Computers in Human Behavior 99 (2019) 181–189

Contents lists available at ScienceDirect

Computers in Human Behavior

journal homepage: www.elsevier.com/locate/comphumbeh

Perceived responsiveness in text messaging: The role of emoji use

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ARTICLE INFO

Keywords:
Emojis
Emoticons
Perceived responsiveness
Computer-mediated communication
Online
First impressions

ABSTRACT

This research investigated how emojis can be used in text messaging to communicate perceived responsiveness, guide impression formation, and contribute to reflected appraisal. Participants (N = 179) disclosed a positive and negative event to a responder (a confederate) over iMessage. Participants were randomly assigned to receive either text only responses or a mixture of text and emoji responses from the responder. For positive self-disclosures, participants had higher ratings of perceived responsiveness when there was convergence in emoji use between the participant and responder than when there was divergence. In other words, participants rated the confederate higher in responsiveness when both or neither used emojis (converged) than when only one used emojis (diverged). There were no effects of emoji use on perceived responsiveness for negative self-disclosures. Additionally, following the set of interactions, participants had more positive impressions of the responder and more positive perceptions of how the responder felt towards the participant (reflected appraisal) when there was convergence rather than divergence in emoji use. Discussion centers around whether emojis can serve as a substitute for nonverbal cues typically found in face-to-face conversations.

1. Computer-mediated communication in modern life

The rise of smartphone ownership has increased reliance on computer-mediated communication (CMC) to maintain contact with relationship partners. Text messaging is a common form of CMC, and the most used function of mobile phones (Duggan, 2013). Increased text messaging frequency between relationship partners is associated with positive perceptions of the relationship, relationship satisfaction, intimacy, and support (Morey, Gentzler, Creasy, Oberhauster, & Westerman, 2013). Although text messaging (and CMC more generally) is beneficial in that it provides a way to initiate and maintain interpersonal relationships without face-to-face (FtF) contact (Pettigrew, 2009), an important drawback to CMC is the lack of nonverbal cues to differentiate attitude, interest, and emotion (Kiesler, Siegel, & McGuire, 1984). A speaker's nonverbal cues such as vocal inflection, head nods, smiles, body position, and distance are used to judge the speaker's attitudes and emotions (Kraut, Lewis, & Swezey, 1982). Without the nonverbal signals customary in FtF communication, CMC offers fewer cues to aid in regulating conversation (Kraut et al., 1982), and may undermine effective communication.

One important function of nonverbal behavior is to communicate understanding, validation, and care to conversation partners when they reveal personal details about the self (Maisel, Gable, & Strachman, 2008). These three elements of perceived responsiveness contribute to how people connect and relate to each other (Burgoon & Le Poire, 1999). Intimacy is built and maintained through a process of partners responding supportively to each other's feelings, thoughts, and experiences, and perceiving each other to understand, validate, and care for core aspects of the self (Reis & Shaver, 1988). The lack of access to nonverbal information in CMC may cause interaction partners to perceive each other as less responsive in this medium.

Despite the absence of nonverbal cues in CMC, individuals are not willing to forego intimacy and responsiveness in their computer-mediated interactions. Instead, individuals have been motivated to reduce the uncertainty of the medium (Walther, 1996) and have adapted their communication to the modality. Emojis offer one alternative means of conveying emotion and communicating responsiveness in CMC. Emojis (generally translated as picture characters) are a graphic form of emoticons developed in Japan and are used to express, clarify, and emphasize emotions (Fullwood, Orchard, & Floyd, 2013; Kaye, Wall, & Malone, 2016). Emoji use is rampant in texting and on social media platforms, but its usefulness as a tool to clarify sentiment and promote interpersonal connection has not been adequately assessed. The goal of the current research is to investigate whether emoji use facilitates perceived responsiveness and positive perceptions in one form of CMC, text messaging.

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https://doi.org/10.1016/j.chb.2019.05.023
Received 14 February 2019; Received in revised form 11 April 2019; Accepted 17 May 2019
Available online 20 May 2019
0747-5632/

1.1. Interpersonal process model of intimacy

According to the interpersonal process model of intimacy (Reis & Shaver, 1988), intimacy develops when two people reveal personal information and respond to each other supportively in an ongoing reciprocating fashion. Reciprocal self-disclosure in daily life contributes to positive perceptions of the other individual, feelings of acceptance, and the belief that the other individual evaluates the self positively (reflected appraisal; Laurenceau, Barrett, & Pietromonaco, 1998).

Responsiveness involves active, supportive attentiveness to elements an individual considers important to his or her self-concept, whether positive or negative (Reis, Clark, & Holmes, 2004). Socially sharing positive events in emotionally expressive ways is known as capitalization (Langston, 1994). Successful capitalization occurs when a person feels responded to (understood, validated, and cared for) by the person they disclose to (Reis et al., 2010), and uniquely benefits the capitalizer's positive affect (Gable, Reis, Impett, & Asher, 2004; Langston, 1994), and the relationship between sharer and respondent (Gable, Gonzaga, & Strachman, 2006; Reis et al., 2010). Socially sharing negative events (i.e., support-seeking) is typically undertaken to alleviate negative affect but can also increase positive affect (Collins & Feeney, 2000) and promote relationship outcomes (Reis et al., 2010). Thus, regardless of the type of information shared (positive or negative), successful forms of both processes share an essential feature: the perception that a partner is understanding, validating, and caring (Gable & Reis, 2010). In fact, the discloser's perception of responsiveness may be more vital to intimacy than the actual behaviors enacted by the responder (Reis & Shaver, 1988).

Nonverbal cues, such as tone of voice, physical gestures, touch, and facial expressions are important elements for effectively conveying responsiveness (Maisel et al., 2008). Individuals can express understanding through paralinguistic cues, or backchannel utterances like “mm-hm”. Validation can be communicated with a nod, a high-five, or a matched facial expression (or invalidation with a shrug, an eye roll, or an impatient sigh). Care can be conveyed wordlessly with a hug, a smile, and steady eye-gaze. In CMC, however, nonverbal behaviors are unavailable to users, which could hinder people's ability to communicate and perceive responsiveness, thus impeding the development or maintenance of intimacy.

1.2. Intimacy in computer-mediated communication (CMC)

Nonverbal elements of communication unavailable in CMC are essential to conveying emotional information and promoting interpersonal understanding (Maisel et al., 2008), two key elements of intimacy (Reis & Shaver, 1988). Text messages lacking emotional content produce frustration, anxiety, and anger in the recipient (Kato & Akahori, 2005, pp. 723–730). Relying on text alone undermines recipients' ability to accurately perceive senders' emotional states (Kato, Kato, & Scott, 2007, pp. 705–712; Kruger, Epley, Parker, & Ng, 2005). For example, participants who received messages over e-mail were less accurate in judgments of senders’ sarcasm, seriousness, anger, sadness, and humor compared to those who received the same messages by voice recording or in a FtF interaction (Kruger et al., 2005). Therefore, both senders and recipients suffer consequences when emotions are not successfully expressed and interpreted in CMC.

