

Why Did You/I Read but Not Reply? IM Users' Unresponded-to Read-receipt Practices and Explanations of Them

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ABSTRACT

We investigate instant-messaging (IM) users' sense-making and practices around read-receipts: a feature of IM apps for supporting the awareness of turn-taking, i.e., whether a message recipient has read a message. Using a grounded-theory approach, we highlight the importance of five contextual factors – situational, relational, interactional, conversational, and personal – that shape the variety of IM users' sense-making about read-receipts and strategies for utilizing them in different settings. This approach yields a 21-part typology comprising five types of senders' speculation about why their messages with read-receipts have not been answered; eight types of recipients' causes/reasons behind such non-response; and four types of senders' and recipients' subsequent strategies, respectively. Mismatches between senders' speculations about unresponded-to read-receipted messages (URRMs) and recipients' self-reported explanations are also discussed as sources of communicative friction. The findings reveal that, beyond indicating turn-taking, read-receipts have been leveraged as a strategic tool for various purposes in interpersonal relations.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in ubiquitous and mobile computing.**

KEYWORDS

Read receipt, seen function, instant messaging, texting, responsiveness, sense-making, turn-taking, explanation

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1 INTRODUCTION

Instant-messaging (IM) apps have become one of the most essential communication channels in our daily lives. Their increasing popularity is due not only to their convenience – they allow their users to initiate and respond to communication nearly anywhere and at any time – but also because such pervasiveness generally allows users to obtain instant responses. Nevertheless, as a computer-mediated communication (CMC) technology, IM shares many of the characteristics, including the limitations, of other CMC tools. Initially, one such limitation was its lack of non-verbal cues, which made it challenging to follow turn-taking in one's current conversation. In recent years, however, the read-receipt feature – also referred to as the seen-function [24, 54] – has been introduced by several IM services, including LINE, Facebook Messenger, KakaoTalk, and WhatsApp. A read-receipt serves as an awareness cue [10] that allows IM conversation partners to share an awareness that a message has been read, as shown in Figure 1, and thus presumably supports the progression of turn-taking in their conversation.

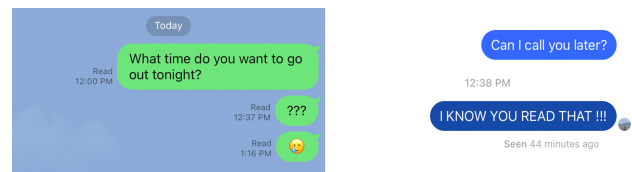


Figure 1: Read Receipts on Line and Facebook Messenger

However, since this feature became available, numerous media articles and blog posts have criticized its negative consequences [1–4, 11, 17, 19, 26, 66], which have also been confirmed by a number of studies. One commonly noted downside is that read-receipts

make message recipients feel social pressure to respond to messages promptly after reading them [10, 31, 54, 59, 63], and/or concerned and uncomfortable with their behavior being tracked and observed by the sender [15, 31, 54, 55, 59]. Read-receipts have also been criticized for fostering message senders' inappropriate expectations that they will receive quick responses, with un-responded-to read-receipted messages (hereafter, "URRMs") leading to feelings of frustration, annoyance, and anxiousness [5, 15, 31, 60, 63]. To avoid such pressures, recipients may adopt message-preview techniques that allow them to see some message content without read-receipts being generated [31, 47, 63] or simply avoid reading the messages they are sent [31]. Nevertheless, the majority of IM users continue to use this feature, citing a desire to be able to check that their conversation partners have read messages from them [10, 24]. Given that the read-receipt feature remains popular with or at least tolerated by numerous IM users, it is vital to shed light on how to improve and augment it. We propose that this can best be accomplished by gaining a detailed understanding of both senders' and recipients' sense-making and strategies around read-receipts and URRMs in a variety of contexts. Nonetheless, over the decade since the read-receipt feature was introduced, the majority of the literature about it has been focused either on its negative aspects or on general attitudes toward it, with hardly any research investigating how IM users' receipt-related attitudes and behaviors vary across different situations.

To fill this research gap, we conducted semi-structured interviews using a constructivist grounded-theory approach [13], with a total of 25 formal study participants talking through their experiences of, practices around, and sense-making about read-receipts from both sender and recipient perspectives in a variety of settings. Our research questions are: 1) RQ1: What are senders' and recipients' sense-making and strategies around read-receipts and URRMs? and 2) RQ2: What contextual factors are influential on such sense-making and strategies?

Through these inquiries, we sought an in-depth understanding of the concerns, values, interpretations, and needs behind their read-receipt-related attitudes, which helped us to extract the contextual factors that were most influential on their read-receipt-related behaviors.

This paper makes three major contributions. First, going beyond prior research that focused narrowly on the negative aspects of read-receipts, it highlights the variety of participants' practices and sense-makings around this IM feature, and how these are highly situated and shaped by five contextual factors: situational, relational, interactional, conversational, and personal. Second, it delineates five types of senders' speculation about why URRMs occur and eight types of recipients' causes/reasons behind URRMs, highlighting the gaps between these two sets of explanations that are likely to cause communicative friction between IM-message senders and recipients, and revealing some recipients' highly strategic intentions to leverage read-receipts for relational purposes. Lastly, the paper presents four types of senders' and recipients' strategies for dealing with read-receipts and URRMs.

2 RELATED WORK

2.1 Turn-taking and Responsiveness in Computer-mediated Communication

Turn-taking and other aspects of communicative rhythm have long been topics of considerable research attention [18]. In synchronous communication, such as face-to-face (FtF) and telephone conversations, conversation partners can easily monitor conversational flow and the state of turn-taking by observing turn signals [22], including non-verbal cues such as facial expressions, gestures, head nods, and tones of voice, as well as temporal cues such as tempo, pauses, and gaps [18, 23, 34, 51, 58]. In addition, synchronous-conversation partners typically adhere to shared social norms of turn taking [58] to avoid negative impressions that they are not paying appropriate attention to the conversation [51], which can be caused by even a short response delay. In recent decades, CMC technologies have emerged as major means of interpersonal communication. Consequently, increasing numbers of researchers are investigating turn-taking and temporal patterns in CMC [25, 27, 28, 42, 50, 53]. Most have long concurred that CMC and synchronous conversation differ sharply in two ways, 1) the absence/presence of non-verbal cues, and 2) their temporal patterns [38, 41, 65]. The traditional absence and delay of cues in CMC gave its users considerable scope to determine the pace at which they read and responded to the messages they received [14], because message senders lacked awareness of when and indeed if their messages had been delivered or read, or of when the recipient had started to compose a reply. As a result, CMC users found it challenging to follow the social norms or scripts that usually guide synchronous conversations' rhythms [28].

Due to the lack of non-verbal cues in CMC communication, temporal information about it – including the time of the last received message and the observed temporal patterns of its turn-taking, commonly referred to as chronemics [21, 37–39, 46, 65], response latency [33, 36, 56, 61], or responsiveness [8, 9, 12, 16, 20, 29, 32, 35, 43, 44] – have become important clues whereby conversation partners track the flow and progression of their conversations and infer when they ought to receive responses. However, since their introduction by multiple popular IM applications, read-receipts have become critically important sources of information: allowing conversation partners to track the progression of their conversations by knowing whether, and sometimes exactly when, individual messages they send have been read. Unfortunately, the literature that discusses users' reactions to and practices around read-receipts, and how contexts affect such reactions and practices, has been quite limited. Below, we review the existing literature about IM read-receipts.

2.2 Read-receipts in Instant Messaging

Read-receipts were initially adopted in email communication. Then as now, a receipt could be requested by the sender of an email, and the recipient could opt out of supplying it. In that context, Tyler and Tang [62] reported that read-receipts create pressures to respond, and separately, encourage people to project images of themselves as responsive. Unlike email read-receipts, read-receipts in IM are generated automatically. One of the first scholarly papers to discuss IM users' perceptions of and reactions to this type of feature was

by Church and de Oliveira [15], who studied users of WhatsApp. They found that many of their participants misunderstood the platform's 'two ticks' icon as indicating that a message had actually been read, though in fact it only meant that the message had been delivered to the recipient's phone. Some of Church and de Oliveira's respondents also sometimes felt pressured to respond to messages by their knowledge of the existence of this indicator. In addition, the authors found that the read-receipt feature fostered stronger expectations among message senders that they would receive immediate responses, which – when that did not happen – led to frustration. Recipients, for their part, expressed privacy concerns about the platform revealing to any/all message senders whether their messages had been received or not.

