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A Frown Emoji Can Be Worth a Thousand Words: Perceptions of Emoji Use in Text
Messages Exchanged Between Romantic Partners

Computer-mediated communication (CMC) can facilitate the expression of affection between romantic partners and promote relationship quality. Text messaging is nowadays an important means of expressing affection and to feel close to one's partner. However, it is unclear if adding emoji to text messages influences perceptions about the relationship. In two experiments (combined $N = 451$), participants evaluated the relationship interest of a romantic partner, based on the messages exchanged. Study 1 compared positive and negative replies varying in emotional cues (without vs. text vs. emoji). Results showed that positive replies signaled the greatest interest, regardless of cue. In contrast, negative replies with (vs. without) cues signaled greater interest in the relationship and this was especially evident for messages with emoji. This benefit occurred because these messages were perceived as more positive (vs. negative messages without cue). Study 2 compared negative replies varying in the seriousness of the issue. Results showed that, for more serious replies, emotional text signaled greater interest by increasing message positivity. In contrast, emoji signaled less interest by increasing message negativity. Together, findings showed how CMC between romantic partners can benefit and be harmed by including emoji.

Keywords: Computer mediated communication; Text message; Emoji; Message positivity; Romantic relationships; Relationship issue

A Frown Emoji Can Be Worth a Thousand Words: Perceptions of Emoji Use in Text Messages Exchanged Between Romantic Partners

1. Introduction

With mobile phone and internet usage growing worldwide (PEW Research Center, 2016), computer-mediated communication (CMC) is becoming increasingly common. CMC is used in numerous channels such as instant messaging, email applications, VoIP systems providers, social networking sites and social media platforms. This type of communication is typically motivated by socialization and affection-seeking (Grellhesl & Punyanunt-Carter, 2012; Jin & Park, 2010), and allows individuals to be continuously connected (Juhasz & Bradford, 2016). Therefore, CMC has important implications for relationship research because it facilitates interpersonal communication between individuals, as well as the initiation and maintenance of interpersonal relationships (Ellison, Steinfield, & Lampe, 2007; Finkel, Eastwick, Karney, Reis, & Sprecher, 2012; Pettigrew, 2009). This paper focuses specifically on text-based communication between romantic partners, using mobile phone text messages, and its implications for the perception of relationship interest.

In comparison to face-to-face communication (FtF), CMC is argued to be more ambiguous due to the absence of non-verbal cues (e.g., tone of voice, body language, facial cues) that would help prevent potential misunderstandings (Choi, Gray, & Ambady, 2005; Perry & Werner-Wilson, 2011; Rettie, 2009). Indeed, research has shown that CMC ambiguity can facilitate a rapid escalation of a conflict (e.g., Derks, Fischer, & Bos, 2008). This can have negative consequences for relationship maintenance, and individuals may not perceive it as an adequate means to address relationship problems. However, there is evidence showing that CMC can benefit relationship quality because it facilitates the expression of affection and increases closeness (Perry & Werner-Wilson, 2011; Pettigrew, 2009). CMC allows for open-ended communication (Rettie, 2009) and the inclusion of

personalized writing elements to convey emotional content (Walther, Van Der Heide, Ramirez, Burgoon, & Peña, 2015) and to reduce message ambiguity (Dickey, Wasko, Chudoba, & Thatcher, 2006). For instance, Luo and Tuney (2015) have recently shown that sending positive text messages to the partner using a mobile phone (vs. not sending messages) increased relationship satisfaction over a two-week period. This positive effect occurred not only for general positive messages (e.g., “What a beautiful day”), but also for customized messages related to the partner or the relationship (e.g., “I miss you”).

Another common way for individuals to customize their messages is to use pictorial cues (quasi-nonverbal cues; Lo, 2008). These include emoticons, that is, symbols created using punctuation, numbers, or letters (e.g., **:D**), and emoji, that is, graphic representations that often include facial cues (e.g., 😊). The use of such cues helps individuals to express specific emotional states and reinforce the content of a message (Fullwood, Orchard, & Floyd, 2013; Kaye, Wall, & Malone, 2016). If using these cues can help overcome the ambiguity of text messages, then individuals may also perceive their use as adequate to modulate the tone of messages, which in turn might be beneficial to the relationship.

There is research showing the impact of using emoticons in written communication (e.g., Lo, 2008). However, there is also recent evidence showing that, in contrast to emoticons, emoji are becoming more frequently used in written communication (Pavalanathan & Eisenstein, 2015) and are evaluated as more appealing, more familiar, clearer, more positive, more arousing and more meaningful (Rodrigues, Prada, Gaspar, Garrido, & Lopes, 2017). Therefore, the impact of using of emoticons in wrtitten communication might be somewhat different from the impact of using emoji. To our knowledge, no research to date has explicitly studied if the use of emoji in CMC is perceived as beneficial to the romantic relationship. In this paper, we examined whether including emoji in CMC is perceived as signaling interest in the relationship (Study 1), and if this

association is moderated by how serious the relationship issue is (Study 2).

1.1. CMC in Romantic Relationships

Communication is reliably associated with relationship quality (Anderson & Emmers-Sommer, 2006; Knobloch, 2007; Stanley, Markman, & Whitton, 2002). By using positive and effective communication with the partner, individuals are able to decrease relationship uncertainty, and increase relationship confidence, closeness, and commitment (Knobloch & Solomon, 2002). But not all forms of communication have similar effects. Compared to FtF communication, CMC is argued to be more ambiguous, and less personal, social, and effective (for a review, see Walther, 2011). These differences resonate with findings comparing communication modalities. For instance, research has shown that most individuals prefer FtF over email communication (Cummings, Butler, & Kraut, 2002), and that voice calls are more effective than email in providing affective and sociable gratifications (e.g., closeness and companionship; Dimmick, Kline, & Stafford, 2000).

Despite these findings, individuals do consider CMC to be an important form of communication with close others, and often use text messages to communicate with their partners (Luo, 2014). Therefore, CMC may actually be beneficial, in particular when it is not the only form of communication between partners (Juhasz & Bradford, 2016; Pettigrew, 2009; Rettie, 2009; Scissors & Gergle, 2013). Indeed, research has shown that CMC can be as efficient as FtF communication in reducing relationship uncertainty (Tidwell & Walther, 2002). Moreover, romantic partners who interacted more frequently using CMC reported greater love and commitment to their partner (Jin & Peña, 2010), and were happier in their relationship (Anderson & Emmers-Sommer, 2006), than those who did not interact using CMC. Presumably, this type of communication facilitates the sharing of information between partners, and helps shaping a sense of togetherness and connectedness (Pettigrew, 2009), therefore increasing intimacy (Jiang, Bazarova, & Hancock, 2013; Walther, 1996) and

relationship quality (e.g., Coyne, Stockdale, Busby, Iverson, & Grant, 2011; Utz & Beukeboom, 2011). Still, it is yet to be determined under which conditions CMC is a positive influence for romantic relationships (see also Juhasz & Bradford, 2016).

