

The Effects of Smileys on Sarcasm Perception in Computer Mediated Communication

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Abstract

Misunderstandings are plentiful within the realm of computer mediated communication (CMC) due to the lack of nonverbal cues such as tone of voice or hand gestures. Sarcasm requires many of these nonverbal cues to be understood. When online, people use emojis to replace these missing cues. In this paper we investigated the effect of smileys on sarcasm perception in online communication. We investigated this through the lens of two prominent theories about sarcasm: the Tinge (Dews & Winner, 1995) and the Enhance hypotheses (Colston, 1997). To test this, we surveyed ($N = 90$) people online. They were separated into sender ($n_{\text{sender}} = 46$) and receiver ($n_{\text{receiver}} = 44$) groups. Our results were analyzed with multiple mixed ANOVAs and post hoc *t*-tests to further specify our results. Our results, on the one hand, provided the information that wink smileys do not always increase sarcasm. On the other hand, the results did indicate an ambiguous conclusion about whether just one of the prominent hypotheses was correct. They demonstrated that sarcasm could be Tinged or Enhanced depending on if the message was literal or sarcastic, and if the text was criticizing or praising. From this thesis we can conclude that smileys are most effective at increasing sarcasm, in sentences involving literal criticism and the sarcastic praise. Additionally, that the wink smiley makes messages seem funnier in all cases when it is added.

Keywords: smileys, emojis, sarcasm, computer mediated communication; Tinge hypothesis; Enhance hypothesis

The Effects of Smileys on Sarcasm Perception in Computer Mediated Communication

Computer mediated communication (CMC) is ubiquitous in today's society, from texting with your friends to emailing your co-workers. It is so omnipresent we often find ourselves picking up our phones without even noticing. A literature review by Thomas, Bennie, De Cocker, Castro, and Biddle (2019) indicated that the time spent using computers and playing video games has augmented since the year 2000. Rideout, Foehr, and Roberts (2010) found that eight to eighteen-year-olds spend on average seven and a half hours a day consuming media. During the global Coronavirus lockdown people have been working from home and socially isolating themselves, which implies that screen time and communication online has increased.

Regardless of CMCs benefits for keeping people in contact with friends and family during the pandemic, which is important for mental health (Hefner, & Eisenberg, 2009), CMC does have large drawbacks. CMC sometimes contains few verbal cues. For example, when sending voice messages, the message contains cues such as tone of voice, but lacks facial expressions. On the other hand, some communication mediums can be completely void of nonverbal cues (e.g.: emailing). Without these nonverbal cues, there are higher risks of misunderstanding (Thompson & Filik 2016).

Sarcasm is an example of a type of communication that requires verbal cues as well as nonverbal cues to be understood correctly. Clark and Gerrig (1984) mention that there is such a thing as an ironic tone of voice and Caucci and Kreuz (2012) found that sarcasm is signalled by head, eye and mouth movements. People use sarcasm when they are trying to communicate in a nonliteral way, it is applied in order to insinuate the opposite of what is actually being said (Filik et al., 2016). In addition to this, sarcasm can be used to criticise (e.g.: You did really well in that football match.) or to praise (e.g.: Your outfit looks truly terrible today.) someone (Filik et al.,

2016). Research has found that some of the primary intentions behind using sarcasm are to convey a) humor, b) aggression, c) to criticise, or d) to praise (Blasko & Kazmerski, 2006; Roberts & Kreuz, 1994; Thompson & Filik, 2016). In the literature on sarcasm we can find two main kinds of discrepancies. The first concerns the differences between irony and sarcasm. The second concerns the way sarcasm works.

Firstly, it is difficult to find a consensus within the research on the definition of sarcasm, in addition to the complexity of differentiating between sarcasm and irony. Some researchers use irony and sarcasm interchangeably (Clift, 1999). Others claim that sarcasm is a specific case within irony, namely verbal irony (Kreuz, & Glucksberg, 1989). Even without a standard definition, Filatova (2012) states that most people can identify sarcasm and irony correctly in a sentence. In this research we will understand sarcasm from the standpoint of Liebrecht, Kunneman and van Den Bosch (2013, p. 30). The definition they implemented asserts that a sarcastic expression involves “a shift in evaluative valence, which can go two ways: it could be a shift from a literally positive to an intended negative meaning, or a shift from a literally negative to an intended positive evaluation”. In other words, people say the opposite of what they intend. Thus, a sarcastic critical message seems outwardly positive and a sarcastic praising message seems outwardly negative.

Secondly, there are inconsistencies about how sarcasm works in the context of face-to-face communication (FTFC). Researchers investigate what the use of sarcasm does to the valence of sentences. In the literature there are two contradictory hypotheses concerning the function of sarcasm; the Tinge hypothesis (or “muting the meaning hypothesis”; Dews & Winner, 1995) and the Enhance hypothesis (Colston, 1997).

The Tinge hypothesis supposes that the function of sarcasm is to mute or reduce the emotional impact of a message (Dews & Winner, 1995). The perception of the intended meaning

of a sarcastic comment will be “tinged” with the literal meaning of the message. For example, sarcastic criticism is perceived as less negative than literal criticism, while sarcastic praise is perceived as less positive than literal praise (Filik et al., 2016; see also Dews & Winner, 1995; Jorgensen, 1996).

