Interpretation of Emotionally Laden Text Messages in Different Styles

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Abstract

With the recent developments in online communication, new research has begun exploring how online communication is fundamentally different from traditional face to face communication. The present study looked at how participants could depict an emotion through a text message that was presented in different styles. The researchers used abbreviated, grammatically correct text, and grammatically correct text with emojis to present various styles of text. Each text style was conveying either positive, neutral, or negative emotional context. Participants were asked to interpret the emotional context of each text message presented to them. The results found that grammatical text messaging style produced the most accurate interpretations of the emotion portrayed. The study also analyzed the differences of emotional context in text style which lead to the discovery of text style and emojis’ impact on emotional interpretation.

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Humans have long used facial expressions as a contextual cue for effective communication. With the ever-growing use of technology, much of the population’s daily communication has been largely online rather than face-to-face. Forms of instant online communication such as text messaging are subject to differing interpretations due to lack of nonverbal cues. The receiver of a message has to be able to interpret tones and emotions with little context, unlike a face-to-face encounter which contains a much richer array of emotional cues. Eventually the forms of online communication adapted to include elements from widely used forms of communication, including reading body language, listening to the tone of voice, and interpreting facial expressions. Through the use of emojis online communication now allows for added means of conveying missing facial expression cues. Emojis were first introduced in the late 1990s to provide the sender a way to add visual cues to text messaging with different forms of facial expressions (Pohl, Domin, & Rohs, 2017).

In a recent study conducted by Riordan (2017), it wassuggested that vocal tones, facial expressions, and gestures are crucial in relaying messages to the interpreter. More specifically, understanding the emotional context of messages was highly dependent on nonverbal cues. In a computer-mediated environment, these cues are highly limited, but users adapted to use emojis to convey these nonverbal cues. Not every user used emojis the same way, so the emotional meaning can be difficult to define universally. This usually results in misinterpretation of emotional context among individuals engaging in computer mediated communication. Riordan (2017) used two studies to investigate the usage of non-face emojis within 16 text messages. During the experiment, participants had to distinguish if a message was positive or negative, then out of the eight emotional categories, pick the emotion it best depicted, and the strength of that emotion on a scale of one to seven. The results showed that text messages rated more positive revolved around similar topics, and that the use of emojis created a significant difference in measuring the accuracy of emotion. With the same methodology, Riordan (2017) conducted a second study that had similar findings of significant positive ratings with the use of two or more emojis in place. This suggested that the use of non-face emojis softens negativity, but does not increase message positivity.

In an additional study, Derks, Bos, and von Grumbkow (2008) suggested that emojis that depict specific facial expressions do not fully represent facial cues simply because they are not representative of real life facial expressions. Furthermore, non-face and face emojis can both be used to create expression, and typically the use of these emojis reflect specific qualities of the person sending them.Before Riordan (2017) investigated nonverbal cues, Derks et al. (2008) conducted a study on how different patterns of nonverbal cues are perceived by participants. By using emoticons, a form of facial expression created by using punctuation marks, they were able to see the differences in interpretation between certain combinations. Derks et al. hypothesized that a verbal emotion paired with the emoticon representing that emotion would convey a more intense emotion when interpreting the meaning compared to using no emoticon. Additionally, Derks et al. also hypothesized that a verbal emotion paired with the opposite emotion of emoticon would convey sarcasm. To test the hypotheses, participants were given a questionnaire that asked them to record what emotion the message was trying to convey on a scale of one to seven, one being very negative and seven being every positive. After the scale of one to seven, they were asked to record how much happiness, sarcasm, or humor the writer of the message was conveying on a scale of one to 100.

Results supported many of Derks et al’s (2008) hypotheses, leaving two unsupported. The two rejected hypotheses included the prediction that a negative verbal message coupled with a frown emoticon would convey greater negativity than a negative verbal message alone, and the prediction that a positive verbal message coupled with a wink would convey less positivity than a positive message alone. There was a significant interaction between emoticon use and emoticons on all aspects, which indicates that emoticons do influence online message interpretation. Results also revealed that emotions are useful in strengthening the intensity of a message, for example, a positive message coupled with a smile is rated with more positivity than a positive message alone. It was also found that mixed messages, a verbal emotion paired with the opposite emotion of emoticon, were rated significantly more ambiguous than pure messages, one emotion of a verbal message with no emoticon. These findings provide insight into how this new form of computer mediated communication affects people’s ability to convey different complex emotions.

