The National University of Ireland Maynooth

The Effect of Message Valence and Emoji Types on Processing Fluency when Reading Text Messages

Thesis submitted to the Department of Psychology, Faculty of Science and Engineering, in fulfilment of the requirements for the degree of Doctor of Philosophy, National University of Ireland Maynooth.

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April 2023

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Acknowledgements

Overall, I feel incredibly lucky and humble to have met so many outstanding, wonderful people who have made my six years an enjoyable experience at Maynooth University. I could not have done it without the support, laughter, tears, and tantrums from so many strong individuals who I can now call friends.

Foremost, I would like to express my sincere appreciation to my hardworking supervisor Professor Fiona Lyddy for the continuous support of my PhD study and research, for her patience, motivation, and enthusiasm. Her guidance and knowledge have shaped me into the researcher I am today. I could not have imagined having a better supervisor for my PhD study. A supreme tower of strength and knowledge.

I owe so much to my mum and sisters also for their support throughout, for that I am eternally grateful. Dad if you are watching from above, I hope I do you proud.

To a very wide and colourful bunch of friends who helped me stay focused, I have so much respect for each and every one of you. A special thanks to my best friend Evan for keeping me on the straight and narrow. To Rachel and Michael, a special warm thanks for the endless chats and broad shoulders to lean on when necessary. Also, many thanks to the office staff in the Department of Psychology at Maynooth University for being professional and supportive with special thanks to Anne, Victoria, Caroline, and Derek.

I want to acknowledge and thank Andrew Coogan (aka Mr Twitter), Bryan Roche and Sean Commins for their endless banter.

A special thanks to absent friends Siobhan O Doherty (RIP) and Erica Cox (RIP).

Special thanks to all the participants who took an interest in this work and who so kindly volunteered their time.

To everyone whose path I have crossed over the past six years, those named here and those I have not mentioned, please accept my deepest and warmest thank you.

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Thesis Summary

The main goal of this thesis was to examine the influence of face and non-face emoji as a means to increase processing fluency and ratings of rapport in positive and negative contexts. This thesis aimed to draw on two key theoretical frameworks – the Processing Fluency Framework and the Rapport Management Model. In an initial naturalistic analysis (Chapter Two), the prevalence and types of emoji used were investigated, along with their relationship to self-presentation and related variables. Face but not non-face emoji were found to be linked to self-presentation variables, although the effects were weak. These emoji informed the design of subsequent experiments. In a series of five experiments (Chapters Three to Seven), the effect of face and non-face emoji on processing fluency and rapport were examined across positive and negative message contexts and manipulating a series of variables of relevance to the emoji (e.g., type, position, congruency with message). In each experiment, participants were presented with hypothetical text messages between friends and asked to rate them on a series of measures relating to fluency (efficiency, clarity, and/ or understandability and believability) and rapport (interest in the friendship and improving the friendship). Consistent with previous literature, emoji presence affected processing fluency and rapport. However, the effect varied depending on message valence, emoji types and the specific message content. Overall, the findings suggest a connection between processing fluency and rapport, related to the perception of emoji in text messages, a relationship which to date has not been identified in the literature. The findings, while supporting the processing fluency account, suggest that emoji effects are more complex, context dependent and nuanced than originally expected.

General Introduction

Chapter One

1.1 Introduction

On October the 29th 1969, a message was first sent over the internet. Today, messages are sent and received rapidly via mobile phones, computers and other devices, making text-based communication very convenient. The term computer mediated communication (CMC) refers to communication through networked computers and devices and it has revolutionised social communication. CMC can be synchronous (where parties are electronically present at the same time and receive immediate feedback) or asynchronous (parties are not present at the same time and are able to give feedback at a later date or time) and it includes use of e-mails, text messages and social network services (SNS). Adopters of CMC technologies include users of Short Message Service (SMS), instant messaging (IM) and other computer mediated short text-based messages. These 'texters' may also use social media platforms such as Twitter and Instagram to communicate. The focus of this thesis is on private text-based communication, between two individuals.

Smart phones have become the most popular device with which to send text messages (Nie, Wang & Lei, 2020). It is estimated that worldwide there will be 7.41 billion mobile phone users by 2025 (Statista Statistic Market Report 2020). A survey conducted by Deloitte in (2018) showed that 88% of people in Ireland own or have access to a smartphone (cited in Gibney & McCarthy, 2020). Mobile phones provide an efficient means of rapid communication (Grace, Kemp, Martin & Parrila, 2014) and the socially interactive nature of text messaging allows people to communicate in real or delayed time (Durkin, Conti-Ramsden & Walker, 2011). Text messages are sent or received by 89% of mobile phone users in Ireland (Statista, 2016).