However, despite the absence of nonverbal cues available in FtF communication, CMC can facilitate intimacy (Dainton & Aylor, 2002). Positive and supportive communication via text messaging occurs in friendships and romantic relationships, and positively predicts relationship satisfaction (Brody & Peña, 2015), so it is important to understand how this medium is used to fulfill relationship needs. Even non-intimate disclosures through CMC can increase intimacy and improve relationship quality (Boyle & O'Sullivan, 2016) . People are motivated to search for meaning in their text-based encounters and will use available information to make attributions about their interaction partner. For example, individuals tend to assume others' self-disclosures through CMC are motivated by a desire for intimacy (Walther & Parks, 2002, pp. 529–563). In addition, people tend to over-attribute the degree of similarity to the person they are interacting with in CMC, leading to an exaggerated sense of closeness and social attraction (Walther & Parks, 2002, pp. 529–563). Thus, CMC can produce idealized perceptions of relational intimacy (Walther, 1996), which can lead to discussion depth and intimacy in CMC exchanges that surpass that of FtF exchanges (Walther, 1997).

Engaging in CMC can also benefit strangers getting to know each other. For example, college students who interacted in anonymous online chatrooms for 4–8 weeks showed declines in loneliness and depression and increases in self-esteem and perceived social support across the time period that they used the chatroom (Shaw & Gant, 2002). The anonymity offered by the online chatrooms facilitated disclosure, so intimacy development was not inhibited by the communication medium (Shaw & Gant, 2002). The success of the computer-mediated exchanges in promoting positive outcomes suggests that individuals can adapt their communication style without having access to typical FtF nonverbal cues. Individuals can use paralinguistic cues to convey information about their mood and intentions, and compensate for the absence of nonverbal cues in CMC.

Paralinguistic cues can clarify the written words they accompany by intensifying, negating, or disambiguating the sentiment of online text communication (Ganster, Eimler, & Krämer, 2012; Kaye et al., 2016; Lo, 2008) and can thus enhance the recipient's understanding of the sender's emotions (Hogenboom et al., 2013, pp. 703–710). People use cues like emoticons and emojis for efficient and concise communication and for emotional expression, humor, and message reinforcement (Derks, Bos, & Von Grumbkow, 2008). In an analysis of 6.06 billion messages from 3.88 million active smartphone users from 212 countries and regions, the most frequently used emojis were considered expressive of emotions (Lu et al., 2016, pp. 770–780). In one study, reading text online without emoticons led to errors in understanding the sender's attitude and disposition whereas adding emoticons provided contextual and emotional information to improve understanding of the sender's sentiment (Lo, 2008).

Emoticons have been shown to attenuate apparent rudeness, particularly when expressing rejection and complaints, and enhance the intensity of emotions behind messages, particularly expressions of gratitude and praise (Skovholt, Grønning, & Kankaanranta, 2014). For example, positive statements that included a smiling emoticon were rated as more positive than the same positive statements without the emoticon (Derks et al., 2008). Moreover, in an analysis of 2080 Dutch tweets and forum messages containing emoticons, the sentiment of the emoticon better matched the sender's intended sentiment than the text itself (Hogenboom et al., 2013, pp. 703–710). In addition to clarifying emotion and intention, paralinguistic cues also convey information about the sender. Individuals are perceived more positively when they use positive or “happy” emoticons in chat rooms (Kalyanaraman & Ivory, 2006) and e-mail messages (Byron & Baldridge, 2007). Viewing positive emoticons on targets' Facebook and chat profiles has also been associated with naïve observers' positive perceptions of the target's personality (Wall, Kaye, & Malone, 2016).

Emojis function like emoticons, but contain more facial features, and better represent human emotional expressions (Ganster et al., 2012), allowing for more complex and nuanced ways to convey sentiments than a simple) or:) (Miller et al., 2016). Emojis can be used for a variety of purposes including providing information, modifying tone, managing and terminating conversation, engaging the recipient, reducing interpersonal distance and formality, and maintaining relationships (Cramer, de Juan, & Tetreault, 2016, pp. 504–509; Kelly & Watts, 2015; Skovholt et al., 2014). Emojis can also be used decoratively as entertainment, to make a text message more appealing, or to trigger a more intense response (Cramer et al., 2016, pp. 504–509). Emojis can diminish social distance by making conversations more personal and

less formal (Skovholt et al., 2014). Emojis show that the sender was trying to be thoughtful of the recipient and not disengage from the conversation. Emojis can also be useful for signifying that a message has been received when there is not much to say in return (Kelly & Watts, 2015). Given the various uses of emojis and their potential to benefit conversations, the current research was undertaken to examine whether using emojis in response to self-disclosures through text messaging facilitates positive perceptions and responsiveness.

2. Overview of the current research

In this experiment, participants actively engaged in two text message conversations with a confederate who they were led to believe was another research participant. Participants self-disclosed one positive and one negative event that happened to them in the recent past. The confederate's responses were supportive, and either contained emojis or did not contain emojis. After each self-disclosure, participants rated the responder (the confederate) in terms of perceived responsiveness. Participants also rated the responders' interpersonal qualities, and perceptions of how participants believed the responder felt about them (reflected appraisal). We tested the hypotheses that when the responder used emojis it would enhance participants' perceived responsiveness (Hypothesis 1), positive impression of the responder (Hypothesis 2), and reflected appraisal (Hypothesis 3) compared to when the responder did not use emojis.

3. Method

3.1. Participants

One-hundred and eighty college students from an urban public institution participated in this research in exchange for course credit. One participant was eliminated for inappropriate responding and suspicion of the legitimacy of the responder, reducing the sample to 179 (113 females, 65 males, one non-binary). Participants' mean age was 20.55 years old (SD = 3.83, range = 18–38). The sample was ethnically diverse with 57 participants identifying as White/European American (31.8%), 43 as Latino/Hispanic (24.0%), 40 as Asian/Asian American (22.3%), 35 as Black/African American (19.6%), 18 as Caribbean/West Indian (10.1%), 13 as Middle Eastern/North African (7.3%), one as Native American/Alaskan Native (0.6%), and one as Native Hawaiian/Pacific Islander (0.6%). Of the total sample, 27 (15.1%) were multiracial. One individual did not report their ethnicity.

Nearly all participants were smart phone users (99.4%, N = 178) and 77.1% (N = 138) were Apple (iPhone) users. Most participants (98.3%, N = 176) reported using emojis for reasons including emotional expression (84.7%; N = 149), sarcasm (71.6%, N = 126), conversation enhancement (69.9%, N = 123), flirting (63.6%, N = 112), emphasis (63.1%, N = 111), and boredom (45.5%, N = 80).

3.2. Procedure

Participants signed up for a lab study involving interactions with another person through text message. They were led to believe that they were going to engage in text message conversations with another participant, and that one participant would be the discloser and the other would be the responder. Participants provided written informed consent. Data were obtained anonymously, and participants were instructed to refrain from sharing any personally identifiable information with their interaction partner. Participants believed they were being randomly assigned to their role of discloser or responder by selecting the topmost sheet from a face-down stack of papers. In reality, the other participant was a confederate, participants were always disclosers and confederates were always responders, and the stack of papers consisted of instructions to list either three positive, or three negative events that happened to them in the recent past. Thus, in actuality, choosing the paper from the stack randomly assigned participants to disclose either a positive or negative event first (the other type of event was disclosed in the second interaction). The confederate remained in a different room throughout the study and never had FtF contact with the participant.

After listing three positive (or negative) recent events, participants rated how positive (or negative) each event was on a separate sheet of paper. The event ratings were kept separate from the event listings to avoid selection bias by the experimenter, and for the participants' privacy. The experimenter instructed the participant to disclose the second or third highest rated event (chosen at random) to the responder. The highest rated event was not selected so participants wouldn't be sharing their most positive (or most negative) experience. After the event was selected, participants disclosed the event to the responder over iMessage on a lab-owned iPod touch.

