



Article

Emoji, Speech Acts, and Perceived Communicative Success

Journal of Language and Social Psychology
2024, Vol. 43(1) 83–103
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DOI: 10.1177/0261927X231200450
journals.sagepub.com/home/jls



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Abstract

Unlike prior research examining how emoji communicate emotions and modify intended meanings, the present research examined whether emoji can perform specific speech acts (remind, etc.), and how well users are able to accurately assess their ability to do so. In four experiments senders were asked to assume that they would send a specific emoji to perform a certain speech act, or to choose which emoji they would use to perform that speech act. Senders and receivers indicated their judgments of communicative success (i.e., that the receiver would recognize the speech act being performed). In two studies, receivers also made judgments regarding the intended meaning of the emoji. Participants judged receivers to be likely to recognize the intended meaning conveyed with an emoji, and there was some evidence of communicative success. However, participants significantly overestimated communicative success, and in all studies, receivers were more optimistic about communicative success than were senders.

Keywords

emoji, speech acts, miscommunication, communication accuracy, experimental pragmatics

According to speech act theorists (Searle, 1969), when people use language, they are frequently performing actions with their words (e.g., blaming, bragging, boasting, etc.). Performing actions is not limited to language, however. For example, a refusal, in response to a request, can be performed nonverbally, by shaking one's

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head back and forth. In fact, such nonverbal actions may be the precursors to the acquisition of performative language. With the emergence of digital communication (texting, emailing, etc.) there are now emblems, in particular emoji, which may also function as nonlinguistic means for performing speech acts. Although this possibility has been noted (dos Reis et al., 2018; Ge & Herring, 2018), it has yet to be extensively investigated. In addition, the successful use of a symbolic system (i.e., emoji) to communicate requires interactants to coordinate and engage in perspective taking (Clark, 1996). Whether this occurs when people use emoji is unknown. In this research I examined several issues regarding these facets of emoji communication. First, I examined beliefs about whether emoji, when used alone (i.e., without any accompanying text), could perform specific speech acts (Studies 1–4), as well as the success that people have in doing so (Studies 3 and 4). Second, I investigated whether people are accurate in judging their communicative success when using emoji (Experiments 3 and 4). Third, I examined the possibility of sender–receiver asymmetry in judgments of communicative success (Studies 1–4).

Functions of Emoji

In face-to-face communication there are a range of paralinguistic and gestural features that can facilitate recognition of a speaker's intended meaning and help initiate repair sequences when miscommunication occurs. Facial expressions, for example, can play a critical role in the successful recognition of certain speech acts (Domaneschi et al., 2017). Such features are lacking in digital communication, however, and this increases the likelihood of miscommunication in these modalities. In fact, people do report higher levels of miscommunication when texting relative to face-to-face communication or phone calls (Johnson et al., 2016; Kelly et al., 2012).

The use of emblems such as emoticons and emoji and shortened expressions (e.g., LOL) have emerged as substitutes for the nonverbal behaviors that occur in face-to-face communication. Of these, emoji have become the most popular. Over 20% of all tweets include an emoji, and over five billion and 60 billion emoji are used daily on Facebook Messenger and Facebook, respectively (<https://emojipedia.org/stats/>). Emoji most frequently represent faces and facial expressions (e.g., 😊), but also include gestures (e.g., 🙌) as well as a wide range of objects (see Bai et al., 2019 for a review). Currently, there are well over 3,000 emoji, all of which can be seen at the Unicode consortium page <https://unicode.org/emoji/charts/full-emoji-list.html>.

As substitutes for nonverbal behavior, a primary function of emoji is to complement text and modify the senders' intended meaning. For example, Holtgraves and Robinson (2020) demonstrated that emoji can facilitate comprehension of indirect replies that are intended to convey negative information. In these experiments, participants were more likely to endorse a conveyed indirect meaning, and to comprehend that meaning more quickly, when it contained an emoji than when it did not contain an emoji. Importantly, this effect occurred when the message contained only an emoji (and no text). In this case, the emoji-only message served as a reply and was interpreted as a

violation of the relation maxim (Grice, 1975), thereby communicating face-threatening information.

Other research has demonstrated how emoji and emoticons may aid in the communication of sarcasm and irony. Filik et al. (2016) demonstrated that intended literal messages were more likely to be perceived as sarcastic when the message included emoticons. Also, when the intended meaning was ambiguous, including an emoticon (wink emoticon) increased the likelihood of sarcastic intent being recognized. Relatedly, other research has demonstrated that emoji and emoticons can serve to modulate the valence of message. Riordan (2017a, 2017b) demonstrated that including an emoji (face or nonface emoji) in a message can reduce perceived ambiguity of the message, and increase interpretation confidence, in addition to influencing judgments of conveyed affect, especially positive affect. In a related vein, some researchers have argued that emoji can serve a politeness function and can be used to symbolically attend to interactants' face (i.e., image) when performing face-threatening speech acts (Togans et al., 2021). Hence, in much the same way as deferential nonverbal behavior can soften the threat of a request, including an emoji can lessen the threat of a face-threatening message.