Texting can be defined as the sending of alphabetical or numeric text messages between two individuals or more. According to Dolzhich and Dmitrichenkova (2019), the

communicative functions of texting on mobile phones, tablets or computers can be comparable to those of a brief verbal conversation. Texting can be viewed as an effective communication skill, which allows users to create and develop their own form of interaction (Luo & Tuney, 2015). Text messages tend to be concise. Most text messages are produced on a keypad of a mobile phone and are limited to 160 characters (af Segerstad, 2005). Estimates of the average number of words per text message are typically around 14 words per text message (e.g., Lyddy, Farina, Hanney, Farrell & O'Neill, 2014; Thurlow & Brown, 2003) with a low 8 words per message also reported (Ling & Baron, 2007). In addition to words, text messages contain non-linguistic symbols. The use of non-linguistic symbols predates communication technology. As cited in Geggel (2017), in 2003 Turco-Italian archaeologists uncovered an ancient jug which dated back to 1700 B.C. in Karkemish, Turkey. The jug had three distinguishable markings: two dots to represent eyes and a rounded line to represent a smile. In 1857, The National Telegraphic Review and Operators Guide recorded the numeric number 73 as meaning 'best regards' as well as 88 in Morse code used to send 'love and kisses'. As cited in the American Atlantic Magazine (see Madrigal, April 14, 2014), Levi Stahl of the University Chicago Press came across a line taken from a 1648 poem entitled "To Fortune" by Robert Herrick. The first line read; 'Tumble me down, and I will sit. Upon my ruins, (smiling yet :)". In the same source, Taylor Blake, a linguist from the University of Carolina noticed in another poem entitled "To Anthea," the colon and closing parenthesis again appeared side by side. The New York Times (2009) reported the use of the symbol ;) (glossed as a wink) in a speech by Abraham Lincoln from August 1862: "There is no precedent for your being here yourselves, [(applause and laughter ;)] and I offer…"

In 1936 a Harvard Lampoon article by Alan Gregg offered several horizontal typographical symbols as a means to communicate to readers: (-) for smile, (---) for laughing, (#) for frown, and (*) for wink. Currently, modern alternatives of such symbols are widely used

along with standard and non-standard language in private and public (online) communication (Lu, Ai, Liu, Li, Wang, Huang & Mei, 2016). This thesis examines the use of these non-linguistic features in text messages, with a focus on the reader's perspective.

1.2 What is Texting?

In this study, the term 'text message' is used to refer to any private text-based message sent between two users and as such includes short message service (SMS) text messages and instant messaging (IM) such as through iMessage, and WhatsApp. These messages can be sent via phone and other devices including computer. Thurlow and Brown (2003) pointed out that texting is different from IM in allowing users to respond immediately or to delay before sending messages; however, increasingly text messages can be used in the same way as IM.

Mc Sweeney (2020) claims texting involves a unique style of writing that has changed the typical written features of written communication into a distinctive style noting, for example, the presence of emoji to deliver pragmatic functions such as a connective rapport, politeness, illocutionary force or individuality. Phatic communication refers to a casual social style of communication rather than specific detailed topics of conversation. It includes 'small talk' and, for example, 'how are you?' 'nice day' and 'good evening' are all phatic expressions. Phatic use of text messages needs to be succinct and clear.

Texting was originally a process of using the keypad on a mobile phone to type messages and send them to someone else's phone; the receiver can type a message in return. Text messages were originally limited to 160 characters in length. Larger text messages that exceeded the 160-character length (including spaces) were shortened into multiple messages for the receiver to interpret. There were often costs to sending such messages and so users kept the messages concise. The screen size of mobile phone handsets also limited the length of text messages in the early years as did the multiple-press keypads (af Segerstad, 2005). These limitations placed the onus on the texter to be concise. These constraints have been eliminated

to some extent by modern smartphones, which have larger screens and QWERTY keypads. Costs have also reduced considerably. Smartphones also have a predictive text mechanism that allows a refined texting function which provides corrective measures to facilitate clarity and speed when sending a text message (Oullette & Michaud, 2016).

However, text messages tend to remain short, suggesting that abbreviations reflect time constraints or communicative efficiency rather than character limits (Denis & Tagliamonte, 2008). The purpose of texting is to convey a comprehensible and retrievable message; as is the purpose of any message, the intention is for the text message to be understood (Crystal, 2008). Any abbreviations that might occur in the text message must not distract the reader but enhance the message in order to facilitate understanding.

1.3 Language in Text Messages

Advances in modern technology and creativity within text messages have reconstructed the way we communicate in our daily lives (Thurlow & Brown, 2003). Text messaging or Short Message Service (SMS) was introduced in the early 1990s and soon a *textese* (txt, texting, text speak, chat speak or texting language) emerged, with shorthand used to deliver meaning, for example IMHO for 'in my humble opinion' or TBH for 'to be honest' (Kleen & Heinrichs 2008).

According to Thurlow and Poff (2013), the language of SMS is underpinned by a version of Grice's (1975) three sociolinguistic principles or maxims. First, the need for brevity and speed is evident in the shortening of vocabulary and the elimination of grammatical punctuation and minimal use of space between words. For example, l8r might be used for 'later' or cu for 'see you.' Brevity is important for the 'back and forth' nature of text messages (Thurlow & Brown, 2003). However, it is important that meaning is not sacrificed (see Kemp, Wood & Waldron, 2014).

