Putting aside your emojis:

The effect of multimodal relationships on the processing of emojis in computer-mediated communications.

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Abstract

Emojis have become an important aspect in our computer-mediated communications. Using emojis allows us to add a certain meaning within a text. However, questions remain regarding the cognitive costs of using emojis in CMC, which was examined in two experiments. In Experiment 1, we assessed preference of three multimodal relationships between text and emojis: congruent (matching the sentiment of the sentence), elaborative (representations of emotions or symbols to elaborate on a certain meaning) and incongruent relationships (non-matching depictions of objects or emotions that did not fit the context), and found a strong preference for congruent multimodal relationships. In Experiment 2, participants' processing of the aforementioned multimodal relationships showed that the type of relationship affects processing, with elaborative relationships requiring a longer time to process and showing lower answer accuracy than the other multimodal relationships. Overall, these results show that the type of multimodal relationship between text and emoji causes cognitive costs when applying these relationships to CMC.

Keywords: emojis, computer-mediated communication, digital communication, text processing.

Introduction

The way we communicate with each other has evolved over the years. Modern ways of communicating, such as email and texting, have taken a prominent role within society. But text in itself does not express much emotion. With the introduction of emojis we have gained the ability to enrich our written text with various symbols. Emojis are pictographic expressions used in texting and social media settings which are often used to convey meaning (Danesi, 2016) and humanize digital messages (Hakami, 2017). Usage of emojis has gained in popularity in recent years, likely due to the adoption of these pictographs in popular applications and mobile devices.

However, these emojis follow interpretation trends which vary the meaning of these emojis (Miller et al., 2016). With over 2,800 emojis available during the time of writing, it comes as no surprise that there is room for different interpretations. This difference comes from different multimodal relations between text and emojis. The difference in interpretation may especially be the case in elaborative relationships (e.g. elaboration on a sentence's meaning 😍) compared to congruent relations (e.g. terms displayed in pictographic form 💩). Given that the meaning of emojis may vary, one could argue that using these symbols to humanize a message may change the processing of these multimodal relationships. This study sets out to determine how these pictographs change the way we process multimodal relations between text and emojis and at what cost. The first part of this study discusses the multimodal interpretations of emojis and their preference within sentences. The second part will discuss the processing of interpreting different multimodal relationships created by combining text with emojis. By combining these two aspects of emojis this study aims to find how we interpret emojis and its effect on processing, adding to research regarding emotions in computer-mediated communications.

Literature Review

Emojis saw their first light in Japan as part of predefined images available on mobile phones, but became a worldwide trend in communication. The adoption of emojis by companies such as Google, Apple, and Samsung caused these colorful pictographs to be known worldwide. The word *emoji* stems from the Japanese *e* (絵), meaning picture, and *moji* (文字), meaning character, and can be defined as a collection of symbols and pictographs, collected in the Unicode standard that is used worldwide. These pictographs display a wide variety of meaning through emotions, gestures, objects, places, etc. via one-unit images. With over 2,800 different emojis at the time of writing, its worldwide use, and even a dedicated movie about emojis released in 2017, this 'language of symbols' has grown to become one of the most important communicative tools of the 21st century.

The quick and continuous advance of emoji goes hand in hand with the growing importance of computer-mediated communication (CMC). Texting, email, and communicating through social media have become prominent ways of communicating in today's society. In its early days, CMC was considered too formal and not rich enough to convey insight and understanding compared to personal sources (Daft & Lengel, 1984), as well as ineffective for interpersonal exchanges. And according to Dubrovsky, Kiesler and Sethna (1991), CMC would "scant social information". But if those assumptions were correct, it would seem illogical to use CMC as one of our most important ways of communicating.

Human communication knows various forms and is, in its natural state, a multimodal process that gets exemplified with face-to-face interactions by the concurrence of speech and gestures (McNeill, 2000). The tone we use in utterances, the natural gestures that accompany speech, the body language, the signals we produce, it all contributes to meaning of

communications. By utilizing these different modalities at certain moments, we exchange lots of information with other human in a more efficient way. Van Wassenhove et al. (2005) showed that information that is presented in multiple modalities is processed faster and better. Human communication is therefore a complex process that involves multiple modalities that convey meaning in a more efficient way by combining these modalities into a cohesive message.

When looking at the basic characteristics of CMC it seems that it lacks these complex processes and modalities that exist in verbal communication. CMC is at its core just text expressed via an online medium, and text by itself does not contain gestures or intonation we find in face-to-face communications. Since the introduction of email concerns were raised that the lack of nonverbal cues would limit the expression of meaning (Sarbaugh-Thompson & Feldman, 1998) and the lack of regulating cues (e.g. nods, smiles, tone of voice) could cause problems that would not be present in human communication (Kiesler, Siegel, & McGuire, 1984). Later research showed that CMC was not as rigid and limited as was assumed early on. Some argued that the differences between CMC and face-to-face communication are very little and not as obvious as previous studies showed, and may even dissolve over time (Walther, Anderson, & Park, 1994; Walther, 1992; Walther & Burgoon, 1992). Others, such as Spears, Lea, Corneliussen, Postmes & Ter Haar (2002), argued that CMC may filter out social cues, but the most important cues are still noticeable. According to the literature review by Derks et al. (2008), CMC is not less emotional or personally involved when conveying a message compared to other forms of communication but relies on different ways of conveying meaning compared to face-to-face communication.

These different ways of conveying meaning in CMC rely on different multimodal relations within a text, compared to face-to-face communication. In the early days of CMC, people applied obvious textual cues and emoticons to their texts to convey the intended meaning. As Rezabek &

Cochenour (1998) stated: “Because the use of email eliminates visual cues such as head nodding, facial expressions, posture, and eye contact found in face-to-face communication, CMC users often incorporate emoticons as visual cues to augment the meaning of textual electronic messages” (pp. 201-202). By applying these emoticons, which are representations of facial expressions through various keyboard characters, helps accentuate a certain tone within the message (Crystal, 2001). Similarly, Thompson and Filik (2016) showed that emoticons play an important role in clarifying message intention within CMC. By combining modalities such as written language and single images, a multimodal interaction is formed to convey additional meaning.

These efforts of augmenting meaning of a text in CMC require a different approach as opposed to face-to-face interactions. The sequential organizations of turns in online textual interactions is different compared to face-to-face interactions. (Petitjean & Morel, 2017). Participants of online textual interactions rely solely on sequential ordering, whereas face-to-face communications have visual and aural cues that are perceived at the same time (Schönfeldt & Golato, 2003). In contrast, using emoticons or emojis to interact with text to convey additional meaning means you have to choose at what point in a text the interaction between the image and the text takes place. It is due to this dependency on sequential ordering that we find disorder and lack of coherence in CMC interactions, as opposed to face-to-face interactions. (Gibson, Huang, & Yu, 2018; Degand & Van Bergen, 2016; Petitjean & Morel). These disorders and lack of coherence can lead to different types of misplacements, such as *phantom adjacency*, where it appears that sequential interactions relate, but they do not (Garcia & Jacobs, 1999).