Similar findings were echoed across subsequent studies. Ling and Lai [45], for instance, noted that the read-receipt feature challenged users' sense of propriety and privacy. Pielot et al. [54] found that their respondents valued read-receipts for helping them estimate when they would likely receive responses, but also had concerns about the social pressure to respond that they created, as well as about their privacy. Lynden and Rasmussen [47] reported a similar set of mixed feelings toward this feature. Van Ouytsel et al. [63] suggested that people's sense of obligation to respond promptly after reading messages is underpinned by their perceived need to be polite and respectful; thus, failure to send timely replies tends to result in feelings of guilt. Similarly, Vorderer et al. [64] reported that 85% of the IM users they surveyed perceived URRMs as impolite. However, the same study's respondents cited various factors that affected their response times, including the perceived urgency of the message, who the sender was, and the broader situation. Mai et al. [48] further suggested that the read-receipt feature allows IM conversational partners to easily monitor and sanction each other's response behavior, resulting in stronger perceptions of their obligation to answer right away. Such perceptions can, of course, become a source of stress, as subsequent studies have confirmed. For example, more than two-fifths of Blabst and Diefenbach's [10] respondents reported that using WhatsApp would be a more relaxed experience without read-receipts, while those who experienced negative emotions caused by read-receipts said they would rather not know if someone had already read their messages on the platform.

Researchers have also identified message-recipients' strategies for avoiding the pressure of not meeting the sender's expectations. More than two-thirds of Hoyle et al.'s [31] respondents said they had avoided viewing messages, with some pretending that they had never seen them. Similarly, Gangneux et al.'s [24] participants perceived the read-receipt feature as a major source of tension, and to deal with it, they developed a skill of bypassing read-receipts using message previews, in part to buy time to think up their replies. This bypassing strategy was also reported by Lynden and Rasmussen [47] and Ouytsel et al. [63]. The former suggested that the reasons for adopting it included the recipient's relative lack of investment in the conversation or the relationship, reluctance to interrupt the task at hand, and desire to wait until they could formulate a meaningful response. However, some of Gangneux et al.'s [24] participants perceived pretending not to have seen/read messages as a kind of deception, yet was necessary to manage tensions and negotiate relationships. Read-receipts have also been leveraged by IM users

to signal their availability. Hoyle et al. [31] reported that 28.2% of their respondents deliberately viewed a message to produce a read-receipt, and that their top three reasons for doing so all reflected consideration of the sender's needs, either in general (e.g., that they were not ignoring him/her) or in response to urgent requests.

Senders' negative emotions in response to URRMs have also been a focus of research [5, 15, 31, 47, 60, 63]. Lynden and Rasmussen [47] found that IM users were less at risk of these negative emotional effects when the URRMs occurred in extremely close relationships. Similarly, Hoyle et al. [31] documented a range of negative emotions senders experienced when URRMs occurred and when their messages were not read, with fewer than one in five deeming these phenomena "not a big deal." Recently, Kato et al. [40] showed that most of the negative emotions produced by waiting for replies occurred significantly earlier in groups that were highly dependent on messaging than in those with lower dependence on it; and that these effects were influenced both by the sender's specific emotion and the recipient's identity.

In addition to emotions, researchers have studied IM users' explanations of URRMs. Lynden and Rasmussen [47] suggest that in the process of speculating about these events, the sender refers to his/her knowledge of the recipient: in particular, that person's current situation, interest in the conversation, and/or interest in the sender. For example, Stonard et al. [60] found that female adolescents often speculated that URRMs occurred because of recipients' lack of interest in them. Respondents to Hoyle et al.'s [31] online survey shared other speculations, including that the recipient was busy, in trouble, having technical issues, misinterpreting their messages, and taking their time to ponder and formulate a response.

Lastly, Lynden and Rasmussen [47] identified factors influencing how IM users react to read-receipts, including personality factors, social/relational context, content factors, and situational context. They found that the more socially insecure a participant was, the more readily s/he was negatively affected by read-receipts; and that participants who were very busy, and thus treated time as a precious resource, were more likely to find read-receipts stressful. Regarding relational context, the same authors suggested that closer contacts were less worried about read-receipts; whereas when interacting with less-close contacts, read-receipts were interpreted as an index of the other party's interest in building the relationship. Content-wise, Lynden and Rasmussen's participants saw certain messages as not requiring any response, specifically because they considered the read-receipt itself to be sufficient as confirmation of message delivery. Finally, the authors noted that some of their participants were aware that it might be inconvenient to respond immediately in certain situations. Although Lynden and Rasmussen also discussed contextual factors, their findings regarding recipients' and senders' explanations of URRMs were fragmentary. This paper identifies many more kinds of recipients and senders' explanations, as well as their strategies for URRMs. Thus, our study significantly provides a more coherent, extended, and comprehensive understanding of IM users' sense-makings and practices around URRMs in various settings.

3 METHODOLOGY

The main objective of this study was to deepen knowledge of IM users' practices and sense-making around the read-receipt feature. To achieve it, we adopted a constructivist grounded-theory approach, which can generate detailed and in-depth understanding of a given phenomenon [13]. Our data collection and analysis focused on how study participants' actions and cognition were situated and contextualized, and on identifying contextual factors that shaped their sense-making and other practices.

3.1 Recruitment

We recruited our main-study participants via 1) various Taiwan-based Facebook groups aimed at recruiting research subjects and 2) the researchers' personal Facebook news feeds. The recruiting message contained a link to a signup form. Prior to the formal main interviews, we conducted informal ones with several IM users aimed at alerting us to research topics that might emerge from the main study, and to individuals' experiences that might usefully inform our recruitment strategy for the main study. As a result, these informal interviewees were recruited via the same process, but their data were not included in our formal analysis. We learned from these informal interviewees that their IM usage, the types of contacts they exchanged messages with, and how much they cared about URRMs led to different experiences with and reactions to URRMs. Thus, we incorporated questions about these topics into our signup form, and our first wave of recruitment of main-study participants focused on those who self-reported caring the most URRMs, as we felt this would help us obtain richer reflections. This initial wave of participants allowed us to generate some broad-brush ideas and tentative coding categories regarding how they made sense of URRMs, as well as their reactions, behaviors, and practices around URRMs. Later, our recruitment strategy utilized theoretical sampling [13]. For example, most participants in our initial wave used IM primarily for relational and social purposes, and most of them were students. When we found that some of them who also used IM for work communication displayed quite different URRM reactions and behaviors, later we focused on recruiting participants who self-reported exchanging messages more often with work-related contacts, and caring less about URRMs, than those recruited earlier, some via the original pool and others via snowball sampling. Aside from these behavioral aspects of IM usage, when selecting participants, the researchers sought to achieve gender and occupational diversity. All members of the final pool of 25 participants were aged between 20 and 49.

3.2 Semi-Structured Interviews

The interviews were conducted over the course of seven weeks, from June to July 2020. The 25 participants were interviewed in a face-to-face meeting. The interviewer provided a consent form, and informed the participants of the research objective and the topics that would be covered in the interview. All the individuals invited to participate agreed to do so, and for their responses to be recorded and fully transcribed. The primary focus of the interviews was on the participants' strategies, decision-making, attitudes, emotions, and attribution around read-receipts, from both message-sender and message-recipient perspectives. To allow flexibility for following

up emerging topics as they arose, the interviews were conducted in a semi-structured style. We started each interview with a warm-up question, "What is your overall impression of the read-receipt feature? What do you like and dislike about it?". Then, we started asking them to illustrate their experiences, from the message-sender perspective, of seeing URRMs left by their various conversation partners. For each instance of URRMs they mentioned, we probed them to share their reactions, feelings, and thoughts about the URRMs, and how they coped with these events. In the second half of the interview, we asked them to share their experience of leaving URRMs from the message-recipient perspective. To help participants recall their sense-making and behaviors, and the contexts in which particular read-receipt-related incidents took place, we encouraged the participants to review their chat histories [57]. To identify elements that played a crucial role in their sense-making and behaviors, our follow-up questions were focused on eliciting their perceptions of contrasts and similarities among various conversation partners, contexts, and topics. This not only allowed us to capture concrete instances of read-receipt-related sense-making and behaviors, but also contextual influences on those instances.

