Emotionality, Truthfulness, and Emoji

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Abstract

In this paper, we investigate the relationship between emoji and truthfulness in chat messages. We specifically study the use of emoji in the production and perception of chat messages used for truth-telling and lying. We find that message writers choose emoji more frequently when being truthful than when being deceptive. Mirroring this finding, message readers tend to ascribe more honesty to messages with emoji, and messages without emoji are seen as slightly less honest.

Introduction

The notions of truth-telling and lying are not only of practical interest to legal professionals, police, and anyone who is a parent. Telling truth from lies has also been of interest to the scientific community for centuries, mainly in philosophy, but also in psychology and linguistics. Lies in face to face communication can be detected by physiological indicators (such as breathing frequency and transpiration), but also by other emotional and verbal indicators (Furnham 2008). In the view of these methods, lie detection in computer mediated communication (CMC) seems restricted to the verbal domain only, since non-verbal emotional and physiological expressions are not transmitted in social media. However, the introduction of emoticons and emoji in social media has the potential to partially remedy this picture, by introducing explicit emotional expressions into computer mediated communication. In this paper, we hypothesize that face emoji, used in social media to indicate speaker emotions, can be used to help detect lies in CMC.

Starting from the hypothesis that emoji are part of emotional language on social media, we specifically study the use of emoji in the production and perception of chat messages used for truth-telling and lying. Using the range of experiments below, we thus investigate the relationship between truth-telling, emotions and emoji in chat messages.

In face to face communication, facial expressions have been identified as one of the most revealing clues for lie detection, because they are said to be particularly hard to fake (Ekman, Friesen, and O'sullivan 1988). In CMC, emoticons and (later) emoji are used to represent emotions and thus can be seen as the social media correspondants of facial expressions of emotion (Harris and Paradice 2007). We therefore choose to study the role of emoji in lying in chat messages.

It was found that emotions help deception to be more persuasive (Mehrabian and Williams 1969). We thus expect that liars will use more emoji than truth-tellers (Hypothesis I), but only if the message authors usually employ emoji moderately to frequently in their chat messages. For authors who rarely use emoji in general, extra emoji in deceptive messages would lead to a quick detection of such messages. These authors may therefore avoid using emoji in deceptive messages in order to seem more authentic (Hypothesis II).

Hypothesis I (emotions are more frequently present in deceptive contexts than truth contexts) is also supported by Zuckerman, DePaulo, and Rosenthal (1981). In lies, emotional expressions are employed by speakers as a strategy to seem more honest, because emotions make a lie appear more authentic (Connell 2012; Ekman et al. 1991). For this reason, we expect texters who rarely use emoji to employ a different strategy when lying to keep up authenticity.

In order to investigate the central research question and the two hypotheses, we carry out a pair of online experiments meant to study the *production* and *perception* of true and deceptive chat messages. Our subjects are put either in the role of the liar, or in the role of the recipient of a potentially deceptive message, and are asked to rate the presence of emoji in these contexts. We find that, contrary to our expectations, subjects significantly prefer the presence of emoji in true utterances compared to deceptive messages. We discuss possible explanations and directions for further study below.

Experiments

Pre-study

In a preliminary study, we identified the most frequently used face emoji in German chat messages. We recruited 62 participants and asked them to submit a screenshot of their frequently used emoji from their chat messenger (*What's App*), see Figure 1. Subjects were recruited from the age groups "under 30" and "over 30" (31 participants per group; each group had 17 female and 14 male participants). The younger group averaged 22 years old, the older group 49.

The emoji lists were analyzed manually for the presence

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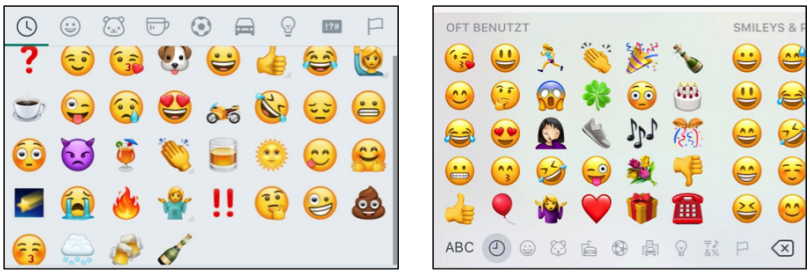


Figure 1: Screenshots of the "frequently used emoji" lists in Android (left) and iOS (right).

emoji	count	description	basic emotion	polarity
😂	47	face with tears of joy	joy	positive
😊	38	smiling face with smiling eyes	joy	positive
😭	21	loudly crying face	sadness	negative
😡	18	angry face	anger	negative

Table 1: Emoji used in the experiments; "count" = their count of occurrence in the "frequently used emoji" list of 62 subjects.

and frequency of face emoji and their polarity. The existing emoji were manually classified into positive, neutral, or negative polarity based on their appearance[1]. The goal was to identify frequently used, positive and negative emoji for use in the two main experiments.