Although emoji can facilitate communication, other research has demonstrated considerable ambiguity in how emoji are interpreted, both between people and between platforms (e.g., Tigwell & Flatla, 2016). Miller et al. (2016), for example, found that when participants rated the same emoji rendering, 25% of the time they disagreed on whether the conveyed sentiment was positive, neutral, or negative. As well, Miller et al. (2017) demonstrated that surrounding text does not reduce the ambiguity of emojis. Berengueres and Castro (2017) investigated discrepancies between writers and readers of text in terms of the emotional valence of a text containing emoji. In general, readers interpreted emoji more positively than did the writers, an effect that was particularly large for negative emoji (on average, readers underestimated the negativity of the writer's negative emotion by 26%). Riordan (2017a, 2017b) has demonstrated that facial expressions are more prone to misinterpretations than other types of emojis.

Emoji, Speech Acts, and Intentionality

Using an emoji is (usually) an ostensive behavior, that is, a behavior that signals an intention to communicate something. Critical here, is the importance of communicative intentions (Grice, 1989; see also Sperber & Wilson, 1995). Specifically, in performing a communicative act, the speaker intends to elicit from the recipient a particular reaction, as well as a recognition that this reaction was intended by the speaker. Speech acts are intentional in just this way and are defined here as intentional communicative acts that people can perform with their conversational turns (for recent reviews of speech act theory, see Levinson, 2017; Harris et al., 2018). According to Grice (1989), however, communicative acts can be performed without language; any observable behavior, linguistic or otherwise, can serve as a vehicle for conveying speaker meaning. Hence, it is possible that emoji can function as intentional communicative acts.

Consistent with this idea, Ge and Herring (2018) conducted analyses of emoji use on the popular Chinese social media platform Sina Weibo. In an extensive analysis of posts from that site, these authors concluded that emoji sequences do function much like stand-alone utterances and express speech acts. In this corpus study, the authors were able to categorize over 95% of emoji sequences as distinct speech acts (e.g., claim, thank, congratulate, etc.). In a similar vein, Escoufflaire (2021) conducted a corpus study of emoji use and concluded that emoji can be used to convey specific speech acts, as well as performing a variety of other functions (e.g., referential, relational, etc.). In short, these studies suggest that the role played by emoji is more complex than simply expressing feeling.

Other researchers have attempted to develop emblems (emoji and emoticons) designed specifically for the purpose of communicating intentions (dos Reis et al., 2018). These researchers recruited participants to assist them in the development of emblems which they term *intenticons*. Using the speech act concept of illocutionary force (Searle, 1969), as well as other pragmatic dimensions (time, mode, etc.), they created emblems to perform a wide range of speech acts or illocutionary classes (e.g., wish, assertion, proposal, etc.). A control set of emoticons also were selected based on the judgments of designers. Both the control and created sets then were evaluated by a group of participants in terms of the extent to which they were representative of each of the illocutionary classes. With only two exceptions (contrition and evaluation), the intenticons were judged to be significantly more representative than the non-participatory control set.

The research of Ge and Herring (2018), dos Reis et al. (2018), and Escoufflaire (2021) suggest that in addition to modulating the meaning of a text, communicating emotions, or softening the implied threat of a message, it is possible that emoji also can perform specific, identifiable speech acts (e.g., request, criticize, etc.).

Communicator Overconfidence

If emoji can be used to perform speech acts, to what extent are communicators aware of their success at being able to do this? More specifically, if a person chooses to use a particular emoji to perform a specific speech act, how accurate are they at judging whether the receiver will correctly recognize the intended speech act? And from the receiver's perspective, how accurate are they at judging whether they have successfully recognized the speech act intended to be performed with the emoji?

Prior research suggests that people generally overestimate the extent to which their intentions are visible to others (Gilovich et al., 1998; Savitsky & Gilovich, 2003). This suggests that people may assume their intended communicative meanings are more visible than they really are. Evidence exists for such a bias. For example, Keysar and Bly (1995) asked participants to estimate whether others would recognize the meaning of an obscure idiom, after they had just been made aware of the meaning of that idiom. Participants significantly overestimated the extent to which others would be able to correctly interpret the idiom, termed a transparency of meaning effect. In a different study, Keysar and Henley (2002) examined the interpretation of

syntactically ambiguous sentences. Participants were told to speak a syntactically ambiguous sentence so as to direct the hearer to a particular unambiguous interpretation. Speakers (but not overhearers) overestimated the extent to which they had successfully done so. Both studies demonstrate that speakers significantly overestimate communicative success, in this case, an overestimation of a recipient's ability to recognize an intended meaning.

If speakers overestimate their communicative success, it seems likely that such an effect will occur as well when people communicate in the digital realm. Keysar (2007) argued that people generally are not sensitive to the communication difficulties that might arise through the use of different media, and in a series of experiments Kruger et al. (2005) investigated this possibility with email communications. They had participants convey various tones, primarily sarcasm but also humor (Study 5) and other emotions as well (Study 3). The general procedure was for senders to communicate a message and to indicate their confidence that their intended meaning would be successfully recognized by the recipient. In Studies 2–5 the messages were conveyed either by speaking or by email. The general pattern of results was that senders were more successful communicating messages by speaking than with email, but there was no difference in communicator confidence across modality. Hence, senders were more overconfident when communicating by email than by speaking. These findings are interpreted as reflecting communicator egocentricity, a bias that is particularly pronounced when communicating via email. In other words, because interactants know what they intend to communicate, they overestimate the extent to which recipients will be able to recognize their intended meaning. The lack of a non-verbal channel in email increases this bias.

