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Communication errors in online interactions: Examining cultural differences in perceptions of rapport and preferred recovery strategies

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Abstract

Information gathering, including in covert contexts, increasingly takes place in online environments amongst individuals from different cultures. Given that rapport facilitates information gathering, we investigated the perceived impact of communication errors on rapport in brief online interactions. In a pre-registered experiment ($N = 191$), we examined detection of errors, their effect on perceived rapport, recovery strategy preferences, and cultural differences between UK (low-context) and Chinese (high-context) participants. Results showed sensitivity to subtle communication breaches, with judgment errors significantly reducing perceived rapport. Apology emerged as the most effective recovery strategy, especially among Chinese participants, perhaps reflecting cultural preferences for relational harmony. Interestingly, both cultural groups similarly detected errors, suggesting shared digital norms. These findings contribute to understanding the dynamics of online rapport-building and cross-

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cultural communication, emphasizing the relevance of relational cues in online interactions - even those with investigative or covert aims.

Key words

Rapport; information elicitation; culture; online interactions; investigations; cross-cultural communication

Resumen

La recopilación de información, incluso en contextos encubiertos, se lleva a cabo cada vez más en entornos en línea entre personas de diferentes culturas. Dado que la buena relación facilita la recopilación de información, investigamos el impacto percibido de los errores de comunicación en la buena relación en interacciones breves en línea. En un experimento prerregistrado (N = 191), examinamos la detección de errores, su efecto en la buena relación percibida, las preferencias de estrategias de recuperación y las diferencias culturales entre los participantes del Reino Unido (bajo contexto) y China (alto contexto). Los resultados mostraron sensibilidad a las infracciones sutiles de comunicación, y los errores de juicio redujeron significativamente la relación percibida. La disculpa surgió como la estrategia de recuperación más eficaz, especialmente entre los participantes chinos, lo que tal vez refleje las preferencias culturales por la armonía relacional. Curiosamente, ambos grupos culturales detectaron los errores de manera similar, lo que sugiere normas digitales compartidas. Estos hallazgos contribuyen a comprender la dinámica de la creación de relaciones en línea y la comunicación intercultural, y enfatizan la relevancia de las señales relacionales en las interacciones en línea, incluso aquellas con fines investigativos o encubiertos.

Palabras clave

Relación; obtención de información; cultura; interacciones en línea; investigaciones; comunicación intercultural

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1. Introduction

Recent decades have seen a major shift from face-to-face interactions to the use of digital communication platforms for communication about all aspects of human life, from personal, social, political, and professional activities to crime-related and investigative communication (Baym *et al.* 2004, Amelia and Balqis 2023, Gebremariam *et al.* 2024). This transformation has had an impact on the activities of law enforcement and security sectors, particularly with respect to intelligence and information gathering (Wilson-Kovacs 2021). As a result, there has been increased reliance on computer-mediated communication technologies, such as text-based chat systems, use of online forums and other digital spaces to support information-gathering activities (Stanier and Nunan 2021). In law enforcement and security contexts, operational activities might include surveillance of online interactions (i.e., third party observations) and online interactions that might be overt (e.g., with witnesses or sources) or covert (e.g., targeting criminal activity on the Dark Web using undercover profiles). This shift in communication format in operational contexts demands empirical scrutiny and, in particular, requires a focus on effective rapport maintenance in one-to-one interactions to ensure successful onward engagements for the purposes of information and intelligence gathering. Just as in face-to-face interactions, communication errors can occur in online interactions (Vignovic and Thompson 2010). To date, little is known about the impact of communication errors in such online interactions on rapport maintenance and potential future cooperation.

At the same time as a shift in communication formats has taken place, global migration is on the increase and reflects greater population diversity and mobility, and indeed increasing global crime networks (Leukfeldt *et al.* 2019). As a result, many online interactions, including interactions in law enforcement and security contexts, likely occur between people from different cultural backgrounds with potentially different communication norms.

In this exploratory research, we examined the effects of communication errors and recovery strategies on perceptions of rapport in the context of an online information elicitation attempt. Given that cultural background and communication preferences may play a role in the perception of communication errors and their potential recovery (Ramirez Marin *et al.* 2019), we compared responses to the interaction scenario between individuals from two different national groups (UK and China). This insight is essential to developing more effective, culturally sensitive practices for online intelligence gathering.

In the following sections, we begin by exploring how culture shapes communication, then discuss the dynamics of information gathering in online contexts. We subsequently examine the role of rapport in this process and conclude by addressing how communication errors can impact each of these elements. For the purposes of this exploration, and following Wang (2021), we consider culture as a dynamic and complex set of shared systems, meanings, and practices within a social group, emerging from the histories and experience of that group and shaping social interactions, relationships and how these are mediated through communication at all levels from the individual to the wider society.

2. Culture, communication and information gathering

In law enforcement and human intelligence investigations, interactions between individuals from diverse cultural backgrounds are increasingly common (Beune *et al.* 2010; Hope, in press). While empirical research on the effects of culture on investigative interviews is emerging, different features of cultural expression affect cross-cultural interviews (for reviews, see Hope *et al.* 2022, Vredeveldt *et al.* 2023).

A key aspect of culture that affects cross-cultural interviewing contexts is communication style. Through socialisation, individuals learn norms, rules and values of their culture that shape their communication preferences. Hall (1976) proposed a differentiation between low- and high-context communication styles. According to this theory, low-context communication is characterized by explicit and direct messages, where meaning is conveyed within the content of the communication itself. This type of communication is typically more transparent and relies on clear, unambiguous language and is commonplace in more individualist societies (e.g., Northern Europe, USA, Australia). In contrast, high-context communication involves implicit and indirect messages in which meaning is heavily dependent on the social or physical context of the interaction. In high-context communication, much of the meaning is understood through the relationship between the individuals, the setting, and shared cultural knowledge (Hall 1976). High context communication styles are more commonplace in collectivist societies (e.g., China, Japan, Middle East). Thus, in cross-cultural interaction contexts, the communication norms of one party (e.g., use of more direct communication) may be mis-aligned with the norms of the other party (e.g., expectation of more indirect communication).