The second principle is paralinguistic restitution, which involves the use of abbreviated capitals (e.g., OMG) and repeated punctuation (???), for example, using NO WAY??? or Wow!!! to compensate for the tone of the voice and visual cues found in face-to-face interaction. This might also be achieved by attaching an emoticon, which may use letters, numbers and punctuation marks to create a visual image of a facial expression. For example, :-) could be used for happy or :-(for sad.

Finally, phonological approximation within text messages is driven by the use of phonetic or speech sounds which are close to the actual word. This includes accent stylizations (e.g., gonna for 'going', cudn for 'could not'), contractions (e.g., nxt for 'next,' nt for 'night') and shortenings (e.g., morn for 'morning', lang for 'language'; examples from Thurlow and Brown, 2003). These various non-standard features of text messages are referred to as textisms.

1.4 What is a Textism?

A textism is a shortening or non-standard alteration of a word or phrase in a text message (Thurlow & Brown, 2003). It has been estimated that between 5-20% of linguistic units in text messages are textisms (De Jonge & Kemp, 2010; Ling & Baron, 2007; Thurlow & Brown, 2003). According to Thurlow and Brown (2003), textisms are linguistic substitutes that can be organised into six categories:

1. *Shortenings* whereby two, three or more letters are omitted from a word (*uni* for 'university'); this includes *contractions* (the removal of middle letters; *wkend* for 'weekend'), *g-clippings* (omitting the final word ending in 'ing' i.e., *comin* for 'coming') or *other clippings* (the end letter is omitted, *til* for 'till').
2. *Acronyms and initialisms* formed from initial letters of words, for example WHO for 'World Health Organization', ASAP for 'as soon as possible'.
3. *Letter and number homophones* which combine the sounds of letters or numbers, for example *2moro* for 'tomorrow', *b4* for 'before'.

4. *Misspelling and typos* (such as *esay* for 'essay', *ofense* for 'offense') may not be true textisms.

5. *Non-conventional spellings* which include a spelling of a word from sound (e.g., *luv* for 'love', *bcum* for 'become').

6) *Accent stylizations,* whereby a word is spelled as it is pronounced (*dat* for 'that', *fone* for 'phone', *cudn* for 'could not').

Subsequent studies have shown the variety of textisms in various abbreviated arrangements; for example, 'got to go' shortened to *gotta go, got 2 go, g2g* (Varnhagen, McFall, Pugh, Routledge, Sumida-MacDonald & Kwong 2010); 'because' shortened to *cause, coz, cus, becos, bcoz, bcus, bcs, bc* (Kemp, 2010, p. 26). Ling and Baron's (2007) texting data also revealed onomatopoeic sequences and a non-word sound-based exclamation e.g., ya for '*you*', da for '*the*', em for '*them*.'

Common initialisms (OMG, FYI, BTW, etc.) are not a new concept and appear in non-CMC contexts. Similarly, the x offering a kiss symbol can be traced back to 1763 in a letter by the natural scientist Gilbert White cited in *The Washington Post* (Epstein,2014). At some point the use of 'x', 'xx', 'xxxx', became a popular symbolic practice in texting (Thurlow & Brown, 2003). Even emoticons, where a picture or visual analogue is used to represent a facial expression, are not a new creation. Emoticons, which denote a face digitally (Glikson, Cheshin and van Kleef, (2017) extended characters from previous symbolic drawings (Alshenqeeti, 2016). As technology advanced, the variety of emoticons developed considerably.

1.5 What is an emoticon?

In addition to textisms, graphic symbols emerged in text messages, including the 'smiley' and 'sad face' ☺ or :-) and ☹ or :-((Ling & Baron, 2007; Thurlow & Brown, 2003). The first digital recordings of the happy :-) and sad :-(emoticons were posted on an academic online science faculty notice board in 1982 (Hogenboom et al., 2015). An emoticon is an image representing

a facial expression that provides an emotional context to the message (Crystal, 2008; Ganster, Eimler & Kramer, 2012). Emoticons are visual representations made up of a series of graphic symbols that are shaped by a standard ASCII keyboard or mobile phone keypad (Walther & D'Addario, 2001; Jibril & Abdullah, 2013; Kelly & Watts, 2015). Emoticons are an important part of CMC which is usually text based (Walther & D'Addario, 2001). Text based emoticons today are much more innovative and offer a wide variety of expressions (Dresner & Herring, 2010). However, the emoticon repertoire is limited (e.g., Oleszkiewicz et al. 2017) and research has shown a decline in the use of emoticons since the introduction of emoji (Prada et al. 2018; Pavalanathan & Eisenstein, 2015; Sampietro, 2020).

There are two main types of emoticons depending on the geographical location. Firstly, in the East, a *vertical* style is preferred, with the eyes being the dominant feature, e.g., @@ for surprise, 0.0 for curious and ^-^ for happy, while the West shows a preference for *horizontal* styles like :-) (Park, Barash, Fink & Cha, 2013). The distinction may reflect cultural differences in interpretation of facial expressions from the eyes versus the mouth (Yuki, Maddux, & Masuda, 2007) as well as cross-cultural differences in pragmatics (Sztencel, 2020, p. 16-17).