Not only do these emoticons and emojis differ in their placement within communications compared to face-to-face communications, the emotions they display are different as well. They lack the *signs given off* (Goffman, 1959) that we transmit when engaging with another person, in

person. It may seem obvious that there is a difference in the display of emotions between CMC and face-to-face communications, as face-to-face communication allows us to observe a variety of multimodal interactions and subtle cues to determine the displayed emotion compared to emoticons or emojis. However, research suggests that there are some aspects that act in a similar way. For instance, Lo (2008) stated that emoticons may function as nonverbal behavior, presented in a verbal manner. Walther & D'Addario (2001) argued that emoticons could be used to emphasize the tone and general emotion of a text, but that it lacks gestures and body language that you otherwise observe and use to determine meaning. It is an intentional display, whereas nonverbal communication in general is less intentional. Derks et al. (2008) found that emoticons offer similar cues of emotion as nonverbal communication in face-to-face encounters. Thus, emoticons and emojis in text play a similar role in conveying meaning as nonverbal cues, but in a deliberate way that relies on different multimodal relationships.

Emoticons and emojis are *atactic* images, single images with no grammar, that depict emotions and symbols to aid in the display of meaning in CMC. But whereas emoticons are limited in their expression, emojis offer a wide range of meanings to convey in CMC through symbols, facial expressions, and objects. We commonly use emojis that display facial expressions, hand gestures, and displays of affection (e.g. lipstick kiss, hearts, etc.) (SwiftKey, 2015) when communicating via CMC. These specific depictions may represent certain gestures or aspects of body language, but their representations are using conventionalized visual vocabulary. For instance, "Smiling Face with Heart-Eyes" (😍), "Grinning Face with Sweat" (😅), and "Dizzy Face" (😵) use visual morphology based on the Japanese visual language found in comics (Cohn & Ehly, 2015), whereas symbols that depict actions such as "Waving Hand" (👋) depend on

common affixations. Due to the conventionalized nature of emojis we are able to assign certain meaning to multimodal interactions between text and emojis.

However, communicating with emojis may not be that straightforward, as the meaning of emojis may not be straightforward. Emoji meaning has been a popular topic of discussion within the emoji literature. Given the wide range of meanings that emojis can display, one could question whether the meaning of each emoji is similar amongst individuals. Lu et al. (2016) argued that emojis are a universal language that bridges cultures, making for a language that can be understood worldwide. This finding can be questioned as emoji use varies from country to country, with a variety of commonly used emojis per country (SwiftKey, 2015). And as Barbieri, Kruszewski, Ronzano, & Saggion (2016) state, there may be an overlap in meaning for some emojis across various countries, there are exceptions that can be interpreted differently. The overlap of meaning may be due to the conventionalized visual language of some emojis, which employ common symbolism or visual vocabulary to depict a certain meaning. However, some emojis may still be interpreted differently, which could lead to misunderstandings and miscommunications (Miller et al., 2016).

The interpretation of an emoji and whether it is prone to different interpretations may depend on the type of multimodal interaction of the emoji with text. Within emoji and their multimodal interactions use we can distinguish two common uses: emojis that follow a sentence or are substituted in it (Cramer, de Juan, & Teltreault, 2016). Emojis used as substitutes are usually displays of congruent meanings that function as a substitute for certain words, e.g. automobile' (🚗), and 'tree' (🌳). As a substitute, emojis are mostly used to enrich text, replace works, or even display certain events or sayings in a sequential, linear form, e.g. 'running late'(🏃🕐), or 'dumpster fire'(🗑🔥). Emojis that follow a sentence are more often used to add additional

meaning to the text. These emojis convey a less obvious meaning and are often used to elaborate a certain meaning or emphasize an emotion (Thompson & Filik, 2016). For example, a statement such as “I’m home alone” yields no more meaning than the statement of being home alone. Adding an emoji after the sentence, to elaborate on the intended meaning, changes the meaning entirely: “I’m home alone 😉”. The intended tone and emotion of the original statement has been altered and now yields a different meaning.

These *elaborative* emojis are mostly considered to be face emojis, as these express a visual representation of conventionalized nonverbal cues that represent their face-to-face counterpart (Derks et al., 2008). However, emojis in general can be considered ideograms or symbolic representations of concepts (Stark & Crawford, 2015). For example, the ‘eggplant’ (🍆) is considered to be a symbolic representation for male genitalia. This means that the meaning of emojis, whether it is literal or nonliteral, elaborative or descriptive, ambiguous or unambiguous, is flexible and can vary between people and may even differ depending on relations (Riordan, 2017).

This flexibility in interpretation of emoji might have an effect on how we process sentences and the multimodal interactions that emojis initiate. Although it appears that the comprehensibility of a sentence is not affected by the use of literal emojis as substitutes (Cohn, Roijackers, Schaap, & Engelen, 2018), the time it takes to process a sentence that includes substitutive emojis is longer than sentences with words (Gustafsson, 2016; Cohn et al., 2018). But whereas most literature focuses on these substitutive emojis and the cost on processing them, little research has been done on the elaborative side of emojis.

This paper sets out to extend on previous studies regarding the meaning and processing of emoji. We evaluate the interpretations of emoji meaning within context (Experiment 1) and

explore the processing of how emoji relate to a sentence (Experiment 2). By doing so, we aim to offer new insights in the multimodal aspect of emojis expressed via CMC.

Experiment 1

Emojis offer the possibility to insert meanings into CMC in a verbal form that represents non-verbal cues. However, these cues are often met with high levels of ambiguity (Hakami, 2017). Their interpretation can differ from person to person, and thus it is possible that emojis can cause misunderstandings and miscommunications (Miller et al., 2016).

According to Miller et al. (2016), two people require the same interpretation of a certain signal in order to achieve a successful conversation. These cues are often non-verbal conversational cues, like gestures, facial expressions, and intonation, and help us add meaning to communications (McNeill, 2002). However, when transmitting these signals and cues we assume the receiver understands them and interprets them as intended, which is not always the case. Differences in interpretation can therefore cause miscommunication (Miller et al., 2016).

With the introduction of CMC, concerns were raised due to the lack of these nonverbal cues, making it more likely that CMC would be prone to misunderstandings (Sarbaugh-Thompson & Feldman, 1998; Riva, 2002). But as Derks et al. (2008) argued in their literature review, CMC may not be less emotionally involved compared to other forms of communication. It does, however, rely on different ways of conveying meaning. Nowadays, these different ways of conveying meaning often consist of the use of emojis.

Emojis possess a certain scope of how their meanings can be interpreted by individuals (Tigwell & Flatla, 2016), making them potentially prone to misunderstanding due to varying interpretations. There are two common reasons why emojis are misinterpreted, these being their

varying design across different platforms, or because people's opinions on what an emoji displays vary (Miller et al., 2016). Although emojis as a single image may be open for interpretation, it seems likely that text limits the scope of the meaning that the emoji displays. However, according to Miller, Kluver, Thebault-Spieker, Terveen, and Hecht (2017) these misinterpretations occur when surrounded by text as well. This may be due to the different multimodal relations text and emojis can form. In this regard, Riordan (2017) argues that the meaning of emojis can change, depending on the context and even the relations between people communicating. Thus, it makes sense that emojis vary in their interpretation, depending on people's opinions, context, and relations.