Contrarily to the Tinge hypothesis, the Enhance hypothesis (Colston, 1997) asserts that sarcasm enhances the meaning of a negative message. Colston (1997) suggested that a form of contrast is noticed when a person comments by mentioning a more desirable outcome which did not arise. In this case, sarcastic criticism is perceived as more negative than literal criticism (for support of this hypothesis, see Colston, 1997; Toplak & Katz, 2000). In additional contrast to the Tinge hypothesis, the original Enhance hypothesis by Colston (1997) only contains predictions for one direction of valence. The negative side of sarcasm: sarcastic criticism. Meaning that sarcastic criticism will seem more critical than literal criticism.

Thus far, the research that has been conducted on sarcasm and CMC has mainly focused on simulated interactions (one real person communicating with a simulated other person) in labs (e.g.: Pickering, Thompson, & Filik, 2018) or investigations on how people try to portray sarcasm in CMC (e.g.: Thompson & Filik, 2016). However, as we discussed previously, in CMC there is an absence of non-verbal cues, such as facial expressions or inflections of tone which are usually quintessential to sarcasm detection. Without these cues, it seems highly probable that misunderstandings occur between interlocutors whilst using sarcasm in CMC.

Nevertheless, developers of CMC have created emojis, smileys, emoticons and GIFS as a means to mediate the problems that present themselves with this lack of nonverbal cues. Emoticons are representations of a facial expressions using punctuation, symbols and letters (e.g.: :P or ^.^). Emojis are graphic symbols with defined names, ID’s and codes called “Unicode” (Rodrigues,

Prada, Gaspar, Garrido, & Lopes, 2018). These emojis include representations of facial expressions (also referred to as smileys) (e.g.: 😊¹), feelings (e.g.: ❤️²), animals (e.g.: 🦊³) and activities (e.g.: 🧗⁴). In this paper we will use the word emoji and smiley interchangeably. Indeed, emojis have been found, amongst other things, to disambiguate communicative intentions behind texts (Kaye, Wall, & Malone, 2016), to set an emotional tone (Kaye, Malone, & Wall, 2017) and to strengthen the intensity of a message (Derks, Bos, & Von Grumbkow, 2008).

Thus far, research in sarcasm has found that the tongue emoticon (e.g.: “:P”), wink emoticon (e.g.: “;”), and ellipsis (e.g.: “...”) are most often chosen by people when they want to appear sarcastic in written communication (Thompson & Filik, 2016). To support the idea of sarcasm being communicated by emojis in CMC, a study (Weissman & Tanner, 2018) found that irony delivered by emojis (in their case the “wink emoji”) elicits the same brain response as irony delivered by words. This indeed suggests that people understand sarcasm online in the same way as they do in FTFC.

Although we saw that smileys were designed as a replacement for nonverbal cues. No study has tested whether smileys are an effective means of communicating these nonverbal cues to others. The purpose of this thesis is to take stock of how well emojis do at conveying sarcasm between people in CMC. Thus, our research question is: How does the use of wink emojis in sarcastic messages aid the sender to convey his intentions to the receiver, using the framework of the Tinge

¹ <https://emojipedia.org/winking-face/>

² <https://emojipedia.org/red-heart/>

³ <https://emojipedia.org/raccoon/>

⁴ <https://emojipedia.org/person-climbing/>

and Enhance hypotheses? Based on the sum of the research in the introduction and our research question we formulated two hypotheses and a third exploratory research question.

Our first hypothesis is based on the research by Thompson and Filik (2016). This research found that the wink smiley is the most often chosen emoticon to signal sarcasm in CMC. Thus, we predict that the wink emoji will help in signalling sarcasm. Our first hypothesis will test this prediction.

Hypothesis 1: Messages including a wink emoji will be rated as more sarcastic than messages without this emoji.

Our second hypothesis inspects the impact of the wink emoji on the underlying intentions of sarcasm. The primary intentions behind using sarcasm are to convey a) humor, b) aggression, c) to criticise, or d) to praise (Blasko & Kazmerski, 2006; Roberts & Kreuz, 1994; Thompson & Filik, 2016). Since there is evidence in the literature for both the Tinge and the Enhance hypotheses, we formulated a non-directional second hypothesis.

Hypothesis 2: Sarcastic messages including a wink emoji will be rated differently than sarcastic messages not including this emoji. Based on the Tinge hypothesis, they will receive lower ratings than sarcastic messages without an emoji, because this approach predicts that sarcasm is used to mute a message's content. Based on the Enhance hypothesis, the opposite (i.e., enhanced ratings) would be predicted. These hypotheses cover all four primary intentions behind using sarcasm: Criticism, Praise, Humor and Aggression.

In addition to the first two hypothesis we will include a third exploratory research question concerning the differences between senders and receivers. We already know from previous research that the primary intentions behind sarcasm are to convey a) humor, b) aggression, c) to criticise, or d) to praise (Blasko & Kazmerski, 2006; Roberts & Kreuz, 1994; Thompson & Filik,

2016). But we have also discussed that sarcasm in CMC can lead to miscommunication due to the lack of nonverbal cues. Thus, we created this third exploratory research question in which we will test whether smileys have the same effect from the point of view of senders and receivers.

Our experiment will test all three of our hypotheses. Firstly, analysing whether the wink emoji aids the communication of sarcasm. Secondly, inspecting sarcastic intensions with the help of established hypotheses. Thirdly, exploring differences between senders and receivers.