Faces make up a large portion of all frequently used emoji (on average, 53%), and this preference is even more pronounced for the younger and female participants (61%). In all subgroups, positive emoji account for the majority of all face emoji (around 60%), and neutral and negative emoji are split about evenly. In the further experiments we focus on basic positive and negative emoji that were frequently used by the preliminary study participants. The chosen emoji (two positive, two negative) are shown in Table 1.

Production Experiment

This experiment was devised to study the usage of emoji (Hypotheses I and II) in the *production* of chat messages. The study was carried out as an online survey using the social science survey platform SocSciSurvey[2]. Participants were recruited through social media and did not receive compensation for participation. 44 subjects (25F, 19M) between 16 and 59 years of age (∅=27.5) completed the survey and were included in the analysis. The experiment was carried out in German and participants were screened for being native speakers of German and having grown up in Germany.

Subjects were presented with 16 contexts that required them to compose a chat message to a friend. We saw friendship as the most likely context for chat messaging, as well as for using emoji (even though speakers may be more likely to lie to strangers). The contexts were manipulated to require either a truthful message or a deceptive message (subjects were split into A and B groups so each subject saw each context only in one version). Table 2 shows a sample survey item translated into English. Subjects were shown the message they were about to send (either truthful or deceptive), and asked to choose which emoji (or none) of the study emoji they would select for this message. The deceptive messages constitute so-called *asocial* or selfish lies, which primarily bring advantages for the sender. These kinds of lies are unambiguously seen as lies by speakers.

A final section of the survey recorded participants' demographic information as well as the frequency and intensity of their social media and emoji usage. This part was included in order to address Hypothesis II in particular. Emoji usage was collected both explicitly, by asking subjects to rate themselves on their frequency of emoji use (on a scale of 1–5), as well as implicitly. Here, the subjects were asked to check how many of their most recent 10 chat messages to their best friend include emoji.

Perception Experiment

A second experiment aimed at the *perception* of chat messages with and without emoji. Again, we conducted an online survey on SocSciSurvey. Participants were again recruited through social media and did not receive compensation. Participants in the previous experiment were asked not to participate again. 56 people (43F, 11M) between 18–66 years (∅=31) finished the survey.

In this experiment, the same items from Experiment 1 were shown, but the situation context was neutralized so that it is ambiguous between truthful and deceptive messages (see Table 3). Items were presented either with an emoji or without attached emoji, where the emoji shown was the one most frequently chosen by the participants of Experi-

[1]Indicators for positive polarity are for example a smiling or kissing mouth or smiling eyes, negative polarity is indicated by a downturned mouth, color variations (blue/green/purple), or squeezed shut eyes.

[2]https://www.soscisurvey.de/

context	condition	situation	answer	selection
Your best friend finally contacts you after being sick in bed for three weeks with flu symptoms.	truth	You're happy to hear from her because you missed her. When she asks you whether you can meet up soon, you answer:	Yes definitely!	none 😂 😊 😭 😡
	lie	You're happy that she's feeling better but you don't want to see her yet because you're afraid of catching the flu from her. You know that she never really cures her illnesses. When she asks you whether you can meet up soon, you answer:		

Table 2: Sample item from Experiment 1 (Production), translated from German. Subjects see the context, situation, and answer, and are asked to select one of the emoji (or none) to go with the answer. Subjects see only one of the two possible situations (either truth condition or lie condition) per item.

condition	context	reply
emoji	You haven't seen your friend in a while and ask her if you can meet up in the next few days.	Yes definitely! 😊
no emoji		Yes definitely!

Table 3: Sample item from Experiment 2 (Perception), translated. Subjects rate replies for truthfulness on a 1–7 scale.

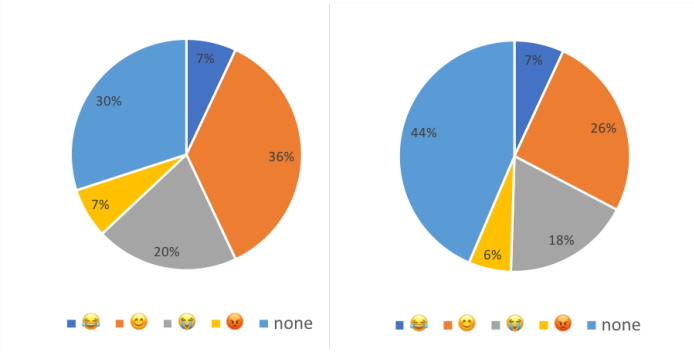
ment 1 (two items that led to ambiguous choice of emoji were excluded from this experiment). Each participant saw each item only either in the emoji or the non-emoji condition. Subjects were asked to select how honest they rated the message writer to be on a 7-point scale. The second part of the survey again collected demographic information as well as details about the intensity of usage of CMC.

Results

Across both conditions (truth and lie) and across all items, subjects frequently chose emoji to add to the text message (63% overall). In contrast to expectations, emoji were more frequently chosen in the true contexts (71% messages have emoji) than in the deceptive contexts (56%), see Figure 2. In both conditions, positive emoji are more frequently included than negative emoji (59% positive out of all chosen emoji).