Present Research

I conducted four studies to examine whether people can use emoji to perform speech acts, and the extent to which users (i.e., senders and receivers) accurately assess their ability to do so. In all experiments, senders were asked to either assume that they would send a specific emoji to perform a specific speech act, or to choose from a limited set of emoji which emoji they would use to perform a specific speech act, and to then to provide ratings regarding their belief that a receiver would recognize the speech act being performed with the emoji. Receivers, working independently, provided parallel ratings regarding their beliefs about the likelihood that a sender would be using an emoji to perform a specific speech act, and in Experiments 3 and 4 they made judgments regarding the intended meaning of the emoji, thereby providing a means of assessing communicative accuracy.

Based on Ge and Herring's (2018) analyses of emoji use on Sina Weibo, as well the intencion research of dos Reis et al. (2018), I expected participants (both senders and receivers) in Experiments 1 and 2 to judge the likelihood of using a single emoji to perform a speech act to be relatively high (i.e., greater than the scale midpoint). As well, when communication accuracy was assessed (Experiments 3 and 4), I expected to observe, consistent with Kruger et al. (2005), communication overconfidence; that

is, the estimates of communicative success of both senders and receivers would be significantly greater than actual communication success. Finally, although I expected both senders and receivers to be overconfident, I expected this effect to be greater for receivers than for senders. Prior research on communication overconfidence has focused primarily on the sender (or speaker) and has demonstrated that speakers overestimate their communicative success. In contrast to senders, however, receivers are in the position of judging an action that has already occurred, and as a result, are likely to be subject to the hindsight bias (Bernstein et al., 2012; Lange et al., 2011); that is, a tendency to overestimate the likelihood of an action occurring (e.g., performing a speech act with an emoji) after it has occurred. In contrast, senders, while also overconfident, are in a less certain position because they are making judgments about the future. Hence, in all four experiments I expected to observe greater overconfidence from receivers relative to senders.

All experiments were approved by the Ball State University Institutional Review Board. All experimental materials are available at <https://osf.io/fvu3x> and all data are available at <https://osf.io/sxqbw>. The target sample size for all experiments was 100. Sensitivity power analyses (power = .80, alpha = .05, $N = 100$) indicated that these experiments were able to detect median effects sizes ($d = .50$). The first two experiments were conducted on Amazon Mechanical Turk, with participant screening set to include only U.S. workers with an approval rate greater than 95%; participants were prohibited from participating in more than one of these studies.

Study 1

Experiment 1 was an initial experiment designed to assess the likelihood estimates of senders and receivers regarding successful emoji speech act performance, and to test the hypothesis that senders would judge the likelihood of successful communication to be greater than that judged by receivers.

Method

Participants. One hundred and one participants were recruited from MTurk and paid \$1.00 for their participation. Seven participants failed the attention check item and were excluded from all analyses. Reported analyses are based on the remaining 94 participants (58 males; 35 females; 1 preferred not to say). Participants ranged in age between 23 and 70 ($M = 35.55$; $SD = 9.53$).

Materials. Twelve scenarios were created in which one person (the sender) is planning to send a text message consisting of a single emoji to another person (the receiver). Each scenario/message was designed to convey a specific speech act. There were three each of the following four speech act categories: assertive (agree, accuse, and remind), commissive (promise, refuse, accept [offer]), directive (warn, beg, and ask), expressive (thank, condole, and congratulate). Below is the sender and receiver

versions for the “agree” speech act (sample scenarios for each speech act category are presented in the Appendix; all materials are available at <https://osf.io/sxqbw>).

Agree—Sender. You have a friend with whom you often discuss current topics, and one day your friend states their belief that animals should not be used in medical experiments. The next day, you decide that you agree with your friend’s position. So, to **agree** with them, you send them this emoji 👍 indicating that you agree with them.

Agree—Receiver. You have a friend with whom you often discuss current topics, and one day you state your belief that animals should not be used in medical experiments. The next day, your friend sends you the following text: 👍

Research assistants (between three and five) nominated emoji for each speech act, and the most frequently nominated emoji was chosen for each scenario. There was 100% agreement for seven scenarios, 75% agreement for four scenarios, and 66.66% agreement for one scenario. Sample emoji are presented in the Appendix; all emoji can be seen at <https://osf.io/sxqbw>.

Procedure. Participants completed the study on Qualtrics and were randomly assigned to either the sender or receiver condition. They were asked to read each scenario and respond to the speech act likelihood item that followed. Senders were asked to indicate the likelihood (1 = *Extremely unlikely* to 9 = *Extremely likely*) that your friend would recognize that you are “insert speech act here.” Receivers were asked to indicate the likelihood (1 = *Extremely unlikely* to 9 = *Extremely likely*) that your friend is saying they are “insert speech act here.” For example, for the agree scenario, senders were asked to indicate the likelihood that your friend would recognize that you are saying you agree with them; receivers were asked to indicate the likelihood that your friend is saying that they agree with you. One attention check scenario was included (“Mark 8 to show that you are paying attention”). The thirteen scenarios were presented in a random order. The procedure took less than 10 min.

Results and Discussion

Preliminary analyses were conducted that included participant gender and age (median split) in the model. There were no significant main effects or interactions for these variables (all $p > .10$), and they were dropped from the model (analyses that include these variables are available online at <https://osf.io/k834a>). The mean speech act likelihood rating (collapsing over senders and receivers) was 6.65 ($SD = 1.08$), and a one-sample t-test indicated that this was significantly greater than the scale midpoint of 5, $t(93) = 14.83$, $p < .001$. Separate tests for senders and receivers indicated that the mean speech act likelihood rating was significantly greater than the scale midpoint for both senders ($M = 6.34$, $SD = 1.02$, $t(48) = 9.23$, $p < .001$) and receivers ($M = 6.99$, $SD = 1.05$, $t(44) = 12.64$, $p < .001$). Overall, then, the use of these emoji (alone) to perform specific speech acts was judged to be plausible.