Methods

Design

The study had a 2 (Perspective: Sender vs. Receiver; between-subjects) x 2 (Message Type: Sarcastic vs. Literal; within-subjects) x 2 (Emoji: Emoji vs. Plain Text; within-subjects) x 2 (Message Valence: Criticism vs. Praise; within-subjects) mixed design.

The dependent variables that were measured were the following: sarcasm, humour, aggression, criticism, praise. These variables represent the main intensions behind sarcasm, represented in the literature (Blasko & Kazmerski, 2006; Roberts & Kreuz, 1994; Thompson & Filik, 2016) as well as sarcasm itself.

Sample





The participants for this study were recruited via the online participant recruiting platform Prolific. All participation was on a voluntary basis and they were paid 0.75 pence for the participating, the study took 6 minutes to complete. Only people who indicated high English proficiency were able to part take in this study. The final sample included $N = 90$ participants, with 51 males and 36 females. One participant's gender was missing, and 2 participants chose "other" as their gender. The mean age was $M = 24.54$ years ($SD = 7.62$). Participants were almost evenly spread across both conditions ($n_{sender} = 46$, $n_{receiver} = 44$).

Materials

In this study participants rated hypothetical text message conversations between themselves and a friend. These text message conversations were created to look like WhatsApp messages via a fake post generator website (<https://fakepostgenerator.com/?whatsapp>; see Table 1 for an example).

Table 1:

Example materials for each variation of sentence without smileys, sender condition

Sentence type	Sarcastic Praise	Literal Criticism	Sarcastic criticism	Literal Praise
E.g.				

Note: In the smiley conditions, the wink emoji was placed at the end of the last sentence in the conversation, after the full stop. In the receiver condition, the speaker tags were inverted (“you” becomes “friend” and vice versa).

For the content of these messages we chose 8 sample scenarios from materials supplied to us by Thompson and Filik (2016). All scenarios were created with four main different variations: Sarcastic Praise, Sarcastic Criticism, Literal Praise and Literal Criticism. Each of the variations was created both with and without wink emojis present. In total this leads to sixty-four text message scenarios for the sender condition and sixty-four for the receiver condition. Sarcasm is a

phenomenon where you state the opposite of what you mean, and thus the sarcastic comment presented as the last sentence of the Sarcastic Praise and Literal Criticism scenarios are similar. As well as the last comment of Sarcastic Criticism and Literal Praise being similar (see Table 1).

For the sarcastic message conditions, we modified the second message in the conversation to make the conversation more obviously sarcastic (see Table 1), all whilst trying to keep the messages similar to the Thompson and Filik (2016) materials. The scenarios for Literal conditions were kept identical to the original ones supplied, with the addition of a smiley in the necessary conditions.

Each of the message conversations were rated on five scales representing each of our dependent variables, for example “The last message is sarcastic.” (see Appendix A for full list of statements used). The scales presented were 7-point Likert scales (1 = strongly disagree, 7 = strongly agree).

The other material used in this study was the Sarcasm Self-report scale (SSS); Ivanko et al. (2004). The original scale contains sixteen items. Eight self-report questions about how sarcastic the participants rate themselves and eight questions which are scenario based. We chose to only use the first eight questions in our survey, similarly, to Dress et al. (2008) as well as Bowes and Katz (2011; see Appendix B for list of questions). Participants responded to these questions on a 7-point Likert scale, the labels differed depending on the question.

The wink emoji used to insert into the messages was the following: 🙄 (Unicode: U+1F609) from the website <https://emojipedia.org/winking-face/>. We chose to use the WhatsApp

form of this emoji, because the conversations were written in a WhatsApp format. All materials mentioned above are available on at the link of our preregistration on OSF⁵.

Procedure

Each participant first saw a consent form, informing them of the risks of the study as well as their rights to withdraw at any time. Following this each participant was randomly assigned to either the receiver or the sender condition.

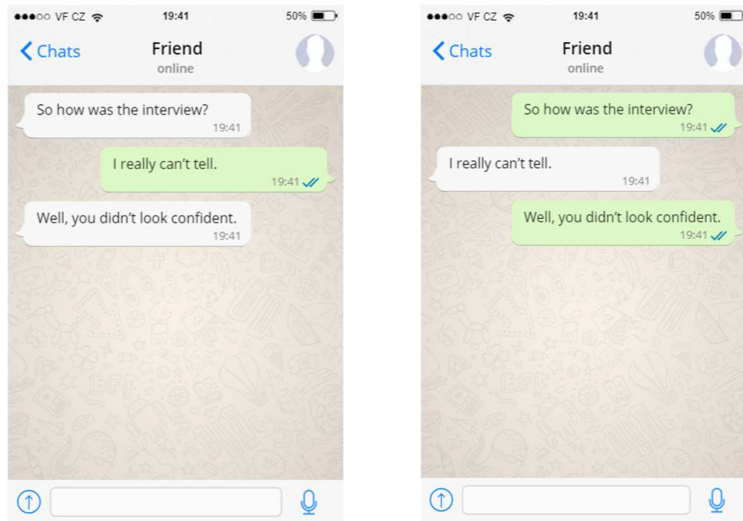
Both conditions saw a total of eight random text conversation scenarios representing each of the factors of the design. Each of the 8 conversation scenarios contained a total of three individual text messages. These messages were identical for both the sender and the receiver conditions, but the order of the messages was changed in order to make the scenario the most ecologically valid. In the receiver condition they saw a message from a friend, followed by a message that they hypothetically sent and a final response from a friend. In the sender condition they saw the opposite; two messages that they hypothetically sent and a response from a friend in the middle (see Figure 1).

