between misinformation and genuine advice when some elements are perceived by individuals as less harmful and potentially accurate. When talking about P8's reasons for challenging their family member, they said: *"I picked out the things that I thought were probably the most dangerous. I mentioned the [not consuming] cold food and cold drinks and said that's really terrible advice"*. This highlights how the participant addressed what they considered to be the harmful elements of the message, to help keep their family member safe, and reduce its potential harm to their wider family and social circle.

*Misunderstanding facts.* In some cases, the misinformed individual had interacted directly with misinforming materials which influenced their views. However, in one case the individual had simply misunderstood facts, which then shaped their understanding. These misunderstandings resulted in the misinformed individual spreading false information, leading the participant to attempt to correct their understanding. For example, P1 explained, *"There are also some clear things [...] that she was wrong about like in the red is labour and blue is conservative"*. In this case, the misunderstanding arose from the difference in political colours between the UK and the USA. Due to concerns the misinformed individual had relating to their own political views, the conversation and subsequent challenge occurred as the misinformed individual did not want their sister moving somewhere that did not agree with their political alignment.

*Challenging during normal conversations.* In some cases, misinformation challenges took place during everyday conversations. Multiple participants described these conversations occurring around

mealtimes (P2, P5), as part of regular phone calls (P3, P6), and during regular periods set aside to discuss the week's events (P4). As the communication channel through which challenges occurred presented issues for participants, the integration of misinformation conversations into regular conversations allowed some to overcome the barriers that technology and asynchronous platforms present.

There were also cases where individuals were already discussing examples of misinformation or news coverage on misinformation when a family member expressed their support for the misinformation topic (P2, P6). P6 talked about the start of a conversation he had with his father which led to a disagreement and subsequent challenge from P6. They said: "*We were having a discussion regarding [...] vaccinations. It was [...] quite a big subject because [...] it had sprung up in the news again about vaccines causing autism*". In these situations, there was no initial aim to challenge misinformed beliefs and while the challenge did occur, participants felt they lacked time to prepare, and were ill-equipped for the conversation.

*Event Trigger.* In other cases, misinformation conversations were triggered by specific events. For example, challenges occurred during significant life events, and where misinformation spread caused upset and alarm within the family as we highlight in the example below. In the case of P9, the worry caused by the misinformation itself was the basis for challenging. As footage had been shared of a violent attack in the area near their family home, in a different country to where P9 was residing, family members of P9 used authenticity checking software to determine whether the video was authentic and whether their family members were under threat. Had it not been for the alarm caused by this piece of misinformation, it is likely that the misinformation would have remained unchallenged.

*Those who did not challenge.* Above, we describe reasons people had for challenging misinformed family members. Yet, not all of our participants challenged the misinformation themselves. We heard from a number of participants who, whilst wanting to understand their family member's beliefs and the reasons they had for sharing the misinformation, felt unable to perform the challenge. In all of these instances, another family member took on the task of challenging the misinformation and these participants talked about how they viewed this experience. In the case of P9, where the misinformation challenge was supported by using fact checking resources, they were satisfied with the outcome of the misinformation challenge that was conducted by their family member. By using fact checking software, elder members of their family determined that the video shared, of a violent attack near their family home, had not in fact occurred and was old footage. This quelled the anxiety of all family members in the group chat, including those of the individual who originally shared the misinformation. However, in the case of P5, they were left dissatisfied. They talked about wanting to better understand their family member's misinformed beliefs, as this did not occur through the challenge. Here, the misinformed family member believed that COVID-19 vaccinations were unsafe. P5 explained that, had they felt comfortable, they would have chosen to discuss their family member's beliefs directly with them to develop a better understanding of the underlying reasons for their belief, as opposed to a direct challenge. They said: "*It's easy for people to judge uhm,*

*what other people share? And I think for me having this real understanding of why she's doing it and how she feels [is] very important*". In both cases, there was a role taken by another member of the family to address the misinformation. Both participants who did not challenge also referenced respect for their family members due to their family roles, with the respect for elder members holding an important place in both participants' cultures.