The most frequent emoji by a large margin is the happy face 😊, even though the items were balanced across positive and negative contexts. This emoji is used particularly often in true contexts. It is followed by the crying face 😭, with 😡 and 😂 chosen least frequently. For most items, there is a clear preference for one of the four emoji that is shared in both the true and deceptive conditions; for example, the happy face for the item in Table 2. Two items that did not lead to a clear favorite emoji were excluded from the subsequent perception experiment.

In addition, we performed a factor analysis to test if the age categories (under 30/over 30), gender, or the operating



(a) Truth (b) Lie

Figure 2: Choice of emoji in Experiment 1 (Production).

system used had any effect on the usage of emoji in the given conditions. The basic observations (preference for positive emoji; more emoji in the truth condition) hold across all studied subgroups. Finally, subjects were asked why they use face emoji in a free-form question. About half of all participants mentioned that they use emoji to "express or enhance feelings and emotions". Additional frequently mentioned uses include "adding expressivity" (10 mentions), and "disambiguation" or "avoiding misunderstandings" (9 mentions).

The second experiment tests the perception of messages

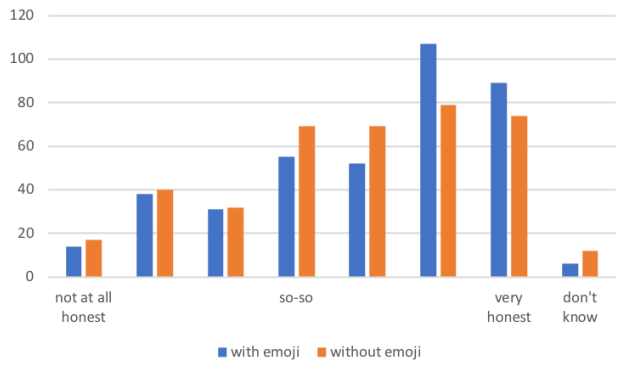


Figure 3: Interpretation of messages with/without emoji in Experiment 2 (Perception).

with and without emoji with respect to their truthfulness. Subjects generally rated the utterances as truthful. However, messages with emoji were seen as significantly more truthful than messages without emoji (see Figure 3). In this result, the message recipients from Experiment 2 mirror the data from the message producers in Experiment 1 (even though the two participant groups were distinct).

Analysis and Discussion

Existing analyses of verbal and nonverbal indicators of lying in face to face communication identified emotionality as a good predictor (Zuckerman, DePaulo, and Rosenthal 1981; Toma and Hancock 2010). Since emoji are one of the main ways of expressing emotion in computer mediated communication[3], we expected emoji to be used as an expression of emotionality in deceptive messages. In contrast to this expectation, Experiment 1 showed a significantly higher frequency of emoji in truthful messages, over deceptive messages. In particular, the positive emoji 😊 was used more often in truthful contexts. This behavior could be seen across all demographic subgroups and was not restricted to the participants with the most intense use of emoji.

The results of Experiment 1 thus do not confirm the hypotheses. In addition, the preference for emoji in truthful messages was also confirmed in the perception task of Experiment 2. This means that readers of chat messages are to some extent aware of the truth-indicating nature of the emoji present. On average, items presented without emoji were seen as less honest by the participants (though they overall judged all messages as relatively truthful).

There are many possible alternative explanations for the liars' tendency to avoid emoji. One possibility is that all participants try to keep up the appearance of "neutrality" when lying, in order to make their utterances seem more authentic. Writers are possibly not aware of the frequency of their emoji usage in truly authentic messages. Another option is based on the fact that the propositional and the emotional content of the message are in essence two distinct types of information. Faking just one part, the propositional content, may be easier than having to fake the emotional content, as well. Liars may also be reluctant to fake emotions in their chat messages. A final, alternative explanation for the results is that the facial emoji, in particular 😊, receives a specific semantic interpretation similar to a VERUM operator like the word *really* (Romero 2005). It is noteworthy that the increase in intensity of emoji usage in truthfulness is carried mainly by that one emoji in the production experiment. One could therefore suspect that this emoji carries a meaning of truthfulness. Further studies are needed to investigate which of these possible relations between emoji, emotionality and truthfulness can be corroborated.

[3]This main use of emoji was also confirmed by our study subjects in Experiment 1.

Summary

In this paper, we investigated the relationship between truthfulness, emotionality and emoji. We performed a production and a perception experiment where messages were chosen/read that either included an emoji or no emoji. In addition, we manipulated the context so that messages could be truthful or deceptive. We found that message writers chose emoji more frequently when being truthful than when they were deceptive. Mirroring this finding, message readers tended to ascribe more honesty to messages with emoji, and messages without emoji were seen as slightly less honest. Since this result in CMC potentially conflicts with earlier findings about face to face communication (where emotions are more frequently expressed in lies), our study opens up new questions for further research within this area.

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