Previous research suggests that the fit between individuals' preferred communication styles can affect interview outcomes in law enforcement contexts (Beune *et al.* 2010). Specifically, interviewers may fail to detect that features of the interviewee's response to requests for information reflect cultural differences with respect to expectations and norms for communication as opposed to reticence or lack of engagement. According to communication accommodation theory (Giles 2008), a "mis-match" in expected communication patterns may be detrimental to a productive interaction. In fact, communications where expectations (and the accommodation of each party's norms) are poorly calibrated, produce a range of negative cognitive and affective outcomes, including increased social distance and dissatisfaction in addition to the potential for miscommunication (Giles *et al.* 2023). For this reason, interviewers may need to adapt their communication approach, including rapport-building techniques, to suit the cultural context, as certain strategies may be more (or less) effective depending on the cultural background of the interviewee (Goodman-Delahunty and Howes 2016).

3. Online information gathering

A first step towards enhancing our understanding of challenges in online interactions in security and intelligence contexts is to establish cross-cultural perceptions of communication errors and identify any cross-cultural differences in preferred recovery strategies in computer mediated communication (CMC). CMC encompasses various digital channels such as texting, instant messaging, e-mail, social networking platforms, and chat interfaces. Compared to face-to-face (FTF) interactions, CMC differs in

fundamental components—such as the sender, receiver, communication channel, and feedback process—which can influence the potential for error and misunderstanding (Walther 1996). CMC also offers an increasing variety of interaction options, including text-based synchronous chat and asynchronous messaging as well as a range of voice and video-based formats. Currently, instant messaging services, such as WhatsApp, WeChat, Telegram and Messenger are among the most widely used forms of computer-mediated communication (Dixon 2025). In online contexts, individuals have space and time to construct their messages and revise content prior to sending which, in the absence of having to process external cues, may enhance focus on the message itself, particularly for asynchronous interactions (Walther 2011). Even where messages are being exchanged relatively quickly, editing and review options remain for message senders.

On the receiving end, however, the lack of contextual cues necessitates inferential processing to interpret messages. In other words, message receivers need to interpret aspects of the meaning to "fill in the gaps" (Edwards *et al.* 2017) which, according to the hyperpersonal model of CMC, leads to a feedback loop in which initial impressions are not only reinforced but amplified (Walther 2011). While this interaction loop can reinforce positive impressions, this feedback mechanism in CMC could potentially escalate misunderstandings or increase the negative impact of communication errors rather than reduce them.

The limitations imposed by electronic communication media are especially relevant when considering the absence of nonverbal signals—an essential part of communication in FTF interactions. Nonverbal behaviours like eye contact, physical proximity, and facial expressions play a significant role in conveying emotional nuance and social cues (Burgoon *et al.* 1984, 2016). Although alternate strategies can be used to mitigate absence of nonverbal cues (e.g., emoticons; Derks, Bos *et al* 2008, Ganster *et al.* 2012, Cavalheiro *et al.* 2022), online messages are often interpreted as more emotionally neutral or negative than intended by the sender (Byron 2008, Kingsbury and Coplan 2016; see also Chang *et al.* 2020).

In the field of information gathering, research examining communication style, rapport and interviewing or intelligence gathering has focused almost entirely on face-to-face interactions. However, some recent studies indicate that the medium of communication, whether face-to-face or online, has limited detrimental effects on the elicitation of accurate and detailed information in simulated police interviews (Nash *et al.* 2014, Dickinson *et al.* 2021, Luke 2021, Dion Larivière *et al.* 2023, Hoogesteyn *et al.* 2023). For example, Nash *et al.* (2014) found that, while communication modality influences certain aspects of interaction, the quality and quantity of information provided by witnesses in investigative contexts remain relatively stable. It should be noted that this finding has largely been limited to synchronous communication formats, such as video calls (e.g., Zoom or Skype) and telephonic interviews, which allow for real-time verbal exchanges and the occasional use of visual aids.

Less is known about text-based online interviewing formats, which are increasingly used in information gathering operations on platforms such as Messenger, WhatsApp, or secure chat applications. These platforms present unique challenges, including delays in response, reduced nonverbal communication, and the potential for misinterpretation

due to the absence of tone and visual context including, as outlined above, the potential for escalating the impact of communication errors.

Providing some useful initial insights, Hoogesteyn *et al.* (2023) observed that while remote interviewing via chat does not significantly reduce the quantity or accuracy of information provided, it does negatively impact interviewees' perceptions of rapport and engagement with the interviewer. This diminished sense of connection could have implications for information elicitation, particularly with reluctant or semi-cooperative sources, where building trust, facilitating rapport and reducing resistance may well be critical. However, recent work by Hope *et al.* (2025) showed that the use of rapport-based strategies in online chat-based interviews can enhance disclosure of intelligence-relevant information. Importantly, participants interviewed using a rapport-based approach rated higher levels of rapport with the interviewer and did not necessarily detect that they had provided more information than participants in the control interview, where no special attempts were made at building rapport. Thus, building and maintaining rapport in online interactions is likely to be critical for effective information gathering, particularly as online interactants may be sensitive to communication errors in the absence of additional nonverbal information or cues regarding their co-interactant (Tickle-Degnen 2006).

4. Rapport and information gathering

Rapport-building has been empirically and anecdotally linked to positive disclosure outcomes in interrogation, investigative interviewing, and human intelligence debriefings. A growing body of scientific research demonstrates that fostering rapport helps create a non-coercive environment conducive to cooperation and information sharing (Abbe and Brandon 2013, Alison *et al.* 2013, Alison and Alison 2017). Data from laboratory studies, simulation exercises and real-world investigative interviews indicate that rapport-based interviewing encourages adaptive interpersonal behaviour in both suspects and victims, which leads to increased information yield (Alison *et al.* 2013, Kim *et al.* 2020, Brimbal *et al.* 2021). In a professional investigative context, using rapport-building techniques to facilitate a positive interaction between the interviewer and the interviewee, in turn, facilitates information elicitation (Gabbert *et al.* 2021). This is unsurprising as rapport helps us create bonds and form relationships with others.