## 4.2 Barriers to Challenging

When describing experiences of challenging, or being unable to challenge, participants often spoke of barriers that prevented them from challenging or made challenging more difficult. While some participants experienced only single barriers to challenging, more often barriers were interrelated, overlapping where similarities were present.

*Knowledge of the personality of those being challenged and anticipating how they would respond.* When participants spoke of their misinformed family members and what they considered prior to the challenge, they often described using prior knowledge of the misinformed individual's personality and behaviour to anticipate their response. Where a negative reaction was predicted due to the family member's personality or prior knowledge of their behaviour, they described a negative experience resulting from the challenge. For example, P2 described the difficulty of approaching particular subjects with his father, and when he challenged his beliefs around the authenticity of the COVID-19 information they were discussing, he had to "give up" on the discussion. He said: "*It's very difficult to sort of approach these subjects delicately 'cause when I try, it immediately evolves into a shouting match where he just outright doesn't listen to anything you say*". In the case of P4 who also raised COVID-19 related misinformation with a family member, he described his uncle as being someone that did not like to be corrected, and on challenging him, he said he "*blocked me on all social media*".

In both of these examples, we see a delicate balance between people's desire to challenge their misinformed family members, and their need to maintain healthy relationships. We find people drawing on their prior knowledge and experiences with their family members to help them predict how they may respond. Yet, as we have seen above, this was often not sufficient in preventing conflict. In both of the above examples, whilst a negative response was predicted, both still attempted a challenge. However, this was not always the case. For example, P5 spoke of their inability to discuss misinformation with other family members, in this case, their father. They described them as having a lack of trust in the government, and as a result, felt unable to discuss the news or any political topics with them. They said: "*I think that's why we cannot even start talking about things that might seem possible or he completely rejects whatever, whether it's, you know, valid or not or stating it's true*". Here, although they were not discussing the misinformation scenario, P5 highlights that, if their father was to be misinformed, not only could they not discuss the misinformation with them, they could not discuss the misinformation context as their father would quickly reject any challenge or legitimate information.

*Strong ingrained pre-conceptions.* The role that misinformation can have in influencing an individual's identity also posed a barrier to

challenging. Multiple participants described the strongly ingrained pre-conceptions that misinformed individuals held as having an influence on the extent to which they believed the misinformation. For example, P7 said: *“It’s really hard to change someone’s mind when they are deeply rooted to their beliefs”*. Similarly, P2 highlighted how their family member likely already held deeply rooted beliefs around the misinformation they shared making it difficult for any challenge to be effective. They said: *“I generally find that the misinformation that they believe, at least ones that I’m then informed of, are stuff that he already agreed with anyway”*.

As a result of these strong pre-conceptions, in some cases, there was no overall agreement possible. For example, in the case of political misinformation, participants struggled to reach agreements due to significant differences of opinion, and because of the misinformation. In the case of medical misinformation – which in our sample often related to COVID-19 and vaccines – the misinformation exacerbated the perceived (and misinformed) health risks making it unlikely for family members to reach an agreement.

*Misunderstanding the intention.* For some participants, it was not initially clear why the family member was sharing misinformation. This uncertainty resulted in a delay or a lack of challenge. For example, P7 described their family member talking about the dangers of vaccinations and initially thought the information had been shared as a joke, not appreciating the seriousness of the misinformation being shared. They said: *“At first I thought it was like maybe a joke or passing opinion, I didn’t think she would take it that seriously”*. In this example, the opportunity to challenge the misinformed family member was missed, which allowed the misinformation to become more ingrained over time.

*Inappropriate communication channels.* Communication channels were also highlighted as barriers to challenging. While computer-mediated communication (CMC) platforms (e.g., WhatsApp, Facebook) are commonly used to spread misinformation, these same channels were often not preferred to challenge misinformed beliefs and information. They were described as being less personal than face-to-face interactions and made the challenge feel more significant than it needed to be. For example, P5, who did not feel comfortable challenging their aunt, discussed their difficulties crafting an instant message to challenge a piece of misinformation. This barrier, together with their inability to have the conversation face-to-face in a more casual setting, meant the misinformation went unchallenged. P5 said:

*“I [...] don’t feel that technology, at least not through, you know, text messaging or even maybe on the call it would [...] replicate on interaction”... “When I see these posts and see [them] sharing their mind [I] would love to, [...] go pay them a visit, [...] make a cup of tea sit at the table and have a conversation about it” (P5)*

The respect that P4 had for their aunt meant they felt unable to challenge via technology due to the potential for conflict. A face-to-face meeting may, in some cases, help to diffuse or prevent conflict as discussions are held in more informal and intimate settings, like over *“a cup of tea”*.