3.3 Qualitative Analysis

The first cycle of coding and memo-writing, using spreadsheets, commenced in parallel with data collection and lasted from June to August 2020. Its purpose was to develop the initial set of codes as a basis for the second cycle, i.e., full data analysis, and to identify whether data saturation had been reached. The first cycle of coding involved two researchers and resulted in a set of 192 codes. The coding schema focused on senders' and recipients' actions and feelings after seeing/leaving URRMs, their reasons and intents behind these actions, and the contexts that influenced them. After all data were collected, three researchers conducted the second cycle of coding online using the web version of ATLAS.ti from October 2020 to August 2021. Specifically, they reviewed the initial codebook and used it as a basis for coding all transcripts, but remained open to revising, removing, and adding codes whenever they agreed that this was necessary or useful. In particular, in the process of the second coding cycle, the researchers recognized the vital influences of senders' ascription of reasons to URRMs, and recipients' actual reasons for leaving them, on their subsequent actions; for this reason, more focus was placed on illustrating these aspects in the second cycle. The researchers also replaced some of their reason-behind-actions codes with contextual-factors codes to better explain and contextualize senders' actions, and increased the granularity of the coding schema for contextual factors. Whenever codes were added or revised, their applicability was examined against other data. A fourth researcher met with the three coders weekly to discuss any revisions to the codebooks and to resolve any discrepancies or uncertainty. In axial coding, the researchers regularly discussed the categories of their codes and those categories' interrelationships. At one point, during such discussions, a strong similarity was identified between our participants' ascriptions of reasons to URRMs and two theories – the Theory of Mind [5–7] Malle's Folk-conceptual Theory of Explanation [49] – both of which provide explanations of how people infer and explain the thoughts and intentions of others using the concepts of belief and desire. The

Table 1: The demographic background and IM frequency of our participants

ID	Age	Occup.	IM Frequency	ID	Age	Occup.	IM Frequency	ID	Age	Occup.	IM Frequency
P1	40-49M	IT	High	P10	20-29M	Student	High	P19	20-29F	Govt EMPL	High
P2	20-29F	Student	Very High	P11	20-29M	Student	High	P20	20-29F	Svcs	Very High
P3	20-29F	Student	Low	P12	20-29F	IT	Medium	P21	20-29M	Student	Very High
P4	20-29F	Student	High	P13	40-49M	IT	Very High	P22	20-29F	CCI	High
P5	20-29F	Student	High	P14	20-29F	Mfg	Medium	P23	20-29M	Student	High
P6	20-29F	Student	Very High	P15	20-29M	IT	High	P24	20-29M	Student	Very High
P7	20-29F	Student	High	P16	30-39M	IT	High	P25	40-49M	Mfg	Very High
P8	20-29M	Student	Very High	P17	20-29F	Svcs	High				
P9	20-29F	Student	High	P18	30-39M	IT	High				

Note. IM frequency: Very High = Several Times a Hour; High = Several times a day; Medium = Once a day; Low = At least once a week

latter theory, in particular, proposed four modes of explanation: one for unintentional behavior (causes), and three for intentional behavior (reasons, causal histories, and enabling factors). Our research team thus adopted both theories as a conceptual framework for analyzing and categorizing the participants' explanations of read-receipts and URRMs, from both sender and recipient perspectives. Our final code categories covered 1) senders' reactions to URRMs, including their emotions and sense-making (i.e., interpretations of read-receipts and speculations about URRMs); 2) recipients' self-reported reasons for causing URRMs or allowing them to occur; 3) senders' and recipients' actions and strategies subsequent to URRMs occurring; and 4) five types of contextual factors. The 16 codes pertaining to senders' interpretations/speculations and the 35 pertaining to recipients' causes/reasons were organized into five and eight high-level explanation categories, respectively. A concept map illustrating the key code categories in our final codebook is presented as Figure 2.

4 FINDINGS

In this section, we provide the answers to our two research questions. First, given that our participants' sense-making and coping strategies around read-receipts emerged as highly situated, we first introduce five types of contextual factors that shaped these behaviors. Then, we walk through senders' explanations of and strategies for coping with URRMs. Lastly, we present message recipients' explanations for URRMs, and their URRM coping and prevention strategies.

4.1 Participant's Sense-makings, Reactions, and Practices around URRMs Were Situated

In answering our RQ2, also the first important highlight of this study, we found that – in contrast to prior literature, which has tended to focus on IM users' negative feelings about URRMs – our participants' sense-making, reactions, and practices around URRMs were varied and highly situated. Our final codebook contains 68 codes describing the contexts in which the participants' sense-making and strategies took place, which we categorized into five types of high-level contextual factors: personal, situational, conversational, relational, and interactional.

Among these, *personal* described perceptions of the sender's own or the recipient's traits, disposition, habits, culture, and past experience. This primarily influenced our participants' sense-making, such as P12's tendency to attribute his grandfather's URRMs to the latter's difficulty in typing, or P23 readily ascribing the URRMs left by several of his classmates to their laziness.

Situational factors are the perceived situations of senders or recipients during and/or after a URRM. They include activity; emotion; technology; and physical, temporal, and social surroundings. We found that these factors primarily influenced how participants made sense of and felt about the recipients' URRMs. For example, having known or speculated about the recipients' situation tended to lead our participants to attribute URRMs to the situations they perceived. For instance, P22 noted of a friend's URRMs that they "*just mean she has nothing important to tell me or she's too busy. I know she has a kid she needs to take care of.*" Situational factors were also reported as influencing the participants' feelings upon seeing URRMs. As P17 commented on her emotional context, "*If I'm in a bad mood and need someone to talk to but he [left URRMs], that would make me feel really awful.*" On the recipient side, situational factors were also mentioned as influencing participants' desire to avoid producing URRMs, as doing so might lead to more hassle: as P20 said, "*I'd not tap into the message after work on Friday!*"

Conversational factors included the participants' perceptions of the characteristics of their current conversations. These were first categorized into conversations perceived as requiring them to take action or not, because we found that this distinction strongly affected their subsequent coping strategies. Conversations requiring action were further categorized by the type of action, including task execution, information provision, decision-making, and acknowledgement of message/meaning delivery. For example, participants' subsequent actions tended to be forthright, and sometimes relatively aggressive, if they needed the message recipients to take action immediately. As P9 noted, "*My tone will become intense or I'll just call*" when message recipients leave URRMs. Other conversational factors included urgency, importance, cost and benefit, formality, progression, temporal relevance, and the controversy of the topic. For example, when participants deemed a conversation not worth continuing, they felt comfortable with recipients' URRMs, perceiving that "*even if you try to talk further, it's likely to end up with something they don't need to respond to either*" (P15).

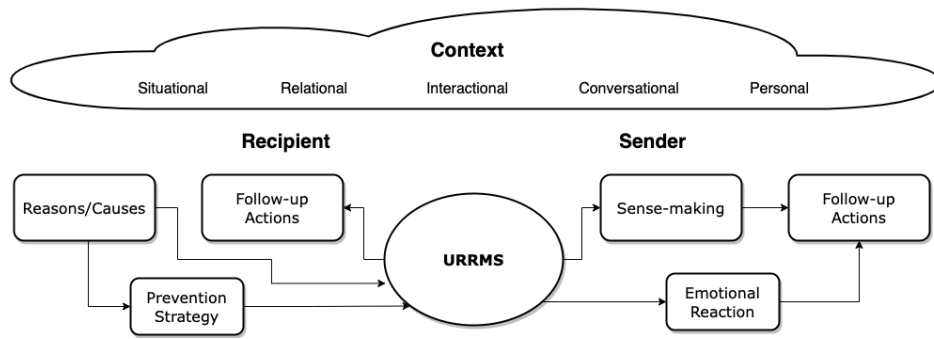


Figure 2: A concept map of the key code categories

Relational factors describe the perceived relationship between the sender and the recipient; their key codes include superior-subordinate relationship, work/non-work relationship, the perceived current stage in the relationship development process (initial, escalating, de-escalating, maintaining, terminating), certainty, trustworthiness, familiarity, anticipated reciprocal interaction, anticipated future interaction opportunities, and anticipated future benefit. Despite the variety of relational factors, each had a different breadth and depth of influence on the participants' sense-making and practices around URRMs. For example, participants' perceived stage of their relationship with their interlocutors tended to have broad influences, not only on their explanations as senders of the recipients' URRMs and their decisions as recipients to leave URRMs, but also on the strategies they subsequently adopted. For instance, participants who perceived their relationship with the recipient was stable tended to care less when seeing their URRMs, whereas those who were seeking to escalate their relationship tended to care about more seeing URRMs, and to open new topics that they thought the recipient would be interested in as a means of putting their conversation back on track (P15). In another example, P1 said, "I'd try to avoid [URRMs] with the person who would affect the outcome of my performance review." In other words, when participants foresaw benefits arising from being friendly to senders, they would avoid producing URRMs in their conversations.