However, the maintenance and recovery of rapport during information gathering interactions have not received as much attention in the existing literature. Insights drawn from research in crisis communication, particularly in hostage negotiations, highlights the complex and high-stakes nature of these interactions. In such interactions communicative missteps that lead to breakdowns in rapport are not considered possible but inevitable. Rather than striving for interactions without mistakes the focus there is more on how to recover from them (Oostinga *et al.* 2018a, 2018b).

4.1. Communication errors and recovery

Misunderstandings are commonplace in both face-to-face and online interactions (Edwards *et al.* 2017) and communication errors often underpin misalignment within interactions (Schegloff 1992). In investigative contexts, even skilled practitioners are unlikely to avoid such errors (Russano *et al.* 2014, Oostinga *et al.* 2018a, 2018b). According

to Oostinga *et al.* (2018a), who focused on unintentional errors by the interviewer like we do in the current paper, communication errors can be categorized into three main types: i) factual errors, where the message includes incorrect factual information; ii) judgment errors, which refer to behaviours that are inappropriate, not aligned with or "out of tune" with the thoughts and feelings of the other person; and iii) contextual errors, which arise when there is a failure to adhere to established protocols or procedures. Among these, judgment errors—particularly those that occur early in the interview—can be especially damaging to the interviewer-interviewee relationship. In mock-interviews, judgement errors have been shown to lower perceptions of trust and rapport (e.g., Oostinga *et al.* 2018b). This might occur for several reasons, including a negative impression of the error maker's professionalism (e.g., Vignovic and Thompson 2010). Surprisingly, under certain circumstances (e.g., crisis negotiation), errors can increase the quantity—while not affecting the quality—of information disclosed (Oostinga *et al.* 2018b). This counterintuitive outcome may occur if the interviewee perceives the error as a threat to be corrected (see Oostinga *et al.* 2018b for further discussion).

Once a communication error occurs in an information gathering context, the interviewer's response will likely hinge on whether they are aware of the error and on individual preferences or tendencies in responding to such events (Weiner 1985). Oostinga *et al.* (2018a) identified four primary strategies for responding to communication errors in this context. These strategies include (1) *contradiction*, where the interviewer denies the occurrence of the error and refuses responsibility; (2) *attribution*, which involves shifting the blame to another party; (3) *apology*, which entails acknowledging the error and requesting forgiveness; and (4) *acceptance*, whereby the interviewer admits to the mistake but refrains from apologizing, instead offering reassurances that it will not happen again. Of course, another option is to deploy no recovery strategy by simply ignoring or moving on without acknowledging the error.

Different response strategies are employed across contexts, but more importantly, their effectiveness also varies depending on the situation. For example, in suspect interviews, an acceptance strategy has been found to be most effective in re-establishing rapport following a communication error, whereas in suicide negotiations, either an apology or acceptance proves to be most powerful (Oostinga *et al.* 2018b). More recently, research in the context of victim interviews has shown that an apology alone can effectively restore rapport (Oostinga *et al.* 2024). These findings highlight that not only the type of response matters, but that its success is shaped by the specific communicative context—an insight that becomes even more critical when considering the role of cultural factors.

In the wider literature, there is some limited evidence that recovery strategies are perceived differently across various cultural contexts, with individuals from different cultural value orientations evaluating these strategies in distinct ways. For example, individuals from collectivist cultures may view responses initiated by the offending party (such as an organization) as more favourable than individuals from individualist cultures, who may not demonstrate the same positive response (Patterson *et al.* 2006). To date, research has not examined cultural differences in the perceived impact of communication errors and recovery strategies on rapport and other assessments of an interaction in the information gathering context although fieldwork and professional

experience further highlight that establishing and maintaining rapport in cross-cultural interactions can be particularly challenging (Hope *et al.* 2025).

5. The current research

Through triangulating relevant literature on rapport, information gathering, online interactions, and communication errors, the main aim of the current research is to examine the perceived effect of communication errors on rapport in online interactions in the context of a brief interaction between apparent strangers, one of whom has the covert purpose of obtaining personal information. A further aim was to explore cultural differences in perceived effects of communication errors and identify recovery strategy preferences. In our design and subsequent analyses, we combined these aims. Specifically, we sought to (i) assess the detection and identification of communication errors in online interactions; (ii) determine the effect of communication errors on perceived rapport in online interactions; (iii) examine preferred recovery strategies for online communication errors and (iv) explore cultural differences in the perceived effect of communication errors online between participants from two national groups (reflecting low vs. high context communication style, UK and China respectively). Our main pre-registered hypothesis [https://osf.io/s9gh7/overview] was that perceptions of rapport will be lower when evaluating online interactions in which a judgement error (vs. no judgement error – control condition) is committed. In the absence of significant previous research on this topic, our other questions, including those pertaining to culture, were considered in an exploratory manner. For comparison purposes, we introduced an initial error for one group and then a subsequent error which all groups encountered. In the absence of related prior research, we also had no specific hypotheses pertaining to the effects of a repeated error and our analyses were exploratory.

5.1. Method

5.1.1. Design

Participants were recruited from two national groups (reflecting low vs. high context communication style, UK and China respectively) and were randomly allocated to one of two error conditions (Initial Error condition vs. No initial Error condition) to observe an unfolding online interaction scenario presented by dynamic transcript. Communication error was manipulated twice with groups observing (or not) an error at Interaction 1 and all groups observing an error at Interaction 2. The main dependent variables were ratings of perceived rapport provided for Interaction 1 and Interaction 2 and the preferred recovery strategy selected.

5.1.2. Participants

An a priori power analysis using G*Power (Faul *et al.* 2007) determined a required sample of $N = 200$ participants to conduct a 2x2 analysis of variance (ANOVA) examining the effects of cultural group and error manipulation on rapport. Alpha level .05 and power .80 standard parameters were considered and small to medium effects were expected based on previous research on communication errors on rapport ($\eta^2 = .039$, Oostinga *et al.* 2018b, Study 1, $N = 188$).