In another previous study, Jackson, Linden, & Raymond (2012) examined how incidental information impacts visual working memory (WM) when containing emotional information, such as positive or negative facial expressions. The study consisted of presenting 24 (eight positive, eight negative, and eight neutral) word stimuli that contained 18 emotional facial cues for the task of measuring WM. Participants were shown either two angry faces or two happy faces followed by a nine second period showing either a flashed positive, negative, or neutral word on the screen three times. To measure working memory, a neutral face was shown on the screen for the participant to decide whether the face was or was not shown. The results proved that angry faces had a higher amount of recall in working memory when an emotional, versus a neutral word, was presented during the maintenance interval. The study concluded that the presence of an emotion within a distracting stimulus, in this case a word, increased the emotional interpretation of threat-related information. This was maintained in the visual component of working memory, ultimately improving the performance of WM. The effects of negative emotional stimuli are a result of the activated networks in one’s amygdala. The amygdala has been long known to produce an emotional affect when interpreting facial cues, therefore, this study concluded emotional events accompanying each other will not always produce a distraction from a WM task.

In a study done by Novak, Smailovic, Sluban, and Mozetic (2015), the researchers aimed to determine the emotional content of emojis in tweets from Twitter. The researchers created an Emoji Sentiment Ranking which created a map of the 751 most frequently used emojis (Novak et al., 2015). Using 1.6 million tweets from 13 European languages, 83 human annotators were asked to determine the emotional context (negative, neutral, or positive) of each tweet by estimating the emotional attitude of the person who wrote the tweet. The study had found that the most popular emojis used had a positive connotation. The results had also shown tweets with emojis had a higher agreement level among the participants. In addition, the study also found that the ability to interpret the emotion increased when the emojis were found at the end of the sentences. The final finding of this study had additionally shown no significant differences between the 13 European languages. The emojis in the present study had been placed at different polarities in text messages and the agreement on sentences was built by the researchers.

The present study aimed at expanding the literature on emotional context and text messaging by studying the emotional interpretation of text messaging using emojis. Sentences were presented as text messages to participants in three different styles, abbreviated text, grammatically correct text, and grammatically correct text with emojis. Experimenters characterized emotions under positive, neutral, or negative, and participants were measured based on their accuracy in interpreting emotional affect within text messages. The present study predicted that if each of these styles have differing emotional context (negative, neutral, or positive), with abbreviated text having the least context and emoji text having the most, then participants’ ability to predict emotional intent among the messages will be the strongest among emoji text and the weakest among abbreviated text, with grammatical text falling in between.

**Method**

**Participants**

Participants consisted of 39 students at Minnesota State University, Mankato that were chosen from two sections of a psychological research methods course. The experimenters did not gather any demographic information due to the nature of the experiment being focused on cognitive processes which were tested as human universals. No compensation was given to participants since they were enrolled in the class and their participation was required.

**Design**

The independent variable in the present study included three levels of style of text message sentence structure. The independent levels of style consisted of abbreviated words, grammatically correct sentence structure, and grammatically correct structure with the use of emojis. Under the emoji condition, an emoji was inserted within each sentence to directly portray the underlying emotion within the sentence. In addition, data were gathered based on three levels of emotion being provoked within the sentences context, which were used for post-hoc analysis. The three levels of emotions were positive, neutral, and negative. The dependent variable was measured as the proportion of answers correct when attempting to decide the emotion depicted. The participants’ scores were accessed through a database and exported in Excel using the website that the experimenters generated for the study. The design was conducted as a 3 x 3 within-subjects design.

**Materials**

The researchers of the present study constructed a total of 36 sentences based on specific words that were selected from Jackson, Linden, and Raymond’s (2012) table of negative, neutral, and positive words. The experimenters attempted to depict positive, neutral, and negative contexts within the text messages using the words chosen from the aforementioned table. Each word selected to represent the emotional context had three sentences constructed to fit each category within the sentences style of abbreviated style, grammatically correct style, and emoji style of text messages. Following construction of the sentences, a small web application was created by the experimenters for this experiment, in which the participants’ data as well as the 36 sentences were stored in a database and easily accessed by experimenters. The website was accessed by participants on the Chrome web browser using computers managed by the school. All 36 sentences, as well as information regarding access to the website, can be found in the Appendix of the present study.

**Procedure**

The participants were informed to navigate to the website used to conduct the experiment and register using a randomly generated username and a password of their choice. Following registration, participants were asked to write their randomly generated username on a note card that was passed out prior to instructions, which was later used by experimenters to verify that no additional accounts were created. After registration, participants were given instructions on the screen, which were also explained aloud by the experimenters before continuing with the timed questions. Upon starting the experiment, participants were individually shown a randomly chosen sentence for five seconds. Following the sentence, participants were given a question for 10 seconds and were asked to decide the emotional context of the messages, consisting of three options: positive, neutral, or negative. Participants repeated this process of being exposed to sentences and answering the emotional context questions until all 36 conditions were shown. Once each participant completed the 36 questions, they were instructed to wait quietly until all participants finished. After all data were accounted for, the experiment was complete.