When pairing emojis with sentences a multimodal relationship is created. These relationships can differ, thus creating specific meaning. But as Medlock and McCulloch (2016) argued, emojis are more likely to be misinterpreted in context compared to emojis as a single image. This may indicate that we are more likely to use emojis that create a multimodal relationship to prevent or minimize miscommunication, such as substitutions (Miller et al., 2017). On the other hand, using emojis to create various multimodal relationships allows us to emphasize meaning which may elaborate on the context of the text (Thompson & Filik, 2016). Thus, the question arises if we have a preference in multimodal relationships when pairing emojis with sentences. Are we more likely to pick emojis that clarify the meaning of a sentence, or do we prefer to elaborate on the meaning of a sentence? By asking participants what type of emoji they would pair with a formulated sentence we aim to determine whether there is a preference of multimodal relationships when using emojis.

In addition to preference, we look at potential relations between emoji expertise and its relation to preference. This emoji expertise score aims to quantify individuals' perception of their

emoji knowledge. It displays emoji fluency and frequency of emoji use, and was appropriately dubbed Emoji Language Fluency-score, or ELF-score in short.

Method

Stimuli

We created 10 sentences which consisted of various statements, which were paired with three options with each a different emoji (Appendix A). Participants were asked which emoji they would use in the sentence. The first option was a congruent emoji that matched the sentiment of the statement based on the definition stated on Emojipedia, e.g. “My cat just died 😭 “, depicting a crying face that matches the sentiment. The second option was an incongruent emoji that did not match the sentiment of the statement, e.g. “My cat just died 😂”. The third option depicted an elaborative emoji that could match the sentiment of the statement, albeit less clear than the first option, e.g. “My cat just died 😶”. The emoji still elaborates on the sentiment, but in a different and less obvious form.

Participants

We recruited 120 participants via snowball sampling, using social circles and online platforms (e.g. Reddit). Of these participants, 81 were female, 37 were male, and two selected a different gender. The average age of participants was 25.8 (SD = 8.90) with a range of 13 to 58. Using the Emoji Language Fluency (ELF) score participants reported high overall emoji expertise (M = 0.438, SD = 0.21) well beyond the high average score (Table 1). Measured on a 7-point Likert scale, frequency of sending emoji *(*M = 5.2, SD = 1.76), the frequency of receiving emoji

(*M* = 5.37, *SD* = 1.43), emoji expertise (*M* = 5.33, *SD* = 1.41), and emoji enjoyment (*M* = 4.71, *SD* = 1.43) scored high, whereas emoji efficiency (*M* = 3.06, *SD* = 1.90), and the frequency of emoji-only texts (*M* = 3.34, *SD* = 1.93) scored lower.

Table 1. Emoji Language Fluency rating scale.

ELF Metric scale	Mean
Maximum	1
High average	0.32
Average	0.18
Low	0.08
Minimum	0.02

Procedure

Participants were presented with an online questionnaire via Qualtrics. After introducing the topic of the study and consenting to participation, participants were asked to report demographic data. Next, participants were presented with a sentence and three emoji options, to which the question was "Which emoji would you use in this sentence?". In total, 10 sentences were shown to participants. Lastly, participants were asked to rate their emoji fluency and expertise, which were used to calculate ELF-scores.

Data Analysis

To determine preference, responses were counted and categorized for each participant in congruent, elaborative, and incongruent multimodal relationships. A repeated measures ANOVA was applied to analyze if people chose different multimodal relationships at different rates. In

addition, a correlation was performed to analyze relations between preference and ELF-scores. A regression was performed to determine if different components of the ELF-score predict preference.

Results

A main effect was found between preference of congruent, elaborative, and incongruent emojis paired with sentences, $F(2, 238) = 2529$, $p = <.001$. This occurred because participants showed high preference for selecting congruent multimodal relationships between the text and emoji compared to elaborative and incongruent relationships when given the task to pick which emoji fit best (Table 2). As Figure 1 shows, in some cases elaborative relations may make sense, but incongruent relations are not preferred in nearly all proposed cases.

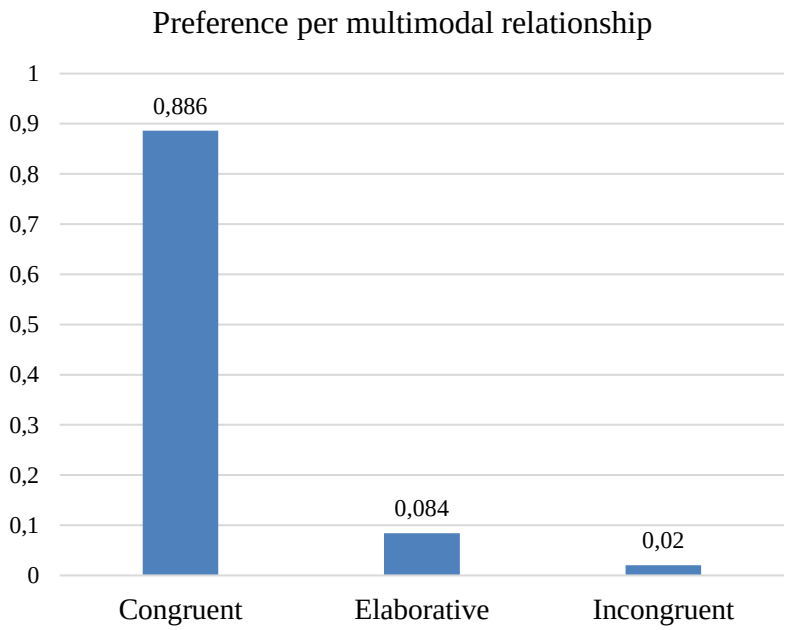

Figure 1. Preference per multimodal relationship across all participants.

Table 2. Preference per multimodal relationship

Multimodal relationship	Mean	SD	N
Congruent	0.886	0.110	120
Elaborative	0.084	0.089	120
Incongruent	0.020	0.044	120

To examine the relationship between the ELF-scores and multimodal relations preference a correlation was performed, which showed no correlation between preference and ELF-score, nor did any of the components of the ELF-score predict preference, indicating that perceived emoji fluency and expertise do not affect preference in multimodal relationships between emojis and text. We found no link between age and preference, meaning that age was not a relevant factor for our participants.

Discussion

Experiment 1 examined the preference between three multimodal relationships between text and emojis. We found that participants have a preference for congruent relations between text and emoji when asked to choose between three different multimodal relationships. The majority of participants paired a sentence with an emoji that created a congruent multimodal relation, whereas elaborative or incongruent relations were less preferred.

This preference may suggest a high agreement on what the multimodal relationship displays, suggesting that the combination of modalities helps to disambiguate meaning. This goes against previous studies (Medlock & McCulloch, 2016; Miller et al. 2017) that suggest that context does not facilitate ambiguity of emoji meaning. However, whereas they looked at how text affected

the ambiguity of emojis, questions remain whether similar observations can be made when looking at how emoji affect the ambiguity of text, as multimodal relationships can go both ways. This sentiment was reflected in both Miller et al.'s (2017) and Cramer et al.'s (2016) work on emoji, and aligns at least somewhat with our work, as the preferred emojis in this study reflect on the sentence, rather than the other way around. This would suggest that context does have an effect on emoji meaning and preference, but further studies should examine these relations in different directions.