CMC can be used with different purposes within a romantic relationship. Greater usage of CMC between close others has been associated with less loneliness (Jin & Park, 2013; Park, Lee, & Chung, 2016). Also, sending customized messages to the partner can increase affection in the relationship, and using positive emotional words (e.g., “happy”) in CMC predicts relationship satisfaction later on (Luo & Tuney, 2015; Slatcher, Vazire, & Pennebaker, 2008). Because greater CMC use with close others is associated with greater message understanding (e.g., less ambiguity; Dickey et al., 2006), it is possible that CMC is also a useful method of communication to address relationship issues between romantic partners. For instance, Perry and Werner-Wilson (2011) showed that individuals have more positive opinions about using CMC to discuss issues of contention between romantic partners, or to reiterate or clarify a point made in a previous FtF conversation. Based on follow-up interviews, the authors further found that text messages allowed individuals to reflect about the problem, helping them to gain distance from the problem and to focus on the content of the message.

When partners have differing opinions, using CMC to discuss an important issue is viewed more negatively (Miller-Ott, Kelly, & Duran, 2012; Perry & Werner-Wilson, 2011). Presumably, the lack of non-verbal cues conveys greater ambiguity in these situations, leading problems to escalate rapidly. Yet, Scissors and Gergle (2013) showed that addressing relationship problems using CMC can help by allowing partners to manage their emotions and reach a solution, especially when different communication modalities are used. When the relationship problem is addressed and solved, individuals indicate CMC to be as satisfying as FtF communication (Coyne et al., 2011; Derks et al., 2008). If the use of pictorial cues (e.g.,

emoticons and emoji) introduce emotional content into writing and helps individuals to express their feelings in the absence of non-verbal cues, they may also be beneficial CMC between romantic partners.

1.2. Use of Pictorial Cues in CMC

Research has shown that pictorial cues (e.g., emoji, emoticons) are used to add emotionality or intention in to CMC (e.g., Kaye et al., 2016; Thompson & Filik, 2016). For instance, Lo (2008) showed that individuals attributed greater emotionality to a message (e.g., “the sun is shining brightly today”) when paired with an emoticon. Moreover, the valence attributed to the message (i.e., positive vs. negative) was congruent with the emoticon used (i.e., smile vs. frown). Emoticons may then function as contextualization cues, signaling how a given message should be interpreted. Indeed, Skovholt, Grønning, and Kankaanranta (2014) showed that individuals include emoticons in workplace emails when they want to signal irony in their remarks, reinforce positive messages, or soften a request or a rejection.

Unlike text, emoji and emoticons can be used to depict facial expressions that parallel, to some extent, those conveyed in FtF communication. In a recent study, Thompson, Mackenzie, Leuthold and Filik (2016) showed that a sarcastic message ending with an emoticon elicited physiological responses related to positive affect (i.e., higher arousal, reduced frowning, and enhanced smiling), compared to the same message without an emoticon. Therefore, it seems that the advantage of using this type of pictorial cues for communicating derives from the positivity it adds to the message. However, CMC between romantic partners is used to address multiple matters, including issues of contention (Perry & Werner-Wilson, 2011) and the inclusion of pictorial cues in such cases may not be so beneficial. Kato, Kato and Scott (2009) showed that individuals use less pictorial cues (emoticons) in contexts associated with strong negative emotions such as anger, and argued

that, in these contexts, emoticons dilute the emotionality of the messages. Because emoji are perceived differently than emoticons (Rodrigues et al., 2017) and because research examining the specific role of emoji is much scarcer, based on previous evidence we argue that the advantage of using emoji when addressing relationship problems might be restricted to contexts associated with moderate, rather than intense, emotionality.

1.3. Overview of the Present Research

In two experimental studies, we examined how the use of additional information to convey emotionality in text messages can influence the perception of how interested romantic partners are in their relationship. In Study 1 participants saw a mock-up message exchange between romantic partners. One of the partners sent an invitation (“What are we doing later today?”) and the other partner replied using either positive or negative response. These replies did not have an explicit justification (e.g., “I really liked what happened with us yesterday” – positive condition). We examined if adding emotional text (e.g., “I’m happy”) or emoji (e.g., 😊) to the reply was perceived as indicating a greater interest in the relationship. In Study 2 we made a partial replication of Study 1 using only negative replies, and manipulated the seriousness of the issue stated in such replies. Additionally, in both studies, we examined whether the impact of using emoji in CMC was explained by an increase of perceived positivity of the replies. These studies extend previous findings on the CMC context within romantic relationships (e.g., Miller-Ott et al., 2012), and provide an insight into how useful pictorial cues in CMC are perceived to be, and how beneficial they are to address different relationship issues. Equally important, these studies include a diversified sample of participants (see also Park et al., 2016).

2. Study 1

In this study, we asked participants to read a series of text messages exchanged between two partners in a romantic relationship. The reply messages varied in valence

(positive vs. negative) and in emotional cue (without vs. with text vs. with emoji).

Participants were asked to indicate whether they thought the content of the replies signaled greater interest in the relationship. We expected a main effect of valence (H1), such that positive replies should signal greater interest in the relationship than negative replies.

Because verbal and pictorial cues help to express emotional states, reinforce message content and reduce ambiguity (e.g., Fullwood et al., 2013; Kaye et al., 2016), we also expected a main effect of emotional cue (H2), such that replies with emotional cues – text or emoji – should signal greater interest in the relationship, than without such cues.

We also explored the interaction between valence and emotional cue. Because empirical findings are somewhat scarce, we considered two possible outcomes. On the one hand, emotional cues were always congruent with the valence of the replies and this could strengthen its intended meaning. This being the case, no interaction should be observed (H3a). On the other hand, emotional cues may have a redundant, rather than an additive, effect on positive replies, because they express the same information and are perceived as lacking usefulness in such cases (Riordan & Trichtinger, 2017). Therefore, differences according to emotional cues could be less likely to occur for positive replies due to a ceiling effect. For negative replies, however, there is the possibility that using emotional cues have an additive or informative effect, such that their inclusion could be perceived as signaling greater interest in the relationship (H3b).