Texting facial expressions is usually based on the mouth shape, e.g., :D for laugh :P for sticking tongue out and :) for happy. Colons (:) are generally used for the eyes. Various mouth shapes represent facial expressions e.g. ;) for wink, : (((for very sad, and :o for surprise or neutral. However, emoticons are not only restricted to facial expressions, but they can also include other symbols, such as, <3 for 'heart'; :{{ for 'angry' and >:) for 'evil' (Thompson & Filik, 2016).

Emoticons have been compared to punctuation markers (Markham & Oshima, 2007), which may explain why emoticons tend to be placed at the start or end of a sentence (Garrison, Remley, Thomas, & Wierszewski, 2011) and placing an emoticon in mid-sentence is unusual (Provine, Spencer & Mandell, 2007). Emoticons have been shown to affect the

processing of text messages, for example, user enjoyment, perceived usefulness and perceived information richness (Huang, Yen & Zhang, 2008). A positive impact on users' perceived social presence has been shown (Park & Sundar, 2015). If an emoticon has the same congruence as a message, the valence is increased (lp, 2000). Positive emoticons reflect positive feelings (Derks, Bos, & von Grumbkow, 2008; Luor, Wu, Lu & Tao, 2010). Conversely, emoticons can be used to 'soften the blow' in negative messages such as rejections or complaints (Skovholt, Grønning & Kankaanranta, 2014). This relates to a politeness function, discussed below.

Huang, Yen and Zhang (2008) explored the uses of emoticons by two hundred and sixteen American students. They were presented with a questionnaire requesting information on the use of emoticons, including questions on their feelings about information richness, personal interaction, perceived usefulness and level of enjoyment. Of the sample, 56% agreed that they used emoticons to express their personal feelings, while 74% of students stated that their friends used emoticons while using IM to communicate. Oleszkiewicz, Karwowski, Pisanski, Sorokowski, Sobrado and Sorokowska (2017) gathered information regarding the patterns of emoticons from a large sample of Facebook users (n = 86,702; 56% women). Participants' self-reports on the use of emoticons were recorded. They also completed an International Personality Item Pool (IPIP) questionnaire (Goldberg, Johnson, Eber, Hogan, Ashton, Cloninger & Gough, 2006). Results revealed that women used more emoticons than men and emoticon usage declined with age for both genders. Further analysis showed that 90% of the Facebook sample used at least one emoticon. The top five emoticons (e.g. :) for smile, :D for laughing, :(for sad, (: for frown and :P for sticking tongue out) represented 88% of all posted emoticons. The most popular emoticon was the :) smiley face, posted 918,434 times over a six-month period. Findings also revealed that participants who scored high on

agreeableness and neuroticism used more emoticons, suggesting a link to self-presentation variables.

1.5.1 Function of an Emoticon

The main function of emoticon usage is to 'strengthen the message, 'regulate the interaction' and 'put into perspective' (Derks et al., 2008). Emoticons mimic non-verbal cues in speech (Jibril & Abdullah, 2013). In this way, emoticons function as a replacement for facial expressions in order to express an emotion, illocution or sarcastic utterances in CMC (Beißwenger, Ermakova, Geyken, Lemnitzer, & Storrer, 2012).

Several studies have shown that emoticons were used to express an emotion as well as apply a jovial humour to the text message or to articulate the sender's feelings in a similar manner as non-verbal behaviours in face-to-face communication (Kaye, Malone & Wall, 2017). When users use an emoticon, for example, :->>>> to mean overjoyed, in order to communicate an emotion, it tends to lend an emotional impact to a message (Dresner & Herring, 2010; Lo, 2008).

Dresner and Herring (2010) describe emoticons as having a much larger role to play in CMC than just communicating emotions: in fact, they help to form meaning. Dresner and Herring (2010) at first argue that facial emoticons are quite unemotional. For example, a winking eye ;) is not a straightforward sign of an emotion. It could be interpreted in many ways including taunting, sarcasm, or humour, all of which may be linked with emotional states but are not emotions themselves. According to Dresner and Herring (2010), the concept of an illocutionary force (i.e., the importance of a word or expression which may be shaped as a question, promise, warning) is best described as being the communicative effect.

Dresner and Herring (2010) argue that emoticons cannot stand alone as separate emotions isolated from a text. Instead, they are very much inclusive and play an important role

in showing the meaning behind it. Dresner and Herring (2010) also emphasize that the context in which it is placed requires the reader to interpret the specific intended meaning of any emoticon. In addition, Amaghlobeli (2012) found that emoticons are not only used as expressive markers (i.e., tone and pitch) but play a considerable part in the structuring of a sentence.