Looking at perceived emoji fluency, we found that participants scored very high, which suggests that participants consider themselves knowledgeable about emojis and their uses. However, this level of expertise does not appear to have an effect on the preference of different multimodal relations between text and images. These findings may be rudimentary, as the constructs of the ELF-score were not previously tested, but the scores are in line with previous studies that employed similar measurements of emoji fluency (e.g. Cohn et al., 2018; Cramer et al., 2016).

Overall, these results support that there is a preferred congruent relationship between text and emojis, which is not affected by emoji fluency.

Experiment 2

The second question of this study asked to what degree emojis connect with the meaning of text in different multimodal interactions, by measuring processing times. Emojis in messaging generally fall in one of two types of interactions; following a sentence or as a substitute for specific words or expressions (Cramer et al., 2016). Substituting a modality into another is a characteristic of almost all multimodal interactions (Cohn, 2016). In the case of emojis, an image replaces a

written word in a text while maintaining the structure of the text. Emojis that follow a sentence create a different multimodal relationship where the image functions as an addition an additional layer of meaning to a sentence.

The purpose of this addition to text can vary, depending on the multimodal relationship between the text and image. Martinec and Salway (2005) describe several ways of how text and image may elaborate, extend, or enhance the meaning across the involved modalities, based on Halliday's (1994) research regarding logio-semantic relations. Emojis that are used as an addition to the text to display additional meaning can be characterized as elaborative, as the use of emojis as additions adds meaning or emphasis on an emotion within the text (Thompson & Filik, 2016). They can be used to indicate illocutionary force, which is the intended purpose of an utterance (Dresner & Herring, 2010), which makes a particular utterance more than a bland piece of information. This multimodal relationship between text and emojis as single images offer us ways to share emotional and pragmatic information through text.

In contrast, emojis that function as substitutions replace part of a modality while the structure is retained (Cohn, 2016). This means that the meaning of the sentence remains the same, which means that the emoji used in such case matches the representation of the word it replaces, e.g. "I missed the 🚊 yesterday" ("I missed the *train* yesterday"). In this case, the meaning of the emoji is congruent to the word, and is a literal depiction of a word. These substitutions are getting more common due to the implementation of emoji suggestions within messaging programs, which suggest appropriate emoji replacements for certain words. However, the use of these emojis as literal substitutions comes at a cost. Research has examined the difference in reading times between sentences with and without emojis as substitutes for words. Overall, sentences that included emojis as substitutes for words require a longer reading time compared to sentences

without substitutions (Gustafsson, 2017). Thus, the multimodal relationship within the text has been altered, resulting in longer reading times. However, despite the longer reading times, it does appear that the comprehension of the sentence was not affected negatively by emoji substitutions (Cohn et al., 2018)

Nonetheless, emojis as literal substitutions are not as common as emojis that function as an elaborative addition to a text. Even though emojis might often have a recognized meaning, their use in context might interact with a sentence in a way that in turn changes how the sentence is understood. For example, the commonly used "Winky Face" emoji can be used as a substitution for winking, but it is more commonly associated with a suggestive addition to a statement. Of the 20 most used emojis (EmojiStats, 2018), most are used to add meaning, and not function as a substitution. The most used emoji, "Face with Tears of Joy" (😂), is more likely to be used as an elaborative addition, whereas the runner up, "Heart" (♡), can function as a literal substitute ("I ♡ you"), an elaboration ("you're my angel ♡") or as a literal addition ("I love you♡) . Thus, the multimodal interaction between the text and the emoji determines the meaning of the emoji and the sentence.

Given the inherent differences in multimodal interactions between different emojis and text, it remains unclear whether a similar phenomenon can be observed when looking at these elaborative meanings of emoji, compared to literal meanings of emoji. Previous studies regarding context incongruity and expressions of irony in text indicate that they take significantly longer to process than the literal meaning of text (e.g. (e.g. Hancock, 2004; Ivanko & Pexman, 2003). This increase in processing time is due to the way we process such utterances, as it requires reanalysis and reprocessing to decipher the intended meaning. A similar process occurs when being exposed to nonverbal communications. The actions, movements, and intonation of the speaker are

combined with the literal meaning of the utterance to form meaning. With emojis being representations of nonverbal cues in text (Derks et al., 2008), one could assume that a similar reanalysis and reprocessing of meaning can be observed when communicating with elaborative emojis.

Weismann & Tanner (2018) were the first to look into how the brain processed elaborative additions in the form of emojis. More specifically, they did an analysis on the link between processing irony expressed in verbal and emoji form. They found that irony delivered by emojis elicits a similar brain response as irony delivered by words, indicating that we use similar processes of reanalysis when encountering irony delivered by words and emojis. However, expressing irony is just one of the types of multimodal relationships emojis can display (e.g. Derks et al. 2018; Hochschild, 2012; Riordan, 2017). In addition, it remains to be seen whether the use of emojis in the elaborative sense shows similar costs as emojis that function as substitutions (Cohn et al., 2018).

So, the question remains whether, similarly to substitutions, elaborative emojis encounter similar effects on processing. As irony processing takes longer than processing literal meaning, and similar processed can be identified between irony expressed verbally and by emojis, we can expect similar results for other elaborative multimodal relationships between text and emoji. Literature has covered individual aspects of this question (e.g. (e.g. Cohn et al., 2018; Weismann & Tanner, 2018; Gustafsson, 2017; Hancock, 2004; Ivanko & Pexman, 2003), but little research has combined these different aspects. Thus, this study sets out to determine the processing between congruent, elaborative, and incongruent multimodal relations between emojis and sentences. By comparing response times sentences paired with one of these multimodal relations we aim to discover their effect on processing to further extend the knowledge on emojis and CMC

Method

Stimuli

We formulated 24 unique sentences which described various statements and events. Each sentence was paired with an emoji to create a congruent, elaborative, and incongruent multimodal relationship for each sentence (Appendix B). The congruent relationship was created by matching a word of the sentence with an emoji in its literal meaning, e.g. “I saw Stacy’s dog today! 🐕”. The elaborative relationship was created by selecting an emoji that changed or elaborated on the meaning of the sentence, e.g. “I saw Stacy’s dog today! 😍 “. The selected elaborative emojis were partially based on Study 1 and expanded upon. Lastly, the incongruent relationship was created by pairing the sentence with a mismatch emoji which did not relate to the meaning of the sentence or individual words, literally or elaboratively, e.g. “I saw Stacy’s dog today! 👂”. This resulted in 72 different stimuli, which were divided over three lists. To make sure conditions were counterbalanced, each sentence appeared on each list, paired with a different condition.

Participants.

The experiment was distributed via snowball sampling, using social circles and online platforms (e.g. Facebook, Reddit, etc.). There were no predefined limitations for participating in the experiment. In total, 79 complete responses were collected via Qualtrics. Of the 79 participants, 34 were male, 40 were female, and five selected ‘other’. The average age of participants was 28.96 (*SD* = 9.816). The participants of this experiment were divided across 15 different nationalities, of which 59.5% spoke more than one language.