*Difference from normal conversations.* This barrier is multi-faceted, with elements being the topic of conversation, resources required

and the additional effort needed for challenging misinformation. Participants often described their usual family conversation revolving around topics like shopping, friends, games, and work. Conversations about misinformation could become quite *“heated”* (P7) and participants described the use of sources and lack of balanced debate to be a change from their typical conversations. For example, P1 said: *“Yes, they [...] tend to be a lot less aggressive, or I mean I tend to not pull up sources and be like look at this”*. Whilst P8 said: *“Or actually I would love to have them had much more balanced debate”*.

Our participants often spoke of the high level of effort required to prepare for conversations intended to challenge misinformation beliefs, in comparison to the effort required for normal family conversations. For instance, time and effort are needed to read the source of the misinformation, and to look for and read reliable sources that refute the misinformation. This barrier was exacerbated by the asynchronous communication channels (such as commenting on Facebook posts or sending a message) due to the effort needed to carefully craft a message to challenge the misinformation. This disparity in required effort between the two makes effective challenging difficult, and where regular challenging of misinformation is required, the effort needed on the side of the challenger may result in them feeling unable to continue challenging.

*Family hierarchy.* The role and position an individual holds within a family appears to have some impact on both the experiences had when challenging misinformation, and the likelihood of an individual challenging the misinformed family member. The majority of participants in this interview study were (adult) children challenging parents, and the parent-child dynamic impacted multiple discussions. As an example, P6 explained the difficulties that they experienced when approaching their parents’ misinformed beliefs, believing that the parent-child dynamic significantly affected the perceived credibility of the information they were sharing. They said: *“It’s like you’re still our child you should believe what our opinions are first, uhm over, you know, scientific knowledge, even though that makes no realm of rational sense”*. Similarly, P8 believed that their parents’ perceptions of P8’s role as their child also altered their parents’ perceptions of the correct information. Referring to their parents, P8 said that they could not challenge political misinformation: *“[they think] ‘cause they’re older they know best”*. This barrier appeared further exacerbated for individuals from cultural backgrounds where hierarchy plays a more significant role. P5 originally from North America (Mexico) reflected on the deep respect they had for their aunt (the misinformed individual) and that in their culture *“challenging older members of the family is seen as disrespectful”*.

### 4.3 Resources for Challenging

When misinformation challenges occurred, those challenging reported using a range of resources to support them in these conversations. This theme explores these resources and the successes and pitfalls that participants experienced when using them. Resources described by participants include other people (such as the use of authority figures for support or the use of groups to develop group narratives), changing the style of conversation by using humour, or the use of external sources of information. Although in some cases participants reported using only one of these resources, more often



a combination of these was used to support them in challenging the misinformation.

*Individuals with a higher authority.* Participants reported seeking support from people with a higher perceived authority within the family, to help them validate the information that they were providing to challenge the misinformation. Those with higher perceived authority were typically older family members and parents (P1, P9), but also members of a religious community (P7), and specialists in their field (e.g., economists for Brexit or scientists for COVID-19 (P10)). We found participants who utilised a family member to support their misinformation challenge would typically seek the opinion and support of someone holding a higher familial authority than the individual they were challenging. For example, P1 was engaged in challenging misinformation that her sister was sharing and felt unable to further engage with her without support. In this example, the challenger sought the help of their father who they likely perceived to have a higher level of authority within the relationship. She said: "[I got] my father to back me up because again [...] [he's] a better source of authority. And then she's like, "OK, fine". But it did take a while [to be persuaded] and she was being very defensive". In another example described by P9, a video was shared of a violent attack near the family home. The authenticity of the video was later challenged by a family member who held a respected role in the family. Although P9 did not feel comfortable challenging, they described "Some elderly people in the family who are also part of the [WhatsApp] group gave uh the true circumstances of things at that point in time [...] and then it just doused the commotion and pandemonium that might have been caused".