As noted in Aldunate and Gonzalez-Ibanez's (2017) review, emoticons in text messages can reinforce the emotional expression in order to convey meaning. For example, 'I am happy today' can be read in its exact context. By contrast 'I am happy today' with an emoticon added at the end of the sentence gives further support to the message. However, with the introduction of an emoticon e.g., (: P) for tongue sticking out, (:0) for surprise or (;) for a wink, the potential for a negative emotional impact is introduced (Thompson & Filik, 2016; see also Carvalho, Sarmento, Silva & de Oliveira, 2007). Thompson and Filik (2016) found that emoticons were frequently used with sarcastic comments rather than literal ones and the frequent use of ellipsis was attached more so to sarcastic comments than praise. Frowns were frequently used to critique whereas smiles expressed positivity or praise. This supports the notion that sarcasm requires non-verbal cues which are unavailable in pure text (see Filik, Hunter, & Leuthold, 2015).

Emoticon usage not only supports written communication (Derks et al., 2008) but it lends itself to individuality and creativity (Derks, Bos, & Von Grumbkow 2007; Schnoebelen 2012; Park, Barash, Fink & Cha, 2013). Emoticons allow expression to be added to an otherwise routine text-based interaction (Tossell, Kortum, Shepard, Rahmati, Walkow & Zhong, 2012). Dresner and Herring (2010) place the usage of emoticons in CMC between the extremes of linguistic and non-linguistic communication. Emoticons were limited by the selection of typographic symbols available. By contrast, an emoji allows the person to express concepts and emotions in a flexible manner (Novak et al. 2015).

1.6 What is an Emoji?

Emoji are an everyday phenomenon in CMC (Wijeratne, Balasuriya, Sheth & Doran, 2017). Instead of sending :-D for happy, texters can now send a visual icon e.g., 😃 in addition to, or as a substitute for, words in text messages (Pohl, Domin & Rohs, 2017). The first set of emoji emerged from Japan in 1999 and emoji design has expanded internationally and evolved over time (Moschini, 2016; see Table 1.1). The word 'emoji' translates into English as 'pictogram' and originates from the Japanese for 'picture' and 'character' (Danesi, 2016). Emoji are generally colourful expressive images that are distinctive and generally static (non-animated) within text messages. They include face and non-face types such as objects and gestures (see Table 1.1).

Differences between emoji types are an important consideration in emoji research, yet this distinction has not always been made in studies of emoji use. There is a clear rationale for making a distinction between face emoji and non-face emoji in that they depict very different concepts and ideas (e.g., Riordan, 2017). Face emoji generally express emotions and feelings (Tigwell & Flatla, 2016; Walter & D'Addario 2001) as well as denoting message tone such as sarcasm (Thomson & Filik, 2016; Subramanian et al., 2019) and serving to manage the conversation; for example, they can serve to upgrade or downgrade speech acts (Sampietro, 2019; this is discussed in Section 1.8.1). In this way, face emoji may substitute for facial expressions in face-to-face (FtF) communication. One of the more important forms of non-verbal cues that we use is facial expression. Recognition of face expressions is of crucial importance in building and maintaining relationships (e.g., Behrmann et al., 2005; Cowen et al., 2019). Showing an angry or happy face when face to face provides an effective line of communication in understanding people's emotions (Kroencke et al., 2022). As sociable species, we produce and understand a wide range of different expressions (e.g., Ekman & Friesman, 1971), and evidence from studies of visual perception show that faces are treated as

a ‘special stimulus’. Humans are primed to respond quickly to faces (van Santen & Jonides, 1978), recognise familiar faces and expressions from a young age (Ellis, 1992), and even see faces where there are none, a phenomenon referred to as pareidolia (Zhou & Meng, 2020). Reading emotional expressions from the face shows a strong gender difference (e.g., Wingenbach et al., 2018). Faces are therefore an essential cue in communication; but in digital communication, these cues are absent. Face emoji provide a means to address this absence.

Non-face emoji can represent objects, concepts, ideas and increasingly gestures. Their popularity has increased in recent years (Riordan, 2017). Representations of objects in particular are more concrete (see Table 1.1) and less open to interpretation than face emoji, albeit they can have literal, non-literal and personalised meanings. Gesture emoji are a relatively new subtype. They arguably fall between the two categories. Where for example the 🙄 eyes rolled up emoji is open to interpretation (e.g., sarcasm or mockery), the 👍 thumbs up emoji arguably has a more stable and clearly defined meaning. Object emoji such as 🍔 tend to have a clear meaning, although they also remain open to interpretation (Stark & Crawford 2015). Differences between face and non-face emoji are explored in Chapter 2 (Section 2.4).

Emoji allow for expression of many emotional states as well as enabling texters to represent a wide variety of objects or situations. This allows for flexibility and creativity within the text messages. There is now a large emoji repertoire available to users; some examples are shown in Table 1.1 below. Emoji are now a common feature of communication (Wijeratne, Balasuriya, Sheth & Doran, 2017). Emojistats.com (a website that monitors daily emoji usage in real time) reported almost 3.1 billion uses of emoji recorded on a daily basis (see Figure 1.1; accessed in June 2022). Emoji have developed and expanded over recent years. A number of studies have shown that emoji facilitate expressive communication (Pohl, Domin & Rohs, 2017; Tauch & Kanjo, 2016) and aid word reading (Barach, 2021,p.15). Emoji tend to occur in predictable locations in the sentence. For example, Novak et al. (2015) studied 1.6 million tweets and found that emoji usually occur at the end of messages.