2.1. Method

2.1.1. Participants and Design

Participants were 232 Portuguese native speakers (146 women) with ages ranging from 18 to 57 years old ($M = 29.69$, $SD = 8.36$). Most participants were workers (53.7%) and university students (44.2%). From the workers' subsample, the majority had completed a

university degree (91.1%). Most participants indicated Android (60.3%) and Apple (36.2%) as their usual mobile operating systems.

Participants were randomly assigned to one of the conditions of a 2 (Reply: negative vs. positive) x 3 (Emotional cue: without vs. with text vs. with emoji) between-subjects experimental design.

2.1.2. Procedure, Materials and Measures

This study was in agreement with the Ethics Guidelines issued by the Scientific Commission of [host institution]. The study involved only adult volunteers, results were analyzed anonymously, and individuals were not paid nor given other incentives to participate.

A Qualtrics hyperlink was sent to mailing lists and posted on social networking sites (e.g., Facebook.). The questionnaire was in Portuguese. Individuals were invited to participate in a study about communication via text messaging. Before starting, they were informed that participation was voluntary and anonymous, and that their participation could be terminated at any time without their responses being retained for analyses. Upon providing informed consent by clicking on the “*I agree to participate*” option, participants were asked to fill a set of demographic questions (e.g., age, gender, occupation, country of origin, and operating system for mobile messaging).

Afterwards, participants were informed that they would be exposed to messages exchanged between two individuals in a romantic relationship. Their task was to read these messages and focus on the replies, in order to make a series of judgments about that relationship. To clarify what were the received messages and the replies, participants were shown an example image depicting a mobile screen with two messages saying “Hello”. To the first message we added a grey arrow with the description “Received”. To the second message we added a green arrow with the description “Reply”. This positioning reflects the

common convention in many messaging apps, including iMessage, WhatsApp, and Facebook messenger. Upon clicking on the button to proceed, participants were then shown another mobile phone mock-up image.

In all experimental conditions, the grey text balloon showed a message denoting an invitation (i.e., “What are we doing later today?”). For half the participants, the reply (green balloons) consisted of two consecutive negative messages: “I want to be alone” followed by “I didn’t like what happened with us yesterday” (negative reply condition). For the other half, the reply consisted of two positive messages: “We can have dinner” and “I really liked what happened with us yesterday” (positive reply condition).

For participants without emotional cues, no other replies were shown. In the emotional text conditions, the reply also included the messages “I’m sad” (negative reply condition) or “I’m happy” (positive reply condition). In the emoji conditions, the reply also included the corresponding emoji (Rodrigues et al., 2017), i.e., 😞 (negative reply condition) or 😊 (positive reply condition)¹ (for an example, see Figure 1).



¹ Materials are available upon request from the first author. Messages were originally developed in Portuguese, but researchers can also request a template with which they will be able to manipulate language, number of received messages and replies, and also the content of the messages.

Figure 1. Example of mock-up mobile screen showing the standard sent message (in grey) and the reply message (in green). Depicted is the positive reply with emoji.

In all experimental conditions, participants were asked to consider the replies and indicate: “Do you think the person is interested in the romantic relationship?” (1 = *Not interested at all*, 7 = *Very interested*), “Do you think this reply help to improve the romantic relationship?” (1 = *They definitely do not help*, 7 = *They definitely help*). Because these items were highly correlated, $r = .69, p < .001$, we computed a mean score of perceived interest in the relationship.

As manipulation checks, participants were additionally presented with four questions presented in a random order: “In your opinion, to what extent do you consider that the reply ...” “...was positive?”, “...was negative?” (reverse coded), “...was efficient in transmitting its meaning?”, and “...had a clear meaning?”. All responses were given in 7-point scales (1 = *Not at all*, 7 = *A lot*). The first two questions were highly correlated, $r = -.84, p < .001$, and the latter two questions were highly correlated, $r = .73, p < .001$. Therefore, we computed a mean score of message positivity and a mean score of message efficiency, respectively.

Finally, participants were presented with a series of control questions. These included two questions about the use of emoji in their daily written interactions – “In your written communications how often do you send emoji?” and “In your written communications how often do you receive emoji?” (1 = *Never*, 7 = *Always*). Both items were correlated, $r = .59, p < .001$, and were combined into a single score. We also presented six questions assessing attitudes about the use of emoji ($\alpha = .85$) – “Do you consider that the use of emoji in written communication is...” (e.g., 1 = *Useful*, 7 = *Useless*) –, and nine questions assessing the perceived value of emoji for communication ($\alpha = .72$) – “When I use emoji in my written communications is to...” (e.g., “indicate to others how I feel and my emotional state”) (1 = *Completely disagree*, 7 = *Completely agree*). At the end, participants were thanked and

debriefed. Surveys had an average completion time of 5 minutes. Because this was a forced-response survey, only completed surveys were retained for analyses.

2.2. Results and Discussion

2.2.1. Preliminary Analyses

Overall descriptive statistics and correlations are presented in Table 1. Our main dependent variable – perceived interest in the relationship – was only positively correlated with perceived positivity and efficiency of the replies, both $p < .001$. The latter two were also positively correlated, $p < .001$. Control measures regarding emoji were all positively correlated, all $p < .001$. Finally, perceived efficiency of the replies was positively correlated with value of emoji use, $p < .001$. There were no gender differences in our dependent variable, $t < 1$, nor differences according to age (median split: 28 years), $t < 1$, occupation, $F(1, 228) = 1.71$, $MSE = 4.49$, $p = .183$, education level, $F(1, 228) = 1.63$, $MSE = 4.32$, $p = .184$, or operating system used, $F < 1$. Therefore, sociodemographic and control variables were dropped from subsequent analyses.