Finally, *interactional* factors, though conceptually overlapping with some relational factors, were kept as a separate category because our participants often considered them separately from their relationships with their interlocutors. The key codes for interactional factors were: interactional norms and patterns; media for communication; mutual contacts; and recent interactional experience, including but not limited to conflicts and disagreements. For example, some participants' perceptions of the interactional norms and patterns prevailing between them and their interlocutors influenced both their sense-making about and their reactions to URRMs. As P2 explained, "We already know each other's habit and patterns, so we know her [URRM] means she's busy now." On the other hand, participants' perceptions of the existence of an alternative communication channel between themselves and message recipients (e.g., face-to-face communication (P21) or voice calls (P5)) influenced their reactions to and strategies after seeing URRMs, such as whether to use such alternative channels. Participants' perceptions of their recent interactional experience with senders (e.g., recently

having had a fight (P22)) also influenced their intentions to leave URRMs.

Although we assume that our above list of contextual actors is non-exhaustive, we feel that it covers a wide enough range of the factors that affected study participants' sense-making and choice of strategies. Due to space limitations, we could not walk through the impact of every contextual factor in this section, but whenever suitable, the sections below will discuss how such factors situated participants' sense-making and strategy choices.

4.2 Senders' Five Explanations of URRMs

As part of our answer to RQ1, we will first present how participants as senders made sense of message recipients leaving URRMs. We classified their explanations into eight categories, and present them below.

4.2.1 Unintentional and Justifiable URRMs. One common type of sender explanation for URRMs was that they were unintentional, or at least, intentional but justifiable in the circumstances. These two explanations have been grouped together because the participants giving them expressed relatively little concern about URRMs having occurred. Specifically, they mostly attributed these events to the recipient forgetting to respond, as some found it happened "quite often" (P2). P13 likewise noted, "She replied to me nearly always. When she didn't, I wouldn't speculate about the reason. She's probably just busy or forgot to respond." Sometimes senders reasoned that recipients were "too busy to respond" (P3) or would be "preoccupied" with other matters (P7), on the basis of their familiarity with the latter's activities and routines. Sometimes, they also speculated that a recipient needed more time to provide a response, because s/he "was considering how to deal with the issue" or because the sender's own message was "not intelligible enough" (P7).

Another type of justifiable URRM involved the perceived progression of the conversation. That is, participants speculated that the recipient did not perceive it as necessary to respond because s/he had interpreted something in the previous turn as a signal for terminating the conversation. Such sender judgments were made in light of past experience, i.e., of interactional patterns with the recipient. For example, P15 said it was "easy to turn to a read-receipt" to serve as the end-point of a conversation that seemed to be going nowhere. Similarly, P14 said: "It's like an unspoken agreement that we should stop there. However, participants did not always agree

with recipients' views that their conversations had been terminated: *"As far as politeness is concerned, if you want to end the conversation, a sticker [emoji] is a minimum. I don't get why he left a read-receipt"* (P4).

4.2.2 Attribution of URRMs to Perceived Low Obligation and Necessity. This category of URRM attribution refers to situations in which the sender speculated 1) that the recipient perceived the message content to be not urgent enough to respond to quickly, or 2) that the recipient felt a low level of obligation to respond to the sender him- or herself. As P21 recounted, *"He had a car accident, and I LINEd him and asked if he was OK. We're quite close, but he did not reply to me. LINE showed a read-receipt and then I was figuring that he did not want to let other people know what happened to him."* As this comment suggests, a number of our participants perceived the issuing of a read-receipt as the product of their interlocutor's deliberate choice. Nevertheless, attributing these supposedly deliberate read-receipts to the recipients' belief (i.e., not needing to respond) rather than their desire (i.e., not wanting to respond) appeared to make senders feel better about URRMs having occurred.

4.2.3 Attribution of URRMs to Recipients' Rejection and Displeasure. Sometimes, participants speculated that URRMs were intentional expressions of lack of interest in the conversational topic or of negative emotional responses to it or to them. For example, P15 said: *"Basically, no response means no interest, unless they forgot to respond [...]. If you say something interesting, they will respond."*

As well as these topic-related reasons, our participants inferred that URRMs were rooted in relationship or interaction issues. They became easily annoyed or anxious about URRMs when they still felt uncertain and insecure about their relationship with the recipient. P6 shared her feelings of insecurity that arose when her now-close female friend had not responded to her in the early stages of their friendship. *"Whenever she did not reply to me, I started to wonder if it was because she disliked me or because she found my messages annoying."* Similarly, after seeing a URRM, P25 felt insecure and wondered if the parties' relationship had changed: *"We used to be quite close. Why would this [URRM] happen? Was it because he felt some difference in my recent interaction with him? Or is it just because of the time or distance between us?"* As dyads gradually became more certain about their relationships, we observed that their interpretation of URRMs grew less alarmist; i.e., senders' speculations about why URRMs occurred shifted from rejection of the relationship to expressing short-term displeasure, akin to the *"silent treatment"* sometimes given when *"two [people] just had a fight"* (P1).

Attribution of URRMs to the recipients' displeasure was particularly common in the context of coordinating work- and business-related conversations, when participants were aware that they might have offended recipients. P8 provided a vivid example of having a conversation with an online merchant to coordinate a refund. *"I was wondering if he was thinking the business was screwed up, or I was being too aggressive. Then I waited for a day and he still had not replied, but he'd read it. Then I figured that I had pissed him off."* P13 shared an experience of feeling worried about annoying his supervisor, despite not having any particular reason for thinking he had. *"I texted my supervisor and [...] he read it but did not respond. [...] Then I was wondering if I said or did something wrong."* To sum up, our participants commonly attributed URRMs to their conversation

partner's refusal to engage with a topic (whether due to displeasure about it or simple lack of interest); possible problems in their relationship, especially in its early stages; or specific, potentially negative aspects of their recent interactions.

4.2.4 Attribution of URRMs to Evasion of Responsibility. Participants also attributed URRMs to the recipients attempting to evade responsibility. *"We need to be on time. I think he was not taking responsibility. He either was too busy to do it, or was trying to avoid doing it. He chose to show the receipts"* (P5). In group-chat settings, it was perceived as easier to evade responsibility, since everyone in the group chat received the same messages, unless the sender explicitly mentioned a particular recipient. As P2 noted: *"When it is related to doing an assignment, they probably are thinking 'I don't want to reply, it's not urgent'."* During the particular incident being recounted here, P2 also speculated that one recipient was trying to avoid being assigned tasks.

4.2.5 Attribution of URRMs to Recipients' Personal Characteristics. Finally, participants sometimes attributed URRMs to their conversation partners' characteristics, including their dispositions, habits, preferences, and capabilities, based on observation of URRM trends. This attribution process, referred to as causal history of reasons [49], typically took place when the sender was unaware of situational reasons that might explain URRMs. As P23 noted, non-active IM users *"typically reply after a week, which is not a big deal. [...] So I'm not surprised [at URRMs]."* P12 also noted a trend she observed from her grandfather: *"Typing is quite burdensome to him, so it's easier for him to simply read my message. [...] He would think it's a waste of his time, so I'm pretty used to seeing him show read-receipts."* Notably, the ascribing a URRM to the recipient's personal characteristics seemed to be an easy and convenient way for the participants to make sense of it; and when doing so, they tended to exhibit less negative feelings about URRMs. Nevertheless, perhaps also because such ascriptions were quick, convenient, and made them feel better, when they made such ascriptions, the participants' mentions of recipients' intention behind URRMs were relatively rare.

4.3 Senders' Actions Subsequent to URRMs

Regarding participants' strategies for coping with URRMs, we found that they varied in three dimensions: channel, aggressiveness, and forthrightness. *Channel* refers to the medium through which the participants dealt with URRMs, which could be either the same chat window in which the URRM took place, or an alternative medium, e.g., another messaging app, a voice or video call, face-to-face conversation, or a human intermediary. The most commonly mentioned coping strategies took place in the original channel. *Aggressiveness* refers to the levels of urgency and forcefulness with which the participants dealt with URRMs; and *forthrightness*, to whether they chose to address URRMs upfront or avoided confrontation to maintain harmony with the recipient. Note that participants reported all four combinations of aggressiveness/non-aggressiveness and forthrightness/lack of forthrightness across different contexts, and their choices of strategies were profoundly situated and affected by the aforementioned contextual factors. Below, we separately discuss the four types of strategies implied by these different pairings of aggressiveness and forthrightness.