As the study was conducted in English, participants who were not native English speakers also completed an English language test. Namely, the *Test Your English test* by Cambridge [available at https://www.cambridgeenglish.org/test-your-english/general-english/ Cambridge University Press & Assessment]. This test questions are publicly available and can be used freely for research. While the test is not a measure of proficiency, a score of 18/25 is equivalent to B2 level with the Common European Framework of Reference for Languages, which was used to verify the inclusion criterion concerning English language proficiency. Nine participants were excluded from the final sample based on performance below this threshold. The final sample were 191 participants, which included 99 British nationals [*M* age = 42 years (*SD* = 13.2); Male = 37) and 92 Chinese nationals [*M* age = 30 years (*SD* = 8.4; Male = 36] who were recruited using Prolific, an online behavioural research platform. Participants were required to be over 18 years old to take part (participant age range was 18-64 years).

In addition to participants identifying as Chinese or British nationals, we examined cultural affiliation using Park's *et al.* (2012) measure of communication style that accounts for individual and cultural variations drawing on data from 17 countries. The scale consists of 23 statements about direct communication style and face-saving needs, with agreement ratings on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Differences in participants' overall score in this measure did not reveal a significant difference between the groups, t (189) = .72, p = .236.

This research was scrutinized by the University of Portsmouth Science Faculty Ethics Committee and the CREST Security Research Ethics Committee.

5.1.3. Materials

- Interaction Transcripts

Transcripts presenting online chat interactions between two interactants were generated. Specifically, two transcript sets (so four interactions in total) were devised to avoid stimulus specific effects. The core elements of these fictional transcripts were informed by insights provided by practitioners experienced in online interactions for security and law enforcement information gathering purposes. Additionally, the transcripts were modelled on training materials for practitioners working in this context. Additional transcript elements were then devised to reflect the recovery strategies described in Oostinga *et al.* (2018b). Pilot testing (n = 10) facilitated the further refinement of the stimuli and ensured there were no substantive differences between transcripts (i.e., comparable in terms of length, interaction format, type of error). Additionally, twelve pilot participants observed the interactions to facilitate examination of the detection and interpretation of the errors.

In these short online chat interactions, the general context for the interaction is that one interactant (Person X) has initiated an "out of the blue" online chat conversation with another person (Person Y) and is attempting to obtain some personal information about them (their location / travel plans). Each transcript comprised three blocks which were part of the same interaction instance between the two parties. In the first interaction block, a judgement error is present in the interaction for participants in the Initial Error condition but not for participants in the No Initial Error condition. In both transcripts

the judgement error reflected requests by Person X pressing Person Y for particular details (e.g., their location, nearest airport).

In the second interaction block, a judgement error is presented in the interaction for all participants. Here the error reflects insisting requests by Person X about personal information (e.g., how much they earn; where they have travelled). Across transcripts, such errors are briefly rebutted by Person Y ("I don't talk about it on here"; "I'd rather not share financials"). The transcript sets were reviewed closely, in collaboration with professionals, to ensure the rebuttal was similar across stimuli, despite differences in the interaction theme.

Following and adapting Oostinga *et al.* (2018b, 2020), we exposed all participants to communication error management in a final segment of the interaction transcript. We devised segment transcripts in which the person seeking to obtain information follows up on their communication error using one of three different error management strategies: accept, contradict or apologise (Oostinga *et al.* 2018b), or no error management strategy (control condition). In the final interaction block, participants were presented with the three counterbalanced potential recovery strategies and a no error response strategy. In the Acceptance strategy, Person X acknowledges they made an error [e.g., "I get it, many people don't like discussing financials and we don't have to talk about that topic"]. In the Apology strategy, Person X makes an explicit apology for the error [e.g., "I'm sorry, I know many people don't like discussing financials so I shouldn't have asked you. I didn't mean to talk about this if you're not comfortable with the topic."]. In the Contradiction strategy, Person X takes a more combative approach in their response [e.g., "I never understood why people don't like discussing financials. Everyone should be more comfortable talking about this topic"]. Finally, in the No Recovery condition, Person X makes no remarks relating to the error and just continues the interaction as if no error had occurred. We examined any effects of stimuli on rapport ratings in both communication error groups; there were no significant differences as a function of stimuli set, $F(1, 187) = 0.01$, $p = .941$.

To increase psychological realism, transcripts were presented online in a dynamic format such that participants saw the interaction appearing as a naturalistic synchronous conversation including turn taking between two parties.

- Rapport Scales

Participants completed the Rapport Scales for Investigative Interviews and Interrogations, Observer Version (RiS3-O; Magee 2020). The scale includes nine items, in which participants indicate to what extent they endorse each of the statements in the questionnaire, on a 6-point scale from Not at all (0) to Very Well (6). The scale consists of ratings related to attentiveness, coordination, and irritability examining both interviewer behaviour and the interaction. The overall rapport score was used as the main dependent variable. The RiS3-O has been found to have excellent internal validity, Cronbach's $\alpha = .93$ and composite reliability = .94; and adequate inter-rater reliability, ICC range (.75 - .90, Magee 2020). The description of the demographic sample used for validation was reported as 77.8% Hispanic. Thus, while the RiS3-O shows some psychometric robustness continued validation with more diverse samples is yet to be established.

5.2. Procedure

Participants took part in an online experiment and confirmed informed consent to participate. Those who successfully completed the language test were then randomly allocated to Initial Error vs No Initial Error conditions, and read one corresponding transcript. All participants were told they would read an online conversation between two people (Person X and Person Y) and be asked for their views on how the conversation is going at the end of each of the three blocks of the interaction.

With the exception of the online conversations which were presented in a dynamic format, to reflect a naturalistic synchronous conversation, participants progressed through the online experiment at their own pace (see Figure 1 for an overview of the procedure). First, participants read the first interaction block between Person X (who is seeking to obtain information) and Person Y. In the Initial Error condition, participants read a judgement communication error (made by the person making the approach in the interaction, Person X) which was not present in the No Initial Error condition. In the No Initial Error condition instead, in the first block of the interaction, Person X (who is seeking to obtain information) aimed to establish contact with Person Y and provided a limited explanation of how they were acquaintances.