Similarly to the first experiment, participants were asked to rate their emoji fluency based on Emoji Language Fluency score Participants rated their emoji fluency high, with an average ELF score of 0.459 (*SD* = 0.194) (See Table 1). Both frequency of emoji sending (*M* = 5.65, *SD* = 1.631) and perceived expertise (*M* = 5.70, *SD* = 1.455) scored well above average, with frequency of receiving emoji being the same amongst all participants (*M* = 5, *SD* = 0). Frequency of emoji-only messages (*M* = 3.65, *SD* = 2.231), and perceived efficiency of emoji use (*M* = 3.5, *SD* = 2.065) scored lower on average, but the standard deviations show that participants score either very high or very low on these aspects of emoji language fluency.

Procedure

Firstly, participants were introduced to the topic and gave their consent to participate in the study and were informed about the data being collected. After this, some demographic data was collected regarding their birth year, gender, country of origin, and language affinity. Participants also filled in the Emoji Language Fluency (ELF) questionnaire. After these questions, participants were introduced to the experiment. They were asked to read a sentence carefully, presented as a whole, and then press 'Spacebar' to continue, after which an emoji was shown with the question "Does this emoji match the sentence?". Participants selected either yes or no by pressing '1' or '0' on their keyboard, respectively. In total, each participant was exposed to 24 sentences. By using the lab.js JavaScript plugin within Qualtrics, response times were measured.

Data Analysis

To determine the differences in processing between the different multimodal relations, response times were recorded and analyzed with a repeated measures ANOVA to determine whether there was a significant difference. Accuracy between each multimodal relation was

compared similarly by applying a repeated measures ANOVA as well. Response times and accuracy were correlated to further analyze the relation between these variables.

In addition, a regression analysis was performed to analyze possible relations between the ELF-scores and response time, as well as accuracy. This was done for the overall ELF-score, as well as individual factors that are part of the ELF-score.

Results

A main effect was found between congruent, elaborative and incongruent emojis, $F(2, 156) = 3.35$, $p = <.005$, $\eta^2 = .041$. This occurred because sentences paired with an elaborative relation take longer to respond to than emojis with an incongruent relation, which in turn takes longer to respond to than emojis with a congruent relation to the text, as displayed in Figure 2a.

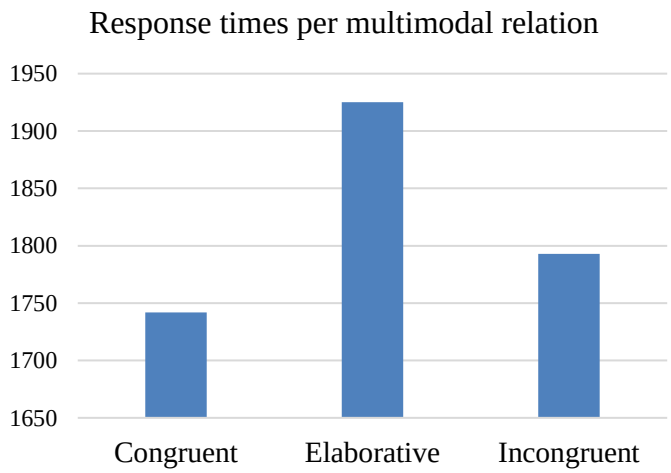

Figure 2. Response times per multimodal relation in milliseconds.

Table 3. Reaction times in milliseconds per multimodal relationship

Multimodal relationship	Mean	SD	N
Congruent	1742	638.5	79

Elaborative	1925	671.7	79
Incongruent	1793	768.5	79

A main effect was also found looking at accuracy of responses, $F(2,156) = 11.77$, $p = <.001$, $\eta^2 = .131$. These results arose because incongruent emojis showed higher accuracy scores than congruent and elaborative emoji pairings, indicating that emoji mismatches, or incongruent relations, are more accurately distinguished than matching emojis in either a congruent or elaborative relation, as shown in Figure 3.

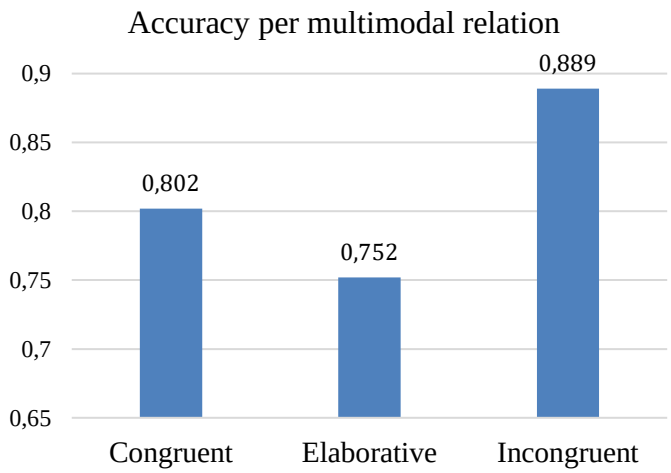

Figure 3. Average of accuracy per multimodal relation.

Table 4. Accuracy per multimodal relationship

Multimodal relationship	Mean	SD	N
Congruent	0.802	0.214	79
Elaborative	0.752	0.188	79
Incongruent	0.889	0.139	79

A comparison between the response times and accuracy showed a negative correlation for congruent emojis, r = -.414, p = <.001, 95% CI [-.212, -.581], elaborative emojis, r = -.289, p = .010, 95% CI [-.073, -.480], and incongruent emojis, r = -.482, p = <.001, 95% CI [-.292, .635]. In all cases, this suggested that a shorter response time indicates a higher degree of accuracy for our participants.

An additional post hoc comparison found a positive correlation between age and response times for congruent (r = .471, p = <.001, 95% CI [.627, .279]), elaborative (r = .538, p = <.001, 95% CI [.679, .360]) and incongruent emojis (r = .433, p = <.001, 95% CI [.597, .234]). This suggested that the slower the response time, the higher the participants' age.

To examine the relationship between the ELF-scores and both response times and accuracy, a regression analysis was performed with the calculated ELF-scores and its individual categories. No relations were found between the ELF-score and both response times and accuracy. Analysis of individual variables of the ELF-scores showed no relationships either.

Discussion

We examined the differences in processing between different multimodal interactions between text and emojis. We looked at congruent, elaborative and incongruent multimodal relationships, and found that elaborative emojis have higher response times than congruent or incongruent interactions. These findings are consistent with previous findings that indicate nonliteral meaning, which in our case are elaborative relations, requires longer processing (Hancock, 2004; Ivanko & Pexman, 2003). Similarly, the results of Weismann & Tanner's (2018) study attributed the multimodal relationship to a reanalysis process. We have shown slower response times to an elaborative multimodal relationship, which may have also been caused by reanalysis.