For each scenario, the participants were asked to rate the last message of the conversation on five different scales (see Appendix A), which represented each of our dependent variables: sarcasm, humour, aggression, praise and criticism. The scales were positioned on the left, adjacent to the picture of the text conversation.

⁵ https://osf.io/j8943/?view_only=26b0735594ce43e4be5a52d5dfc0bbc0

Figure 1:

Side by side comparison of receiver versus sender condition stimulus material



Note: On the right is the receiver condition and on the left is the sender condition.

Once they had completed all eight trials, every participant, irrespective of condition, was asked for some simple demographic information (gender and age). Following this, they were asked to fill in the first eight items of the SSS (Ivanko et al., 2004). Lastly, participants were requested to input their Prolific ID, so that they could receive payment for taking part in the study.

Results

All analyses were carried out in line with the pre-registration of this study on OSF⁶, all of the collected data are also available there. The statistical analyses were completed with SPSS (Version 25; IBM, 2017).

An a priori power analysis was conducted in order to determine the minimum number of participants needed to be recruited. This test was based on the smallest effect size on the most

⁶ https://osf.io/j8943/?view_only=26b0735594ce43e4be5a52d5dfc0bbc0

comparable dependent variable in a recent project (Erle, Schmid, & Martin, 2020), which was Cohen's $d_z = 0.55$. Since for the focal hypotheses will conduct 5 paired samples t -tests, we aimed to achieve a power of $(1-\beta) = .95$ for all individual tests, resulting in an overall power of $.95^5 = .78$. The sample size needed to detect the target effect size with the target power in a set of two-tailed tests was $N = 45$. We decided to realize this sample size in both conditions of the design, resulting in a total sample size of $N = 90$.

Hypothesis 1 was analysed with a mixed ANOVA, a directional post-hoc test and four paired samples t -tests. Hypothesis 2 was analysed with a mixed ANOVAs and four paired samples t -tests for each dependant variable. The paired samples t -tests were used for post-hoc comparisons to further specify the hypotheses. The mixed ANOVAs mentioned above were 2 (Perspective: Sender vs. Receiver; between-subjects) x 2 (Message Type: Sarcastic vs. Literal; within-subjects) x 2 (Emoji: Emoji vs. Plain Text; within-subjects) x 2 (Message Valence: Criticism vs. Praise; within-subjects) with the factors stated above as independent variables.

Hypothesis 1

Sarcasm

We expected that smileys would lead to higher ratings of sarcasm. This would be supported by a significant main effect of Smiley within this analysis. Indeed, the analysis yielded a significant main effect of Smiley, $F(1, 87) = 37.27, p < .001, \eta_p^2 < .30$. A directional post-hoc test indeed revealed that mean sarcasm ratings for messages without smiley ($M_{plain} = 3.20, SD = 1.00$) were lower than for messages with smileys ($M_{smiley} = 4.10, SD = 1.11$), $t(89) = -6.28, p < 0.001$ (one-tailed).

However, the mixed ANOVA also revealed that this main effect was further qualified by a significant three-way interaction between Smiley, Message type and Message valence, $F(1, 87) =$

12.82, $p = .001$, $\eta_p^2 < .13$. Our hypothesis supposed that a smiley would increase sarcasm irrespectively of perspective, Message type and Message valence. To further specify our results, we conducted four post-hoc paired samples t -tests (Table 2).

Table 2

Paired sample t-tests for the dependant variable Sarcasm

Pair		<i>M</i>	<i>SD</i>	<i>t</i> -value	<i>p</i> -value
1	Neutral-Literal-Criticism	2.80	1.82	-6.10	0.000*
	Smiley-Literal-Criticism	4.56	1.95		
2	Neutral-Literal-Praise	2.89	1.95	-0.68	0.496
	Smiley-Literal-Praise	3.09	2.02		
3	Neutral-Sarcastic-Criticism	3.69	2.20	-1.48	0.141
	Smiley-Sarcastic-Criticism	4.20	2.26		
4	Neutral-Sarcastic-Praise	3.39	2.06	-4.35	0.000*
	Smiley-Sarcastic-Praise	4.57	2.04		

Note: * $p < 0.05$

These results show that for criticizing messages using a smiley will increase sarcasm ratings but only with literal messages, there is no significant increase for messages that are already sarcastic. For praise the opposite is found, using smileys will increase sarcasm ratings when the message is already sarcastic. There is no significant effect found for literal praise sentences.

With hypothesis 1 we expected an increase in sarcasm irrespectively of Perspective, Message type and Message valence. However, the analysis revealed an interaction between Smiley, Message type and Message valence. Therefore, Hypothesis 1 was not confirmed.

Hypotheses 2a-2d

The following sections represent the four dependant variables aggression, criticism, humour and praise. Here we conducted a mixed ANOVA as well as post-hoc paired samples t -tests to further specify our results, for each of the dependant variables. We predict two main effects, one of smiley as well as one of sarcasm. We predicted that sarcastic messages including a wink emoji would be rated differently than sarcastic messages not including this emoji. We predict that

sarcastic messages with a smiley will be the most sarcastic. Followed by sarcastic messages without a smiley as well as literal messages with a smiley. The least sarcastic messages should be the literal messages without a smiley. This would be supported by a significant main effect of Smiley and Message type within this analysis of each dependant variable. We formulated a non-directional hypothesis to investigate whether the Tinge or the Enhance hypothesis came into play with the addition of smileys to the literal and sarcastic messages.