At the end of the first interaction block, all participants were asked for their opinion on "how is the communication between Person X and Person Y going?" and asked to provide an open response and a rating (7-point Likert scale, 1 = Conversation is not going well at all, 7 = Conversation is going very well). They also completed the RiS3-O rapport rating items and were asked to describe, in an open response format, what aspects of the communication were working, and which were not in the interaction between Person X and Person Y.

Next, all participants read a second interaction block from the same online conversation, in which Person X commits a judgement communication error (on this occasion participants in both conditions read this error). Again, and using the same questions as in the first interaction block, participants were asked to rate and comment on how the communication was going and asked whether anything had gone wrong in the interaction.

Then participants were asked, in an open response format, to elaborate on which actions Person X could take to recover the communication and reconcile with Person Y. Participants were then presented with four different interaction recovery segments, presented in a random order, in which Person X addresses the error using three different error management strategies: accept, contradict or apologise (Oostinga *et al.* 2018b), or no error management strategy. Participants rated the likelihood that Person Y would accept an invitation for another interaction with Person X and were asked to choose which strategy they believed would be most effective to recover the interaction after the error.

FIGURE 1

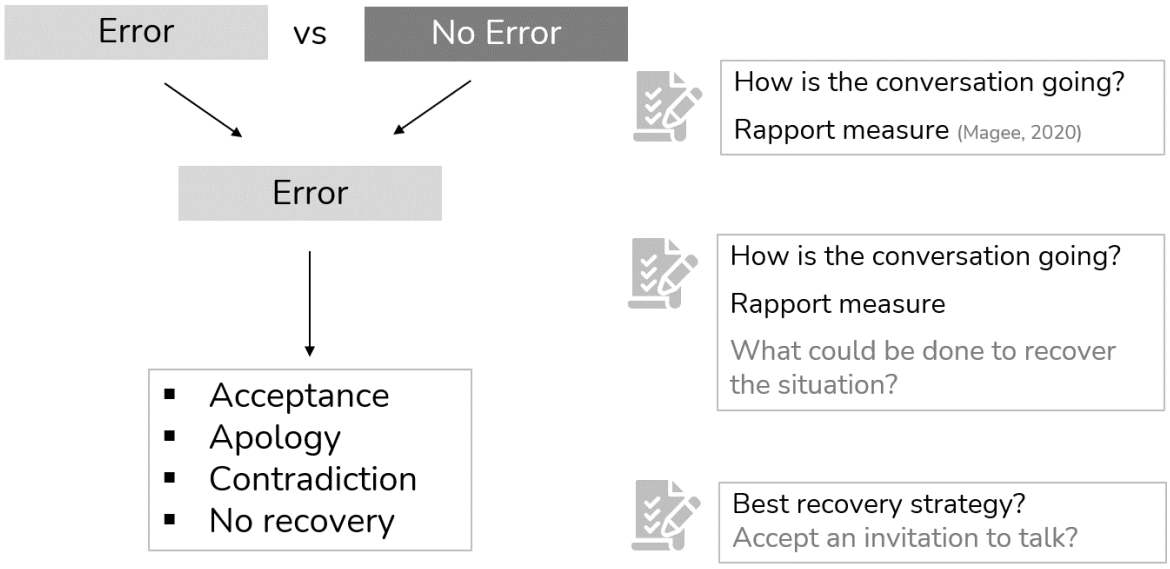

Figure 1. Diagram of the Experimental Procedure.

5.3. Analysis strategy

To address our research questions, factorial ANOVAs were used to analyse the effects of judgement errors on ratings of the conversation and perceived rapport between participants from two different national groups. Individual chi-squares were used to examine the association between participant group and perception of the error. Qualitative data was coded by category using an inductive approach (i.e., drawing from the data, not imposing pre-determined categories). Analyses were conducted on data for both interaction blocks and a similar analytic approach was taken with the recovery data.

5.4. Results

5.4.1. Effect of initial judgement error (Interaction 1)

To test the effect of the initial judgement error, we conducted a two-way ANOVA to examine the effects of participant national group (as identified by themselves; UK vs. China) and communication error (Initial error vs No Initial Error) on participants' ratings of how the conversation was going. There was a main effect of error condition [$F(1, 187) = 42.08$, $p < .001$, $\eta p^2 = .18$] such that participants in the judgement error condition rated the conversation significantly more negatively than those who did not encounter an error (Initial Error condition mean = 2.36; No Initial Error condition mean = 3.62). There was no significant main effect of participant group on ratings [$F(1, 187) = .77$, $p = .38$, $\eta p^2 = .004$] and nor was the interaction between participant group and error condition significant [$F(1, 187) = .73$, $p = .39$, $\eta p^2 = .004$] (see Table 1 for descriptives).

Participants rated perceived rapport between interactants using an adapted version of an observer rating scale (Magee 2020). There was a significant main effect of error condition such that participants who observed the judgement error rated rapport as significantly lower than those who did not observe an error, $F(1, 187) = 39.90$, $p < .001$, $\eta p^2 = .18$. Again, there was no significant main effect of participant group on perceived

rapport [$F(1, 187) = .36$, $p = .55$, $\eta p^2 = .002$] and nor was the interaction between participant group and error condition significant [$F(1, 187) = 1.86$, $p = .17$, $\eta p^2 = .01$].

TABLE 1

	Initial Error		No Initial Error	
	China *M* (*SD*)	UK *M* (*SD*)	China *M* (*SD*)	UK *M* (*SD*)
Interaction 1				
How is the conversation going between X and Y?	2.53 (1.22)	2.20 (1.10)	3.62 (1.50)	3.61 (1.47)
Rapport Rating	32.80 (5.91)	31.00 (6.00)	37.34 (6.72)	38.04 (6.63)
Interaction 2				
How is the conversation going between X and Y?	2.87 (1.37)	2.12 (1.15)	2.02 (1.21)	2.43 (1.35)
Rapport Rating	31.44 (5.61)	29.72 (6.97)	29.19 (7.40)	32.59 (6.42)

Table 1. Mean Ratings (and Standard Deviations) of Rapport for First and Second Interaction Blocks by Condition and Cultural Group.