Looking at accuracy, we see that incongruent multimodal relations are more likely to be correctly identified than congruent and elaborative relations, suggesting that we identify mismatches more accurate than matches, whether those are congruent or elaborative. The non-difference between accuracy for congruent and elaborative relations may be due to how we interpret these multimodal relations individually. One could expect congruent relations to score high since they function as an addition with a literal meaning. However, emojis possess a certain scope of how they can be interpreted (Tigwell & Flatla, 2016; Riordan, 2017; Miller et al., 2016), which could cause miscommunications, and thus scoring similarly to elaborative relations on accuracy.

Furthermore, our results show a negative correlation between response time and accuracy. This shows that a slower response time of our participants means lower accuracy as well. When a multimodal relationship between text and an emoji requires a longer time to process, it could be an indication that the relation between the text and emoji is not exactly clear at first, which in turn causes the longer response times and lower accuracy. If the relation between the text and emoji is clear, it is more likely to be interpreted faster and more accurate.

We also examined the effect of age on response time and accuracy. Our results show that there appears to be no a relation between accuracy and age. Our findings suggest that that the multimodal relationships between emoji and text is not interpreted differently across ages for our participants, which may be a common misconception. Age does appear to correlate negatively with response times, suggesting that response times increase the older our participants were. As accuracy was not affected by age, these results could be explained by age-related cognitive decline (Salthouse, 2009), which causes decline of different cognitive variables over time, amongst which is response time.

How we consider our own emoji knowledge does not coincide with other data, which means that there is no link between the ELF-scores and both response time and accuracy. Interestingly, our results indicate that age has no significant effect on the ELF-scores either. This may suggest that our perceived emoji fluency and expertise may be influenced by other factors than measured during our study. This non-difference could be due to the fact that participants were recruited from an online audience, which were all proficient in emoji enough for age not to be a factor.

To conclude, this experiment demonstrated the difference in processing congruent, elaborative, and incongruent multimodal relations between text and emojis. Response time and accuracy were both affected by elaborative relations, suggesting that the processing of these types of relations comes at a cost of both response time and accuracy. This processing seems to not be affected by participants' perceived fluency.

General discussion

This study investigated the effect of multimodal relations between text and emojis in computer-mediated communications. Across two experiments we demonstrated that people have a preference to certain multimodal relations, and that the processing of different multimodal relationships between emojis and preceding sentences varies depending on these relations. Furthermore, we examined the emoji fluency of participants and found that people rate their emoji fluency as high, although it did not affect preference and processing of emojis.

The purpose of this study was to examine how different multimodal relationships between text and emoji affect the processing of meaning. The study was motivated by three questions. First, we looked at the preference of multimodal relationships between a sentence and emojis. Our results

show a clear preference for congruent multimodal relationships between text and emojis when tasked to pair the most fitting emoji to a sentence. Given the ambiguous nature of emojis (e.g. Riordan, 2017; Miller et al. 2016; Tigwell & Flatla, 2016), it is likely that a congruent relationship is preferred to clarify on the meaning and prevent miscommunications, a sentiment which is reflected in previous studies as well (Cramer et al., 2016; Miller et al., 2017).

Secondly, we looked at the differences in processing between different multimodal relationships between text and emojis by examining response times and accuracy. Our results demonstrated that elaborative multimodal relationships led to longer response times compared to congruent and incongruent relationships. These obtained results are in favor of the predictions made in the introduction, based on Gustafsson's (2016) and Cohn et al.'s (2018) work. These findings are in line with previous studies regarding picture-word matching (Van der Meer, Friedrich, Nuthmann, Stelzel, & Kuchinke, 2003). Van der Meer et al. (2003) argue that processing of picture-word relations takes place in two steps, the first being categorization based on concrete features, and the second being the processing of amodal features. During the first step, the categorization, the congruent and incongruent relations are established and determined whether it is a match or a mismatch, explaining the faster response times for these relations. However, when encountering elaborative relationships between text and emoji the processing of amodal features becomes more apparent and causes an increase in response times. This increase in response time is further affected by age, as higher age means a slower response time as well.

Interestingly, we found that incongruent relationships were more accurately processed as such, compared to congruent and elaborative relationships between emojis and text, suggesting that mismatches between text and emojis are more correctly identified as such than matches. The difference between congruent and elaborative relations on accuracy, albeit not statistically

significant, does show a logical progression in accuracy, with congruent relations between text and emoji being more accurate than the elaborative counterpart. The high accuracy of incongruent relationships goes against previous findings of Van der Meer et al. (2003), who found higher error rates for incongruent pairs of words and images. This difference in results could be due to the use of too obvious incongruent relationships between a sentence and emoji in our study, making it easier to identify the mismatch.

Relations between response time and accuracy demonstrate that a longer processing time of a multimodal relationship indicates a less clear relationship, resulting in lower accuracy. Emojis are ambiguous in their meaning (Miller et al., 2016), which means that the relation between the text and the emoji is not always clear. The longer it takes to process the multimodal relationship between the two, the more likely it is that the relationship is incorrectly identified. This could be caused by various factors that influence the ambiguity of an emoji, such as symbolic representations of concepts (Stark & Crawford, 2015), varying definitions of emojis themselves (Miller et al., 2016), or even the relationship between people (Riordan, 2017).

In both experiments, participants were asked to self-evaluate their emoji fluency, which was translated into the ELF-score. Participants scored high ELF-scores in both experiments, indicating that they found themselves fluent in emoji use. Previous studies (e.g. Cohn et al., 2018; Cramer et al., 2016) on emojis that used self-reported scores on emoji fluency reported similar high scores on factors that were part of the ELF-score. Thus, in general, we consider ourselves fluent when it comes to emojis. However, these scores did not relate to our results in both experiments. This may be because this study did not assess emoji knowledge directly, but focused on the processing of multimodal relationships and not specific emoji definitions.

During our experiments, participants were exposed to different sentences and emojis. However, although emojis share similar designs across different platforms, they are not exactly alike. In both experiments, the used emojis were all in the design used on Apple devices. The differences in design of these emojis may be declining (Emojipedia, 2018), there are still clear differences on emoji design between platforms. Thus, it may be worthwhile to include different designs in future studies to determine if these designs affect emoji processing.

In addition, the participants of both experiments mostly resided in Western countries. However, the emojis we use and the frequency we use them varies across the world (Ljubešić & Fišer, 2016). And whereas the semantics of most emojis may be similar in Western countries (Barbieri et al., 2016), given their different and more frequent use across the globe, there may be differences in preference and processing of emojis, opening up avenues for further research.

All this taken into consideration, we can conclude that different multimodal relations between text and emoji affect how we process them. Although we may have a preference when it comes to what emoji would fit a sentence the best, when assessing different multimodal relationships in CMC we are affected by the type of relationship. Using elaborative relationships to emphasize a certain meaning to sentences requires more processing and is overall less accurate, as opposed to congruent or incongruent emojis. Thus, putting aside your emojis may lead to shorter processing and higher accuracy on meaning. But where is the fun in that?

References

Barbieri, F., Kruszewski, G., Ronzano, F., & Saggion, H. (2016). How cosmopolitan are emojis? Exploring emojis usage and meaning over different languages with distributional semantics. In *Proceedings of the 2016 ACM on Multimedia Conference,* 531–535.