To examine whether the difference between senders and receivers was significant, the speech act likelihood ratings were analyzed with a generalized linear mixed model

(gamma distribution and log link) with perspective (sender vs. receiver) as a fixed effect and participant and scenario as random effects. In this analysis, the ratings of speech act likelihood were significantly greater for receivers ($M=7.028$, $SD=2.122$) than for senders ($M=6.344$, $SD=2.294$), $F(1, 1,195)=9.46$, $p=.002$.¹ Hence, as expected, receivers were more likely to believe the emoji performed the speech act than were senders.

Study 2

In Study 1, the senders were told to assume they would use each emoji, and hence the likelihood that they would use each emoji was not assessed. The procedure for Experiment 2 was the same as in Study 1, except for the addition of an item designed to assess the extent to which senders would be likely to use each emoji to perform each speech act.

Method

Participants. One hundred and two participants were recruited from MTurk and paid \$1.00 for their participation. Ten participants failed the attention check item and were excluded from all analyses. Reported analyses are based on the remaining 92 participants (62 males; 29 females; 1 nonbinary). Participants ranged in age between 20 and 69 ($M=36.55$; $SD=11.61$).

Materials and procedure. The study was hosted on Qualtrics, and the materials and procedure (including the attention check scenario) were identical to Experiment 1 except for two changes. For each scenario, senders first indicated the likelihood (1 = *Extremely Unlikely* to 9 = *Extremely Likely*) that they would use the emoji to perform that speech act. Then, senders responded to the speech act likelihood item that had been reworded to: If you would send this emoji, how likely is it that the recipient would recognize that you are “insert speech act here.”

Results and Discussion

Preliminary analyses were conducted that included participant gender and age in the model. There were no significant main effects or interactions for these variables (all $p > .10$) and they were dropped from the model (analyses that include these variables are available online at <https://osf.io/k834a>).

The mean speech act likelihood rating (collapsing over senders and receivers) was again high ($M=6.706$; $SD=1.159$), and a one-sample t-test indicated that it was significantly greater than the scale midpoint of 5, $t(91)=14.121$, $p<.001$. Separate tests for senders and receivers indicated that the mean speech act likelihood rating was significantly greater than the scale midpoint for both receivers ($M=7.204$, $SD=0.85$) $t(43)=17.194$, $p<.001$) and senders ($M=6.250$, $SD=1.223$, $t(47)=7.084$, $p<.001$). Hence, participants again found it plausible to use these emoji to perform certain speech acts.

To examine sender–receiver asymmetry in perceived likelihood, speech act likelihood ratings were analyzed with a generalized linear mixed effects model (gamma distribution and log link) with perspective (sender vs. receiver) as a fixed effect and participant and scenario as random effects. The likelihood rating for receivers ($M=7.262$; $SD=1.888$) was significantly higher than that for senders ($M=6.381$; $SD=2.404$), $F(1, 11.81)=18.289$, $p<.001$.¹ Hence, as in Experiment 1, receivers were more likely to believe the emoji performed the speech act than were senders.

For each scenario, senders also indicated the likelihood that they would use each emoji to perform the associated speech act. The mean likelihood of use for senders ($M=5.491$, $SD=1.711$) was significantly greater than the midpoint of the scale, $t(47)=1.989$, $p=.026$ (one-tailed). As well, there was a significant positive relationship between senders' likelihood of use ratings and their judgments that the receiver would recognize the intended meaning ($r(48)=.758$, $p<.001$). In other words, the more likely they were to use the emoji, the more likely they were to believe that the recipient would recognize the intended meaning.

Study 3

The extent to which interactants successfully communicated with emoji was not examined in the first two experiments. In Experiment 3 this issue was addressed by asking receivers to attempt to identify the speech act being performed with each emoji. In addition, senders and receivers were asked to respond to an Yes/No item assessing their judgment of communicative success, that is, whether the recipient would (for sender) or did (for receiver) correctly recognize the performed speech act. Finally, senders indicated their confidence that the receiver would recognize the intended speech act, and receivers indicated their confidence that they had correctly interpreted the message.

Method

Participants. Participants ($N=101$) were recruited from an undergraduate subject pool and randomly assigned to be either a sender or receiver. Participants received partial course credit for their participation. One participant failed the attention check and was excluded from all analyses. Reported analyses are based on the remaining 100 participants (82 females; 17 males; 1 nonbinary). Participants ranged in age between 18 and 23 ($M=18.77$; $SD=1.08$).

Materials. The study was hosted on Qualtrics, and the scenarios and emoji were the same as those used in Experiments 1 and 2.

Procedure. Participants were randomly assigned to either the sender or receiver condition. After reading each scenario, senders indicated: (1) whether they thought the recipient of the text message would recognize the intended speech act (1 = *Yes*; 2 = *No*) and (2) and their confidence that the recipient would recognize the intended speech act

(1 = *Extremely unconfident* to 9 = *Extremely confident*). Receivers were first asked to interpret the message/emoji by choosing from a list of 32 different speech acts. The list of speech acts was chosen from prior research (Holtgraves, 2021) and included an equal number of directives, expressives, commissives, and assertives. Receivers also indicated: (1) whether they thought they had correctly interpreted the message (1 = *Yes*; 2 = *No*) and (2) and their confidence that they had correctly interpreted the intended message (1 = *Extremely unconfident* to 9 = *Extremely confident*). Attention check scenarios were included for both the senders (“Choose 9 to show you are paying attention”) and the receivers (“Choose the interpretation ‘bragging’ to show that you are paying attention”). The 13 scenarios were presented in a random order.