Five confederates were trained in responsive behavior. A databank of generic supportive responses was generated based on Maisel et al. (2008) and provided to confederates to use as a reference during interactions. The databank ensured that all participants received relatively consistent responsiveness in that the general sentiments were standard across participants, but responses were personalized to cater to specific disclosures (e.g., "I can imagine that being frustrating" becomes "I can imagine that losing your wallet is frustrating"). Confederates engaged in several practice sessions as responders before interacting with real participants. There were no effects of confederate on participants' ratings for any of the dependent variables.[1]

Each interaction lasted a minimum of five, but no more than 10 min, and we ensured that the responder replied with a minimum of three responsive messages in each interaction. Responders sent an average of 8.68 messages (SD = 2.39, range = 3–18) and disclosers sent an average of 10.94 messages (SD = 5.30, range = 2–47). Participants were randomly assigned to one of two conditions, between subjects. In the emoji condition (N = 91), the responder included emojis in some responses to the participant. Responders only used one emoji at a time within a response (as opposed to using repeated emojis or several different emojis in conjunction). Responders used an average of 4.63 emojis (SD = 1.09, range = 3–8) in the positive event interaction and an average of 4.73 emojis (SD = 1.12, range = 3–8) in the negative event interaction. The types of emojis used by the responder in the emoji condition can be found in Table 1. In the control condition (N = 88), the responder only used text and did not use emojis at all during the conversation.

After the initial interaction, participants rated perceived responsiveness of the responder. Participants then listed three negative events (if the first disclosure was a positive event) or three positive events (if the first disclosure was a negative event). The experimenter repeated the same process for selecting the event to be disclosed, and participants engaged in a second interaction just like the first save for the different topic of disclosure. After the second interaction, participants again rated perceived responsiveness of the responder. Responsiveness was assessed after each interaction to account for perceptions of the responder's words and actions to the specific self-disclosure (Laurenceau et al., 1998). After completing responsiveness ratings following the second interaction, participants then rated their overall impression of the responder, and perceptions of the responder's appraisal of the self (reflected appraisal). Finally, participants answered questions about their general emoji usage and demographics.

[1] Comparing participants who had total divergence (n = 42) with participants who had convergence in only the positive disclosure interaction (n = 108), only the negative disclosure interaction (n = 124), or in both interactions (n = 95) did not alter the results of this analysis, so we opted for the simplest comparison: total divergence (n = 42) versus any convergence (n = 137).

Table 1
Types of emojis used by responders in the emoji condition.

Type	Positive Event Interaction *n* (%)	Negative Event Interaction *n* (%)
Hello/Bye	24 (26.4%)	37 (40.7%)
Happy	89 (97.8%)	77 (84.6%)
Sad	17 (18.7%)	84 (92.3%)
Angry	0 (0%)	6 (6.6%)
Neutral	5 (5.5%)	21 (23.1%)
Object	37 (40.7%)	4 (4.4%)
Other	65 (71.4%)	32 (35.2%)

Note: *Hello/Bye* include emojis such as the waving hand emoji; *Happy* include emojis with smiling faces; *Sad* include emojis with pouting or frowning faces; *Angry* include facial emojis with scowls or eye rolls; *Neutral* include facial emojis lacking positive or negative emotional expression; *Object* include non-facial emojis representing objects; and *Other* include all other miscellaneous emojis such as the flexed bicep emoji.

3.3. Materials

3.3.1. Event ratings

Participants rated the valence of each positive event on a sliding scale from "Good" (0) to "Outstanding" (100) and each negative event on a sliding scale from "Bad" (0) to "Terrible" (100) (cf. Reis et al., 2010). Experimenters used these ratings to eliminate the highest rated event, and randomly select between the two remaining events.

3.3.2. Perceived responsiveness

After each interaction, participants completed 7 modified items from the Perceived Partner Responsiveness scale (Reis, Crasta, Rogge, Maniaci, & Carmichael, 2018) to rate the extent to which they perceived the responder as responsive to their self-disclosures. Items were rated on a 7-point Likert scale from "Not at all true" to "Extremely true." Items addressed the core aspects of perceived responsiveness (e.g., *My partner expressed liking and encouragement for me*; *My partner seemed interested in what I was thinking and feeling*; *My partner was responsive to my needs*). The perceived responsiveness measure had high internal consistency following each interaction (positive event $\alpha = 0.934$; negative event $\alpha = 0.919$).

3.3.3. Positive impression of responder

Participants rated the responder using a set of 20 adjectives from the Interpersonal Qualities Scale (IQS; Murray, Holmes, & Griffin, 1996). Ten positive adjectives (e.g., patient and warm) and 10 negative adjectives (e.g., thoughtless and distant) were rated on a 7-point scale from "Not at all" to "Completely." One item (*emotional*) was eliminated for low internal consistency. Negative adjectives were reverse scored and averaged with positive adjectives to create a composite positive impression score ($\alpha = 0.858$).

3.3.4. Reflected appraisal

To assess how participants thought the responder felt about them, participants rated how much they agreed with the following statements on a 7-point scale from 1 "Strongly Disagree" to 7 "Strongly Agree": (i) *My partner liked me*; (ii) *My partner would like to interact with me again*; (iii) *My partner would probably want to be friends with me*; (iv) *My partner thought I was warm*; (v) *My partner thought I was friendly*. Responses to these five items were averaged and used as a composite reflected appraisal score ($\alpha = 0.910$).

3.3.5. Participant general emoji use

Participants indicated the percentage of their text messages and social media posts that typically contain emojis, as well as the percentage of people with whom they use emojis on slider scales from 0 to 100%. The three items were averaged into a composite emoji use score. In addition, participants selected from a check list what they use emojis for including sarcasm, flirting, emphasis, emotional expression, conversation enhancement, boredom, or other. Participant-generated reasons for using emojis were humor, and to make a text message sound less serious.

3.3.6. Demographics

Participants reported on gender, age in years, ethnic background, and if English was their first language. Participants also reported on the type of mobile phone that they own.

4. Results

4.1. Preliminary analysis

To ensure that responders were consistent in verbal responsiveness across conditions (i.e., irrespective of emoji use), three independent coders evaluated all 358 text conversations blind to condition (all of the responder's emojis were removed from the responses). There was no effect of responder emoji use (condition) on responsiveness conveyed in the responder's language, t (356) = 0.37, $p = .710$.

4.2. Effects of emoji use on perceived responsiveness and positive perceptions

A 2 (condition: emoji; no emoji) X 2 (disclosure type: positive, negative) mixed ANOVA was executed to test the effect of responder emoji use (condition) on responsiveness by type of disclosure. There was no effect of responder emoji use on perceived responsiveness, F (1, 177) = 0.10, $p = .758$, partial η < sup > 2 < /sup > = .001, and no interaction between condition and disclosure type, F (1, 177) = 0.28, $p = .595$, partial $\eta^2 = 0.002$.