Aggression

The analysis revealed a significant main effect of Smiley, $F(1, 87) = 27.73, p < .001, \eta_p^2 = .20$, as well as a non-significant main effect of Message type, $F(1, 87) = 0.74, p = .391, \eta_p^2 = .008$. However, we also found a significant three-way interaction between Smiley, Message type and Message valence, $F(1, 87) = 15.74, p < .001, \eta^2 > .15$. This significant interaction effect renders us unable to interpret the main effect of Smiley. Thus, leading us to our post-post hoc t -tests (Table 3). This was the case for all four dependent variables.

Table 3

Paired sample t-tests for the dependant variable Aggression

Pair		<i>M</i>	<i>SD</i>	<i>t</i> -value	<i>p</i> -value
1	Neutral-Literal-Criticism	4.14	1.82	4.48	0.000*
	Smiley-Literal-Criticism	3.14	1.81		
2	Neutral-Literal-Praise	1.89	1.20	-0.83	0.406
	Smiley-Literal-Praise	1.99	1.40		
3	Neutral-Sarcastic-Criticism	2.30	1.55	1.22	0.226
	Smiley-Sarcastic-Criticism	2.06	1.43		
4	Neutral-Sarcastic-Praise	4.02	1.84	3.40	0.001*
	Smiley-Sarcastic-Praise	3.20	1.78		

Note: * $p < 0.05$

These results show that for critical messages using a smiley will decrease aggression ratings but only with literal messages, there is no significant decrease for messages that are already

sarcastic. For praise the opposite is found, using smileys will decrease sarcasm ratings when the message is already sarcastic. There is no significant effect found for literal praise sentences.

Criticism

The analysis revealed a significant main effect of Smiley, $F(1, 87) = 19.31, p < .001, \eta_p^2 = .18$ as well as a non-significant main effect of Message type, $F(1, 87) = 0.11, p = .738, \eta_p^2 = .001$. However, we also found a significant three-way interaction between Smiley, Message type and Message valence, $F(1, 87) = 23.844, p < .001, \eta_p^2 > .21$. This significant interaction leads us once again to our post-hoc t -tests (Table 4).

For criticism we find the same direction of effects as we do for aggression. The presence of smileys significantly decreases criticism ratings with literal critical phrases but not with phrases that are already sarcastic. Additionally, the smiley, significantly decreases criticism ratings with sarcastic praise sentences but not with literal praise sentences.

For critical messages, sarcasm shows a tingeing effect. For praising messages, it enhances the aggression and criticism ratings.

Table 4

Paired sample t-tests for the dependant variable Criticism

Pair		<i>M</i>	<i>SD</i>	<i>t</i> -value	<i>p</i> -value
1	Neutral-Literal-Criticism	5.21	1.57	5.74	0.000*
	Smiley-Literal-Criticism	3.84	1.87		
2	Neutral-Literal-Praise	2.24	1.51	-0.98	0.330
	Smiley-Literal-Praise	2.46	1.63		
3	Neutral-Sarcastic-Criticism	2.61	1.62	-0.84	0.406
	Smiley-Sarcastic-Criticism	2.80	1.78		
4	Neutral-Sarcastic-Praise	4.74	1.87	3.77	0.000*
	Smiley-Sarcastic-Praise	3.85	1.98		

Note: * $p < 0.05$

Humor

The analysis revealed a significant main effect of Smiley, $F(1, 87) = 84.17, p < .001, \eta_p^2 < .50$ as well as a significant main effect of Message type, $F(1, 87) = 10.79, p = .001, \eta_p^2 = .110$. However, we also found a significant three-way interaction between Smiley, Message type and Message valence, $F(1, 87) = 10.14, p = .002, \eta_p^2 > .10$. We followed up with the post-post hoc t -tests (Table 5).

The results show that all the paired t -test showed significant differences. Smileys significantly increase the humor rating with literal critical, literal praise, sarcastic critical as well as sarcastic praise sentences.

Smileys generally make sentences seem funnier and they are more important than sarcastic versus literal message effects. Here we find evidence for the enhance hypothesis.

Table 5

Paired sample t -tests for the dependant variable Humour

Pair		<i>M</i>	<i>SD</i>	<i>t</i> -value	<i>p</i> -value
1	Neutral-Literal-Criticism	2.50	1.71	-8.96	0.000*
	Smiley-Literal-Criticism	4.52	1.66		
2	Neutral-Literal-Praise	2.40	1.57	-4.34	0.000*
	Smiley-Literal-Praise	3.42	1.82		
3	Neutral-Sarcastic-Criticism	3.17	1.91	-3.16	0.002*
	Smiley-Sarcastic-Criticism	4.10	1.96		
4	Neutral-Sarcastic-Praise	2.78	1.85	-6.62	0.000*
	Smiley-Sarcastic-Praise	4.28	1.78		

Note: * $p < 0.05$

Praise

The analysis revealed a significant main effect of Smiley, $F(1, 87) = 4.41, p = .039, \eta_p^2 = .048$, as well as a non-significant main effect of Message type, $F(1, 87) = 2.81, p = .097, \eta_p^2 = .031$. However, we also found a significant three-way interaction between Smiley, Message type and Message valence, $F(1, 87) = 5.804, p = .018, \eta_p^2 = .06$. Followed by post-post hoc t -tests (Table 6).