Table 1

Descriptive Statistics and Correlations Between All Measures

Measure	<i>M (SD)</i>	Correlations				
		1	2	3	4	5
1. Perceived interest in the relationship	4.21 (1.63)	-				
2. Perceived positivity of the replies	4.22 (1.97)	.64***	-			
3. Perceived efficiency of the replies	4.52 (1.65)	.30***	.32***	-		
4. Frequency of emoji use	5.42 (0.92)	-.02	-.05	-.03		
5. Attitudes towards emoji	5.44 (0.98)	-.02	.02	.06	.46***	-
6. Value of emoji use	4.79 (0.82)	.08	.01	.23***	.27***	.40***

*** $p < .001$

2.2.2. Manipulation Checks

As expected, results showed that positive replies were overall perceived as more positive ($M = 5.80$, $SD = 1.11$) than negative replies ($M = 2.72$, $SD = 1.33$), $t(230) = 19.09$, $p < .001$, $d = 2.52$. No differences in the overall perceived efficiency of the replies emerged between messages without emotional cues ($M = 4.51$, $SD = 1.63$), with emotional text ($M = 4.42$, $SD = 1.73$), and with emoji ($M = 4.61$, $SD = 1.62$), $F < 1$.

2.2.3. Main Analyses

To examine the hypothesis, we conducted a 2 Reply (negative vs. positive) x 3 Emotional cue (without vs. with text vs. with emoji) ANOVA. Results showed a main effect of reply, $F(1, 226) = 119.96$, $MSE = 198.57$, $p < .001$, $\eta^2_p = .35$, such that positive replies elicited greater perceived interest in the relationship ($M = 5.16$, $SD = 1.09$) than negative replies ($M = 3.32$, $SD = 1.52$). There was also a main effect of emotional cue, $F(2, 226) = 10.12$, $MSE = 16.75$, $p < .001$, $\eta^2_p = .08$. Overall, replies without emotional cues ($M = 3.81$, $SD = 1.73$) did not differ from those with emotional text ($M = 4.10$, $SD = 1.51$), $t(226) = 1.50$, $p = .135$, whereas messages with emoji elicited the greatest perception of interest in the relationship ($M = 4.71$, $SD = 1.55$), $t(226) = 4.23$, $p < .001$, $d = 0.56$.

More importantly, there was a significant interaction between the factors, $F(2, 226) = 3.71$, $MSE = 6.13$, $p = .026$, $\eta^2_p = .03$ (Figure 2). Planned contrasts showed that, for negative replies, participants perceived greater interest in the relationship when it included additional emotional text ($M = 3.27$, $SD = 1.26$) or an emoji ($M = 4.05$, $SD = 1.69$), when compared to a negative reply without such cue ($M = 2.59$, $SD = 1.37$), $t(226) = 4.26$, $p < .001$, $d = 0.57$. Furthermore, a negative reply including emoji elicited greater perceptions of interest in the relationship when compared to the same reply with the respective emotional text, $t(226) = 2.71$, $p = .007$, $d = 0.36$. No differences emerged for positive replies, all $p > .169$.

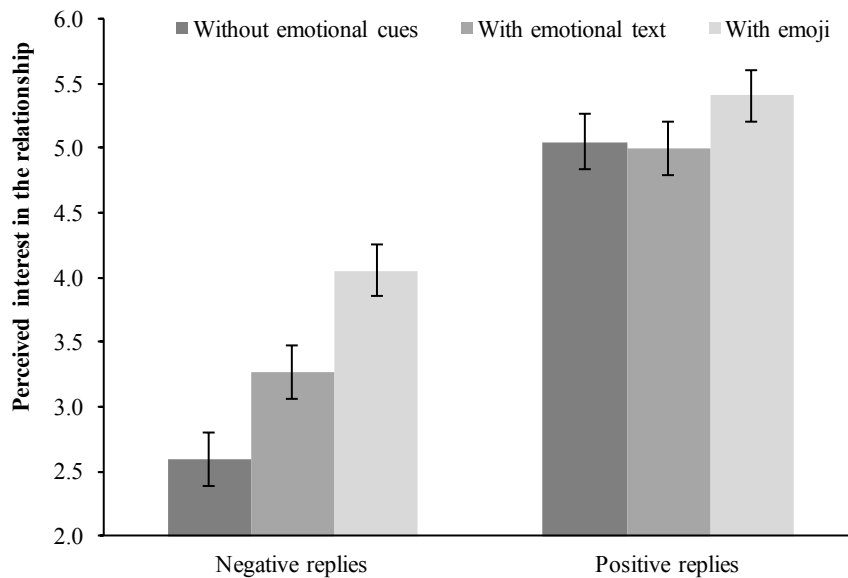


Figure 2. Perceived interest in the relationship based on negative and positive replies, according to emotional cue (without vs. with text vs. with emoji). Error bars indicate standard errors.

2.2.4. Value of Emoji in Negative Communication

Our findings suggest that when the reply is already positive, the inclusion of additional emotional cues (text or emoji) is not additive. In contrast, negative text messages seem to benefit from the inclusion of an emotional cue, in particular emoji. If the use of pictorial cues can increase positive affect (Thompson et al., 2016) and help soften requests or rejections from others (Skovholt et al., 2014), including an emoji could be perceived more positively than not having an additional emotional cue, thus signaling interest in the relationship. To explore this possibility, we estimated a 10,000 bootstrapped multicategorical mediation model using the PROCESS macro, Model 4 (Hayes, 2013; Hayes & Preacher, 2014). Emotional cue was the predictor variable, perceived positivity of the reply was the mediator variable, and perceived interest in the relationship was the outcome variable. All variables were centered prior to the analyses.

Results showed that the inclusion of emotional text (vs. without emotional cue) did not increase perceived positivity of the reply, $b = -0.15$, $SE = 0.17$, $p = .375$, 95% CI [-0.49;

0.19], and the indirect effect was not significant, $b = -0.06$, $SE = 0.07$, 95% CI [-0.23; 0.07].

In contrast, including emoji (vs. without emotional cue) increased perceived positivity of the reply, $b_{c2} = 0.36$, $SE = 0.17$, $p = .037$, 95% CI [0.02; 0.69], which in turn increased perceived interest in the relationship, $b = 0.40$, $SE = 0.10$, $p < .001$, 95% CI [0.21; 0.58]. This indirect effect was significant, $b = 0.14$, $SE = 0.08$, 95% CI [0.02; 0.33] (Figure 3). No significant results emerged when perceived efficiency of the reply was used as mediator variable.