Results and Discussion

Preliminary analyses were conducted that included participant gender in the model. There were no significant main effects or interactions with these variables (all $p > .10$) and they were dropped from the model (analyses that include these variables are available online at <https://osf.io/k834a>).

Receivers correctly identified the intended meaning 62.76% ($SD = 14.6\%$) of the time. A one-sample t-test indicated that this rate far exceeded chance recognition (1 out of 32 or 3%), $t(48) = 28.57$, $p < .001$. I then conducted one-sample t-tests to compare sender and receiver judgments of communicative success (i.e., whether they believed the receiver would correctly recognize the intended speech act) to actual communicative success (i.e., whether the receiver did correctly recognize the intended speech act). These comparisons indicated that senders ($M = 72.22\%$, $SD = 15.24\%$) estimated communicative success to be greater than actual communicative success ($M = 62.76\%$), $t(50) = 4.32$, $p = .001$. Likewise, receivers ($M = 93.20\%$, $SD = 10.02\%$) judged communicative success to be higher than actual communicative success ($M = 62.76\%$), $t(48) = 21.103$, $p < .001$. Hence, both senders and receivers estimated communicative success to be greater than it was.

Even though participants overestimated communicative success, it is possible that their judgments were related to actual communicative success. It was not possible to examine this issue for senders because their judgments were not paired with receivers' actual performance. It was, however, possible to examine this issue for receivers. To do this, I conducted log-linear generalized mixed effects models (binomial distribution with logit function) in which communicative success was treated as the dependent variable and analyzed with either receiver judgment of communicative success or receiver confidence as a fixed effect, and participant and scenario as random variables. Receiver confidence was significantly and positively ($b = .434$) related to communicative success, $F(1, 586) = 30.70$, $p < .001$. Similarly, receiver judgment of communicative success was significantly and positively ($b = 2.154$) related to communicative success, $F(1, 584) = 15.43$, $p < .001$. Hence, although receivers overestimated the extent to which they correctly recognized the intended speech act, their judgments and confidence were significantly related to their actual recognition performance.

Finally, to examine sender–receiver asymmetry, I conducted separate analyses of confidence ratings and communicative success judgments. For the judgment of communicative success variable, I conducted a log-linear generalized mixed effects model (binomial distribution and a logit function) that included perspective (sender vs. receiver) as a fixed effect and participant and scenario as random effects. Senders' estimates of communicative success ($M = 72.22\%$, $SD = 15.24\%$) were significantly lower rate than receivers' estimates of communicative success ($M = 93.20\%$, $SD = 10.02\%$), $F(1, 1,196) = 56.744$, $p < .001$. For the confidence variable I conducted a generalized linear mixed model (gamma distribution with a log link function) and included perspective (sender vs. receiver) as a fixed effect and participant and scenario as random effects. Receivers were significantly more confident in their judgment of the meaning ($M = 7.440$, $SD = 1.75$) than were senders ($M = 5.926$, $SD = 2.553$), $F(1, 1,198) = 58.168$, $p < .001$. Overall, then, receivers were more likely to believe that they correctly recognized the intended speech act, and were more confident that they had done so, than were senders.

Study 4

In prior experiments, the senders did not choose which emoji to use. In contrast, in this experiment senders were given a choice of which emoji to send to perform each speech act. A separate group of receivers then judged the conveyed meaning for each emoji created by one sender. Both judgments of communicative success and confidence were assessed as in Experiment 3. Again, I expected judgments of communicative success to exceed actual communicative success. I also expected receivers to produce higher estimates of communicative success and display greater confidence than the senders.

Method

Participants. All participants ($N = 98$) were recruited from an undergraduate subject pool and received partial course credit for their participation. The first set of participants ($N = 46$) served as the senders. After their data had been collected, their responses were presented to a different group of participants who served as the receivers ($N = 52$). The responses of one sender were not seen by a receiver, and the responses of seven senders were seen by two receivers. In the former situation the senders' data was excluded. For the latter situation, one receiver (of the two) was randomly selected for inclusion. This resulted in a complete set of 45 sender (11 males, 33 females, 1 non-binary)— receiver (12 males, 33 females) dyads. Sender participants ranged in age between 18 and 25 ($M = 18.73$; $SD = 1.341$). Receiver participants ranged in age between 18 and 22 ($M = 18.80$; $SD = .910$).

Materials and procedure. The study was hosted on Qualtrics, and the scenarios were the same as those used in Experiment 3. However, senders were asked to choose which emoji to use (out of four) to perform the specific speech act. The four emoji for

each scenario always included the critical emoji used in the other experiments; the three additional emoji were those most frequently nominated by three research assistants (the four emoji options for four scenarios are presented in the Appendix; all emoji can be seen at <https://osf.io/sxqbw>). After choosing which emoji to use, senders indicated (as in Experiment 3) whether they thought the receiver would recognize the intended speech act (Yes/No) as well as their confidence (on a nine-point scale) that the receiver would recognize the speech act. The responses (i.e., emoji choice) of each sender were then presented to a single receiver. The situation for the receiver was identical to that of receivers in Experiment 3, except that the emoji that they judged was the one that had been selected by the sender with whom they had been paired. Receivers choose what they believed to be the intended meaning of the emoji (from the list of 32 speech acts) and indicated whether they thought they had correctly identified the speech act (Yes/No) as well as their confidence (on a nine-point scale) that they had successfully identified the conveyed speech act. Attention check scenarios were included for both the senders (“Choose 9 to show you are paying attention”) and the receivers (“Choose the interpretation ‘bragging’ to show that you are paying attention”). The 13 scenarios were presented in a random order.