*Group narrative.* Whilst some participants engaged with individuals with higher perceived authority for support, others preferred to engage within a group of people to help them form a group-based narrative to counter the misinformation. This approach meant multiple people would share the same advice and information to counter the misinformation in a form of group-based intervention. This has an important distinction from using individuals with higher perceived authority as it utilises a range of family members, regardless of their role in the family. P7 had already attempted to address the misinformed beliefs of their family member, and when they were unsuccessful, they utilised this approach to counter the misinformation shared. P7 explains their rationale for this strategy, saying "I think it's just the group narrative, supporting... believing in a group. If you have 4/5 people telling you the same thing you tend to lean towards that."

*Humour.* The resources discussed above involve people, either individuals or groups. Yet, we also find humour being used as a conversational tool to support them in addressing misinformed beliefs. In the example P5 provided, they described how their family members used humour in a family WhatsApp group to challenge misinformation that individuals who had been given the Russian developed COVID-19 vaccine would have to fight in the war in Ukraine. They said "their response in the group was, you know, sort of jokingly teasing him about obviously this is not true. I didn't personally do it, but other family members did".

*External sources and information.* The final strategy utilised by participants was the use of external sources and information. Participants shared data that they deemed to be trustworthy with their misinformed family members in an attempt to refute the misinformation. In some cases, this included news articles that aligned with the participant's views, while for others it included checking the source of the misinformation itself and sharing the findings from their analysis. This often included the reason(s) the original source of information was inaccurate. In the example given by P4, they reported an attempt to combat misinformed beliefs that their family member had about the dangers of the COVID-19 vaccination and used external sources to help support their counter-narrative that the COVID-19 vaccine was safe. P4 reported sending links to websites that offered information that the challenger considered "factual" and "evidence" as opposed to relaying the information themselves. They said: "I would always provide links to whatever evidence, factual things that would always include those in the reply. So that he had access to see that he was incorrect.". Similarly, P6 was also in a position where they were having to challenge misinformation related to vaccines, they said "But yeah, so effectively it was like: this individual [Andrew Wakefield] was struck off, but here is all the information to disprove his paper, here is all the information about the event itself".

For P6, the family members' behaviour had not been changed due to their misinformed beliefs, but their past experiences of seeing children become vaccinated and soon exhibit symptoms of Autism Spectrum Disorder caused them to believe the (now redacted) findings of Andrew Wakefield [57]. Although these misinformed beliefs did not change the family member's decision to vaccinate themselves or their children, P6 felt a duty to address the misinformed beliefs so their family member understood that Wakefield's work was false. Thus, P6 went to additional effort to challenge the misinformed beliefs, including sharing sources, to (attempt to) address the pre-conceptions their family member held.

#### 4.4 Coping Mechanisms

Throughout discussions with their family members, a range of coping mechanisms were used by participants to help them manage conversations and relationships. These coping mechanisms include the use of avoidance and seeking validation and support from others.

*Avoidance.* Participants described their use of avoidance as a strategy for coping with misinformed beliefs held by family members. While avoidance was used by those that chose not to challenge their family members, it was also used by those that did challenge, often after a challenge that was deemed unsuccessful. Often this coping mechanism was a way of maintaining a healthy relationship. For example, we know that P5 chose not to challenge their family member and instead avoided any discussion related to their misinformation beliefs. They said: "I haven't gone and actively [...] engage[d] with those arguments". While P6 originally challenged their parent on vaccinations, on failing to change the view of their parents they utilised avoidance to prevent further conflict, saying "I wholeheartedly avoid the subject of vaccines and autism now because I can't, like I did my due diligence to try and correct the misinformation". P7 described this as wanting to "keep the peace".