One-way ANOVAs revealed no significant effect of responder emoji use on positive impressions of the partner, F (1, 177) = 0.27, $p = .603$, partial $\eta^2 = 0.002$, or reflected appraisal ratings, F (1, 177) = 0.64, $p = .424$, partial $\eta^2 = 0.004$. In other words, responder emoji use generally had no effect on participants' perceptions of the responder or perceptions of the responder's evaluation of the self. Hypotheses 1, 2, and 3 were not supported. Average perceived responsiveness, positive impression, and reflected appraisal ratings can be found in Table 2.

4.3. Exploratory analyses

Although responder emoji use did not produce the hypothesized effects on responsiveness, impression formation, or reflected appraisal, in reviewing the text conversations, it became apparent that some participants used emojis ($N = 110$) whereas some did not ($N = 69$). Among participants who used emojis, the average number of emojis sent was 2.75 ($SD = 2.02$, range = 1–12) in the positive event interaction and 2.57 ($SD = 1.79$, range = 1–10) in the negative event interaction. The types of emojis used by participants can be found in Table 3. Thus, we explored participant emoji use as a moderating factor by coding for participants use (1) or non-use (0) of emojis.

4.3.1. Participant emoji use. A chi-square test of independence revealed that participant emoji use depended on responder emoji use during both positive event interactions, χ^2 (1) = 7.78, $p = .005$, and negative event interactions, χ^2 (1) = 27.52, $p < .001$. More participants used emojis when the responder used emojis. When the responder used emojis (emoji condition), 71.4% ($n = 65$) of participants used

[2] Controlling for the number of emojis used by participant and responder, difference between amount of emojis used by participant and responder, number of messages sent by participant and responder, and amount of times 1 + emojis were used in a message directly following the message of the other individual did not alter the above results for perceived responsiveness, positive impressions, or reflected appraisal ratings.

Table 2
Responsiveness, interpersonal qualities, and reflected appraisal ratings by responder emoji use.

	Responder Used Emojis		Responder Didn't Use Emojis	
	M	SD	M	SD
Responsiveness to Positive Event Disclosure	4.96	1.39	4.95	1.45
Responsiveness to Negative Event Disclosure	5.06	1.44	4.96	1.35
Interpersonal Qualities after Both Interactions	6.12	0.73	6.18	0.62
Reflected Appraisal after Both Interactions	4.69	1.04	4.81	1.05

Table 3
Types of emojis used by participants.

Type	Positive Event Interaction *n* (%)	Negative Event Interaction *n* (%)
Hello/Bye	18 (10.1%)	17 (9.5%)
Happy	86 (48.0%)	65 (36.3%)
Sad	26 (14.5%)	65 (36.3%)
Angry	0 (0%)	3 (1.7%)
Neutral	4 (2.2%)	16 (8.9%)
Object	10 (5.6%)	1 (0.6%)
Other	25 (14.0%)	22 (12.3%)

Note: Hello/Bye include emojis such as the waving hand emoji; Happy include emojis with smiling faces; Sad include emojis with pouting or frowning faces; Angry include facial emojis with scowls or eye rolls; Neutral include facial emojis lacking positive or negative emotional expression; Object include non-facial emojis representing objects; and Other include all other miscellaneous emojis such as the flexed bicep emoji.

emojis while 28.6% (n = 26) did not during the positive event interaction, and 80.2% (n = 73) of participants used emojis while 19.8% (n = 18) did not during the negative event interaction. However, when the responder did not use emojis (control condition), only 51.1% (n = 45) of participants used emojis while 48.9% (n = 43) did not during the positive event interaction and only 42.0% (n = 37) of participants used emojis while 58.0% (n = 51) did not during the negative event interaction.

In the emoji condition, the responder was typically first to use emojis in the interaction: 82.4% (n = 75) in the positive event interactions and 80.2% (n = 73) in the negative event interactions. Responder emoji use may have prompted participants to respond with emojis. In the other ~20% of cases, participants only used emojis before the responder when they used an emoji in their initial message (participants were always the initiators in the conversations). In the emoji condition, disclosers used an emoji in their message directly after a responder used an emoji 43.3% (n = 39) of the time in the positive event interactions and 45.6% (n = 41) of the time in the negative event interactions. In addition, responders used an emoji in their message directly after a discloser used an emoji 52.2% (n = 47) of the time in the positive event interactions and 48.9% (n = 44) of the time in the negative event interactions.

A series of 2 (responder emoji use: use, no use) x 2 (participant emoji use: use, no use) between-subjects ANOVAs were conducted to assess whether convergence between responder and participant emoji use impacted participant perceptions of the responder's responsiveness. Because participants were not always consistent in their use of emojis across the two disclosures, we could not include disclosure type in a 2 (responder emoji use) x 2 (participant emoji use) x 2 (disclosure type) mixed model analysis. Instead, we conducted separate analyses for positive and negative disclosure interactions to account for participants' disclosure-specific emoji use. For the positive impression and reflected appraisal outcomes, we compared participants who had total divergence with the responder (participants and responders did not converge on emoji use in either interaction) to those who had any convergence with the responder (participants and responders converged on emoji use during at least one interaction).[1,2]

4.3.2. Responsiveness. For positive event disclosures, there was no significant main effect of responder emoji use on responsiveness, F (1, 175) = 0.59, p = .444, partial η^2 = 0.003, or participant emoji use on responsiveness, F (1, 175) = 1.91, p = .169, partial η^2 = 0.011. However, there was a significant responder emoji use X participant emoji use interaction, F (1, 175) = 6.00, p = .015, partial η^2 = 0.033. When the responder did not use emojis (control condition), responsiveness ratings of participants who did use emojis did not differ significantly from the responsiveness ratings of participants who did not use emojis, F (1, 175) = 0.62, p = .430, partial η^2 = 0.004. However, when the responder did use emojis (emoji condition), participants who also used emojis rated the responder significantly more responsive (M = 5.20, SD = 1.21) than participants who did not use emojis (M = 4.36, SD = 1.62), F (1, 175) = 6.20, p = .014, partial η^2 = 0.034. As shown in Fig. 1a, responsiveness ratings were relatively higher when responder and participant both used emojis compared to when only the responder used emojis.

For negative disclosures, there were no significant main or interactive effects of participant emoji use on responsiveness (all p's > 0.663). See Fig. 1b. [3]

4.3.3. Positive impression of the responder. There was a significant main effect of responder emoji use, F (1, 175) = 4.79 p = .030, partial η^2 = 0.027, and a marginal main effect of participant emoji use, F (1, 175) = 3.45, p = .065, partial η^2 = 0.019, on positive impression of the responder. Main effects were qualified by a significant responder emoji use X participant emoji use interaction, F (1, 175) = 7.47, p = .007, partial η^2 = 0.041. When the responder did not use emojis (control condition), there was not a significant difference in positive impression for participants who did or did not use emojis, F (1, 175) = 0.47, p = .492, partial η^2 = 0.003. When the responder used emojis (emoji condition), participants who used emojis tended to rate the responder

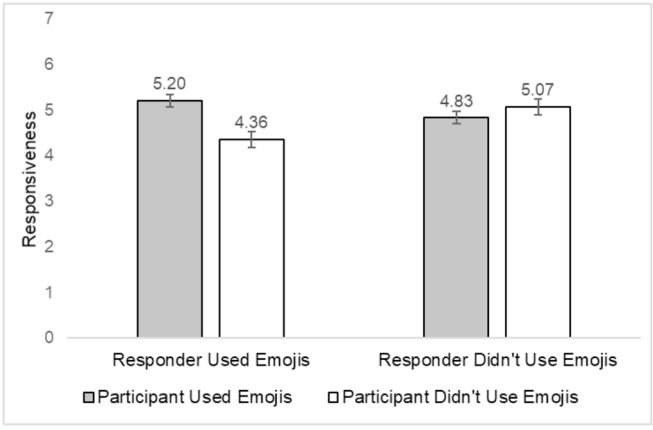

Fig. 1. a Responder X participant emoji use on responsiveness to positive event disclosure. b Responder X participant emoji use on responsiveness to negative event disclosure.