Results and Discussion

Initial analyses were conducted that included participant gender (separately for sender and receiver) in the model. When there were significant main effects or interactions involving these variables, the presented results include them as fixed effects in the models. When there were no significant effects for these variables, they were dropped from the reported analyses (analyses that include these variables are available online at <https://osf.io/k834a>).

Receivers correctly identified the intended meaning 59.8% ($SD = 15.8\%$) of the time, similar to the accuracy rate in Experiment 3 (62.8%). A one-sample t-test indicated that this rate exceeded chance recognition (one out of 32 or 3%), $t(44) = 24.187, p < .001$.

I then conducted one-sample t-tests to compare sender and receiver judgments of communicative success to actual communicative success. As in Experiment 3, both senders ($M = 89.8\%$; $SD = 12.0\%$) and receivers ($M = 91.6\%$; $SD = 11.4\%$) estimated communicative success to be higher than *actual* communicative success ($M = 59.9\%$), $t(44) = 18.593, p < .001$ for receivers and $t(44) = 16.674, p < .001$ for senders.

To explore differences between senders and receivers in their judgments of communicative success and confidence, I conducted separate analyses of confidence ratings and judgments of communicative success. For the confidence variable I conducted a generalized linear mixed model (gamma distribution with a log link function) and included perspective (sender vs. receiver), sender gender, and receiver gender as fixed effects, and participant and scenario as random effects. The only significant effect was a Perspective by Receiver Gender interaction, $F(1, 1,071) = 11.987, p < .001$ (all analyses are available at <https://osf.io/k834a>). Follow-up simple effects tests indicated that receivers ($M = 7.319$; $SD = 2.137$) were significantly more confident

than senders ($M = 6.535$; $SD = 2.085$) when the receiver was male, $F(1, 286) = 13.772$, $p < .001$, but senders ($M = 7.00$; $SD = 1.787$) and receivers ($M = 7.043$; $SD = 2.077$) did not differ when the receiver was female, $F(1, 789) = .023$, $p = .881$.

For the judgment of communicative success variable, I conducted a log-linear generalized mixed effects model (binomial distribution and a logit function) that included perspective (sender vs. receiver), sender gender, and receiver gender as fixed effects, and participant and scenario as random effects. The only significant effect was a Perspective by Receiver Gender interaction, $F(1, 1,072) = 9.225$, $p = .002$ (all effects are available at <https://osf.io/k834a>). Follow-up simple effects tests indicated that receivers estimated that they would be correct ($M = 94.44\%$, $SD = 22.99\%$) at a higher rate than senders ($M = 84.03\%$, $SD = 36.76\%$) when the receiver was male, $F(1, 286) = 8.511$, $p = .004$. The difference between senders ($M = 91.92\%$, $SD = 27.89\%$), and receivers ($M = 90.40\%$, $SD = 29.49\%$) was not significant when the receiver was female, $F(1, 790) = .632$, $p = .427$.

Finally, I examined, on a by-trial basis, the relationship between participants' judgments of communicative success and actual communicative success, as well as the relationship between their confidence ratings and actual communicative success. In other words, were the judgments of communicative success and confidence ratings of senders and receivers related to actual communicative success? To do this, I conducted analyses in which communicative success was treated as the dependent variable and analyzed with a log-linear generalized mixed effects models (binomial distribution with logit function), the first including sender confidence and receiver confidence as fixed effects, and the second including sender and receiver judgment of communicative success as fixed effects. Both models included participant and scenario as random variables. Sender confidence was not related to communicative success, $F(1, 535) = .193$, $p = .661$, but receiver confidence was significantly and positively ($b = .509$) related to communicative success, $F(1, 524) = 48.948$, $p < .001$. Similarly, sender judgments of communicative success were not related to communicative success, $F(1, 525) = .169$, $p = .681$, but receiver judgments of communicative success were significantly and positively ($b = 2.15$) related to actual communicative success, $F(1, 525) = 18.254$, $p < .001$. Hence, the results for receivers parallel the results for receivers observed in Study 3.

General Discussion

The present research was designed to investigate several issues regarding emoji communication. The first issue was whether emoji, when used alone, can perform specific speech acts. Prior research has suggested this is possible. For example, Ge and colleagues (Ge & Gretzel, 2018; Ge & Herring, 2018) demonstrated that sequences of emoji in social media posts can be interpreted by analysts as performing specific speech acts. These researchers did not, however, demonstrate this communicative function from the viewpoint of actual communicators. Other researchers (dos Reis et al., 2018) have taken a different approach and attempted to develop a scheme of emblems (emoji and emoticons) that can be used for the communication of intentions

(or speech acts). Their primary dependent measures, however, were judgments of representativeness, and not the actual performance of speech acts as judged by senders and receivers.