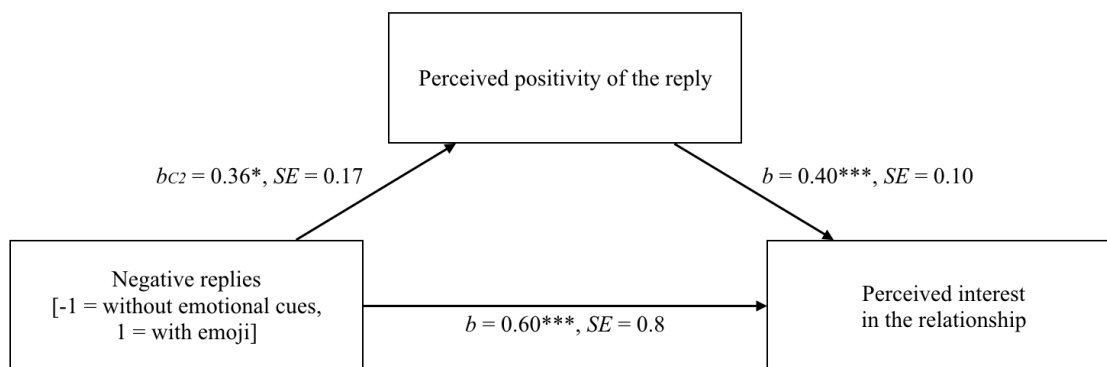


Figure 3. Mediation of perceived positivity of the reply when including emoji (vs. without emotional cues) in negative replies.

Taken together, our results suggest that using emotional cues to address relationship issues can be beneficial to the relationship, but only for negative replies. These replies with emotional cues (text or emoji) signaled greater interest in the relationship, compared to a reply without such cues, and this was especially the case of emoji. More importantly, a negative reply with emoji, but not emotional text, was perceived more positively than a reply without an emotional cue, which in turn increased the perception of interest in the relationship. In the case of positive replies, the lack of differences may reflect the redundant effect of the emotional cues (Riordan & Trichtinger, 2017).

People seem to perceive emoji as beneficial to address relationship issues using CMC, at least in a scenario that reflects an issue arising from an ambiguous cause. However, this form of communication is seen as less adequate when partners have divergent opinions (Perry & Werner-Wilson, 2011), and most people consider that more serious issues are best

addressed in FtF communication (Miller-Ott et al., 2012). Because the use of pictorial cues in highly emotionally-charged messages (e.g., anger) dilute the emotionality of the message (Kato et al., 2009), using an emoji in a negative reply stating a more serious relationship issue might not be perceived as an adequate form to address it. Therefore, it is possible that the perceived advantage of emoji in negative replies is restricted to less serious issues.

3. Study 2

As in the previous study, we asked participants to read a series of messages exchanged between romantic partners and replies varied in the emotional cues provided (without vs. with text vs. with emoji). Replies were always negative and explicitly identified the cause of the relationship issue. We tested whether the influence of additional information on the perceived interest in the relationship was modulated by the seriousness of the issue (less vs. more).

We hypothesized a main effect of seriousness (H4), such that replies stating a less serious issue should signal greater interest in the relationship, when compared replies stating a more serious issue. We also expected an interaction between seriousness and emotional cues (H5). Based on our previous findings, replies stating a less serious issue with additional emotional cues, emoji in particular, should signal greater interest in the relationship, when compared to a reply without such cues (H5a). In contrast, a reply stating a more serious issue that include emoji should decrease perceptions of interest in the relationship (H4b).

Moreover, if emoji elicit positive affect in a reply stating a less serious issue, then the effect of emoji on perceived interest in the relationship should be mediated by an increased perceived positivity of the reply (H5a). If emoji impair emotionality in a reply stating a more serious issue, then its effect should not be mediated by the positivity of the reply (H5b).

3.1. Method

3.1.1. Participants and Design

Participants were 219 Portuguese native speakers (162 women) with ages ranging from 18 to 61 ($M = 28.07$, $SD = 9.40$). Most participants were university students (47.0%) and active workers (45.2%). The majority of this latter subsample had completed a university degree (89.8%). Most participants indicated Android (66.3%) and Apple (28.4%) as their usual mobile operating systems.

Participants were randomly assigned to one of the conditions of a 2 Seriousness of the issue (less vs. more) x 3 Emotional cue (without vs. with text vs. with emoji) between-subjects experimental design.

3.1.2. Procedure, Materials and Measures

All procedures and measures were the same as in Study 1, with two exceptions. First participants were only presented with negative replies. Specifically, participants were presented with a text message screen mock-up, in which a grey text balloon showed the message “What are we doing later today?”. This was always followed by the negative reply (green balloons) “I want to be alone” and “I didn’t like what happened between us yesterday”. Seriousness of the issue was manipulated in the third message presented. For half the participants, it stated “I still can’t believe you spent our anniversary dinner yawning” (less serious issue), whereas for the other half it stated “I still can’t believe you were so late for our anniversary dinner” (more serious issue)². Second, at the end of the main task, participants were asked to report probable justifications for both situations, starting with the one they had seen previously (i.e., yawning or being late).

3.2. Results and Discussion

3.2.1. Preliminary Analyses

² In a pre-test, 60 individuals (43 women; $M_{\text{age}} = 31.08$, $SD = 9.98$) were randomly assigned to one of these replies and asked to indicate how serious was the issue (1 = *Not serious at all*, 7 = *Very serious*) and how harmful was it for the relationship (1 = *Not harmful at all*, 7 = *Very harmful*). Because these items were highly correlated, $r = .61$, $p < .001$, we computed a mean score of seriousness and tested for differences between the groups. Results showed that participants in the more serious reply condition perceived the issue as actually more serious ($M = 4.89$, $SD = 1.07$) than those in the less serious reply condition ($M = 4.16$, $SD = 1.21$), $t(58) = 2.49$, $p = .016$, $d = 0.65$.

Overall descriptive statistics and correlations are presented in Table 2. The overall pattern of correlations replicated Study 1. Perceived interest in the relationship was only positively correlated with perceived positivity and efficiency of the replies, both $p < .001$. These latter two were also correlated, $p < .001$. Control measures regarding emoji were positively correlated, $p < .001$. Unlike Study 1, the correlation between perceived efficiency of the replies and value of emoji use was non-significant. Also, perceived positivity of the replies was negatively correlated with attitudes toward emoji use, $p = .012$, and with value of emoji use, $p = .038$, whereas perceived efficiency of the replies was positively correlated with attitudes toward emoji use, $p = .035$. There were no gender differences in our dependent variable, $t(217) = 1.37, p = .174$, nor differences according to age (median split: 25 years), $t < 1$, occupation, $F < 1$, education level, $F < 1$, or operating system, $F(1, 216) = 1.74, MSE = 3.67, p = .179$. Therefore, these variables were dropped from subsequent analyses.