Cohn, N. (2016). A multimodal parallel architecture: A cognitive framework for multimodal interactions. *Cognition, 146,* 304–323.

Cohn, N. & Ehly, S. (2015) The vocabulary of manga: Visual morphology in dialects of Japanese Visual Language. *Journal of Pragmatics*, 92, 17–29

Cohn, N., Roijackers, T., Schaap, R., & Engelen, J.A.A. (2018). Are emoji a poor substitute for words? Sentence processing with emoji substitutions.

Cramer, H., de Juan, P., & Tetreault, J. (2016) *Sender-intended functions of emojis in US messaging.* Paper presented at the Proceedings of the 18th International Conference on Human-Computer Interaction with Mobile Devices and Services, Florence, Italy.

Crystal, D. (2001). Language and the Internet. Cambridge: Cambridge University Press.

Danesi, M. (2016). The semiotics of emoji: The rise of visual language on the age of the internet. London: Bloomsbury.

Daft, R. L, & Lengel, R. H. (1984). Information richness: A new approach to managerial behavior and organization design. *Research in Organizational Behavior, 6,* 191–233.

Degand, L. & Van Bergen, G. (2016). Discourse markers as turn-transition devices: Evidence from speech and instant messaging. *Discourse Processes, 55*(1), 47–71.

Derks, D., Fischer, A. H., & Bos, A. E. (2008c). The role of emotion in computer-mediated communication: A review. *Computers in Human Behavior*, 24(3), 766-785.

Dubrovsky, V. J., Kiesler, S., & Sethna, B. N. (1991). The equalization phenomenon: Status effects in computer-mediated and face-to-face decision-making groups. *Human Computer Interaction, 6,* 119–146.

Emojipedia. (2018). Retrieved from: http://www.emojipedia.org

Emojipedia. (2018, February 13). 2018: The year of emoji convergence? Retrieved from: https://blog.emojipedia.org/2018-the-year-of-emoji-convergence/

EmojiStats. (2018) Retrieved from: http://www.emojistats.org

Facebook. (2018) Facebook and Messenger Data, April 2018. Retrieved from: http://www.facebook.com

Garcia, A. C. & Jacobs, J. B. (2010) The eyes of the beholder: Understanding the turn-taking system in quasi-synchronous computer-mediated communication. *Research on Language and Social Interaction, 32*(4), 337-367.

Gibson, W., Huang, & Yu, Q. (2018) Emoji and communicative action: The semiotics, sequence and gestural actions of 'face covering hand'. *Discourse, Context & Media, 26,* 91–99.

Goffman, E. (1959). The presentation of self in everyday life. *New York.*

Gustafsson, V. (2017). Replacing words with emojis and its effect on reading time. *USCCS 2017,* 73.

Hakami, S. A. A. (2017). The importance of understanding emoji: An investigative study. *Research Topics in HCI,* 1-20.

Halliday, M. A. K. (1994). An introduction to Functional Grammar, 2nd edn., London: Arnold.

Hancock, J.T. (2004). Verbal irony use in face-to-face and computer-mediated conversations. *Jornal of Language and Social Psychology, 23*(4), 447–463

Hochschild, A.R. (1979). Emotion work, feeling rules, and social structure. *American Journal of Sociology, 85,* 551–575.

Hochschild, A.R., (2012). The Managed Heart: Commercialization of Human Feeling. University of California Press.

Ivanko, S.L. & Pexman, P. M. (2003). Context incongruenty and irony processing. *Discourse Processes, 35*(3), 241–279.

Kiesler, S., Siegel, J., & McGuire, T. W. (1984). Social psychological aspects of computer-mediated communication. *American Psychologist*, 39, 1123–1134.

Ljubešić, N., & Fišer, D. (2016). A global analysis of emoji usage. In *Proceedings of the 10th Web as Corpus Workshop* (pp. 82–89)

Lo, S. K. (2008). The nonverbal communication functions of emoticons in computer-mediated communication. *CyberPsychology & Behavior*, 11(5), 595–597.

McNeill, D. (2000). Language and Gesture. Cambridge: Cambridge University Press.

Medlock, B., & McCulloch, G. (2016). The linguistic secrets found in billions of emoji. In *Technology presented at the SXSW.* http://www.slideshare.net/SwiftKey/the-linguistic-secrets-found-in-billions-of-emoji-sxsw-2016-presentation59956212.

Miller, H., Kluver, D., Thebault-Spieker, J., Terveen, L, & Hecht, B. (2017). Understanding emoji ambiguity in context: The role of text in emoji-related miscommunication. In *Proceedings of the 11th International AAAI Conference on Web and Social Media, ICWSM 2017* (pp. 152–161). AAAI press.

Miller, H., Thebault-Spieker, J., Chang, S., Johnson, I., Terveen, L., & Hecht, B. (2016). "blissfully happy" or "ready to fight": Varying interpretations of emoji. In *Proceedings of the 10th International Conference on Web and Social Media, ICWSM 2016* (pp. 259–268). AAAI press.

Petitjean, C., & Morel, E. (2017) "Hahaha": Laughter as a resource to manage WhatsApp conversations. *Journal of Pragmatics, 110,* 1–19.

Rezabek, L. L., & Cochenour, J. J. (1998). Visual cues in computer-mediated communication: Supplementing text with emoticons. *Journal of Visual Literacy*, 18, 201–215.

Riordan, M. A. (2017). Emojis as tools for emotion work: Communicating affect in text messages. *Journal of Language and Social Psychology, 36*(5), 549–567.

Riva, G. (2002). The Sociocognitive Psychology of Computer-Mediated Communication: The Present and Future of Technology-Based Interactions. *CyberPsychology & Behavior, 5*(6), 581–598.

Salthouse, T. A. (2009). When does age-related cognitive decline begin? *Neurobiology of Aging, 30*(4), 507–514.

Sarbaugh-Thompson, M., & Feldman, M. S. (1998). Electronic mail and organizational communication: Does saying "hi" really matter? Organization Science, 9, 685–698.

Schönfledt, J., & Golato, A. (2003) Repair in chats: A conversation analytic approach. *Research on Language and Social Interaction, 36*(3), 241–284.

SwiftKey. (2015). *SwiftKey Emoji Report*. Retrieved from https://www.scribd.com/doc/262594751/SwiftKey-Emoji-Report

Thompson, D., & Filik, R. (2016). Sarcasm in written communication: Emoticons are efficient markers of intention. *Journal of Computer-Mediated Communication, 21,* 105–120.