It appears, then, that the present research is the first experimental demonstration of the use of emoji to perform speech acts. This was demonstrated via both judgments and performance. First, the judgments provided by participants in these experiments demonstrate that people do believe that emoji can be used to perform specific speech acts. Senders in Experiment 2 indicated that they would be likely to use emoji to communicate specific speech acts, and in Experiments 1 and 2 senders judged it to be highly likely that receivers would recognize the speech act conveyed with an emoji. Receivers agreed, and in Experiments 1 and 2 they judged it to be highly likely that senders were communicating a specific speech act with these emoji. Not only did senders and receivers believe that emoji could perform specific speech acts, the results of Experiments 3 and 4 demonstrated that these beliefs are, to a certain extent, based in reality as participants were able to successfully convey and recognize speech acts performed with emoji at a rate that far exceeded chance (i.e., 3%) in both Experiments 3 (62%) and 4 (59%).

The second issue examined in this research, and one that is a direct extension of the first issue, is whether people can judge accurately their ability to successfully perform speech acts with emoji. Even though participants indicated that they could successfully communicate specific intentions with emoji, and even though there was evidence of their ability to do so, there was also evidence for systematic overconfidence in this regard. That is, both senders and receivers displayed overconfidence in the receivers' ability to correctly identify the speech act intended to be communicated with an emoji. This overconfidence was dramatic in Experiment 3 when both senders (72%) and receivers (93%) substantially overestimated actual communicative success (63%). This effect was even greater in Experiment 4 when senders were given the option of choosing which emoji to use; both senders (90%) and receivers (92%) substantially overestimated communicative success (60%).

One relevant comparison for this overconfidence effect is Kruger et al.'s (2005) study of email communication. In that study, participants' estimates of communicative success (78% to 97%) exceeded their actual communicative success (56% to 84%) at a rate fairly similar to what was observed in the present experiments. Note, however, that in the Kruger et al. (2005) experiments, participants were communicating sarcasm and humor via email, using only text (i.e., no emoji or emoticons). Riordan and Trichtinger (2017) also examined the communication of emotions via email but allowed senders to include emoji in their messages. Their participants also demonstrated significant overconfidence in the successful communication of emotions. These similar patterns suggest the existence of a fairly general principle.

Even though participants in the present experiments overestimated communicative success, there was also evidence that their judgments were not totally independent of actual communicative success. That is, the confidence and judgments of communicative success of receivers were significantly higher when they correctly identified the intended speech act, an effect that occurred in both Experiments 3 and 4.

Importantly, however, it did not occur for senders in Experiment 4 (the only experiment for which it was possible to examine this relationship for senders). In that experiment, the confidence and judgments of communicative success of senders were independent of whether the recipient recognized the intended speech act performed with the emoji. Receivers, of course, have an advantage because they are judging their own accuracy; senders, on the other hand, are judging the accuracy of someone else. Still, it is noteworthy that senders were unable to judge the likely success of their messages.

The third issue examined in this research was a sender–receiver asymmetry in overconfidence. Prior research on communication overconfidence (e.g., Keysar & Henley, 2002) has focused primarily on the sender (or speaker). Although the present results did demonstrate sender overconfidence, it was receivers who displayed the most overconfidence. In Experiments 1 and 2, receivers judged communicative success to be more likely than did senders, and in Experiment 3, judgments of communicative success were significantly (and incorrectly) higher for receivers than for senders. This asymmetry occurred in Experiment 4 as well, but only when the receiver was male. One possible interpretation of this receiver–sender asymmetry in confidence and judgment of communicative success is that receivers are displaying something akin to the hindsight bias (Bernstein et al., 2012; Lange et al., 2011), that is, a tendency to overestimate the likelihood of an action occurring (e.g., performing a speech act with an emoji) after it has occurred. It is important to note, however, that receivers are not completely biased because their judgments of communicative success were related to actual communicative success, unlike the judgments of senders which were totally unrelated to communicative success.

One obviously important but unanswered question pertains to how the intended meaning of emoji is recognized. It seems likely that the process will be highly context dependent. That is, without a prior context, there is no reason for a particular emoji (e.g., 🙏) to perform a specific speech act (e.g., thank). In this way emoji, it seems, are instances of particularized implicatures (Grice, 1989). That is, their conveyed meanings are constructed based on their occurrence within a particular context, and as a result, there is no one-to-one mapping between specific emoji and specific speech acts. Rather, it is likely that there are a range of emoji that can be used in certain contexts to perform certain speech acts. As particularized implicatures, this suggests there may be a slight processing cost for using emoji to perform speech acts, a possibility that awaits future research.

As particularized implicatures, both context and coordination are critical for successful communication with emoji. This, of course, is a general point that is relevant for other types of symbolic communication. For example, Grundlingh (2017) has argued that another common internet communication device—memes—can also perform speech acts. She was able to classify a large set of internet memes using a speech act classification system (Bach & Harnish, 1980), a scheme like the one used in the present research. One of the primary points of her analysis is that memes are communicative to the extent that an underlying shared representation is available,

that is, a mutual awareness of relevant cultural references. To the extent that such an awareness does not exist, successful communication will not be likely. This general point is also well illustrated by the research of dos Reis et al. (2018). Their demonstration that user-generated emblems were judged more representative of illocutionary classes points to the importance of user input, and hence coordination, in the creation of a symbolic communication system.