These results show that the praise ratings significantly increase when smileys are introduced in the literal criticism condition, but this effect is not present when the critical sentences are already sarcastic. For critical messages, sarcasm “enhances” praise ratings. Additionally, we can see that smileys significantly increase the praise ratings in the sarcastic praise condition but not when the praising sentence is literal.

Table 6

Paired sample t-tests for the dependant variable Praise

Pair		<i>M</i>	<i>SD</i>	<i>t-value</i>	<i>p-value</i>
1	Neutral-Literal-Criticism	2.08	1.33	-3.16	0.002*
	Smiley-Literal-Criticism	2.61	1.52		
2	Neutral-Literal-Praise	4.68	2.11	0.04	0.973
	Smiley-Literal-Praise	4.67	1.94		
3	Neutral-Sarcastic-Criticism	3.94	2.14	0.46	0.650
	Smiley-Sarcastic-Criticism	3.80	2.12		
4	Neutral-Sarcastic-Praise	2.35	1.60	-3.04	0.003*
	Smiley-Sarcastic-Praise	3.11	1.88		

Note: * $p < 0.05$

Summary of Hypothesis 2a-d results

Based on the Tinge hypothesis (Dews & Winner, 1995), we expected that literal messages would receive higher ratings on all the dimensions than the sarcastic messages. This would be indicated by a main effect of Message Type. As well as a tinging effect of the smiley which make the message appear more sarcastic. This would be indicated by another, independent main effect of Smiley.

Based on the Enhance hypothesis (Colston, 1997), it would be expected that literal messages receive lower ratings on all of these dimensions than sarcastic messages - indicated by a main effect of Message Type. In addition, since smileys make a message seem more sarcastic, they will also "enhance" the effects of the respective messages - which would be indicated by another,

independent main effect of Smiley. The direction of both effects is opposite of what the tinge hypothesis would predict.

The analyses showed evidence for both the Tinge and the Enhance hypothesis depending on the observed dimension. Thus, hypothesis 2 is neither confirmed nor unconfirmed.

Exploratory Analysis

For the final exploratory analysis, we want to explore whether there were differences between the senders and receivers for the smiley and the non-smiley conditions. There are two different ways that we chose to explore our data for this question: by looking at the means or by inspecting variances.

Firstly, we looked into the means. If the sender is being sarcastic and the receiver understands it correctly then the rating on all the dependent variables will be similar. We looked at the ANOVA results concerning the interaction between sender versus receiver and smiley versus non-smiley conditions. We found an insignificant effect $F(1, 87) = 0.001, p = .971, \eta_p^2 = .000$. This indicates that senders and receivers give similar ratings on all the dependent variables. Additionally, the absence of an interaction indicates that: regardless of smiley presence people in the sender and receiver condition rate the messages similarly.

Secondly, we looked at the variances. We did this by conducting a Levenes-Test for equality of variances for all five dependent variables. Should the senders and the receivers understand messages in a similar way, then we expect there to be less variance. We anticipate the variances to be smaller for messages with smileys than messages without if the addition of smileys eases communication. We find mixed evidence based on our hypothesis. From our Levenes-Tests we found no effect of humor, the variances are equal $F(1, 718) = 1.97, p = .193$. There are trends for sarcasm and praise. For sarcasm $F(1, 718) = 2.94, p = .087$ smileys increase the variance. For

praise $F(1, 718) = 3.30, p = .070$ smileys reduce variance. Finally, smileys indeed significantly reduce the variance for criticism $F(1, 718) = 9.20, p = .003$ and aggression $F(1, 718) = 9.69, p = .002$.

We will use the following section of this thesis to discuss our results in more depth. In addition to this, we will discuss the limitations of our study as well as suggestions for future research.

Discussion

More and more often people are relying on computers and mobiles to assist them with communication. This computer mediated communication (CMC) is prone to miscomprehension due to the lack of nonverbal cues such as, tone of voice, hand movements or facial expressions. These nonverbal cues are essential to understanding the subtleties ingrained in communication. In this thesis we aimed to assess how emojis affect the comprehension and interpretation of sarcasm in CMC through the lens of two prominent theories in the realm of sarcasm; the Tinge (Dews & Winner, 1995) and the Enhance hypotheses (Colston, 1997). We created two main hypotheses to investigate as well as a third exploratory hypothesis. Firstly, we postulated that the wink emoji would lead to higher ratings of sarcasm detection in all messages where the emoji was present. Secondly, we predicted that smileys would function independently of the other variables this would be supported by a significant main effect of Smiley and Message type within this analysis of each dependant variable. Lastly, we are interested whether there were differences in the means and variances between senders and receivers when comparing the smiley and the non-smiley messages.

Our results firstly showed that, the addition of the wink emoji does not unanimously increase the perception of sarcasm, this perception seems to be dependent on whether the message is sarcastic or literal as well as if the message is praising or criticizing someone. These results

contradict our first hypothesis. Secondly, we found that, the wink emoji can lead to an Enhancing or a Tingeing effect on sarcastic intentions depending on whether the message is sarcastic or literal as well as if the message is praising or criticizing someone. Lastly, we found no indication of differences between senders and receivers on their perception of the dependent variables. Indicating that, overall, communication works quite well, if senders believe they are being sarcastic, receivers interpret it in the same way.

In the next paragraph we will further interpret our results, this is divided into sections corresponding the perception of sarcasm and then the intentions.