4.3.1 Aggressive and Forthright. Most of our participants noted that they were more likely to address URRMs upfront and aggressively to people they were close to, such as family members and partners, asking straight questions such as "Why didn't you respond to my message?" (P23) and "Why did you read but not respond?" (P15). Other than within this kind of relationship, the aggressive and forthright strategy was typically adopted because the message required its recipient to take action: either supply information, execute tasks, make decisions, or acknowledge that they had received the message, especially when the situation was urgent. As P16 noted, "I would just tell her, if you don't want to do it, just say it. Don't use this [URRM] approach." When dealing with his supervisor, P16 softened his tone, but still chose to be upfront due to seeing this as his responsibility: "I'd leave him messages over and over again, or even give him a call. I would use a more bureaucratic-style tone to ask him to respond, and tell him about the consequences if he did not respond in time." P17 explained the reason for adopting confrontation as follows: "If the work only matters to you, and you failed it, that's your problem. But if your work matters to me, I'll push you as much as I can. [...] If it still doesn't work, I'll ask if my supervisor or his supervisor to contact him."

4.3.2 Aggressive but Non-forthright. Participants who adopted this approach did so to avoid confrontation, but nevertheless terminate the interaction, or even the relationship. As P14 explained, "In the beginning I would care and wonder why she did not reply to me. I had no clue if I had offended her. I was really mad, like, 'What made her think my things weren't important?' Okay, fine, if we don't share a common ground, it's hard for us to get along with each other either. So in the end I decided [...] I don't need this kind of friend." Similar coping strategies were adopted in group-chat settings. P19 commented, "I'm a person who chooses to fade out, either never talking again or quitting the group." When mentioning this strategy for coping with URRMs, the participants mostly did not feel that their interactions with recipients were reciprocal, and withdrawing from rather than trying to repair these indifferent interactions seemed reasonable to them.

4.3.3 Forthright but Non-aggressive. Conversely, even in situations where the actions requested of the message recipient were perceived as urgent, participants sometimes adopted a forthright but diplomatic approach that they hoped would not be seen as intrusive or pushy. This was generally because the recipient was someone with whom the participant felt a need to maintain a relationship or wished to present a friendly image to. To achieve this, some strategically embedded casual language and/or emojis/stickers to allay the tension when inquiring about URRMs. As P5 noted, "I know I tend to push people when I want things to be on time, but I don't want them to feel pressure. So I often try to add some humor elements, like emojis or stickers."

Various participants commented that adjusting their own tones or words was essential, based on a perception that everyone could have their own distinct interpretation of the original message. As P10 said: "if nobody responded to me, it might be that they couldn't answer or did not know how to. So I reframed my proposals and questions, making my discourse and thoughts more thorough, and asked them again."

Another type of adjustment was to find an alternative channel in which the recipient would be more responsive or less able to evade responding. For example, P6 shared, "I was wondering: 'Why is she available online but just doesn't reply to me?' She even once kept tagging me on Facebook but just did not respond to my messages for several days. Then I decided to directly reply to her tag, 'I suppose you should reply to my message now?' Then she did." Another example was provided by P20, who attempted to make an appointment with her professor. "I felt very bothered by him repeatedly showing read-receipts when I asked for a time for an appointment. If you can't find him there you find another way [...]. I went to any place where I might run into him."

4.3.4 Non-forthright and Non-aggressive. Participants sometimes adopted an even softer way to address URRMs. For instance, when they perceived that the action they had requested was non-urgent, trusted the other party to eventually take it, and/or thought that the cost of not taking it was acceptable, some participants reported just waiting, or pretending that nothing had happened. As P4 recounted, "The instructor said he would reply with a sticker when he's done, but he did not. I'm not sure if he had actually graded it yet or not. [...] He's a trustworthy person, I believe he will remember."

In conversations where no actions by the recipient were required, e.g., chitchat, participants preferred to adopt this passive strategy either when they wanted to maintain a good relationship or escalate it. For instance, P9 noted that after a URRM occurred with a particular recipient, "What I did was wait. But after I waited till a certain point, I sent him a message again. [...] I would beat around the bush. I'd start a new topic and wouldn't ask him why he did not respond to me, because I liked him." P13 also adopted such a strategy when having a political debate with his close friend: "I left the conversation there, waited for a couple days, and then started a new topic not related to politics. We both pretended nothing happened. After all, we're still good friends, just with different political stances." P20, on the other hand, switched to a different channel for more informal conversation opportunities: "We both recognize that Teams is more for work communication. So I switched our conversation to Telegram or LINE so that our conversation can be more casual and informal." In all these cases, the participants were concerned that addressing a URRM forthrightly or aggressively would harm their relationship.

Next, we turn to how the participants, in their role as message recipients, explained the URRMs that they caused, how they dealt with such situations, and how they tried to prevent further URRMs from occurring.

4.4 Recipients' Eight Explanations of URRMs: From Unintentional to Highly Strategic

As the other part of our answer to RQ1, we present below how participants as recipients explained why they had caused such events. In comparison to sender-perspective explanations, the participants provided more varied explanations as recipients. We classified the latter set of explanations into eight categories, only some of which corresponded to the sender-perspective explanations. We present these eight recipients' explanations below, and will compare them against senders' ones in the Discussion section.

4.4.1 Unintentional and Justifiable URRMs. Participants mentioned that their URRMs were often accidental or unintentional, including due to having entered the chat window accidentally: e.g., *"She happened to text me while I was checking our previous conversations"* (P6). When this happened, as P1 noted, the sender *"would think that I was aware of his message, but in fact I was not"*. Other participants also mentioned that sometimes they were even unaware that they had opened the chat window. P6, for example, said: *"the phone just opened the chat window itself when it was in my bag. My phone screen was very sensitive. I didn't realize that the chat window had opened until I checked my phone."*

Participants also mentioned that URRMs often resulted from their forgetting to respond, when they were *"preoccupied"* (P1) or *"interrupted"* (P16). As P24 said, *"If on that day you get a lot more messages coming in, these messages might be buried and then I would forget that I've read it"*. Sometimes, however, they thought they had responded to particular messages, but had not (P14). They noted that reminders were vital to avoiding such incidents.

At other times, participants told us, URRMs were not unintentional, but they were prevented from responding by situational, personal, or conversational factors; this, they said, was both justifiable in itself and understandable to message senders. Situational factors shared by P18 included perceived social inappropriateness, e.g., because attending an important gathering, and a perception that texting was not an efficient way to communicate, prompting a decision to *"leave the conversation till the conference call later"*. Personal factors included feeling stressed and tired in the moment (P12). On the other hand, several participants noted that causing URRMs or not depended on whether the senders could understand and empathize with their situations, based on prior familiarity or interactional experience. As P19 explained, *"we could understand that [the URRM] was because we were busy. We know each other and our situations very well. For friends that are in the smaller circle, it's fine. But I would be more careful about this [URRMs] for people outside the circle."*

Another conversational factor was the perceived progression of the conversation: i.e., participants perceiving a signal of the termination of turn-taking, and thus believing it unnecessary to progress the conversation further. *"When they share something, like a meme, or something they see somewhere, you see it and you know it. That's it. [...] If they really want to get your responses, they'll add more text, not just an image"* (P6). P7 shared an interpretation that a URRM *"indicates that 'The topic is over. I don't know what to say, and it's hard for you to go on, too. Let's stop here'"*. However, there were instances in which senders did not agree that a URRM was a signal for termination *He thought we had not finished, but I thought we had. [...] One day he said to me, 'Do you not like that topic?', and I said, 'No, why?' and he said, 'Last time when we talked about this, you disappeared right away'"* (P6).