[3] Analyses controlling for the positivity/negativity of the discussed events, as rated by the participants, revealed that event ratings did not affect perceived responsiveness for either disclosure.

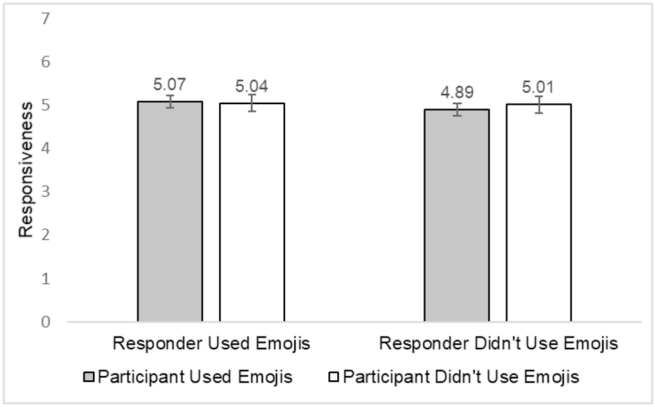

Fig. 1. (*continued*)

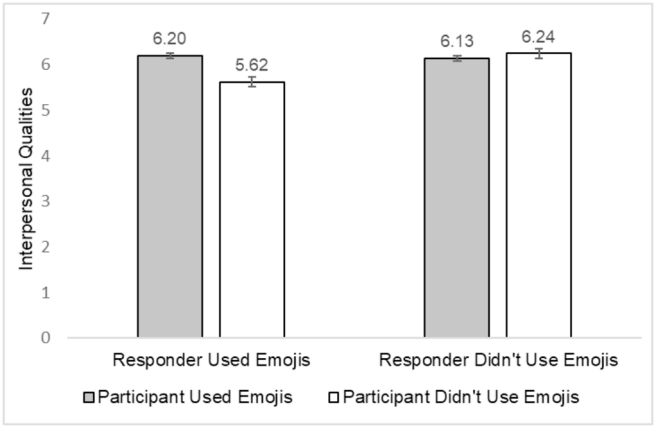

Fig. 2. Responder X participant emoji use on positive impression.

marginally more positively (M = 6.20, SD = 0.66) than participants who did not use emojis (M = 5.62, SD = 0.96), F (1, 175) = 3.63, p = .058, partial η^2 = 0.020. Similar to the results for responsiveness, impression ratings were more positive among pairs where participants and responders both used or both didn't use emojis while ratings were less positive among pairs where only one used emojis (with lowest average ratings when the responder used emojis, but the participant did not). See Fig. 2.

4.3.4. Reflected appraisal. There were significant main effects of responder emoji use, F (1, 175) = 6.29, p = .013, partial η^2 = 0.035, and participant emoji use, F (1, 175) = 8.43, p = .004, partial η^2 = 0.046, on reflected appraisal. The main effects were qualified by a significant responder emoji use X participant emoji use interaction, F (1, 175) = 5.28, p = .023, partial η^2 = 0.029. When the responder did not use emojis (control condition), there was not a significant difference in reflected appraisal for participants who did and did not use emojis, F (1, 175) = 0.40, p = .529, partial η^2 = 0.002. When the responder used emojis (emoji condition), participants had more positive reflected appraisal ratings when the participant also used emojis (M = 4.82, SD = 0.97) than when the participant did not use emojis (M = 3.82, SD = 1.10), F (1, 175) = 4.11, p = .044, partial η^2 = 0.023. See Fig. 3.

4.3.5. Gender. Analyses were rerun with gender as a factor to see if participant gender altered the results reported above (excluding the one individual who identified as non-binary). The responder emoji use X participant emoji use interaction on responsiveness for the positive event disclosure remained significant with gender in the model, F (1, 170) = 4.47, p = .036, partial η^2 = 0.026. Participant gender moderated this responder emoji use X participant emoji use interaction on responsiveness, F (1, 170) = 5.70, p = .018, partial η^2 = 0.032. Female

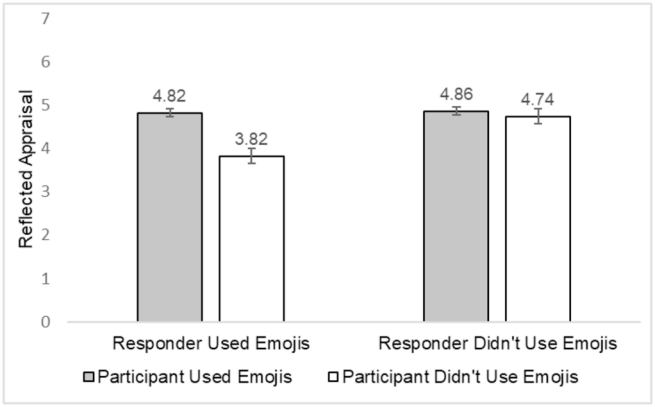

Fig. 3. Responder X participant emoji use on reflected appraisal.

participants who didn't use emojis had significantly higher ratings of responsiveness when the responder didn't use emojis (M = 5.38, SD = 1.29) than when the responder did use emojis (M = 3.87, SD = 1.84), F (1, 170) = 8.15, p = .005, partial η^2 = 0.046. In addition, female participants who did use emojis had marginally higher ratings of responsiveness when the responder used emojis (M = 5.31, SD = 1.23) than when the responder didn't use emojis (M = 4.78, SD = 1.51) F (1, 170) = 3.10, p = .080, partial η^2 = 0.018. For male participants, there were no interactive effects of participant and responder emoji use (all p's $>$ 0.591).

There were no significant main or interactive effects of gender on responsiveness to the negative disclosures, positive impressions of the responder, and reflected appraisal (all p's $>$ 0.139).

5. Discussion

The current research was conducted to begin to understand how people use emojis within CMC to convey responsiveness, build connections, and form impressions of others. Little research has tested the interpersonal benefits of emoji use in CMC, making this study a novel contribution to the understanding of interpersonal processes in CMC. The results provide insight into some of the boundary conditions of when emojis may contribute to intimacy development in CMC. The initial hypotheses that using emojis in text message responses would promote perceived responsiveness, positive impressions of the responder, and reflected appraisal were not supported. If emojis act as a partial substitute for the nonverbal signals of emotion (e.g., facial expressions) that are absent from CMC, they do not uniformly promote intimacy development. However, if emojis are truly functioning similarly to nonverbal cues, then it is reasonable that emojis would not be uniformly beneficial. Just as a hug or a pat on the back may not increase responsiveness and connection in every scenario, emojis may not either.

It was not until participants' own emoji use was considered in conjunction with responder emoji use that we were able to predict variation in interpersonal perceptions. For positive event interactions, when both responder and discloser used emojis, it produced increases in perceived responsiveness, positive impressions of the responder, and positive reflected appraisal relative to when only the responder used emojis. It appears that the responder's emoji use may have actually detracted from positive perceptions of the responder when the participant did not use emojis.