Table 1.1 Example of emoji by category

Facial	Smiley ☺️	Sad 😥	Crying 😭	Surprise 😲	Zany 🤪	Lying 🙄
Object	Balloon 🎈	Hammer 🔨	Brick 🧱	Scissors ✂️	Alarm Clock ⏰	Key 🔑
Gesture	Thumbs Up 👍	Thumbs Down 👎	Oncoming Fist 👊	Shaking Hands 🤝	Clapping Hands 👏	OK Hand 👌
Food/Drink	Cocktail 🍹	Birthday Cake 🎂	Hamburger 🍔	Pizza 🍕	French Fries 🍟	Beer Mug 🍺
Skin Tone/Hair	Medium S.T. 👩🏽	Medium S.T 👨🏽	Dark S.T 👨🏿	Blonde Hair 👱	Red Hair 👩‍🦰	Bald 👨‍🦲
Animal/Nature	Dog 🐶	Cat 🐱	Lion 🦁	Rose 🌹	Palm Tree 🌴	Mushroom 🍄
Travel/Places	Airplane ✈️	Ship 🚢	Bus 🚌	Hospital 🏥	Chapel ⛪	House 🏠
Activities	Football ⚽	Tennis 🎾	Basketball 🏀	Skiing ⛷️	Surfing 🏄	Yoga 🧘
People	Woman 👩	Man 👨	Judge 👩‍⚖️	Student 👨‍🎓	Chef 👨‍🍳	Policeman 👮

1.6.1 Function of an Emoji

Pragmatic language is concerned about the social language skills we use in order to build an understanding with people on a daily basis. Therefore, what we say, how we say it and our bodily gestures (i.e., facial expressions, nod of head, eye contact) need to be fully understood for both the listener and the speaker (See Gawne & McCullough, 2019). While it is almost impossible to replicate these actions through written language, there are options to fill the gap of nonverbal characteristics in written language.

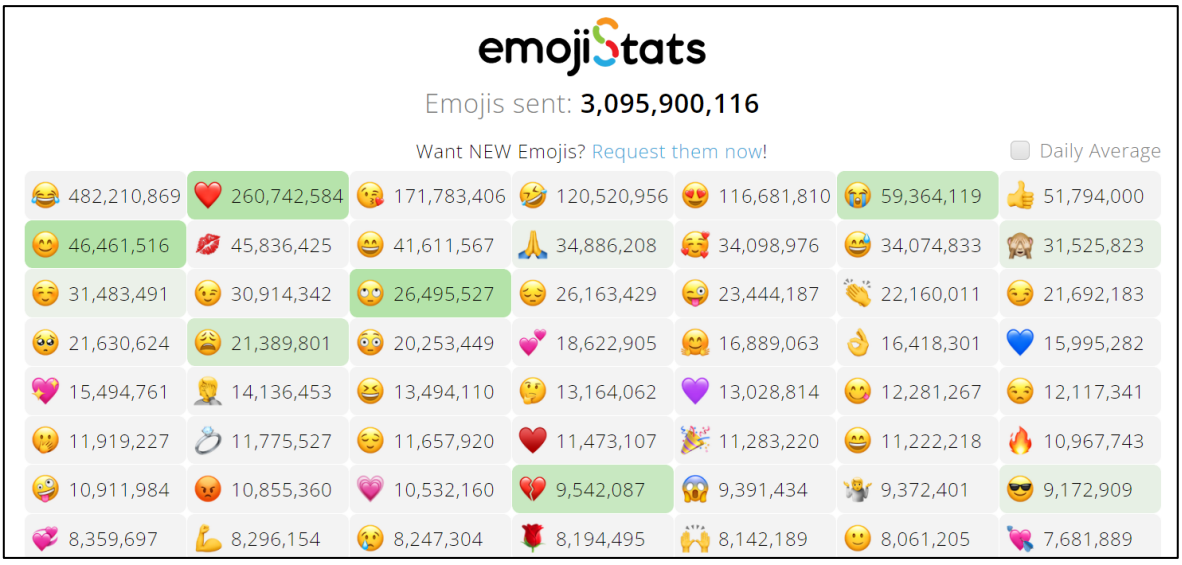


Figure 1.1 Common emoji types from Emojistats.com

downloaded on the 27th June 2022. The green highlights indicate live daily updates at the time of download

Emoji allow for expression of many emotional states but extend beyond emotion and can express various content including people, animals, food and sports (see Table 1.1). An emoji can substitute for or complement words in a text message (Li, Yan & Zhang, 2017). Emoji can also be seen as a replacement for body language or gestures (e.g., hands, arms or face movements) or tone and pitch of the voice (Stark & Crawford, 2015). Gawne and McCulloch (2019) suggest that emoji are digital gestures that can function as a 'pantomime character'; a pantomime character expresses meaning through a mixture of gestures and limited speech on

stage. Emoji can be used literally, figuratively or can be given a sound-based interpretation (Danesi, 2016). Emoji are used because of their effortlessness, convenience and ease with which they facilitate emotional expression (Bai et al., 2019). In some cases, emoji can be used for deception (Njenga, 2018) as well as displaying sarcastic humour (Thompson & Filik, 2016) or to express jokes or irony (Skovholt et al. 2014).