Participants described avoiding the discussions on an imminent basis (such as P5 above) or on a long-term basis (P7 above). Additionally, avoidance can be seen as a strategy for both sides when no consensus could be reached and to prevent arguments or conflict. The avoidance mechanism described here intersects with findings presented earlier related to the communication channels available for challenging misinformation. We found that technology channels (e.g., WhatsApp, Facebook) make for less personal interactions and can be a barrier to challenging. Yet, here we also find asynchronous communication channels acting as a means to avoid, as they allow people to distance themselves from the conflict. For example, P1 described the relative ease with which she was able to avoid her sister when communicating online as she was able to delay replying to messages. She said *“When we’re having arguments online [...] it’s much easier for me to just ignore her message and then in a few hours, she’ll get bored [...] and send me photos of her cat or complain about one of her co-workers”*. Moreover, this communication method affords the challenger more time to collate resources and approach the conversation more carefully, which can be important where, as we have found, a greater level of effort is required during these types of conversations.

*Seeking validation and support from others.* We previously highlighted how some participants engaged with individuals and groups for support in tackling misinformation spread within a family network. However, we also found people engaging with individuals and groups to help them validate their own views and beliefs that were counter to those held by their misinformed family members. In some cases, validation was also sought to support the decision to challenge, and the approach to challenge. Moreover, individuals and groups were also used to assess how effective the challenge was, and whether the challenge caused conflict and upset. For example, P3 said: *“I guess just validation that I went about it the right way and that I didn’t upset her, but also that she was now correctly informed”*. This form of validation was generally sought from those who had the same prior views/beliefs as the challenger. Some participants used this strategy as a form of echo chamber, wanting to protect their own views and discuss the topic with people of the same opinion, rather than with the misinformed individual who did not. For example, P8 said: *“We’re terrible [...] thinking less about like how do we change them? It’s more of a filter bubble that we like being [...] We just like to think that we’ve got the right — the moral high ground”*. Participants also described using other family members as outlets for their anger or frustrations. For example, in the case of P6, they engaged with their partner as an outlet for their frustration following the misinformation discussion they had with their family, as there was no consensus reached during the discussion. By having an outlet, they were able to process the conversation and lack of consensus with someone who had the same prior beliefs as themselves.

#### 4.5 Outcomes of inner-family misinformation challenges

Our findings highlight the impact that misinformation challenges can have on both the challenger and the family member being challenged. In this section, we explore some of the outcomes of misinformation challenges, and the effect discussions had on both the

participant and the family member. Some outcomes were applicable to both sides, such as negative experiences felt during and after challenge discussions, and changes to behaviour post challenge. Others were a result of the experience that the individual had, such as some challenger’s desires to have tried a different approach due to a lack of success in the challenge, or a negative experience.

*Negative experience.* For both parties involved in these discussions, there were negative emotional experiences. Participants who challenged their family members described their experience as tiring (P2), frustrating (P4), and participants described both parties experiencing feelings of anger or getting worked up (P4, P5, P7). The negative experience for challenged individuals came from the knowledge that they had spread misinformation rather than from the conversation itself. For example, P8 said *“Well, I think she was a little bit upset first that she’d peddled and promoted this stuff with their own friends”*, while P3 said *“[she] felt kind of bad like I predicted she would”*.

*Changing attitudes.* The second outcome of these conversations was a shift in attitudes. This outcome had two elements — a change in the person’s attitudes and beliefs attitudes and beliefs previously changed by misinformation, or a change in attitudes and actions involving a member of their family. Relationship changes towards family members were shown from both sides and included changes in communication habits, or a cease in communication completely:

*“He blocked me on all social media ... and I never spoke to him again”* (P4)

*“It taught me to be more cautious, uh and to respect her opinion. We don’t necessarily have to have the same opinion of her to make a decision”* (P7)

*“I think the communication has really been affected by misinformation”* (P8)

These findings highlight the potential for these types of conversations to have both a positive and negative long-term effect on relationships. Changes in attitudes are also reflected on the side of the misinformed individual and are tailored more towards the misinformation itself. Some participants described how family members started to check the credibility of information sources they encountered online, to prevent spreading further harm. Others described changes in their family member’s behaviours towards social media, showing improved information literacy, and a move away from platforms that could be considered untrustworthy. These changes often occurred as a result of the discussion the participant had with their family members:

*“She has gotten better at kind of [...] doing what I told her to erm in regard to looking up other articles and she’s actually seen a couple of things online and kind of decided to run them past me.”* (P3)

*“She just said to me it seems just a bit of a [...] cesspit for [...] bad information that could be harmful. So, she’s come off Facebook now”* (P8)

*“I think it has brought a bit of caution to the way she shares information on groups”* (P9)

From this, it can be seen how previously misinformed family members started taking steps to protect themselves from misinformation, once the misinformation had been addressed. They utilised

strategies that had been demonstrated by participants, such as fact checking of materials, and the avoidance of platforms where misinformation was commonly spread – to reduce their own risk of encountering and spreading misinformation. Although participants often did not recognise it, these were positive outcomes for both the participant and the misinformed individual. In these instances, the challenger successfully addressed the specific misinformation as well as the behaviours associated with it. However, these changes in beliefs and behaviours were often not applicable to all misinformed beliefs. In the case of P8, although their mother showed a change in behaviour with their approach to misinformation exposure and personal care during COVID-19, the attempt at addressing immigration misinformation with both parents was unsuccessful. They said *“I suspect around Brexit and immigration that [they are] still badly misinformed because they don’t want to believe that. They are happy who they are”*.

*No change in attitudes.* The above is not the only example where attitudes did not change after a challenge. The inverse of the two trends above is observed throughout: a lack of change in the relationship between family members, and the lack of change in their attitudes and beliefs surrounding the misinformation topic. Multiple participants reported a lack of change in relation to the actions they took/opinions they developed as a result of the misinformation (P2, P10, P8, P4), with one case resulting in the death of the misinformed individual as a result of their beliefs, highlighting again the potential harm this type of information can cause. However, there were cases where the misinformation conversation had no effect on the family relationship (P1, P3, P8, P9, P10), and in one case (P8) the misinformation only affected future conversations related to the specific misinformation shared.

*Recognition that they were misinformed.* Another outcome from these discussions was a realisation by the misinformed family member that they had indeed been misinformed as a result of misinformation spread. Although in this interview study, the participants were comprised of the challengers of the misinformation, P8 explains that, after the challenge occurred, their parents (the misinformed individuals) talked about being misled.

*Desire to try a different approach.* The final outcome was on the side of the challenger, in that they wished, for a range of reasons, that they had tried a different approach. In the case of P5, it was a desire to have challenged their family member, as they did not challenge due to a range of barriers previously discussed. For others, it was a desire to use different techniques, or provide a contested opinion to combat the misinformation. For instance, P8 said *“I [would] still let them vote for Brexit but I think it would have been lovely [for them to see] the different erm information”*, while P7 said: *“Instead of arguing [...] I could’ve tried something else”*.

## 5 DISCUSSION

This paper describes barriers faced by individuals who experience misinformation within their family networks which can result in negative experiences, and misinformation going unchallenged. We describe strategies developed to challenge misinformed views, and coping mechanisms used to help manage the often delicate balance between confronting misinformed family members and maintaining

healthy relationships. We highlight limitations in CMC (computer-mediated communication) platforms that can result in people either not challenging misinformed views, or challenging off the platform (e.g., in face-to-face conversations). Lastly, we describe how family members experience an imbalance between the effort required to share misinformation, and the effort required to challenge it. While our research develops new insights into how families manage misinformation within their networks, it also offers further support to prior research on the role of relationships when challenging misinformation [7, 13, 14, 36–38], strategies utilised to combat misinformation [7, 65, 66], and the use of coping mechanisms when faced with a stressful social situation [4]. This section explores these areas in more depth, drawing from prior work to contextualise our findings.

### 5.1 How families are impacted by and cope with misinformation challenges

Prior research finds family and friend networks being used as vectors for misinformation transmission [17, 21]. We focused on these experiences to learn how they are affecting families. In line with prior research [56] we find family members feeling a responsibility to challenge shared misinformation, and we describe reasons family members have for challenging. However, the act of challenging can result in negative outcomes for family members due to conflict that develops. Research has shown how challenging elder members of a family can be more difficult due to the authoritative positions they hold [37, 58], and our work supports this. When family members challenge misinformation, we describe negative experiences they can face, including social exclusion (e.g., being blocked on social media) and aggression. This can lead to family members utilising different coping mechanisms, such as avoidance and seeking validation.