In addition to ratings, all participants also provided open responses to the question "How is the conversation going"? The content of these responses was coded as "positive" (e.g., "the conversation is going well"), "negative" (e.g., "The conversation between X and Y seems a bit awkward and tense") or "neutral" (e.g., "it is mainly neutral with small talk"); with vague or ambiguous responses uncoded. Negative responses were associated with participants noting that the interaction was awkward or distant, involved uncertainty or ambiguity or reflected a reluctance to share information. In the Error condition, comments indicated that a majority of participants in both groups perceived the interaction negatively [China = 84%; UK = 93%]. In the No Error condition, Chinese nationals more frequently described the interaction in positive terms compared to UK nationals (24.4% vs 8.9%), whereas the latter more frequently described the interaction as neutral (44.4% vs 22.0%). In the Error condition the association between participant group and valence of response (positive, negative or neutral) was not significant, $\chi^2 (93) = 3.22$, $p = .20$. In the No Error condition, and reflecting differences between more positive and neutral responses, the association was marginally significant, $\chi^2 (86) = 6.59$, $p = .044$.

In total, 76% of participants in the Error Condition identified that something had gone wrong in the conversation, suggesting that despite the relatively nuanced error it was detected by the majority of participants who were exposed to it. The association between participant group and explicitly noting the error was not significant (UK = 78%; China = 73%; $\chi^2 < 1$).

Qualitative comments reflect the detection of a judgment error on the grounds that one interactant is out of tune with the thoughts and feelings of the other person, e.g., "X was

not respecting Y's boundaries and wishes to keep his location private as he wasn't sure he knew X" [Chinese participant]; "X was not respecting basic online rules of not asking strangers for location" [UK participant]; "X was pushy and wasn't reading the signals Y was sending out" [UK participant]; "One was hounding the other while the responder had no interest in the conversation" [Chinese participant]; "They view privacy differently" [Chinese participant]; "It was going OK until X asked a personal question about Y" [UK participant].

5.4.2. Effect of the main judgement error (Interaction 2)

Recall that after reading the first part of the interaction, all participants then read the next part of the interaction in which a judgement error took place. This was the first error encountered by participants in the No Initial Error condition while participants in the Initial Error condition had already observed a previous judgment error made by Person X. There was no main effect of error condition on perceptions of how the conversation was going, $F(1, 187) = 2.12$, $p = .15$, $\eta p^2 = .01$], which is unsurprising given that all participants have now seen an error in the interaction. There was no main effect of participant group, $F(1, 187) = 0.85$, $p = .36$, $\eta p^2 = .005$. However, the interaction between participant group and error condition was significant, $F(1, 187) = 9.78$, $p = .002$, $\eta p^2 = .05$. A review of the means suggests that Chinese participants who had not previously encountered an error rated the progress of the interaction more negatively than UK participants while those who had encountered an error viewed the interaction more positively (see Table 1).

For perceived rapport, there was no main effect of error condition $F(1, 187) = 0.10$, $p = .75$, $\eta p^2 = .001$], nor was there a main effect of participant group $F(1, 187) = 0.76$, $p = .38$, $\eta p^2 = .004$. However, the interaction between participant group and error condition was significant, $F(1, 187) = 7.08$, $p = .008$, $\eta p^2 = .04$. As per above, a review of the means suggests that Chinese participants who had not previously encountered an error rated rapport more negatively than UK participants while those who had encountered an error viewed the interaction more positively. Overall ratings for perceived rapport were only moderate across all participants ($M = 30.73$; $SD = 6.74$) and were more negative following the second interaction than the first interaction (see Table 1).

Across all participants, 77% noted that something had gone wrong in the conversation in this second interaction block. For this error, the association between participant group and noting the error was not significant (UK = 77%; China = 77%; $\chi^2 < 1$). Again, qualitative responses provided suggest that participants were adept at identifying judgment errors in interactions when one interactant is out of tune with the other person, e.g., "X seems somewhat intrusive, while Y doesn't want to disclose personal financial information" [Chinese participant, prior error]; "Y doesn't want to engage with X's attempts to find out more about him" [UK participants, no prior error]; "X is becoming a bit pushy and isn't learning when to change topic or stop pushing Y for a response about salary. He also isn't reading the cue that Y is not interested in the conversation" [UK participant; no prior error]; "Y is repeatedly pushing Y to talk about what he does not wish to share and ignores his feelings" [Chinese participant, no prior error].

5.4.3. Perception of recovery strategies

Given that all participants observed at least one judgement error by one of the interaction protagonists, we wanted to know what participants thought would be the most effective recovery strategy to repair the interaction sufficiently to result in a positive behavioural response to an invitation made by X. After each interaction, participants rated how likely it was that Y would accept X's invitation to talk soon again (0-100%; see Table 2 for mean ratings by cultural group and initial error condition).

TABLE 2

	Initial Error		No Initial Error	
Odds (%) of accepting invitation following...	China *M* (*SD*)	UK *M* (*SD*)	China *M* (*SD*)	UK *M* (*SD*)
Acceptance strategy	55.67 (26.59)	47.90 (25.67)	56.66 (25.73)	52.00 (28.44)
Apology strategy	63.89 (25.85)	55.72 (24.98)	69.57 (25.39)	58.65 (28.25)
Contradiction strategy	25.15 (25.13)	24.24 (24.16)	24.53 (23.64)	23.69 (24.72)
No recovery strategy	40.07 (27.61)	33.22 (23.52)	39.51 (25.28)	41.22 (26.79)

Table 2. Mean rated odds (%) of accepting an invitation following different strategies by Condition and Cultural Group.