Kelly and Watts (2015) found that emoji help "to build forms of meaning that are uniquely interpretable within a particular relationship" (2015, p.5). Danesi (2017, p.95–116) describes emoji as "mood enhancers, generally communicating, maintaining, or reinforcing a sense of togetherness among interlocutors". Placing a single or sequence of emoji at the beginning or end of a text message builds up a stronger rapport (Pohl, Domin & Rohs, 2017). They can also play an important role in relationship quality and to create an impression (Rodrigues et al. 2017; Coyle & Carmichael, 2019). Li and Yang (2018) identified 7 functions of emoji: attitude/emotion signal, attitude/emotion intensity enhancer, illocutionary force

1.7 What is a Graphic Interchange Format (GIF)?

The increased variety of emoji has expanded this aspect of communication further allowing texters to convey literal or figurative meaning or add affect as well as serving other pragmatic functions. In addition, other image-based forms, GIFs, are now trending in popularity as forms of expressive images (Veszelszki, 2015).

A graphic interchange format (GIF) is an image that expresses emotion or is used to convey humour (Veszelszki, 2015). Typically, they are animated. GIFs are essentially high-resolution images or video files, which allow texters to go beyond the non-linguistic symbols (i.e., emoticons and emoji) within text messages (Tolins & Samermit, 2016). There has been a surge in the popularity of GIFs (Veszelszki, 2015) on social media platforms such as Facebook, Twitter, WhatsApp and they are now also beginning to appear within text messages (Wen, Baym, Tamuz, Teevan, Dumais & Kalai, 2015).

1.8 Theoretical Frameworks for understanding emoji use

A number of theoretical frameworks guided development of this thesis. Five are introduced here: Politeness Theory, the Rapport Management Model, Media Richness Theory, the Hyperpersonal Model and the Processing Fluency account. This thesis focuses on the latter of these but is informed by all five.

1.8.1 Brown and Levinson's Politeness Theory

Brown and Levinson (1978) proposed a theory of politeness built on the assumption that many speech acts are essentially threatening to what they refer to as 'face'. Their concept of face is derived from Goffman (1955) and is consistent with everyday notions such as saving or losing face or public self-image. The term 'speech act' refers to specific expressions that serve a function, for example, when we apologise, complain, praise or greet someone (e.g., 'hey Bob', 'Sorry Bob' or 'well done Bob'). Brown and Levinson (1987) argue that two kinds of 'face' are evident when interacting with one another: a negative face which protects the right not to be intruded upon and a positive face which asserts a positive self-image and reflects a need to be to be liked, respected or accepted by the other person. According to Brown and Levinson (1987), when communicating face-to-face, every word and expression is potentially a face threatening act (FTA) either to a negative or positive face. They define negative face as "the want of every competent adult member that his actions be unimpeded by others". They define positive face as "the want of every member that his wants be desirable to at least some others" (p.312). Negative face is politeness as non-imposition and is consistent with traditional notions of formal politeness and the norms thereof. Brown and Levinson (1987) regard positive face as being less obvious in its forms but is related to the individual's public self-image and personality (p.312). People's interactions are guided by an assumption that face is maintained and that it is emotionally salient (p.311).

On Brown and Levinson's account (1987) FTAs that threaten a positive face include those acts in which a person does not appreciate or respect the other's positive face or self-image (e.g., criticisms or disapproving, intrusive or offensive comments). FTAs that approach a negative face include those acts that threatens the person's freedom from impeding actions. For example, an act such as 'I promise you I will pay you back' carries a strong emotional valence and constrains the receiver's negative face, in that he or she may be forced to minimise the debt, or accept it, or it may lead to embarrassment or a faux pas or require him or her to commit to a future action (Brown & Levinson, 1987, p.315).

Positive politeness strategies are about expressing compliments. In contrast, negative politeness strategies such as expressions in terms of; 'maybe', 'no' and 'perhaps not' are seen as introducing negative connotations into a conversation. The way in which something is said is important when two people communicate face to face. Several researchers have suggested that emoji serve a politeness function in the CMC setting (e.g., Holtgraves & Robinson, 2020; Sampietro, 2019). Emoji may then serve different functions or be perceived differently depending on whether the message is positive or negative in valence in that a negative message is more threatening to 'face'.