Sarcasm perception

For the dependent variable Sarcasm, we expected that smileys would enhance sarcasm ratings for all messages, but this was only the case for outwardly negative sentences (literal criticism and sarcastic praise). There was no difference for outwardly positive sentences (literal praise and sarcastic criticism). We interpret these findings as showing that smileys emphasize sarcasm whenever the message is outwardly negative. Thus, our study shows that the wink smiley does not unanimously increase the perception of sarcasm within a sentence.

This extends the findings of Thompson and Filik (2017), who found that the wink smiley was most often chosen to make a sentence seem more sarcastic. In addition to this, they found that the use of the ellipsis (“...”) and the tongue emoticon (“:P”) were also popular choices. Their study indicates that the tongue face, wink face, and ellipsis appear at different rates depending on the kind of sentence presented. For example, the ellipsis appeared most often in sarcastic criticism. It is possible that this is the case because an ellipsis is more ambiguous than a smiley. This could imply that people choose different kinds of visual aids to represent sarcasm within the different kinds of sentences, depending on if they seem positive or negative at first sight. Which could

explain why the wink smiley did not increase sarcasm perception in all of the different kinds of sentences presented in our study.

Sarcastic Intensions

For all the dependent variables included in the second hypothesis (aggression, criticism, humor and praise) we had non directional predictions concerning the Tinge and the Enhance hypothesis. If the Tinge hypothesis was found, then we expected that literal messages would receive higher ratings on all the dimensions than the sarcastic messages. On the other hand, if the Enhance hypothesis was found, we expected that literal messages would receive lower ratings on all of these dimensions than sarcastic messages.

For the dependent variables Aggression and Criticism, we found very similar patterns. Sarcastic criticism was overall rated lower than literal criticism. This suggests a Tingeing effect in which sarcasm aids in diminishing aggression and criticism ratings. For praising messages, we find the opposite, that sarcastic messages are rated higher than literal ones. Indicating an Enhancing effect. Smileys seem to carry out a similar function to sarcasm itself by making outwardly negative sentences appear less aggressive and less critical. In this situation the most negative options were literal criticism or sarcastic praise. A sarcastic praise message with a smiley is still not truly positive, but it is less negative than a sarcastic praise without a smiley. We find within our comparisons that smileys are the tinging agents not sarcasm in the sentence itself. To summarize, for critical messages sarcasm tinges but for praising messages it enhances the ratings of aggression and criticism.

For the dependent variable Praise, we find the opposite of what we found for aggression and criticism. The addition of the smiley makes outwardly negative sentences seem more praising. We should take away from this is that: regardless of smileys, literal praise is rated much more

highly than sarcastic praise. This suggests that if you wish to praise someone, you should not use sarcasm because it will reduce the perception of praise. To summarize, for critical messages and literal messages sarcasm creates a tingeing effect. Because it makes critical messages seem more praising and praising messages seem less praising.

For the dependent variable Humor, we found that the smileys make all messages appear more humorous. In terms of which effect (tinge or enhance) is at play here the data is unclear because all ratings increase with the addition of smileys. However, what we can see from the data is that the addition of a smiley (versus no smiley) is much more influential for the ratings on humor than the presence of a sarcastic (versus literal) utterance.

In regard to our hypotheses, these results are very mixed. There seems to be evidence for both the Tinge (Dews & Winner, 1995) and the Enhance (Colston, 1997) hypothesis, simply in different circumstances. We find Tingeing effects for critical messages for the dependent variables of aggression and criticism as well critical and praising messages for the dependent variable of praise. On the other hand, we find Enhancing effects for praising messages for the dependent variables of aggression and criticism, as well as a kind of enhancing effect for both critical and praising messages for the dependent variable of humor. We can attempt to explain these results with the help of the EASI model by Van Kleef (2009).

The EASI model states that, in face to face communication, facial expression can influence others by two different routes: via the noetic pathway and emotional contagion. When influenced via the emotional contagion pathway, the person being communicated with will mirror the emotion that has been shown to them. For example, if a person looks sad it makes you feel sad. With the noetic pathway when you are communicating with someone you reason about the meaning behind the facial expressions being shown to you. After having reasoned about meaning, you adapt your

emotions. For example, someone looks sad, you contemplate the reasons they might be sad then respond the appropriate emotion. You could apologize if you think you caused their sadness or maybe compassion if something external caused their sadness. We could suppose that the results found for the dependent variable humor are due to the emotional contagion pathway. People see the wink smiley, which is known to be positively valenced (Jaeger, Roigard, Jin, Vidal, & Ares, 2019). Thus, they feel happy and rate the message as funny. For the results of aggression, criticism and praise people seem to require an interpretation of the meaning behind the presented smiley, using the noetic pathway, not simply adopting the positive emotion. In the case of these dependent variables people first consider if a person is being honest or sarcastic subsequently to that they adapt their responses.

Limitations

Before interpreting these results with too much confidence, however, some limitations of this research need to be stated. Our survey contained a total of 64 message variations of which participants only saw a total of 8. Each conversation was kept simple with a total of three messages to avoid large differences between all the scenarios. It might have been wise to show participants a larger number of messages varying in length which covered larger varieties of daily situations. Our choices for this study did not necessarily detract from the validity but more variety could have led to a more ecologically validity.