**Results**

The present study had aimed to predict the accuracy of text message style interpretation under negative, neutral, and positive emotions. The data were organized as the percentage score of text messages that participants correctly answered on emotional context. The original hypothesis proposed that the levels of text style would impact the perceivability of text message emotional content. Data were analyzed in a 3 x 3 ANOVA with follow up Bonferroni pairwise comparisons. The researchers had collected extra dataregarding the emotional categories that had resulted in an interaction not included in the researchers’ hypothesis. The use of a 3 x 3 ANOVA had produced two significant main effects for text style *F*(2, 76) = 20.07, and for emotion *F*(2, 76) = 45.55, with one significant interaction between text messages and emotion *F*(4, 152) = 6.909.

For abbreviated sentences, participants were presented with three levels of emotion (positive, neutral, and negative). The mean proportion of emotional accuracy was compared for abbreviated sentences. The positive abbreviated sentences were shown to have the highest accuracy among the abbreviated sentence style (*M* = .78, *SD* = .24). The neutral abbreviated sentences were least likely to convey emotional context (*M* = .57, *SD* = .21). Among the negative abbreviated sentences, similar results were found compared to that of the positive abbreviated sentences (*M* = .72, *SD* = .17). The ANOVA was followed up with a Bonferroni pairwise comparison that had found a significant difference of positive abbreviated sentences with higher accurate interpretations over abbreviated neutral sentences (*p* = .002). Furthermore, there was a significant difference between negative abbreviated sentences with higher emotional accuracy over neutral abbreviated sentences (*p* = .003). There had been no significant differences (*ns*) between positive abbreviated to negative abbreviated sentences (see Figure 1).

The mean proportion of emotional accuracy was also compared for grammatically correct sentences with the three different emotions as well. Positive grammatical sentences were shown to have the highest emotional context predictability (*M* = .93, *SD* = .13). Neutral grammatical sentences were shown to be highest in emotional interpretability among the three text styles under the neutral emotion (*M* = .76, *SD* = .22). Finally, the grammatical sentences were predicted well under the the negative emotion (*M* = .81, *SD* = 19). The follow up Bonferroni pairwise comparison after the ANOVA found significant differences between grammatical positive to both grammatical neutral (*p* = .002) and grammatical negative (*p* < .001). There were no significant differences (*ns*) found between grammatical negative to grammatical neutral (see Figure 1).

Finally, mean proportion of emotional accuracy for emoji sentences were compared. The positive emoji sentences had the highest emotional context predictability of all trials (*M* = .94, *SD* = .12). The neutral emoji sentences were shown to be the most difficult to interpret, with the least emotional context (*M* = .51, *SD* = .26). Negative emoji sentences were interpreted similarly to the negative grammatical sentences (*M* = . 71, *SD* = .19). Once again, the ANOVA was followed by a Bonferroni pairwise comparison. There were significant differences found among the levels of emotion, with positive emoji sentences significantly different from to neutral emoji (*p* < .001) and negative emoji (*p* < .001) sentences (see Figure 1).

**Discussion**

The current study did not support the full hypotheses of the present study, which predicted that abbreviated text would yield the least accurate interpretations while emoji text would yield the most accurate interpretations. The results displayed that grammatical text yielded the most accurate interpretations, and abbreviated text yielded the least accurate interpretations. There had been unexpected data within emotional context in text style, revealing an interaction that helped the researchers identify the differences in data, comparing other effects between emotion. The availability of this extra data helped set apart the present study from previous studies.

The present study is not without its limitations. The sentences (see Appendix) generated for the experiment were created by the researchers, where each sentence was written to depict a word that represented an emotion (positive, negative, and neutral). Although the sentences were self generated, the words were chosen from an article published by Jackson, Linde, and Raymond (2012) in order to eliminate any potential bias. The emojis used in the present study were previously ranked in a full emoji list by Unicode Consortium Inc. (2018) and hand selected by the researcher’s discretion. The position of the emoji was placed at the end of the sentence in all but one sentence. The inconsistency in placement could have caused the one different sentence to become an outlier and later sway the data. This assumption is guided based on earlier research by Novak, Smailović, Mozetič (2015), suggesting that emojis placed at the end of messages resulted in better interpretation.