The Apology Strategy had higher (more positive) overall ratings than any of the other strategies regarding the odds of accepting a later invitation (Apology Odds *M* = 61.81%; Acceptance Odds *M* = 52.94%; Contradiction Odds *M* = 24.62%; No recovery Odds *M* = 38.43%). There was a main effect of the participant group for ratings of the odds of accepting an invitation later for the Apology strategy such that participants in the Chinese sample provided significantly higher ratings for the Apology strategy than participants in the UK sample, F (1, 187) = 6.35, p = .013, ηp^2 = .03. The main effect for initial error condition was not significant [F(1, 187) = 1.29, p = .26, ηp^2 = .007] and nor was the interaction [F(1, 187) = .13, p = .72, ηp^2 = .001]. Main effects of group and error conditions, and associated interactions, were not significant for any of the other strategies. Finally, we asked participants to identify which was the best recovery strategy to most likely result in Y accepting X's invitation to play a game later. The Apology strategy was, by some margin, recommended as the recovery strategy most likely to be effective (see Figure 2) with the No Recovery strategy perceived as least likely to be successful. There was no significant association between participant group and preferred recovery strategy.

FIGURE 2

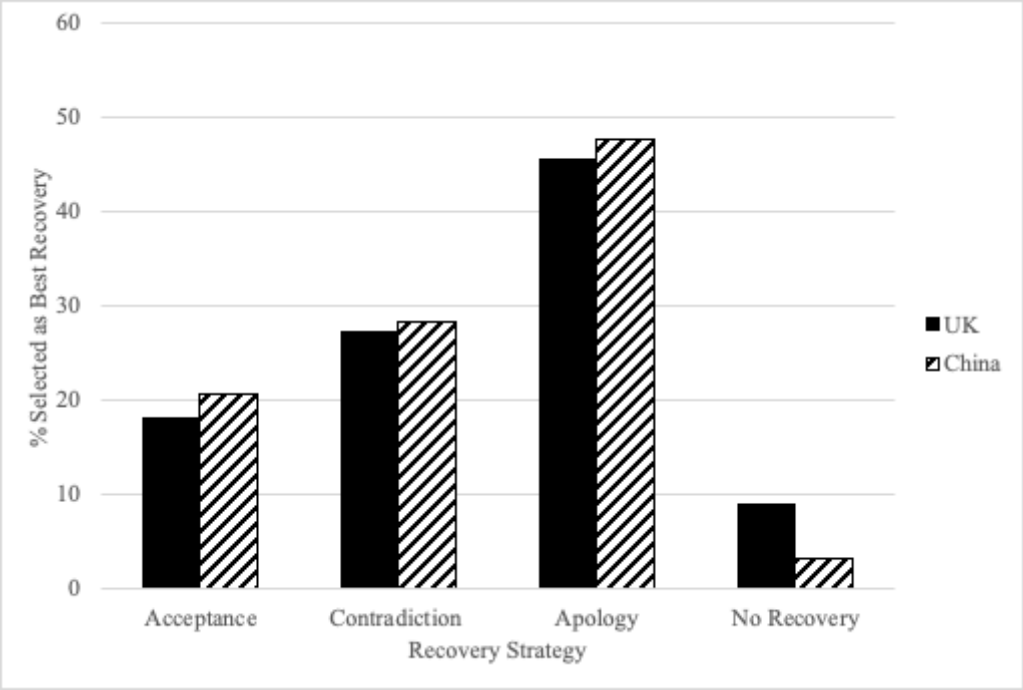

Figure 2. Strategies selected as the 'Best Recovery' Strategy by Cultural Group (%).

6. Discussion

This research examined the detection and impact of communication errors by observers on perceived rapport during brief online interactions between apparent strangers, one of whom was covertly attempting to elicit personal information. To assess how recovery strategies are evaluated in different cultural contexts, we also compared recovery strategy preferences of participants from China and the UK.

First, our results demonstrate that participants were highly sensitive to the initial communication error within the online interaction and described it in consistent ways. The majority of participants identified and articulated the judgment error, despite its relatively nuanced nature. This suggests a high degree of sensitivity to normative expectations for online behaviour, including implicit social cues about the appropriateness of information-sharing (Derks, Fischer *et al.* 2008). In line with previous research on online impression formation (Walther 1996), these findings suggest that observers were attentive to breaches of communication norms, reflecting broader expectations regarding privacy and self-disclosure in interactions in digital contexts.

Second, and confirming our pre-registered hypothesis, we found that perceptions of rapport were significantly more negative following an interaction where a (initial) judgment error was committed, compared to error-free interactions. Importantly, while perceptions of rapport decreased following the initial error, there was no evidence of a cumulative effect whereby a second error further negatively affects rapport beyond the impact of the first. This pattern of perceptions aligns with prior work suggesting that early impressions are particularly influential in online settings and that initial violations can have enduring effects (Ramirez *et al.* 2002). This suggestion is consistent with the hyperpersonal perspective according to which information-seekers make attributions to

reduce uncertainty but in doing so become susceptible to making exaggerated attributions based on a limited subset of information (for a discussion of different models accounting for attributions in CMC, see Ramirez *et al.* 2002).

Third, apology emerged as the most effective recommended recovery strategy, preferred by participants as a means of repairing the relationship and securing continued engagement. Participants perceived explicit apologies as substantially more effective than other recovery strategies, such as ignoring the error. This finding is consistent with the extensive literature documenting the effectiveness of apologies in relationship repair, both offline and online (e.g., Fehr and Gelfand 2010, Lewicki *et al.* 2016). Extending this line of research, the current study found that the apology was not only preferred but also the most effective recovery strategy, shortly followed by acceptance (in terms of rating data). This is particularly noteworthy given previous research showing that apologies are especially effective in expressive interactions (e.g., suicide negotiations, victim interviews) compared to more instrumental interactions like suspect interviews where merely acceptance prevailed (Oostinga *et al.* 2018b, 2024). Our findings suggest that online attempts at gathering information may similarly prioritize relationship-building, resembling expressive interactions more than previously assumed. This highlights the enduring importance of relational dynamics, even within digital information gathering settings.

Notably, cultural differences (where national group served as proxy) were also observed in this preference pertaining to apology: Chinese participants rated the likelihood of successful engagement following an apology significantly higher than UK participants. This finding resonates with previous research highlighting that collectivist cultures, such as China, place a higher value on maintaining relational harmony than more individualist comparators and view apologies as critical relational acts (Lee and Park 2011, Lee *et al.* 2012, Merolla *et al.* 2013, Shafa *et al.* 2017). However, the effect size was small, and it should be noted that both groups preferred the apology approach.