Table 2

Descriptive statistics and correlations between all measures

Measure	<i>M (SD)</i>	Correlations				
		1	2	3	4	5
1. Perceived interest in the relationship	3.60 (1.43)	-				
2. Perceived positivity of the replies	2.80 (1.14)	.33***	-			
3. Perceived efficiency of the replies	4.41 (1.64)	.41***	.21***	-		
4. Frequency of emoji use	5.50 (0.93)	.04	-.07	.14	-	
5. Attitudes towards emoji	5.61 (1.01)	-.03	-.19*	.16*	.55***	-
6. Value of emoji use	4.83 (0.82)	.10	-.16*	.13	.45***	.36***

*** $p < .001$. * $p < .050$.

3.2.2. Manipulation Checks

Despite the results from the pre-test regarding seriousness of the issue, replies stating less ($M = 2.89, SD = 1.14$) and more serious issues ($M = 2.72, SD = 1.20$) were perceived as

equally negative, $t(190) = 1.03, p = .306$. As in Study 1, no differences in perceived efficiency of the replies emerged between messages without emotional cues ($M = 4.33, SD = 1.72$), with text ($M = 4.63, SD = 1.59$), and with emoji ($M = 4.12, SD = 1.58$), $F(2, 189) = 1.62, MSE = 4.30, p = .200$.

3.2.3. Main Analysis

To examine our hypotheses, we conducted a 2 Seriousness of the issue (less vs. more) x 3 Emotional cue (without vs. with text vs. with emoji) ANOVA. There were no main effects of seriousness, $F(1, 213) = 1.64, MSE = 3.40, p = .201$, or emotional cues, $F(2, 213) = 1.62, MSE = 3.35, p = .201$. However, the interaction between the factors was significant, $F(2, 213) = 3.34, MSE = 6.91, p = .037, \eta^2_p = .03$ (Figure 4). Planned contrasts showed no differences in perceived interest in the relationship between a reply stating a less serious issue without emotional cues ($M = 3.50, SD = 1.44$), when compared to the same reply with emotional text ($M = 3.71, SD = 1.29$) or emoji ($M = 3.96, SD = 1.70$), $t(213) = 1.12, p = .265$. The comparison between the latter two was also non-significant, $t < 1$.

For replies stating a more serious issue, perceived interest in the relationship was similar between those without emotional cues ($M = 3.42, SD = 1.55$) and those with emotional text ($M = 3.97, SD = 1.33$), $t(213) = 1.67, p = .096$, and with emoji ($M = 3.03, SD = 1.30$), $t(213) = 1.17, p = .242$. Yet, a reply with emotional text signaled greater interest in the relationship when compared to a reply with emoji, $t(213) = 2.85, p = .005, d = 0.39$.

Specifically regarding emoji use, participants perceived lower interest in the relationship after reading the reply including emoji stating a more serious issue, than after reading a reply including emoji stating a mild issue ($M = 3.03, SD = 1.30$), $t(213) = -2.74, p = .007, d = 0.38$. No other contrasts reached significance, all $p > .426$.

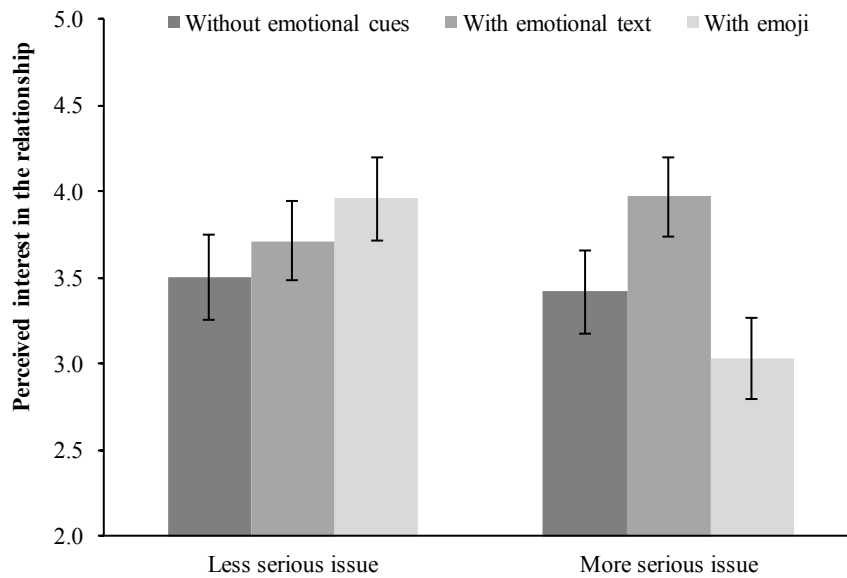


Figure 4. Perceived interest in the relationship based on negative replies stating a less or more serious issue, according to emotional cues (without vs. with text vs. with emoji). Error bars indicate standard error.

3.2.4. Value of Emoji in Negative Communication

As in our previous study, we examined if the use of emoji in negative replies stating a less serious issues was advantageous because they were perceived as more positive than those without emotional cues. We additionally explored the role of positivity in negative replies stating a more serious issue in a separate analysis. We estimated two 10,000 bootstrapped multicategorical mediation models using the PROCESS macro, Model 4. Emotional cue was the predictor variable, perceived positivity of the replies was the mediator variable, and perceived interest to improve the relationship was the outcome variable. All variables were centered prior to the analyses.

Results showed that replies including emotional text (vs. without emotional cue) stating a less serious issue were not perceived more positively, $b_{CI} = -0.19$, $SE = 0.16$, $p = .232$, 95% CI [-0.50; 0.12], and the indirect effect was not significant, $b = -0.06$, $SE = 0.06$, 95% CI [-0.21; 0.03]. Those that included an emoji (vs. without emotional cue) were perceived more positively, $b_{C2} = 0.33$, $SE = 0.16$, $p = .042$, 95% CI [0.01; 0.65], which influenced the

perceived interest in the relationship, $b = 0.32$, $SE = 0.13$, $p = .013$, 95% CI [0.07; 0.57]. This indirect effect was significant, $b = 0.11$, $SE = 0.06$, 95% CI [0.02; 0.28] (Figure 5). No significant results emerged when we entered perceived efficiency of the replies as the moderator variable. These results replicate those from Study 1.