Tigwell, G. W., & Flatla, D. R. (2016. Oh that's what you meant! *Proceedings of the 18th International Conference on Human-Computer Interactions with Mobile Devices and Services Adjunct - MobileHCI '16.*

Van Der Meer, E., Friedrich, M., Nuthmann, A., Stelzel, C., & Kuchinke, L. (2003). Picture–word matching: Flexibility in conceptual memory and pupillary

responses. *Psychophysiology, 40*(6), 904-913.
Van Wassenhove, V., Grant, K. W., & Poeppel, D. (2005) Visual speech speeds up the neural processing of auditory speech. *Proceedings of the National Academy of Sciences, 102*(4), 1181–1186.
Walther, J. B. (1996). Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication Research, 23*(1), 3–43.
Walther, J. B., & Burgoon, J. K. (1992). Relational communication in computer-mediated communication. *Human Communication Research, 19*(1), 50–88.
Walther, J. B., & D'Addario, K. P. (2001). The impacts of emoticons on message interpretation in computer-mediated communication. *Social Science Computer Review*, 19(3), 324–347.
Walther, J. B., Anderson, J. F., & Park, D. W. (1994). Interpersonal effects in computer-mediated interaction: A meta-analysis of social and antisocial communication. *Communication Research, 21*(4), 460–487.
Weissman, B., & Tanner, D. (2018). A strong wink between verbal and emoji-based irony: How the brain processes ironic emojis during language comprehension. *PLoS ONE, 13*(8).
Willis, J., & Todorov, A. (2006). First impressions: Making up your mind after a 100-ms exposure to a face. *Pshychological Science, 17*(7), 592–598.

Appendix A

Stimuli of Experiment 1, Sentences & Emojis

* Emojis depicted in this appendix are Windows representations of the selected emojis for this experiment.

Scenario	Condition type	Sentence	Emoji
1	Congruent	You look hot today!	😘
	Elaborative	You look hot today!	😶
	Incongruent	You look hot today!	💩
2	Congruent	My little brother is super annoying today.	🙄
	Elaborative	My little brother is super annoying today.	😕
	Incongruent	My little brother is super annoying today.	😘
3	Congruent	Let's have pizza. I'm super hungry!	😋
	Elaborative	Let's have pizza. I'm super hungry!	🤳
	Incongruent	Let's have pizza. I'm super hungry!	🤳
4	Congruent	Don't worry, I'm not going to share your secret.	🤐
	Elaborative	Don't worry, I'm not going to share your secret.	🤭
	Incongruent	Don't worry, I'm not going to share your secret.	⚽
5	Congruent	Wow, you look super nice today! Love your outfit.	😍
	Elaborative	Wow, you look super nice today! Love your outfit.	😂
	Incongruent	Wow, you look super nice today! Love your outfit.	🙄

6	Congruent	I tripped and fell on the floor, so embarrassing.	
	Elaborative	I tripped and fell on the floor, so embarrassing.	
	Incongruent	I tripped and fell on the floor, so embarrassing.	
7	Congruent	My cat just died!	
	Elaborative	My cat just died!	
	Incongruent	My cat just died!	
8	Congruent	Congratulations on your new job!	
	Elaborative	Congratulations on your new job!	
	Incongruent	Congratulations on your new job!	
9	Congruent	I just ran into Kyle while he was in the shower	
	Elaborative	I just ran into Kyle while he was in the shower	
	Incongruent	I just ran into Kyle while he was in the shower	
10	Congruent	Thank you for helping me with my homework, Phil!	
	Elaborative	Thank you for helping me with my homework, Phil!	
	Incongruent	Thank you for helping me with my homework, Phil!	

Appendix B

Stimuli of Experiment 2

* Emojis depicted in this appendix are Windows representations of the selected emojis for this experiment.

Scenario	Condition Type	Sentence	Emoji
1	Congruent	John eats pizza every Sunday	
1	Elaborative	John eats pizza every Sunday	
1	Incongruent	John eats pizza every Sunday	
2	Incongruent	I'm having dinner with my family	
2	Congruent	I'm having dinner with my family	
2	Elaborative	I'm having dinner with my family	
3	Elaborative	Your crush is coming to the party!	
3	Incongruent	Your crush is coming to the party!	
3	Congruent	Your crush is coming to the party!	
4	Congruent	I missed the train!	
4	Elaborative	I missed the train!	
4	Incongruent	I missed the train!	
5	Incongruent	I saw Stacy's dog today!	

5	Congruent	I saw Stacy's dog today!	
5	Elaborative	I saw Stacy's dog today!	
6	Elaborative	I have class till 5pm today	
6	Incongruent	I have class till 5pm today	
6	Congruent	I have class till 5pm today	
7	Congruent	Man, she's one hell of an artist	
7	Elaborative	Man, she's one hell of an artist	
7	Incongruent	Man, she's one hell of an artist	
8	Incongruent	That's great! Terrific!	
8	Congruent	That's great! Terrific!	
8	Elaborative	That's great! Terrific!	
9	Elaborative	Someone is wearing perfume, I can smell it.	
9	Incongruent	Someone is wearing perfume, I can smell it.	
9	Congruent	Someone is wearing perfume, I can smell it.	
10	Congruent	Want to go grab a cup of coffee?	
10	Elaborative	Want to go grab a cup of coffee?	
10	Incongruent	Want to go grab a cup of coffee?	
11	Incongruent	She fell down the stairs while texting him!	

11	Congruent	She fell down the stairs while texting him!	
11	Elaborative	She fell down the stairs while texting him!	
12	Elaborative	I may have had a drink or two..	WOOZY*
12	Incongruent	I may have had a drink or two..	
12	Congruent	I may have had a drink or two..	
13	Congruent	She bathes like 4 times a week, man.	
13	Elaborative	She bathes like 4 times a week, man.	
13	Incongruent	She bathes like 4 times a week, man.	
14	Incongruent	My sister still sleeps with that unicorn	
14	Congruent	My sister still sleeps with that unicorn	
14	Elaborative	My sister still sleeps with that unicorn	
15	Elaborative	You want a piece of that Kiwi, don't you?	
15	Incongruent	You want a piece of that Kiwi, don't you?	
15	Congruent	You want a piece of that Kiwi, don't you?	
16	Congruent	He refuses to read that part of the book	
16	Elaborative	He refuses to read that part of the book	
16	Incongruent	He refuses to read that part of the book	
17	Incongruent	Did you hear her voice?	

17	Congruent	Did you hear her voice?	
17	Elaborative	Did you hear her voice?	
18	Elaborative	I'm going skiing, so I won't be at your party	
18	Incongruent	I'm going skiing, so I won't be at your party	
18	Congruent	I'm going skiing, so I won't be at your party	
19	Congruent	You want to go sailing? Good luck!	
19	Elaborative	You want to go sailing? Good luck!	
19	Incongruent	You want to go sailing? Good luck!	
20	Incongruent	Mom wasn't too happy I went to bed at 4am yesterday	
20	Congruent	Mom wasn't too happy I went to bed at 4am yesterday	
20	Elaborative	Mom wasn't too happy I went to bed at 4am yesterday	
21	Elaborative	You like grapes?	
21	Incongruent	You like grapes?	
21	Congruent	You like grapes?	
22	Congruent	I'd adopt a cat with you	
22	Elaborative	I'd adopt a cat with you	
22	Incongruent	I'd adopt a cat with you	

23	Incongruent	He's a real winner, right?	
23	Congruent	He's a real winner, right?	
23	Elaborative	He's a real winner, right?	
24	Elaborative	It's late and I can't find my keys	WOOZY*
24	Incongruent	It's late and I can't find my keys	
24	Congruent	It's late and I can't find my keys	

*This emoji represents a drunken face and was published in 2018. It is not available for use in documents as of the moment of writing