To a certain extent the present results present a two-sided picture of emoji use, demonstrating both that they can be used successfully to communicate specific intentions, and that people tend to overestimate their communicative success at doing so. The latter is important because it is likely a reason for the occurrence of miscommunication. If people overestimate their likelihood of communication success with emoji, they will likely fail to fine-tune their communications (i.e., consider how the recipient might not recognize their intention) resulting in miscommunication. This finding is important as well because research is emerging suggesting the existence of biases in how emoji are interpreted. For example, Miller et al. (2016) found that when participants rated the same emoji rendering, they disagreed 25% of the time on whether the conveyed sentiment was positive, neutral, or negative. This ambiguity is likely due, in part, to the fact that there are multiple motivations for the use of emoji (Riordan & Trichtinger, 2017). It is also possible that some of these biases may be systematic. For example, Jones et al. (2020) reported gender differences in the interpretation of emoji; specifically, female participants judged negative emoji to be more negative than did male participants, a difference that did not occur for positive emoji. Togans et al. (2021) reported cultural differences in the use of emoji, with people from collectivist cultures more likely to use emoji to convey politeness than people from individualistic cultures. These, and other, systematic differences in emoji use (e.g., familiarity with emoji) may contribute to cross-gender and cross-cultural miscommunication.

Several limitations of the present research should be noted. First, participants were asked to assume (in Experiments 1–3) that they would use a certain emoji to convey a specific intention, leaving open the question of whether they would have used that emoji (or any emoji) to perform that speech act. Still, participants in Experiment 2 did provide judgments of the likelihood that they would use each emoji, thereby providing some evidence regarding the likelihood of use. Also, only a relatively small number of emoji, out of the thousands that are available, were used in this research. Future research in this area might usefully strive to achieve greater experimental realism by attempting to study actual emoji use and interpretation in controlled settings.

Second, the situational context for participants in these studies was relatively impoverished and under specified. As noted above, context is critical for meaningful emoji communication. For example, people are more confident that friends, relative to strangers, will correctly recognize emotions they are attempting to communicate in an email (Riordan & Trichtinger, 2017), a difference that likely had an influence on confidence ratings in this research. Systematic examination of the role of the context in the use and interpretation of emoji are critical.

Conclusions

The present research extends our understanding of the communicative properties of emoji by demonstrating that they can be used, without any accompanying text, to perform specific speech acts. The present study also demonstrates, however, that communicators may overestimate the likelihood of communicative success with emoji. Future research should address these issues within the context of existing relationships, due to the increased common ground between interactants (Clark, 1996). That is, over time, individuals in digital contact with one another may come to use and understand the meaning of certain (perhaps idiosyncratic) emoji. In this sense, emoji use is, in part, relationship dependent. It is important to understand how the nature of a relationship, as well as other features of the context, influence whether emoji use will facilitate or hinder communicative success.

Acknowledgments

The assistance of Karysa Britton and Ky Bray in conducting this research is gratefully acknowledged. I thank the editor for their constructive feedback, which greatly improved the manuscript.

Declaration of Conflicting Interests

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

Funding

The author disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the National Science Foundation (grant number BCS-1917631).

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Note

1. Means and standard deviations differ from the prior analysis due to the use of unweighted rather than weighted means.

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Appendix

Examples of Sender and Receiver Scenarios and Emoji for each of the Four Speech Act Categories (all scenarios and emoji are available at <https://osf.io/fvu3x>)

Assertive Speech Act

Sender Version. There is a friend who you see frequently, and you often discuss current topics with this person. One day, during a discussion of animal rights, your friend states their belief that animals should not be used in medical experiments. The next day, after thinking about your friend’s position for a while, you decide that you very much **agree** with your friend’s position and so you send them (this 👍) (an emoji) indicating that you agree with them.

Study 4. Emoji Choice. Of the emoji below, which would you choose to convey that meaning?



Receiver Version. There is a friend who you see frequently, and you often discuss current topics with this person. One day, during a discussion of animal rights, you state your belief that animals should not be used in medical experiments. The next day your friend sends you the following text: 👍

Commissive Speech Act

Sender Version. You have been very busy lately and have fallen behind in your chores. In short, you’ve been a slob. You feel bad about this and want your roommates to know that you will change your behavior beginning next week. So, to **promise** that you will be neater, you send them (this 🤞) (an emoji) indicating that you are promising them.

Study 4. Emoji Choice. Of the emoji below, which would you choose to convey that meaning?



Receiver Version. Your roommate has been a slob lately. One day, your roommate sends you the following text: 🍷

Directive Speech Act

Sender Version. You and a group of your friends are traveling by two cars to a large city. The car you are riding in left your hometown about an hour sooner than the other car. The car you are in recently passed a state patrol officer who was clocking car's speeds. Knowing the other car's driver always speeds, you want to warn that group of the police officer. And so, to **warn** them, you send them (this 🚨) (an emoji) indicating that you are warning them.

Study 4. Emoji Choice. Of the emoji below, which would you choose to convey that meaning?



Receiver Version. You and a group of friends are traveling to a large city and decided to drive two separate cars. The car you are riding in departed about an hour later than the other group. While on the road, you receive the following text from a group member in the other car: 🚨

Expressive Speech Act

Sender Version. You recently decided to move to a new house. You have lots of stuff to move and a good friend of yours graciously agrees to help with the move. This person worked all day helping you move. After they go home, you realize just how thankful you are for their help. You want to express your **thanks** to this person, and so you send them (this 🙏) (an emoji) indicating that you are thanking them.

Study 4. Emoji Choice. Of the emoji below, which would you choose to convey that meaning?



Receiver Version. Your good friend recently moved into a new house. They have a lot of stuff so you agreed to help with the move. After you get home, you get this text from your friend: 🙏