Coping mechanisms that we describe within our work fall under two main categories: (1) problem-focused coping and (2) emotion-focused coping [4]. The problem-focused coping strategy used was avoidance. In line with prior work [17] we find family members using avoidance to prevent conflict when misinformation is shared. The affordances of CMC platforms were often exploited to allow people to utilise avoidance as a coping mechanism. For instance, where our participants used asynchronous communication tools, the norms around responding allowed for conversation topics to change more naturally over time. Avoidance techniques described were used to change how individuals interacted with the stressful environment or the amount of interaction they had. This is a key element of problem-focused coping [32]. While we found this helped family members avoid conflict, it did little to address the misinformation itself. Emotion-focused coping involves the management of emotional distress and making oneself feel better about a problematic situation, without changing the problem itself [4, 72]. This can be seen throughout our data where participants chose to discuss the misinformation conversation with others, to seek either validation or emotional support. Seeking support from peers is a common coping mechanism in stress reduction, with research showing how a positive social support network can help to reduce feelings of stress [71].

## 5.2 Factors influencing the decision to challenge misinformation

Interventions involving close ties (e.g., friends, family) are among the most effective for successfully challenging misinformation beliefs [7]. Yet, the emotional connection between family members creates a barrier to challenging, as individuals seek to avoid harming the relationship [13, 17, 53]. Family members often feel a responsibility to challenge [56], and our work supports this in the way our participants reported a desire to educate and minimise harm. Due to the complexity of family relations, the decision to challenge is often dependent on who has shared the misinformation. Where respect for elders is important to the challenger and their family, as found in prior work [37], our results indicated that these challenges are often either avoided or deferred to similarly positioned family members.

The relationship between family members means those challenging are aware of the prior beliefs and views held by their family members and the impact these beliefs have on the expected likelihood of them reaching an agreement. The likelihood of reaching a consensus when misinformation has fully situated itself in someone's identity is low. [67]. This is partially due to the competing identities participants hold, sometimes caused by them having become associated to groups that allow them to develop a separate social identity (such as anti-vaccination groups) [52], differing from their family identity. Moreover, where there has been an unsuccessful outcome from a previous difficult conversation, this is taken into consideration when evaluating whether to address the misinformation. In line with previous research, if a negative outcome is expected the challenge may be aborted and avoided due to the outcome of the past discussions [13].

## 5.3 The effects of the communication medium on misinformation conversations

The communication channels available for challenging misinformation were discussed by our participants. We highlight how the differences between channels (e.g., online vs face-to-face) impacted the likelihood of a challenge occurring, the effectiveness of the challenge, and the repercussions of challenging. Research has shown that digital messages are a semi-successful intervention tool in limiting misinformation spread, with the potential for social corrections in online messaging to reduce misinformation belief [7]. However, our work found messaging platforms were not preferred for challenging misinformed family members due to their impersonal nature and their lack of visual emotional cues. An exception to this is where an avoidance coping mechanism is used, where asynchronous communication channels (e.g., WhatsApp) allow more easily for topic changes.

Researchers have started exploring misinformation correction between individuals that share a relationship tie and communicate through messaging platforms [36, 37]. Yet, insights are limited due to the difficulty in conducting studies on closed platforms (e.g., WhatsApp). Our findings indicate that family members often prefer to conduct conversations about misinformation over a synchronous communication channel, as a more personal connection is possible; a finding aligned with prior research [45, 58]. Furthermore, as misinformation spread often occurs through messaging platforms and

social networks [36], the difficulties presented in challenging misinformation may result in misinformation going unchallenged, or a challenge being delayed. This could be problematic, with prior work highlighting the importance of early intervention to prevent the adoption of the information into the identities of those exposed [67].