4.4.2 Use of URRMs to Show That a Message and/or Its Meaning Has Been Successfully Delivered. Participants mentioned that they sometimes intentionally allowed URRMs to occur as signals to senders that their messages had been successfully received and their meaning obtained, essentially in the spirit of email read-receipts. As P22 said, *"For such messages like for notifying me, I don't need to reply. Reading it means I know [the message content], and they know*

that I know it." This approach, of course, assumes that senders will interpret URRMs in the same way, instead of just feeling ignored. Unsurprisingly, therefore, the dyads within which such an approach was used tended to be close. As P14 commented, *"For messages from family or people I'm very familiar with, I let them know that I've read their messages. I can't respond, but I want to let them know that I've seen it. We have a tacit agreement that I'll respond when I become available."*

Indeed, in some close relationships, producing read-receipts was perceived to be more important than responding. *"If he doesn't see that I've read it, my boyfriend will call me. [...] He doesn't really care [if I don't respond]. He wouldn't ask, 'Why did you not respond to me?'"* (P12)

4.4.3 Use of URRMs to Express Displeasure and Dissatisfaction. A desire to express displeasure or disagreement was the most-reported intention behind causing URRMs, and the participants expected their interlocutors to be able to feel and infer this. Often, these events occurred when recipients felt senders to be impolite or disrespectful, across all kinds of relationships. For P8, URRMs were preferable to *"directly say[ing], 'Can you be not this impolite when you ask questions?' I prefer leaving a read-receipt to imply this and see if he can get it."* P1 recounted an incident in which he *"waited more than 10 minutes and she texted back that she was busy and couldn't be on time. Then I read but stopped replying to any message from her. I wanted her not to be able to find me, letting her experience what waiting feels like."* P13, on the other hand, used URRMs to express dissatisfaction to his subordinate, *"I was not satisfied with his performance, and I intentionally left a read-receipt to let him know my dissatisfaction, so that he would reflect upon where he could have done better."* This intention was also often mentioned when the participants felt senders' ceaseless messages to be annoying. As P14 explained, *"I've told him, 'You've asked this same question many times. Please stop asking about it.' I'm tired of him keeping going on. So I left a read-receipt, and I think he got my point."*

4.4.4 Use of URRMs to Express Rejection. Using URRMs to indirectly express rejection was another very commonly reported intention. The first type of rejection was of specific conversational content. In such cases, according to P20, a URRM was *"softer and [more] tactful."* She added, *"Some people have an inclination to share with you their interest or complaints, which I'm not really interested in. [...] I use it [read-receipt] as an indirect way to express that I don't really care."* Similarly, P10 said, *"I hope my mom will observe that I don't reply much when she sends these videos. [...] It's a more passive way of expressing rejection. [If I was more direct ...] she'd get hurt."*

The second type of rejection was of the current phase of the participant's relationship with the sender, or perhaps that entire relationship. When receiving ceaseless messages from senders with whom they were not interested in escalating or maintaining a relationship, they occasionally used URRMs to imply this, as they perceived that URRMs is a signal that was less hurtful than a message (P2). As P17 put it, *"making my response slower is to imply that I don't want to spend time on you."* And P4 and P12 indicated that they used URRMs specifically to terminate entire relationships with whom they weren't likely to meet FtF again. For example, P12 shared her experience, *"He kept texting me. Since the course was over and I won't see him again anyway, I stopped replying to him."*

4.4.5 Use of URRMs to Calm Conversations Down. Interestingly, we observed that, after intense conversations and debates, some participants intentionally caused URRMs not because they wanted to express displeasure, but to avoid escalating conflicts and tensions. P10 said that a friend's opinion *"tended to conflict with those of all the others in the group. [...] It doesn't hurt to not reply, and there's also no need to argue to make your point."* At other times, the participants used URRMs to try to nip controversial topics in the bud. As P1 explained, *"If you respond to his messages [about politics], you'd only have continual debate and conflict on it. It doesn't do anything good for us. I'd try to not touch this kind of issue."*

4.4.6 Use of URRMs to Manage and Shape Impressions. The participants highlighted a variety of instances in which they deliberately caused URRMs to manage the impressions they gave to message senders. Mostly, this involved attempts to provide thoughtful, non-cursory replies to create an image of competence, busyness and working hard. For instance, as P11 reported, *"I intentionally waited for a while and gave a long response, implying that it was not because I did not read it, but to give a detailed and complete answer. [...] You want to craft the message, provide a perfect response, and create a good image"* Similarly, P5 said, *"My boyfriend asked me something and I didn't want him to know that I didn't know the answer. So I deliberately left a read-receipt there. After I had found out the answer, I told him that I had been busy and then gave him my answer."*

The tactic of pretending to have been busy was used not only when encountering a need to take more time crafting messages, but also to show that the recipient was appealing and popular. As P6 noted, *"There are some friends who would once in a while ask me 'Why do we often see you online and chatting. And I'm thinking, 'I'm just taking a break, okay?'" Afterwards, whenever I see their messages, I read but do not respond to them. I pretend that I'm very busy, and wait for them to ask me about it. Then I'd say, 'Oh, don't worry, I've been busy and couldn't reply until now'."*

Crafting a message was also mentioned to create an image of considerateness, as P20 noted. *"I wanted to let her think that I was considering her offer [...] If I replied too fast, she'd feel like I did not actually read the message at all. [...] She was my mom's friend, so I couldn't just brush her off."*

4.4.7 Use of URRMs to Elicit Concern and Feelings of Being Valued, Needed, or Awaited. Some participants used URRMs to prompt message senders to care and wonder about them. Observing that senders were awaiting their responses and pondering when they would receive them made these participants feel valued, needed, and cared about. For instance, P20 deliberately caused a URRM to elicit the sender's reconciliation, because, as she said, *"I was curious about how he was going to apologize to me"*. Similarly, P4 used URRMs to elicit her boyfriend's caring words: *"Sometimes I was upset, but he didn't know. Then I showed him a read-receipt, and he'd ask 'Why did you not respond to me? What's wrong?' I didn't want to just reveal why I was upset by myself. I wanted him to ask me and care about me."* P2, on the other hand, utilized URRMs to make her conversation partners feel anxious and await her responses. *"I'm quite enjoying it among my high school friends. I'd intentionally leave read-receipts to get them desiring me to respond. It's like reflecting my value. [...] URRMs help me feel their anxiety because they need me."*

4.4.8 Bystanders. Some intentions were specific to the group-chat setting. Specifically, in such a chat, some participants allowed URRMs to occur when they were 'bystanders', i.e., perceived that they were not the audience for a particular message – for instance, because it was *"beyond [their] capability"* (P22). They also sometimes did this even when the topic was relevant to them, to avoid attention, responsibility, and/or accountability. As P22 explained: *"If you respond, you cannot get rid of it [...]. If no one speaks, I don't."* Similarly, P25 said, *"I'll wait for the first person to say he's not going, and then I'll follow up with 'I'm not going either'. I don't want to be the first to reject the invitation."* P24 mentioned that he preferred being a bystander when there was a debate because *"I don't want to get into the mess."* On the other hand, several participants stated that when they were new in a group or not familiar with its norms, they also preferred being a bystander. *"I guess it's because I was shy. I didn't know what to say in the beginning. So it's better to just wait and observe"* (P3).

In sum, URRMs were both unintentional and intentional. Within the intentional category, there were also a variety of causes or reasons. Some were perceived as legitimate or even obligatory, others as highly strategic and purposive; some occurred for impersonal reasons, and others for relational ones. Crucially, they were highly situated and contextualized, with particular intentions clustering around certain relationships and situations.

4.5 Recipients' Strategies around URRMs

In contrast to the varied reasons and causes of URRMs, participants as message recipients provided only two main variations of strategies for dealing with URRMs: directly addressing them, and continuing the current conversation. We present them in the sections below.

4.5.1 Directly Addressing URRMs. One of the two strategies participants used message recipients for dealing with URRMs was to address the issue head-on, e.g., by apologizing, providing explanations, and expressing feelings. Apologies could be issued in the same channel as the URRM, or via an alternative one like FtF communication, phone calls, and so on. The participants tended to apologize when their URRMs were unintentional, justifiable, and less purposive, i.e., when they perceived that the senders were likely to misinterpret their meanings or causes. As P6 noted, *"Whenever I notice that I've unintentionally left a read-receipt, I apologize."* This was deemed particularly crucial when the recipient perceived the message as *"time-sensitive"* (P11). However, it was also apparent that recipients' decisions about whether to issue apologies depended on the senders' manner. *"If they are polite, I'd say 'Sorry. I was busy, and I accidentally entered the conversation.' But if they are impolite, my apology is very brief, if I even give one at all. [...] It's like, you're seeking my help but you didn't show your manners. Why would I show my manners to you?"* (P5). Several participants highlighted that they preferred to give FtF explanations of their URRMs to people they valued, *"to show respect"* (P20).

Often, however, an apology was perceived as insufficient. To prevent senders from misunderstanding, some participants would add explanations to describe or justify why URRMs had happened. When explaining, they noted that they often used butler lies, among

which “busyness” was a popular choice, especially when the relationship was of concern to them. For instance, P6 noted, “For those who don’t know much about me, I’d be worried if they thought I was just pretending to be busy or wanting to ignore them. [...] I’d be concerned that they’d start to see me differently. But people who know you well would know it was unintentional.”

The participants also mentioned some situations in which they would provide the true reason for a URRM. One prominent one was when they had intended to imply denial or displeasure, but the sender did not understand this. They disclosed the true reason not only to partners – “when she asked me ‘Why didn’t you reply to me?’ I’d tell her, ‘Because I’m not happy’” – but also to acquaintances, when they felt bothered by them: “Some people would never give up, then I’d tell them why I did not respond” (P17).