The interpersonal processes common in FtF communication may not function so differently in CMC. Similar to FtF interactions in which social mimicry promotes similarity, liking, and rapport (Kalyanaraman & Ivory, 2006), the mimicry of emoji use in text-based communication seems to produce comparable outcomes. Previous research has shown that matching the linguistic style of others (not only in words, but punctuation and emoticon use) is beneficial for building trust and

affinity in CMC (Scissors, Gill, & Gergle, 2008, pp. 277–280). Individuals tend to feel a greater sense of closeness and relationship satisfaction when they perceive their partners to react appropriately to their self-disclosures (Maisel et al., 2008). If participants' expectations about how the responder should react matched their actual experiences, they likely found the responder more responsive to their needs. Thus, in all likelihood, it is the job of the responder to be attentive to the emotional needs of the discloser, which includes accommodating the discloser's communication style. While participants who used emojis likely felt validated and understood when the responder also used emojis in their responses, participants who didn't use emojis may have felt that their emotional needs weren't being met when the responder used emojis. This suggests that one's role as discloser or responder is crucial to gauging the effectiveness of emoji use in text conversations.

While responders may typically be expected to accommodate disclosers, disclosers may also have chosen to accommodate the responder's communication style to build rapport with the responder and to convey a positive impression to the responder. According to Communication Accommodation Theory (Giles, Coupland, & Coupland, 1991), people are motivated to accentuate their similarities by altering their communication style (including intonation, dialect, and nonverbal behaviors) to match the recipient. For example, in one study participants used more emoticons based on their partner's use and that convergence of emoticon use had positive impacts on perceived affinity (Liebman & Gergle, 2016, pp. 570–581). Similarly, in the current research, participants' ratings of responsiveness and their positive impression of the responder were influenced by convergence in emoji use in positive event interactions..

That we found an effect for positive, but not negative event interactions suggest that contextual factors are important to the use and perception of emojis in text messages. Being responsive to negative events is generally more challenging than being responsive to positive events (Gable, Gosnell, Maisel, & Strachman, 2012). Individuals may differ in their need for the type of response they receive to their negative self-disclosures, including the type of emojis used. Whereas some people may prefer responses conveying positive affect to combat negativity and lift spirits (i.e., positive emojis), others may prefer to receive support conveying negative affect to communicate empathy or offer consolation (i.e., negative emojis). On the other hand, positive events elicit only one type of emojis in response – positive.

The complexity associated with providing support for negative events gives rise to at least three additional reasons why emoji use may have had an effect for positive event interactions, but not negative event interactions. First, there may be differences in expectancies and perceived appropriateness of emoji use for positive versus negative text exchanges. Emoticons and emojis are used more prevalently in positive exchanges than negative exchanges (Cramer et al., 2016, pp. 504–509; Derks et al., 2008; Thompson & Filik, 2016) and may be deemed less suitable for negative disclosures. Participants who chose to not use emojis in the interactions may have felt emojis lacked substance or were inappropriate for the interaction. Understanding when emojis are deemed appropriate may inform how their use will influence perceptions of responsiveness and intimacy (Cramer et al., 2016, pp. 504–509). Second, compared to positive events, there was greater variability in how consequential and serious negative events were (e.g., some individuals talked about leaving their student ID at home while others talked about the death of a loved one). Emojis may be beneficial in response to certain negative self-disclosures but may not function similarly across topics of varying levels of severity. Third, there may have been a greater likelihood for participants to misinterpret the meaning behind the responders' emoji use for negative self-disclosures (Miller et al., 2016; Tigwell & Flatla, 2016, pp. 859–866). Emojis can signal less thoughtful consideration of a more serious negative text message conversation (Rodrigues, Lopes, Prada, Thompson, & Garrido, 2017). This supports the contention that context and valence of a conversation are important when considering the potential benefits and drawbacks of using emojis in text messages. It also may be the case that negative events require more immediate feedback and nonverbal representations of support than positive events so texting may not be an ideal way to share negative events.

5.1. Limitations and future directions

This study has several limitations, and this research gives rise to additional important questions that should be investigated to better understand how this commonly used paralinguistic tool functions. It is important to consider that participants may have not used emojis in the way that they typically do in their everyday conversations. Anecdotally, while debriefing participants to the true nature of the study, some commented that they did not use emojis in the way they usually do. People typically use emojis with those they considered close friends and in informal contexts (Tigwell & Flatla, 2016, pp. 859–866). This experimental study could have been viewed as a formal setting and the responder was a stranger, so emojis may not have been deemed appropriate by some participants.

There may be individual differences in emoji use etiquette. For some, emojis may be more appropriate when one does not know an individual well enough for them to recognize their communication style. For others, emojis may be more appropriate for close relationships. Moreover, some unassessed individual difference variables may have played a role in participants' emoji use such as self-monitoring (high self-monitors have more social sensitivity) or extraversion (extraverts are more likely to adapt to interaction partners than introverts) (Giles et al., 1991). Overall, perceptions of emojis require further examination to discern when emojis will and will not be beneficial in text conversations.

Additionally, responders in this study were instructed to not reveal personal information about themselves so participants' impressions of the responder would be based solely on the responder's responsiveness to their self-disclosure. While this reduced noise in the interactions, it could have affected overall perceived responsiveness since reciprocal self-disclosure is an aspect of responsive behavior and is crucial to intimacy development (Reis & Shaver, 1988). Future studies can examine how emoji use affects perceived responsiveness and overall positive perceptions in interactions involving reciprocal self-disclosures.

Further future directions for this research involve testing the effects of discloser and responder emoji use in text interactions for individuals in different types of relationships, with different amounts and contexts of emoji use, and among different demographic groups. Compared to relatively developed relationships, individuals in fledgling relationships have a higher likelihood of saying or doing something that is perceived incorrectly by the responder (Berger & Calabrese, 1975) so social information and clarity of meaning are crucial in initial relationship stages to build intimacy. Future research can compare the association between emoji use and perceived responsiveness for individuals at different (platonic or romantic) relationship stages. On one hand, perceived responsiveness to self-disclosures in ongoing relationships should be more consequential than it was in these brief conversations with strangers. On the other hand, individuals may be more forgiving of less responsive behavior in one interaction if their partner is generally good at being responsive. Overall, testing discloser and responder emoji use among individuals in established relationships may yield different results than what was found in this experiment.

In this experiment, the amount (sheer number of emojis), valence (positive or negative), and type (facial, non-facial) of emoji use did not have significant effects on our outcomes of interest, but they could potentially influence conversation outcomes in longer interactions. Thus, researchers can consider further analyzing the content of emojis, including use of multiple emojis versus single emojis. Adding multiple emojis to a message may not make significant differences to sentiment interpretation (bib_Hu_et_al_2017Hu, Guo, Sun, Thi Nguyen, & Luo, 2017), but an in-depth analysis of the context and valence of

interactions may reveal whether using multiple emojis alters perceptions of interaction partners. There is also evidence that both facial emojis (Ganster et al., 2012; Kaye et al., 2016; Lo, 2008) and non-facial emojis (Riordan, 2017) assist individuals in understanding emotions in text interactions compared to when no emojis are present. As more emojis are added by the Unicode Consortium, it will be up to researchers to continue to understand how and why specific types of emojis are used in CMC.