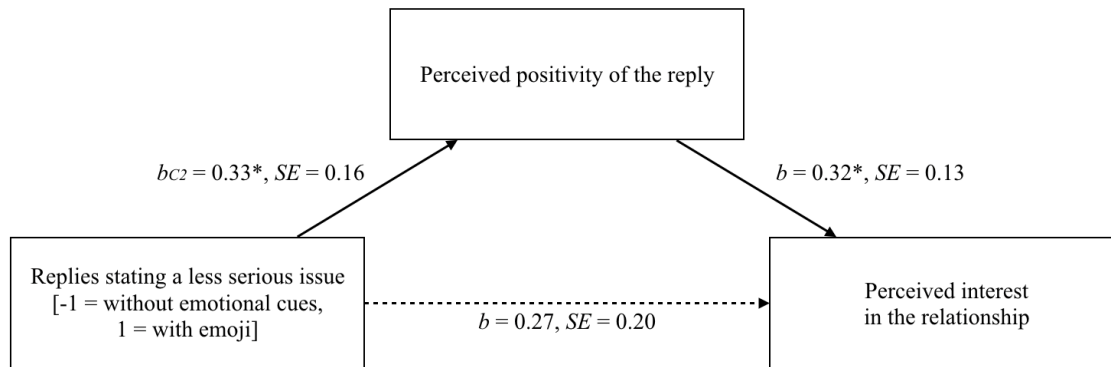


Figure 5. Mediation of perceived positivity of the replies stating a less serious issue, when it included an emoji (vs. without emotional cues).

For replies stating a more serious issue, the inclusion of emotional text (vs. emotional cues) was perceived more positively, $b_{c2} = 0.49$, $SE = 0.17$, $p = .006$, 95% CI [0.14; 0.83], which was then associated with greater perceived interest in the relationship, $b = 0.49$, $SE = 0.12$, $p < .001$, 95% CI [0.25; 0.73]. This indirect effect was significant, $b = 0.24$, $SE = 0.12$, 95% CI [0.06; 0.52]. In contrast, the inclusion of emoji (vs. without emotional cues) was perceived more negatively, $b_{c2} = -0.39$, $SE = 0.17$, $p = .022$, 95% CI [-0.73; -0.06], which decreased perceptions of interest in the relationship, $b = 0.49$, $SE = 0.12$, $p < .001$, 95% CI [0.25; 0.73]. This indirect effect was also significant, $b = -0.19$, $SE = 0.10$, 95% CI [-0.42; -0.04] (Figure 6). Again, no significant results emerged with using perceived message efficiency as the moderator.

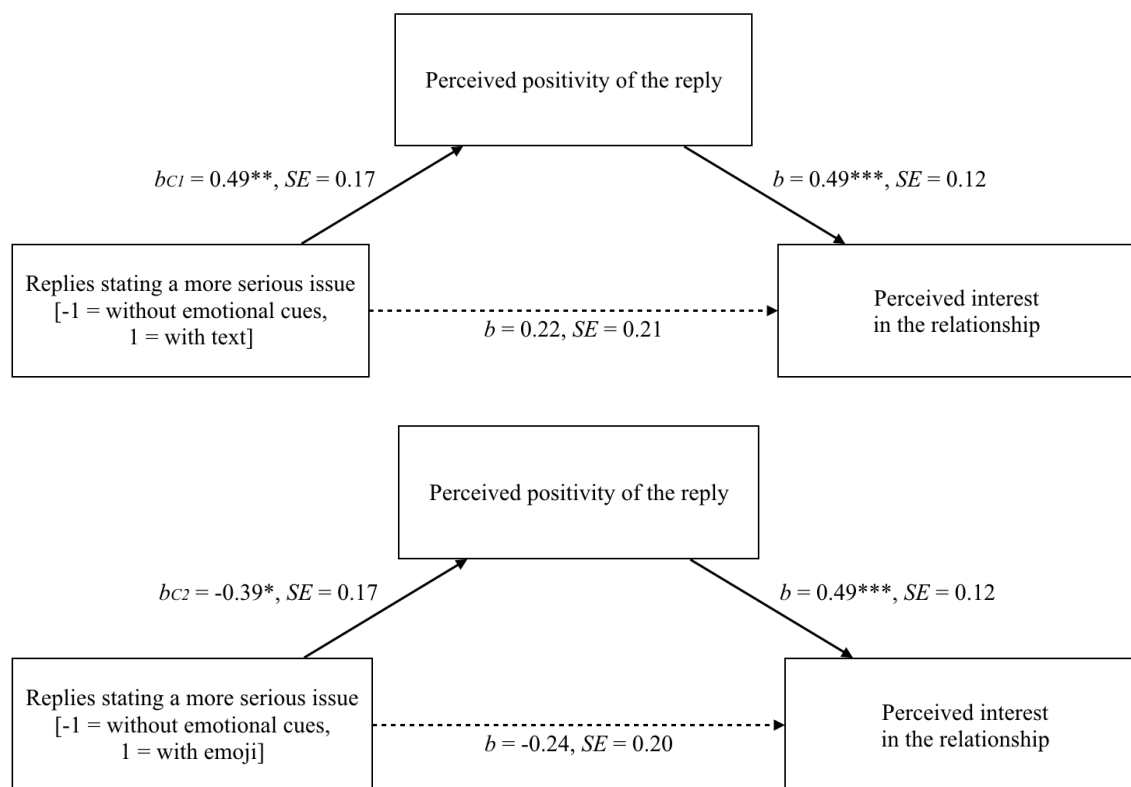


Figure 6. Mediation of perceived positivity of the replies stating a more serious issue, when it included emotional text (vs. without emotional cues) (upper panel) and emoji (vs. without emotional cues) (lower panel).

3.2.5. Additional Analyses

We examined whether the pattern of results obtained for replies (less vs. more serious issues) could be associated with the causes attributed to the behaviors expressed in the replies, i.e., yawning and being late. To do so, we categorized attributions as internal (e.g., “the person was not interested in being there”, “the person forgot about the dinner”) or external (e.g., “the person was tired from work”, “the person was caught in traffic”). The likelihood with which participants attributed external (vs. internal) causes to the situations was 79% in replies stating a less serious issue ($SE = 0.03$) and 78% in replies stating a more serious issue ($SE = 0.03$), which were both reliably above chance (50%), both $p < .001$. Therefore, our results cannot be accounted by the differences in the locus of control of the attributions to both situations.