## 6 REFLECTIONS FOR FUTURE DESIGN

Overall, we have found that messaging platforms may not be ideal spaces for challenging misinformed beliefs. However, by exploring increasing intimacy, synchronicity, and the integration of non-verbal queues, messaging platforms may be able to overcome the limitations that our participants found for having these challenging conversations. In this section, we draw on prior work on developing CMC environments to promote presence, awareness and intimacy to suggest future design directions. For example, our findings show that participants valued the ability to change the subject more easily via CMC. This points to a value in ephemerality in CMC, something that HCI researchers have previously explored. For example, Podlubny et al. developed the Curtains app which forced synchronicity and attention into online communication by requiring both conversation parties to be active and present within the conversation to avoid the “curtains from closing” and the conversation ending and disappearing [46]. While we are not suggesting this approach be applied to the challenging of misinformation, future research could explore how ephemerality might impact misinformation-challenging behaviours from the perspective of the challenger and those being challenged.

Our findings suggest people prefer challenging misinformation offline as these environments provide a more intimate and personal space. The absence of personal, non-verbal, and emotional cues in CMC is a longstanding problem in CMC research (e.g., [31]), and is not easily overcome. Recent HCI research has explored how users appropriate non-verbal cues like emojis to create their own shared meanings to enhance intimacy [70]. Similarly, research has explored approaches for enhancing intimacy between communication partners by adding more contextual information into the interaction [22], and promoting shared visual customisation of the communication environment [23]. While these examples have been explored between romantic partners, our findings suggest that participants want to establish these more personal connections when discussing and challenging misinformation and misinformed beliefs, yet existing platforms do not afford users with these communication intimacies. We call for more research to explore how communication platforms could be designed to support more personal connections between close ties, and how these might support family members in having these often difficult conversations.

## 7 LIMITATIONS AND FUTURE WORK

The differences in definitions for misinformation provided a limitation in this study, as they influenced the perceived success for participants. Multiple participants considered political propaganda (for example Brexit propaganda) to be misinformation, and in these cases, limited success was observed in changing the opinion of the ‘misinformed’ person, as the misinformed family members considered the political difference to be more of a difference of opinion than a straightforward right and wrong. This study also focuses

on participants from the global north, with the study taking place within the UK, and builds on prior work looking at misinformation spread within families which focused on India. Both Malhotra and Pearce's work [36, 37, 45] and our own (although it was not our intention) focus on younger individuals challenging older adults. Therefore, it is important to further our understanding across geographies and ages/family roles. Furthermore, although this study has provided an in-depth insight into the strategies and coping methods that individuals used to deal with difficult conversations such as these, these strategies are shown to have limited effectiveness in several cases. A series of questions have arisen because of this study and further work will be needed to explore these in detail, with methods to overcome the barriers that participants have encountered being one element, and investigating methods of refuting misinformation further being another.

By investigating methods of refuting misinformation further, more in-depth insights into the role of the relationship and inter-family culture on misinformation challenging could be determined. From a practical perspective, several questions have been raised as a result of this study regarding the suitability of instant messaging platforms when challenging misinformation. Participants cited multiple barriers that impacted their ability to challenge their family members on their misinformed views. Further research is required to establish strategies to overcome these barriers and explore methods to prevent conversations about misinformation from having long-term effects on interpersonal relationships and on the home environment.

## 8 CONCLUSIONS

This research explored the strategies used by family members when challenging misinformation with a family member and their experiences during these conversations. We identify a number of barriers, tools, and coping mechanisms used. This has provided an understanding of the role that family members play in challenging misinformation, and the motivations behind these behaviours. This work highlights the long-term negative effect misinformation can have on both the relationship between family members and on individuals' health and well-being. It also has the potential to cause families to cease contact for extended periods, exacerbating pre-existing relationship difficulties. Our work has also identified a range of barriers to initiating conversations that challenge misinformation, the existing knowledge of the misinformed person and their potential response to the challenge. Additionally, this study provides evidence that suggests family members have a preference to challenge misinformation face-to-face rather than on a CMC platform. We conclude by highlighting the need for further research to explore the extent to which family values have impacted conversations that challenge misinformation between family members, and the role technology might have in assisting correction conversations, diversifying from current misinformation literature which focuses on technology as an intervention tool.

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