Texting literacy may also play a role in discerning text messages as responsive. Digital natives (those raised with modern technology from youth) may experience texting differently than their predecessors, who tend to view texting as impersonal, emotionless, and unfriendly (Kiesler, Zubrow, Moses, & Geller, 1985). Generations prior to digital natives have less familiarity with conveying emotions through CMC and may find FtF communication more comfortable and easier to understand (Riordan & Kreuz, 2010). Younger people also tend to have more positive attitudes toward emojis and emoticons than older people (Prada et al., 2018). The current experiment was conducted with college students and the results may not be generalizable to older adults. Future research should be conducted to explore how the interpretation of emojis differs as a function of age.

Finally, women tend to have higher ratings of meaningfulness and clarity for emojis (Rodrigues, Prada, Gaspar, Garrido, & Lopes, 2018) and have been found to use emoticons (Tossell et al., 2012) and emojis (Prada et al., 2018) more than men. The current research found evidence of communication accommodation having stronger effects on perceived responsiveness for women than for men. This effect should be replicated in future research, and accompanied by more detailed assessments of how men and women not only use emojis in text conversations, but how they interpret the use of emojis of others.

5.2. Conclusions

Because perceived responsiveness in everyday interactions is so important to relationship quality (Reis & Shaver, 1988), and so many of our everyday interactions occur through text messaging, it is crucial to understand how people use this medium to self-disclose and communicate responsiveness. The research reported here begins to reveal how individuals can promote perceived responsiveness and connection in CMC. Yet, our comprehension of how people can maintain and improve their relationships with communication that occurs through computer-mediated channels remains limited. Semantics of emoji usage seem to be fairly consistent across languages, so emojis can bridge communication barriers (Barbieri, Kruszewski, Ronzano, & Saggion, 2016, pp. 531–535) and provide more emotional information than words alone (Hogenboom et al., 2013, pp. 703–710). The benefits of emojis have only begun to be explored in this research and the extent of their contribution to the founding and maintenance of relationships remains undiscovered. As our technology continues to evolve, it is imperative that we understand how our ability to communicate intimacy and respond to the needs of others evolves with it.

Declarations of interest

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

No funding was sought for this research. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Acknowledgments

Thank you to Acadia Branch, Stephan Brandt, Andrew Einhorn, Dana Goldberg, Odette Kasavi, Courtney Takats, Gloria Safdieh, and Jonathan Winfield for assisting with data collection on this study.

References

Barbieri, F., Kruszewski, G., Ronzano, F., & Saggion, H. (2016). *October). How cosmopolitan are emojis?: Exploring emojis usage and meaning over different languages with distributional semantics. Proceedings of the 2016 ACM on Multimedia conference*. ACM.

Berger, C. R., & Calabrese, R. J. (1975). Some explorations in initial interaction and beyond: Toward a developmental theory of interpersonal communication. *Human Communication Research, 1*(2), 99–112.

Boyle, A. M., & O'Sullivan, L. F. (2016). Staying connected: Computer-mediated and face-to-face communication in college students' dating relationships. *Cyberpsychology, Behavior, and Social Networking, 19*(5), 299–307.

Brody, N., & Peña, J. (2015). Equity, relational maintenance, and linguistic features of text messaging. *Computers in Human Behavior, 49*, 499–506.

Burgoon, J. K., & Le Poire, B. A. (1999). Nonverbal cues and interpersonal judgments: Participant and observer perceptions of intimacy, dominance, composure, and formality. *Communication Monographs, 66*(2), 105–124.

Byron, K., & Baldridge, D. C. (2007). E-mail recipients' impressions of senders' likability: The interactive effect of nonverbal cues and recipients' personality. *Journal of Business Communication, 44*(2), 137.

Collins, N. L., & Feeney, B. C. (2000). A safe haven: An attachment theory perspective on support seeking and caregiving in intimate relationships. *Journal of Personality and Social Psychology, 78*(6), 1053.

Cramer, H., de Juan, P., & Tetreault, J. (2016, September). *Sender-intended functions of emojis in US messaging. Proceedings of the 18th international conference on human-computer interaction with mobile Devices and Services* (ACM).

Dainton, M., & Aylor, B. (2002). Patterns of communication channel use in the maintenance of long-distance relationships. *Communication Research Reports, 19*(2), 118–129.

Derks, D., Bos, A. E., & Von Grumbkow, J. (2008). Emoticons in computer-mediated communication: Social motives and social context. *CyberPsychology and Behavior, 11*(1), 99–101.

Duggan, M. (2013). *September) Cell phone activities 2013.* Washington, D.C: Pew Internet & American Life Project. Retrieved from http://www.pewinternet.org/2013/09/19/cell-phone-activities-2013/.

Fullwood, C., Orchard, L. J., & Floyd, S. A. (2013). Emoticon convergence in Internet chat rooms. *Social Semiotics, 23*(5), 648–662.

Gable, S. L., Gonzaga, G. C., & Strachman, A. (2006). Will you be there for me when things go right? Supportive responses to positive event disclosures. *Journal of Personality and Social Psychology, 91*(5), 904.

Gable, S. L., Gosnell, C. L., Maisel, N. C., & Strachman, A. (2012). Safely testing the alarm: Close others' responses to personal positive events. *Journal of Personality and Social Psychology, 103*(6), 963.

Gable, S. L., & Reis, H. T. (2010). Good news! Capitalizing on positive events in an interpersonal context. *Advances in Experimental Social Psychology, 42*, 195–257.

Gable, S. L., Reis, H. T., Impett, E. A., & Asher, E. R. (2004). What do you do when things go right? The intrapersonal and interpersonal benefits of sharing positive events. *Journal of Personality and Social Psychology, 87*(2), 228.

Ganster, T., Eimler, S. C., & Krämer, N. C. (2012). Same same but different!? The differential influence of smilies and emoticons on person perception. *Cyberpsychology, Behavior, and Social Networking, 15*(4), 226–230.

Giles, H., Coupland, N., & Coupland, J. (1991). Accommodation theory: Communication, context and consequence. In H. Giles, J. Coupland, & N. Coupland (Eds.). *Contexts of accommodation: Studies in emotion and social interaction* (pp. 1–68). Cambridge: Cambridge University Press.

Hogenboom, A., Bal, D., Frasincar, F., Bal, M., de Jong, F., & Kaymak, U. (2013, March). *Exploiting emoticons in sentiment analysis. Proceedings of the 28th annual ACM Symposium on Applied computing* (ACM).

Hu, T., Guo, H., Sun, H., Thi Nguyen, T. V., & Luo, J. (2017). *Spice up your chat: The intentions and sentiment effects of using emoji.* arXiv preprint arXiv:1703.02860.

Kalyanaraman, S., & Ivory, J. (2006). *The face of online information processing: Effects of emoticons on impression formation, affect, and cognition in chat transcripts. Annual meeting of the international communication association*. Dresden, Germany: Dresden International Congress Centre.

Kato, Y., & Akahori, K. (2005). *Effects of emotional transmissions between senders and recipients on emotions experienced in e-mail communications. Proceedings of World conference on Educational Multimedia*. Hypermedia and Telecommunications.

Kato, Y., Kato, S., & Scott, D. J. (2007). *June). Research on the causal relationship between emotions and emotional transmissions in email communication: Analysis focusing on emotional traits. EdMedia: World conference on Educational media and technology* Association for the Advancement of Computing in Education (AACE).