Despite the cultural divergence regarding recovery strategies, no substantial cultural differences emerged in participants' detection of the communication error. Both participant groups appeared to describe the judgment error similarly, suggesting that certain social expectations for online interactions may be broadly shared across cultures, particularly in digitally mediated contexts. One possible explanation for this convergence lies in the communicative environment itself. The interactions took place in a relatively "neutral" chat-based setting with limited culturally specific cues, which may have reduced the salience of cultural communication preferences. Moreover, the use of English as a "cyberlingua franca" in online interactions may have further attenuated cultural differences (Würtz 2005, Wei 2018, Im *et al.* 2022). As Wei (2018) suggests, translanguaging spaces in computer-mediated communication allow participants from diverse backgrounds to interact within a shared linguistic and pragmatic framework, potentially mitigating traditional cross-cultural communication barriers.

Although there were no main effects of national group on perceptions of how the conversation is going or perceived rapport, there was a possibly intriguing interaction perhaps reflecting a cultural difference in how communication errors might be perceived over time. For the main judgment error, a significant interaction pattern emerged for both perceptions of how the conversation is going and perceived rapport. For both

measures, Chinese participants who had not encountered an error initially rated the progress of the interaction and rapport more negatively than UK participants, while Chinese participants who had encountered an error previously viewed it more positively. One possible albeit speculative interpretation here relates to notions of an openness or tolerance of ambiguity in communications - which is a feature of high context communication (e.g., Hall 1976, Gudykunst *et al.* 1996, Würtz 2005). Specifically, high context communication is associated with implicit communication and an expectation to "read between the lines" rather than be more direct or linear. If we consider how this might play out in the early stages of communication, and as in accordance with how "thin slices" of behaviour are used to infer or make attributions (Ambady and Rosenthal 1992), it is plausible that cultural factors shape how initial communication errors are perceived. Specifically, in high-context cultures, early errors may be seen as less damaging to rapport, whereas in low-context cultures, such as the UK, errors may be interpreted more negatively due to expectations for explicit, consistent communication. In line with this, Chinese participants who had experienced an initial error appeared somewhat more tolerant of subsequent errors compared to British participants. In other words, British participants rated rapport more negatively under certain conditions compared to Chinese participants. Future work might consider cultural differences in more extended interactions, particularly with respect to the time course of errors and associated recovery.

There are also several limitations to consider. Among the most important, is the reliance on third-party observers rather than the actual interactants. While observers offer valuable insights into perceived dynamics and social judgments (Elfenbein *et al.* 2015, Ivececic *et al.* 2021, Liebst *et al.* 2023), they may not fully capture the subjective experiences of the interactants themselves. Future research should thus involve real-time participants to examine whether similar patterns emerge in more ecologically valid settings. Additionally, expanding the range of recovery strategies and including more nuanced cultural framings could provide a deeper understanding of how repair processes function across diverse interactional contexts.

We note that the Chinese participants in this study were not native speakers of English (unlike the UK sample). However, we did recruit Chinese participants with a high level of fluency in English and required them to complete a language test to demonstrate proficiency (participants who did not reach threshold were excluded from participation). One alternative would be to have had participants complete the study in their native language (which may have introduced additional confounds to do with interpretation or translation; Ewens *et al.* 2016, Mayfield and Krouglov 2019) or use a comparative group also responding in a second language. Unfortunately, it is often difficult to comprehensively mitigate against language differences in research involving cross-cultural comparisons (Wang *et al.* 2010).

We also note that it is important to recognize some common misunderstandings about *levels of analysis* in comparative research, particularly regarding the construct of individualism–collectivism. In the current study, we applied national group as a proxy for cultural differences broadly pertaining to this construct (as well as reflecting high/low context communication). As Bond (2002) observed, the concept measured at the national level is not equivalent to the same construct at the individual level, either in

theory or in practice (see also Fiske 2002, Kitayama 2002, Miller 2002). Another complication comes from the use of aggregated data across broad geographical regions, which may be problematic given that official boundaries and classifications have shifted over time (Orr and Hauser 2008). Despite such caveats, the distinction is often employed in overly simplistic ways. For example, Oyserman *et al*.'s (2002) meta-analysis found only limited empirical support for consistent differences in individualism–collectivism between European Americans and other groups. Similarly, reflecting on these issues, Matsumoto (2018) has argued that the field must move beyond "simple, dichotomous, bipolar descriptions of selves across cultures" (p. 19), since such categories fail to capture the complexity, multidimensionality, and likely dynamic nature of the construct (see also Vignoles *et al.* 2016).

Finally, although we used two transcript sets to avoid stimulus-specific effects and despite our best attempts in piloting to make them as equivalent as possible (while still retaining important features of the originally sourced materials), it is possible that methodological factors, such as differences between the perceived intensity of the judgement errors presented, affected outcomes. Future work should also explore cultural differences in response to different forms of judgement error in online interaction. The errors examined here, as relevant to the context of our research, reflected an "overstep" in an attempt to glean information about or from another. It is also the case that different topics may be perceived differently in terms of potential for error or magnitude of error in different cultures. Future research should examine the cultural sensitivity of different topics as a focus of potential error (e.g., discussing money).

Participants in the current study were not informed about any informational goals of the interactions they observed in order to avoid potentially confounding biases (such as lack of trust in authority, negative perceptions of police legitimacy affecting cooperation; Tyler and Fagan 2008). Nonetheless, these findings have implications for practitioners tasked with eliciting information in online contexts whether in an overt or covert capacity.

Overall, the current findings contribute to the growing body of work on online interpersonal communication by demonstrating that even relatively subtle judgment errors are detectable, impactful, and subject to culturally inflected preferences for recovery. Observers were highly attuned to online behavioural norms and reacted strongly to breaches, underscoring the critical importance of managing impressions carefully in initial digital interactions, particularly when seeking personal information.

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