A second limitation to be considered is that we used pre-defined scripts. The text messages were created by the authors in order to minimize confounds and differences between the participants. However, this does somewhat reduce the ecological validity, because participants are trying to picture themselves in a scenario but not coming up with these messages on their own. In the future we could suggest that participants have an actual conversation with a fellow participant

or research assistant via text message. Another possibility would be having the participant choose their response from a pre-defined bank of messages. In this way, the participants would have more freedom over the conversation than in our study, but the researchers still maintain control over the conversation contents.

A final limitation to be taken into account was the online format of our study. Due to the Coronavirus pandemic it was not possible for us to collect data in laboratory settings. We believe that we obtained the best results possible given the circumstances. Nevertheless, it is possible that due to the relaxed nature of the online testing, people may have been distracted and could have answered the questions haphazardly in order to be paid.

Future research

Future research has a multitude of directions in which it could continue to explore the realm of sarcasm and smileys in CMC. Firstly, it is apparent from this research that the question of Tinge or Enhance cannot be answered on a two dimensional, yes or no, scale. Future research should strive to understand and document the nuance between the two hypotheses. Possibly by broadening the list of intensions behind sarcasm and measuring them with more subtle and a multitude of different measuring items. Or by further analyzing the differences between criticism and praise as well as sarcastic and literal sentences.

Secondly, it is possible that there are confounding factors or covariates which were not considered in this thesis. Such as individual differences in the ability to detect sarcasm. Sarcasm is, in a sense, a form of lying. Lie detection relies on the ability to interpret “speaker’s intentions, contextual and paralinguistic information processing, pragmatic knowledge, visual perspective taking, emotion reading, and theory of mind (ToM; representing others’ beliefs, opinions and intentions).” (Shany-Ur et al., 2012). Taking all of these aspects into account it is probable that

people vary on the ability to perform all of these tasks successfully, and thus effecting their ability to detect sarcasm. It could be interesting to see if sarcasm detection and lie detection are truly related in future studies.

Thirdly, it might yield fascinating results to perform larger cross-cultural studies. Dress et al. (2008) found that sarcasm has regional variations. In the USA northern participants self-reported using sarcasm more often than their southern counterparts. They also indicated that sarcasm involved more humour than southern participants. This implies that different regions could define the intensions behind sarcasm differently as well as using sarcasm in different circumstances. This would also create variations in the ability to detect sarcasm, should it be used in a context in which one is not used to it.

Lastly, there is a requirement for more in-depth research on the differences between the intensions of the sender and the impressions of the receiver of sarcasm in CMC. As we discussed previously CMC is scattered with opportunities for misunderstandings, due to the lack of non-verbal cues. In this study we attempted to gain some knowledge in this domain with our exploratory research question. However, the statistical testing was very minimal. It would be noteworthy in the future to inspect the differences between sender and receiver for all of the different kinds of messages (critical/ praise/ literal/ sarcastic) rather than just the mean for the dependent variables that we measured here.

Conlusion

From this thesis we can conclude that the situations in which smileys are most effective at increasing sarcasm, as well as increasing ratings the other dependent variables in the desired ways are the are the outwardly negative sentences (literal criticism and the sarcastic praise). In these situations, adding the emoji made the scenario appear less aggressive, less critical and more

praising. This is an indication of the positive being increased and the negatives decreasing. Which evidently would be a positive action to part take in should one want to appear to be a nice person. However, one must not neglect the intention behind the message. Should someone purposefully want to send a critical message, it would not be wise to include a smiley, as it would distract from the true meaning and purpose of the criticism itself. But if you feel your message is overly critical, the addition of a smiley could work in your favour. This would decrease the aggressiveness and criticism of your message as well as increasing the praise. Thus, adding a smiley in situations where you would like to appear serious can lead to confusion. Your interlocuter will consider your sentence to be a joke. The human brain seems to interpret smileys in the same way as it does nonverbal cues in the realm of sarcasm (Weissman & Tanner, 2018). Thus, if you imagine yourself smiling after a sentence in face to face communication then it might wise to add it to the message also, in order to improve clarity.

The dependant variable of humour requires a different conclusion. We found that in any message the addition of a smiley increases humor ratings. This finding is likely to more closely tied to the affective properties of the wink smiley. The wink smiley can also be considered as the indication of a joke or humour. Thus, when it comes to studying the intention behind sarcasm, it is important to distinguish between the different mechanisms. Such as the ones in the EASI model by Van Kleef (2009). A smiley can convey sarcasm, but it can also signal other things.

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Appendix A*Full list of statements used to measure our dependent variables*

1)	The last message is sarcastic.
2)	The last message is humorous.
3)	The last message is aggressive.
4)	The last message is praising someone.
5)	The last message is criticising someone.

Appendix B*List of questions used from the Sarcasm Self-report Scale*

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- 1) What is the likelihood that you would use sarcasm with someone you just met?
 - 2) How sarcastic do you think you are?
 - 3) What is the likelihood that you would use sarcasm when insulting someone?
 - 4) What is the likelihood that you would use sarcasm with your best friend?
 - 5) How sarcastic would your friends say you are?
 - 6) What is the likelihood that you would use sarcasm with a new colleague at work?
 - 7) What is the likelihood that you would use sarcasm while complementing someone?
 - 8) How often do you make sarcastic statements during daily interactions?
-

Source: Adapted from Ivanko et al. 2004

Note: Questions 1,3,4, and 6 (1 = not likely, 7 = very likely), questions 2 and 5 (1 = not at all, 7 = very) and question 8 (1 = never, 7 = very often).