Kaye, L. K., Wall, H. J., & Malone, S. A. (2016). "Turn that frown upside-down": A contextual account of emoticon usage on different virtual platforms. *Computers in Human Behavior, 60*, 463–467.

Kelly, R., & Watts, L. (2015). *Characterising the inventive appropriation of emoji as relationally meaningful in mediated close personal relationships. Experiences of technology appropriation: Unanticipated users, usage, Circumstances, and Design*.

Kiesler, S., Siegel, J., & McGuire, T. W. (1984). Social psychological aspects of computer-mediated communication. *American Psychologist, 39*(10), 1123.

Kiesler, S., Zubrow, D., Moses, A. M., & Geller, V. (1985). Affect in computer-mediated communication: An experiment in synchronous terminal-to-terminal discussion. *Human-Computer Interaction, 1*(1), 77–104.

Kraut, R. E., Lewis, S. H., & Swezey, L. W. (1982). Listener responsiveness and the coordination of conversation. *Journal of Personality and Social Psychology, 43*, 118–731.
Kruger, J., Epley, N., Parker, J., & Ng, Z. W. (2005). Egocentrism over e-mail: Can we communicate as well as we think? *Journal of Personality and Social Psychology, 89*(6), 925.
Langston, C. A. (1994). Capitalizing on and coping with daily-life events: Expressive responses to positive events. *Journal of Personality and Social Psychology, 67*(6), 1112–1125.
Laurenceau, J. P., Barrett, L. F., & Pietromonaco, P. R. (1998). Intimacy as an interpersonal process: The importance of self-disclosure, partner disclosure, and perceived partner responsiveness in interpersonal exchanges. *Journal of Personality and Social Psychology, 74*(5), 1238.
Liebman, N., & Gergle, D. (2016). *February). It's (not) simply a matter of time: The relationship between CMC cues and interpersonal affinity. Proceedings of the 19th ACM conference on computer-supported cooperative work & social computing*. ACM.
Lo, S. K. (2008). The nonverbal communication functions of emoticons in computer-mediated communication. *CyberPsychology and Behavior, 11*(5), 595–597.
Lu, X., Ai, W., Liu, X., Li, Q., Wang, N., Huang, G., et al. (2016). *September). Learning from the ubiquitous language: An empirical analysis of emoji usage of smartphone users. Proceedings of the 2016 ACM international Joint conference on pervasive and ubiquitous computing*. ACM.
Maisel, N. C., Gable, S. L., & Strachman, A. M. Y. (2008). Responsive behaviors in good times and in bad. *Personal Relationships, 15*(3), 317–338.
Miller, H., Thebault-Spieker, J., Chang, S., Johnson, I., Terveen, L., & Hecht, B. (2016). March). "Blissfully happy" or "ready to fight": Varying interpretations of emoji. *Tenth international AAAI conference on Web and social media*.
Morey, J. N., Gentzler, A. L., Creasy, B., Oberhauser, A. M., & Westerman, D. (2013). Young adults' use of communication technology within their romantic relationships and associations with attachment style. *Computers in Human Behavior, 29*(4), 1771–1778.
Murray, S. L., Holmes, J. G., & Griffin, D. W. (1996). The benefits of positive illusions: Idealization and the construction of satisfaction in close relationships. *Journal of Personality and Social Psychology, 70*(1), 79.
Pettigrew, J. (2009). Text messaging and connectedness within close interpersonal relationships. *Marriage & Family Review, 45*(6–8), 697–716.
Prada, M., Rodrigues, D. L., Garrido, M. V., Lopes, D., Cavalheiro, B., & Gaspar, R. (2018). Motives, frequency and attitudes toward emoji and emoticon use. *Telematics and Informatics*.
Reis, H. T., Clark, M. S., & Holmes, J. G. (2004). Perceived partner responsiveness as an organizing construct in the study of intimacy and closeness. *Handbook of closeness and intimacy,* 201–225.
Reis, H. T., Crasta, D., Rogge, R. D., Maniaci, M. R., & Carmichael, C. L. (2018). Perceived partner responsiveness scale. In D. L. Worthington, & G. D. Bodie (Eds.). *The sourcebook of listening research: Methodology and measures* (pp. 516–521). New York: John Wiley & Sons Inc.
Reis, H. T., & Shaver, P. (1988). Intimacy as an interpersonal process. *Handbook of personal relationships, 24*(3), 367–389.
Reis, H. T., Smith, S. M., Carmichael, C. L., Caprariello, P. A., Tsai, F. F., Rodrigues, A., et al. (2010). Are you happy for me? How sharing positive events with others provides personal and interpersonal benefits. *Journal of Personality and Social Psychology, 99*(2), 311.
Riordan, M. A. (2017). The communicative role of non-face emojis: Affect and disambiguation. *Computers in Human Behavior, 76*, 75–86.
Riordan, M. A., & Kreuz, R. J. (2010). Emotion encoding and interpretation in computer-mediated communication: Reasons for use. *Computers in Human Behavior, 26*(6), 1667–1673.
Rodrigues, D., Lopes, D., Prada, M., Thompson, D., & Garrido, M. V. (2017). A frown emoji can be worth a thousand words: Perceptions of emoji use in text messages exchanged between romantic partners. *Telematics and Informatics, 34*(8), 1532–1543.
Rodrigues, D., Prada, M., Gaspar, R., Garrido, M. V., & Lopes, D. (2018). Lisbon Emoji and Emoticon Database (LEED): Norms for emoji and emoticons in seven evaluative dimensions. *Behavior Research Methods, 50*(1), 392–405.
Scissors, L. E., Gill, A. J., & Gergle, D. (2008). *November). Linguistic mimicry and trust in text-based CMC. Proceedings of the 2008 ACM conference on Computer supported cooperative work*. ACM.
Shaw, L. H., & Gant, L. M. (2002). In defense of the Internet: The relationship between Internet communication and depression, loneliness, self-esteem, and perceived social support. *CyberPsychology and Behavior, 5*(2), 157–171.
Skovholt, K., Grønning, A., & Kankaanranta, A. (2014). The communicative functions of emoticons in workplace E-mails: :-). *Journal of Computer-Mediated Communication, 19*(4), 780–797.
Thompson, D., & Filik, R. (2016). Sarcasm in written communication: Emoticons are efficient markers of intention. *Journal of Computer-Mediated Communication, 21*(2), 105–120.
Tigwell, G. W., & Flatla, D. R. (2016). *September). Oh that's what you meant!: Reducing emoji misunderstanding. Proceedings of the 18th international conference on human-computer interaction with mobile Devices and Services Adjunct*. ACM.
Tossell, C. C., Kortum, P., Shepard, C., Barg-Walkow, L. H., Rahmati, A., & Zhong, L. (2012). A longitudinal study of emoticon use in text messaging from smartphones. *Computers in Human Behavior, 28*(2), 659–663.
Wall, H. J., Kaye, L. K., & Malone, S. A. (2016). An exploration of psychological factors on emoticon usage and implications for judgement accuracy. *Computers in Human Behavior, 62*, 70–78.
Walther, J. B. (1996). Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication Research, 23*, 1–43.
Walther, J. B. (1997). Group and interpersonal effects in international computer-mediated collaboration. *Human Communication Research, 23*(3), 342–369.
Walther, J. B., & Parks, M. R. (2002). *Cues filtered out, cues filtered in. Handbook of interpersonal communication*.