4.5.2 Continuing the Current Conversation. Quite often, the participants chose not to address URRMs upfront, but to continue the conversation, either by not taking any action but responding later, or by providing a rough response fairly quickly. According to our observations, which of these two approaches was chosen depended on the participants’ perceptions of how responsive they were expected to be, and whether s/he wanted to manage his/her image. When perceiving such an obligation, they tended to provide a quick and rough response first, or seek to coordinate their availability, to prevent senders from misunderstanding. As P2 explained, “Some messages can’t be replied to immediately, but you wouldn’t know that until you open them. Then you first figure, would this person care if I left read-receipts, and then whether you care about his or her feelings or not.” The perceived need to respond was particularly strong when the message demanded actions from recipients, especially work-related ones: “it’s impossible that you leave a read-receipt. If you do it, they’ll question you, and blame you the next day” (P15). However, as mentioned earlier, the participants sometimes perceived that a thoughtful and complete response was needed to manage the senders’ impression of them; therefore, they would wait until they could compose a complete response, or follow up their earlier rough message with a more complete one, as P23 noted: “If I choose to respond later, it must be because I have checked everything and am offering a verified answer. But if I accidentally entered the conversation, I’d give a rough and tentative answer, and later add a definite and complete one.”

4.6 Preventing the Occurrence of URRMs

Finally, the participants perceived URRMs as creating pressure on them to respond (except in cases where they had been left intentionally), but because it was not always convenient, necessary, or desirable to respond immediately after reading the message, they tried to prevent URRMs from occurring. As P3 said, “I didn’t want to read it because I’ve not done my exam. I didn’t tap into the message, but I did scan it via a notification. I knew what it was about, and I was planning to reply nicely after I was done.” Two strategies they commonly mentioned, which were also discussed in previous work, were 1) bypassing the message by reading it in the notification drawer (P21), on a locked screen (P9), or through a third-party app (P5, P19) so that they could choose when to respond, and 2) avoiding reading messages. To avoid reading certain messages, P22 used the following tactical approach: “I sent a lot of messages on that day on

purpose, so that his message would be moved down to the bottom. It would lower the likelihood that I accidentally clicked on his message. I just don’t want to see it.” Interestingly, several participants mentioned that they would always reply. As P5 put it, “I try to be the one who sent the last message”, to avoid any misunderstandings caused by URRMs – apparently unconcerned by the fact that, if this tactic were completely successful, every one of her conversations would end in her receiving a URRM from her conversational partner.

5 DISCUSSION

In the previous section, we presented the findings that answered our research questions regarding participants’ sense-making and strategies around read-receipts and URRMs, as well as the contextual factors that influenced such sense-making and strategies. More importantly, we showed that senders’ and recipients’ reactions and behaviors around URRMs are highly contextualized, and not as negative as the prior literature tends to suggest. However, our findings also indicate differences in senders’ and recipients’ explanations of URRMs, some of which might contribute to misunderstandings between individuals in these two positions, which in turn could give rise to negative emotions. We discuss these in more details in the two sections below.

5.1 Reactions to URRMs Are Highly Situated and Contextualized

Our findings show that context profoundly influences IM users’ sense-making and strategies around read-receipts, whether from the sender’s or the recipient’s point of view. That is, while prior research has tended to discuss the negative impacts of read-receipts on both senders and recipients, our findings reveal that such impacts may be felt in certain settings but not in others. For example, while prior studies reported that read-receipts place social pressure on users to respond (e.g., [15, 47, 54]) and/or make them feel guilty if they do not respond promptly [63], our findings suggest that the intensity of such pressure depends on what caused the read-receipt to be generated. For instance, as we showed in subsection 4.4, above, there were some situations in which participants thought they were expected to leave a read-receipt, as a signal to the sender that their message had been successfully received and its meaning obtained. In other situations, participants deemed that justifiable and understandable factors – whether situational, personal, or conversational (e.g., social inappropriateness, fatigue, and conversational progression, respectively) – caused them to leave URRMs. Sometimes, also, URRMs were left purposefully, even strategically, for reasons such as eliciting caring words, or showing displeasure at or rejection of a conversational topic or even an entire relationship. Even in the case of unintentional URRMs, whether a participant perceived a need to respond quickly depended to some extent on his/her sense of obligation to the sender. Therefore, it is reasonable to conclude that URRMs, in and of themselves, do not cause recipients’ feelings of pressure. Rather, they are often treated neutrally, and even produced intentionally in some circumstances.

By the same token, we have also shown that our participants, considered as message senders, did not always feel negative emotions after URRMs, contradicting prior research findings [5, 15, 31, 47, 60, 63]. Sometimes, they even expected URRMs to happen, due

to their knowledge of situational and conversational factors at the recipients' end, such as knowing that the recipients were busy or needed more time to process the message. Nor did our participants feel ignored after URRMs, when they 1) felt confident in the solidity of their relationship with the recipient; 2) agreed that the conversation had reached an end; and/or 3) attributed the URRM to the recipient's personal habits, patterns, and traits. It is also important to note that, when negative feelings did arise in the wake of URRMs, such feelings had a variety of triggers. Sometimes, these triggers were relational, such as feeling insecure or uncertain about their relationships with recipients. But at other times they were conversational, such as that the messages they had sent required the recipients to take action. Similarly, even a single strategy for dealing with URRMs can be adopted for very divergent reasons. For instance, the non-aggressive, non-confrontational approach might be used for reasons ranging from trust that the recipient will take action, to fear of harming the relationship.

Taken together, these findings suggest that reactions to URRMs, sense-making about them, and strategies for dealing with them after they happened were elements of a complex phenomenon, which were influenced and shaped by various causes/reasons, contexts, intentions, and levels of intentionality. This study therefore makes an important contribution to the literature, in that it reveals IM users' various reactions to URRMs in different concrete situations. It strikes us as especially interesting that a feature designed as a turn-taking cue was leveraged by our participants for such a wide variety of purposes in such varied contexts, which they exhibited considerable insight about (subsection 4.4) This indicates that URRMs are already a mature phenomenon, about whose meanings IM users share broad, if tacit, knowledge and agreement.

Due to the complex relationships among the studied contextual factors, we observed many causes and intentions behind URRMs that have seldom been discussed in the literature. Nevertheless, the emergence of these factors suggests that phenomena around read-receipts are likely to be even more complex than we initially thought. As such, we feel that more empirical research aimed at understanding these phenomena is warranted.

5.2 Comparison between Senders' and Recipients' Explanations of URRMs

In addition to the crucial role of context, it is interesting to note that, despite all data having been obtained from the same group of participants, we observed a number of discrepancies between, on the one hand, message senders' sense of their message recipients' URRMs, and on the other, how message recipients explained how/why their own URRMs had occurred.

To aid this comparison, a rough mapping is provided as Figure 3. It should be borne in mind that the above mapping between senders' and recipients' explanations of URRMs is tentative and prone to errors. This is because they were derived from two essentially different perspectives that imply different perceptions of the conversation partners' relationship, of the conversational context, and of the characteristics of the message, as well as unequal access to each other's message-specific situations, needs, and intentions.

That being said, our results show that both sender and recipient perspectives mentioned a similar set of causes of unintentional and

justifiable URRMs, though recipients, unsurprisingly, mentioned a wider array of situational factors. For example, while participants from both perspectives noted that the termination of the conversation could be a legitimate reason for a URRM, disagreement existed. That is, as senders, some participants attributed such events to the recipients' low sense of obligation to reply, rather than concurring that showing a read-receipt was a sufficient response. The map becomes considerably more complex around interpretations of whether URRMs were outcomes of the recipients' beliefs (e.g., that there was genuinely no need to respond) vs. the recipients' desires (e.g., wanting to imply something about the state of the dyad's relationship). In other words, our participants, when commenting on seeing other people's URRMs, often regarded them as expressions of displeasure by the message recipients. Because participants frequently mentioned such attributions, often in the context of having recently fought with the message recipient, this reasoning seemed to map well onto recipients' intentions to imply displeasure and dissatisfaction. Nevertheless, we found that misattribution sometimes occurred: participants were not always aware of their messages' recipients' real reasons for leaving URRMs. As a result, participants-as-recipients also mentioned that they often needed to explicitly explain their feelings about the URRMs they had left. For example, some noted that they occasionally produced URRMs to avoid escalating conflicts; but this intention was never mentioned by the participants from the sender's perspective. Instead, participants-as-senders were inclined to attribute URRMs in this precise context to the recipients expressing further displeasure. It is also noteworthy that senders sometimes misattributed accidental URRMs to recipients' intentional expression of rejection or displeasure, resulting in the former wondering how the message they actually meant to convey, or perhaps their other behavior, had gone wrong. On the other hand, as shown earlier, when participants-as-senders had knowledge of the recipients' situation or had learned their personal habits or patterns, they tended to ascribe recipients' URRMs to these situational or personal characteristics. This approach was welcomed as easy/convenient, and as helping them with their own emotional management, even though it often left the real causes of the URRMs unexplained.