In the researchers’ opinions, the emojis that were ranked neutral by the Unicode Consortium Inc. (2018) and later selected for the neutral sentences, seemed to be more negative than positive. The selected emojis could have caused the low amounts of neutral accuracy interpretation when compared to the other two emotions (negative and positive) with emojis that had higher levels of accuracy. Additionally, the current study used facial emojis, which based on Riordan’s (2017) study of non-face emojis, did not soften or assist in the interpretation of emotion in text messages. However, it was found that the addition of facial emojis among text messages negatively affected the participant’s ability to interpret the emotional context.

After reviewing the data, neutral emojis may have been interpreted as a negative emotion correlating to the selected sentences. For future studies, it is best to consider the impact of neutral emojis on the sentence, including neutral emojis that could be interpreted as negative, and could skew the data for the emoji text messaging style. In addition, it had been stated earlier that contextual cues such as facial expressions assist in effective communication, but the use of facial emojis did not assist in communication for this study. Therefore, future studies should vary the use of facial emojis to see if there are any effects within interpretation. The study of text messaging is a new topic in the psychology world and any new research would be encouraged. The limited research for this topic, especially research on emojis, caused issues in predicting models of emotional interpretation in text messaging. Future research would be needed to expand on the effect of emojis on interpretation due to the limited amount of studies on the topic.

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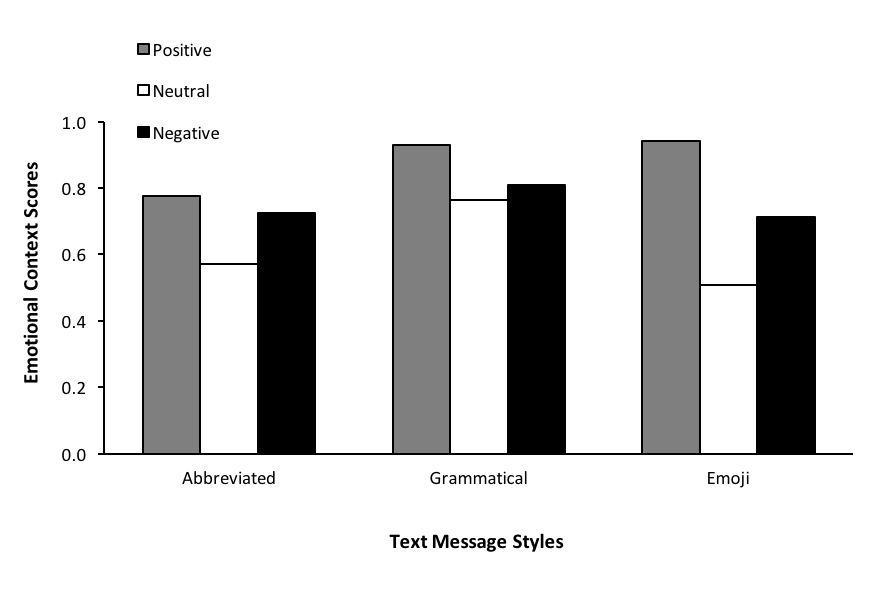
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*Figure 1.* The effects of different emotional contexts on different text styles and the proportion of emotional accuracy.

Appendix

The sentences below were used as the text messages in the present experiment.

12 positive sentences

Thank you for the birthday gift, can’t believe you remembered. 😁

You know I will always tell you the truth. 😊

Christmas is my favorite holiday! 🤗

Yes, he finally sent me a text back! 😍

Lol glad u thought of me

Ur good thx for bein honest

omg im so happy 4 u

ur date tmrw is gonna b gr8

That was very thoughtful of you to send me flowers!

I was so happy to see you last, glad the feelings are mutual!

I value your honesty.

That dress makes me feel so sexy!

12 neutral sentences

I don’t know, 🤔 everyone is acting funny.

The play tonight is making me nervous. 😐

I don’t care where we eat, I’m just hungry. 🙄

I have depression, so a nap would probably help. 😥

Yo i think ur bro is startin ta be onto us

Idc u decide

Yea k

I dont rlly like bein l8

What made them ask that?

I can’t make it, I have work to do

You can do whatever you want to do

I almost fell asleep in the middle of class

12 negative sentences

No, I don’t like you around 😒

You’re coming regardless of what you want 🙃!

I bleached all of your clothes last night 😈

I crashed your car, so… 😂

Smh, gtfo here with that crap

Im not playin’ im bout ta thro hands

Yea i pawned the ring 4 money

So lik ur cat is ded nd im da 1 that did it

Don’t expect me to help you next time you’re involved.

Talk to me like that one more time, I dare you

Yeah, you could have made a cuter baby

Your leftovers were taking up the fridge anyway, so I ate it.