Taken together, our results suggest that using emoji is not always positive to address relationship issues using CMC. Despite results showing that both replies did not differ in negativity, those stating a more serious issue with emoji were perceived more negatively. Interestingly, for these messages there was an advantage of using the corresponding emotional text. In contrast, and converging with our previous findings, the use of emoji in a reply stating a less serious issue was perceived more positively than not using an emotional cue, which in turn increased the perceived interest in the relationship.

4. General Discussion

In two experimental studies, we examined how using different types of cues – emotional text or the corresponding emoji – to convey emotionality in CMC between romantic partners influences perceptions of their relationship. In Study 1 this influence was tested by examining positive and negative replies to an invitation made by one of the partners, without explicitly stating the cause of the reply. In Study 2 we focused specifically on negative replies that only varied on the seriousness of the issue. Both studies had large and diversified samples of participants, and findings were independent of frequency of emoji use in written communication.

Findings from Study 1 showed that positive replies do not seem to benefit from the inclusion of additional emotional cues. Indeed, the perceived interest in the relationship elicited by a positive reply without emotional cues was similar to that of positive reply with emotional text (i.e., “I’m happy”) or with the corresponding emoji (i.e., 😊). This converges with past findings showing that standard positive messages are equally likely to increase relationship satisfaction as customized ones (Luo & Tuney, 2015). It seems that when several positive emotional cues are included in the same message they are perceived as redundant, rather than having an additive effect (for a discussion, see Riordan & Trichtinger, 2017). For negative replies, in contrast, additional cues do not seem to be redundant. Indeed, using

additional emotional cues in these replies increased perceptions of interest in the relationship for both emotional verbal expression and emoji. This effect was more pronounced for emoji, which occurred because individuals perceived the negative reply with emoji as more positive than the same reply without additional information. The mediation via perceived positivity of the reply was not found for the negative reply with emotional text. This converges with recent research showing the perceived functional value of using pictorial cues in written communication (Kaye et al., 2016).

Overall, results from Study 1 converge with past research from Perry and Werner-Wilson (2011), showing that individuals have positive attitudes towards the use of CMC to address small contentions with their romantic partner. However, those same individuals reported negative attitudes towards the use of CMC to discuss a more serious issue. Detailing under which conditions these emotional cues are advantageous when using CMC to address relationship issues, Study 2 used less ambiguous replies and explicitly stated the cause of the issue. The fact that no differences were found across emotional cues for negative replies stating a less serious issue might have been the result of presenting an actual justification for the negative reply. Whereas in Study 1 the replies did not present a concrete justification for the negative feeling (“I did not like what happened between us yesterday”), in Study 2 such feeling was justifiable by an action of the partner (“I still cannot believe you spent our anniversary dinner yawning”). Presumably, lower levels of ambiguity in the replies, as is the case of a concrete justification, might have decreased the impact of emotional cues in the perceived interest in the relationship. Nonetheless, even in the case of a less serious issue, the use of emoji elicited perceptions of the reply as more positive. This suggests that the advantage of emoji in CMC might be especially evident in ambiguous situations, or eventually in which the cause for the relationship issue at hand is less serious. Future research should test this hypothesis in greater detail, for instance examining a range of issues varying

in seriousness, in order to understand at what levels emoji become redundant, or even a negative influence in perceptions of interest in the relationship.

The use of emoji in negative replies stating more serious issues was detrimental for perceptions of interest in the relationship because such replies were perceived more negatively. This converges with past findings showing that the use of emoticons decreases in more emotionally-intense situations, such as expressing anger in written communication, because it dilutes the emotionality conveyed in the message (Kato et al., 2009). In these situations, the use of emoji might signal a lack of interest to address the issue with the partner, or to acknowledge its seriousness, thus having a detrimental effect for the relationship. In contrast, using the emotional text increased perceived positivity of the reply and benefited perceptions of interest in the relationship. Presumably, using emotional text, rather than a pictorial cue, objectively expresses a feeling and possibly opens the channel of communication between the partners, which is not achieved when no emotional text is added to the written communication.

Research focusing on the perceived function of pictorial cues such as emoticons or emoji to reduce ambiguity has typically taken the sender's point of view (e.g., "Why do individuals use emoticons within text-based communication?"; Kaye et al., 2016). Much less is known about whether using pictorial cues actually serves that function or not, from the receiver's standpoint. Our studies seem to suggest it does. Participants were explicitly asked to focus on the sender's replies, and evaluated a negative reply with the frown emoji more positively when the issue was open to ambiguity (Studies 1 and 2), and more negatively when the issue was clearly more serious (Study 2). This is an important contribution to the literature, as senders can consider that using pictorial cues can help solve conflicts, whereas in fact there may be contexts in which their use is not appropriate. Future research should

seek to further examine the perceived function of using pictorial cues, contrasting both points of view.

More broadly, these findings converge with empirical evidence showing that CMC can be an appropriate channel of communication when addressing relationship issues (Miller-Ott et al., 2012; Perry & Werner-Wilson, 2011), especially if individuals use different communication modalities (Scissors & Gergle, 2013). Based on our findings, the use of objective information and emotional text might be a better strategy to help preventing problems from escalating rapidly, until the issue can be addressed FtF.

Despite these promising results and of opening new avenues for future research, our findings only show how people perceive others' interest in a relationship, which is not necessarily the same as how people would react in that same situation, or how people typically behave in their own relationships. Therefore, future research should seek to replicate these findings using the same type of experimental approach used in the current work, but asking participants to imagine they received such replies and answer them from their own perspective. Exploring perceptions about the impact of the reply, in particular the negative ones, on the recipient of the messages would also be interesting. An alternative would be to take on a dyadic approach, for instance examining how messages exchanged between romantic partners include emoji or emotional words, how this varies according to the valence of the messages exchanged and, in the case of negative messages, how it varies according to the seriousness of the issue addressed. Using a longitudinal approach, future research could also examine if and how the use of emoji in CMC predicts relationship satisfaction, as well as if the use of emotional words in CMC to address relationship issues facilitates subsequent FtF communication, thus promoting relationship maintenance.

Literature on the role of emoji in CMC between romantic partners is still scarce. We contribute to this field of research by showing that using emoji in CMC in this context can

have both beneficial and detrimental effects. On the one hand, using emoji seems to benefit written communication to address ambiguous or less serious relationship issues because it promotes a positive tone to the message. On the other hand, the use of emoji to address more serious relationship issues can be detrimental because it leads to a more negative perception of the overall message. In this case, our results indicate that a better strategy for partners is to use objective emotional words to convey feelings and possibly prevent the escalation of the problem.

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