Finally, some causes of URRMs were mentioned only by senders, and some others, only by recipients. Whereas senders would sometimes attribute URRMs to recipients' personal characteristics, recipients rarely did the same. This could be because the latter were unaware of such linkages, or, as mentioned above, this path to making sense of such events was relatively easy for senders to adopt. Conversely, our participants, as senders, never attributed URRMs to two strategic and highly purposive intentions on the part of recipients: managing their images, and wanting to feel valued. This might be because these intentions were simply inaccessible to senders, at least in the moment of a URRM occurring. It is also possible that our participants were reluctant to mention these intentions during interviews, for reasons of social desirability [52].

To sum up, our use of a coding schema inspired by the Theory of Mind [5-7] and Malle's Folk-Conceptual Theory of Explanation [49], resulted in eight categories of causes/intentions behind recipients' URRMs. Our results not only cover Hoyle et al.'s [31] proposed reasons that a person would deliberately view a message to produce a read-receipt, and their four sender speculations about these

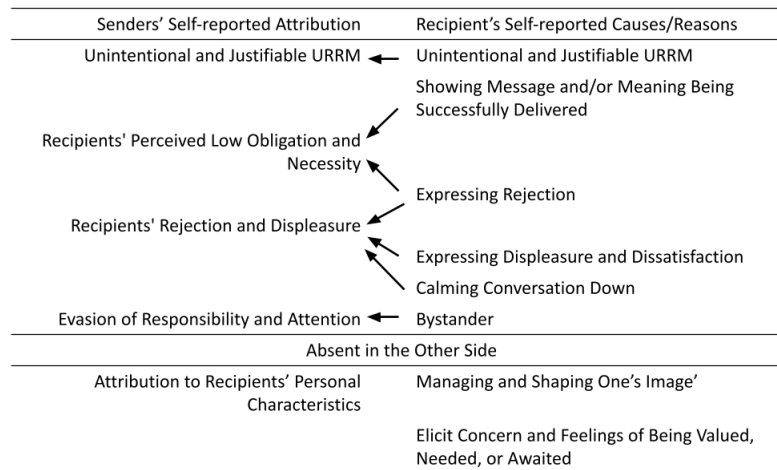


Figure 3: Senders' attribution of reasons, and recipients' self-reported reasons, for URRMs

URRM events, but also many others. That being said, we recognize that our list may not be exhaustive, in part due to the distinctive characteristics of our sample. We will discuss this issue further under Limitations.

5.3 Design Implications

Our findings imply that it could be possible to avoid some frictions and negative impacts of read-receipts, such as those caused by misidentifying unintentional URRMs as intentional ones. Therefore, our first high-level recommendation is that steps be taken to prevent accidental and unintentional URRMs from happening. Although many of our participants had developed strategies to bypass read-receipts, they still commonly reported causing URRMs by accidentally entering chat windows. It might be possible for future IM applications to detect accidental entry into conversations, and to prompt their users for confirmation that they actually mean to be there. For example, a simple detection mechanism could use a time threshold to detect an accidental vs. intended entry. On the other hand, prior research [47, 63] has suggested that IM users want to be able to check messages without producing read-receipts, a view also expressed by our study participants. That is, as they pointed out, it was not always the best time to reply at the moment of reading; however, knowing the message earlier allowed them to assess how quickly, and/or when, they should respond. To fulfill this desire, it may be worthwhile to allow users to set a buffer time for reading messages in the chat window, such that a read-receipt would not be generated until the read-time has passed the threshold, thereby alleviating their read-receipt-driven pressure to respond immediately. However, such a function should be de-activatable by users according to their perceived situational needs. Future IM application could also potentially detect unintentional URRMs, and periodically remind users about them, or even ask them to verify that they wanted these events to occur. Such reminders would be

especially useful to those who, like many of our participants, forget to respond because they have been distracted by other tasks. Even more sophisticated detection of URRMs is also possible. For instance, it could take account of the purpose of the message, such as whether it asks for action on the recipient's part. Future researchers might even wish to explore whether it would be helpful to share the outcomes of automatic detection of unintentional URRMs with message senders.

Customizable read-receipts represent another potentially vital functionality. A user of a system with this feature would be allowed to hide read-receipts from selected contacts, as well as from him- or herself. Certain IM apps such as WhatsApp already allow their users to control who can see their read-receipts; however, hiding them is always mutual, i.e., people who hide their own read-receipts become unable to see those of any of their conversation partners either. We recommend that this feature be made more flexible. On the other hand, prior research has shown that users who experience negative emotions caused by read-receipts would rather not know whether someone has already read their own outbound messages [10]. As such, we believe that allowing users to make read-receipts invisible to themselves could satisfy their periodic need to do this, and thus potentially improve their emotional well-being.

Finally, it is possible that IM statuses, which are intended to enhance mutual awareness, may also affect message senders' speculations about URRMs' causes: e.g., prompt them to ascribe these events to the presented status, rather than to the recipient's intention. As noted earlier, our participants reported being less concerned about URRMs when they saw them as justifiable. Thus, it may be worthwhile for IM apps to display message recipients' receptivity, a topic that has been explored in prior research (e.g. [30, 67]), as a means of guiding both parties to justifications of URRMs. Additionally, a system incorporating this feature could allow its users to set auto-reply messages, to help recipients coordinate their availability

with senders, while still allowing them to see message content. For instance, the latest version of Focus Mode in iOS 15 has a similar feature, which can send auto-replies – along with a statement that Focus Mode is in use – to messenger contacts. Because several of our participants indicated that they still wanted to check messages even when they were busy, we recommend that status-sharing and auto-replies be activatable alongside any user-set status, and not just a Focus Mode or equivalent.

5.4 Study Limitations

The current study is subject to several limitations. First, we adopted semi-structured interviews and qualitative analysis; thus, we were not able to draw firm conclusions about the prevalence of users' practices or types of sense-making, or these factors' relationships with the identified contextual factors. Our results also reveal that the participants' intentions behind URRMs and their follow-up strategies were highly situated and fleeting. Because our methods relied primarily on the participants' retrospection, which could have been influenced by recall errors, we encourage future researchers to utilize methods such as experience sampling to accurately capture these experiences and actions in situ. Additionally, given that our findings highlight the high complexity of the phenomenon being studied, an experience-sampling method approach could also allow quantitative analysis that could shed further light on the complex interrelationships between participants' sense-making and their subsequent behaviors. Second, our participant pool did not include both members of any established conversational dyads. Thus, we could not make head-to-head comparisons of particular URRMs from both the sender's and the recipient's points of view. Third, our relatively small sample's main IM experience was of LINE Messenger and Facebook Messenger. The participants were also mainly aged between 20 and 29, more than half were students, and several were employed in the IT sector. Hence, our data could have been biased towards populations who are young, familiar with technology, and in relatively low positions in workplace hierarchies; and it is uncertain how far our findings are generalizable to populations using different IM apps, with different levels of tech-savviness, and/or who are drawn from different cultural, age, and language groups. It is likely that individuals in those different populations will have distinct IM patterns, URRM-attribution behaviors, and/or URRM follow-up strategies. Nevertheless, we are confident that the current preliminary study has generated new and substantial understandings that will usefully inform future research aimed at improving IM's read-receipt feature.

6 CONCLUSION

Turn-taking is an essential property of communication, and the read-receipt feature is the primary existing method of support for awareness of it in IM. Surprisingly, however, there have been few empirical studies of IM users' practices and sense-making around this feature since it became popular a decade ago. In this paper, we have revealed the importance of five contextual factors – situational, relational, interactional, conversational, and personal – to the variety of IM users' URRM sense-making and practices; as a result, negative impacts of read-receipts on both senders and recipients may be felt in certain settings but not in others. We have

also shown that read-receipts no longer serve merely as indicators of conversational-turn status, but sometimes operate as highly strategic means for achieving various interpersonal aims. We also have highlighted mismatches between senders' and recipients' explanations of URRMs; how these mismatches can be sources of communication friction; and how IM app designers might mitigate or overcome such friction.

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