People act in public and conduct themselves as if their expectations concerning their public self-image or personality will be recognized and appreciated by others. The central concept of 'face' is defined as "the public self-image that every member wants to claim for his or herself" (Brown & Levinson 1978, p.61) and that includes two important aspects, i.e., positive and negative face. In short, negative face is often the need to be private, a desire for independence and not to be manipulated by others, in other words to have the freedom to act however one chooses. Having a positive face is the need to be accepted, liked and valued as an individual and to be treated as an individual within the group, and to know that his or her wants are respectively shared by others (Brown & Levinson, 1978). Synder (1974, p.528) argues that

social appropriateness leads to being self-aware of other people's sensitivities. Therefore, the message valence might be expected to affect perceptions, given that a negative message will be more threatening to face compared to a positive message.

1.8.2 The Rapport Management Model

A second framework guiding this thesis is the Rapport Management Model. As noted by Spencer-Oatey (2005, p.335) in proposing this model, politeness research tended to focus on the speaker and the perspective of the receiver was not considered. Spencer-Oatey's (2000; 2002; 2005) Rapport Management Model critiqued and extended Brown and Levinson's (1987) politeness theory and included a perceiver/receiver perspective in relational management. Spencer-Oatey's (e.g., 2000; 2002; 2005) framework provides a broader perspective on politeness that can be applied to emoji (Sampietro, 2019) and focused on the role that linguistic politeness plays in the management of social relations. Spencer Oatey's Rapport Management Model places an emphasis on "the use of language to promote, maintain or threaten harmonious social relations" (Spencer-Oatey, 2000, p.3).

Given the importance of the face as the key factor for linguistic politeness, and the role it plays in the management of social relations. Spencer-Oatey (2000) reckons there is too much emphasis placed on individuality and the harmony in maintaining a friendly rapport, and not enough placed on the social impact on face. From this, as Goffman (1955) suggested, a person's social world is made up of numerous social faces. It is these social faces that require a particular '*line*' that is presented as verbal or non-verbal gestures. So, when a person expresses their views whether the message is positive or negative in valence. There needs to be a recognition of the impacts caused by these verbal and non-verbal gestures. As well as an understanding towards others and towards oneself. One which Goffman (1955) referred to as a front stage concept, where one acts out the role in its entirety in seeking the approval of others.

The term ‘face’(i.e., or self for that matter) refers to the way that person directs their thoughts and emotions on to others. If we think about linguistic politeness in terms of what it is communicating, for example; sad emotions or happy feelings, become part of the face that person has developed for themselves. Spencer & Oatey (2000, 2002, 2005) Rapport Management Model can reveal to what extent politeness strategies are understood, which range from; personal attentiveness, such as paying attention to face sensitivities e.g., status, life experiences, goals and expectations, all of which need to manage effectively to create the right impression; Sentimental control e.g., able to handle criticism or embarrassing situations, be able to hold different beliefs when surrounded by people with different social backgrounds and cultures; Being socially accommodating when having to regulate your tone, pitch and speed of speaking, intonations and gestures and facial expressions. It follows that face work is also one approach in order to do social interactive work (McSweeney, 2018 p.43).

So, developing a rapport can be perceived as subjective in considering building a bridge between what one would consider as harmonious/disharmonious, kind/rude, or even sociable/unsociable. Particularly in the course of digital communication which is heavily influenced by modern technology.

Therefore, as face and non-face emoji are used in CMC to facilitate comprehension and to compensate for the absence of nonverbal cues that are available in face-to-face communication (e.g., Dresner & Herring, 2010). Emoji are also considered a new nonverbal language unit (Ai et al. 2017). They have the same impact with the same intentional goal in substituting body language (e.g., raised eyebrows, thumbs up or flexing an arm muscle) in order to create a reply from the receiver. The purpose of sending a text message outweighs face-to-face dialogues to convey and understand the intentional use of an emoji in a text message (Dos et al., 2018). Therefore, the importance of maintaining a close rapport when face-to-face is guided by the perceived rights and wrongs and expectations of a mutual

understanding between the sender and receiver (Spencer-Oatey, 2000). Spencer-Oatey (2000:12) claims that maintaining a close rapport is a sound linguistic arrangement between two people. Though, the use of emoji go beyond the realms of linguistic accomplishments, particularly when emoji are seen to supplement or substitute the text and change textual meaning (Zhou et al. 2017).

Sampietro (2019) considered the Spencer-Oatey (2000) rapport management model to be particularly suitable for the study of emoji, which she sees as related to politeness, because "this framework, by definition, goes beyond the linguistic strategies used by interactants, focusing rather on the construction and maintenance of social relationships in interaction." (p.111). Sampietro (2019) found that emoji used in WhatsApp chats can intensify or weaken speech acts, but they can also serve a pragmatic function, by supporting a successful interaction through signalling closing or openings for example (p.109) They also serve as a way to frame playful interactions and therefore serve a stylistic function (Sampietro, 2019). We perform speech acts when we apologise, advise, thank, greet or insult someone when face to face. In addition, Sampietro, (2019, p.117) suggested emoji can be seen as "a form of phatic communion" and have a playful function. Phatic communication refers to small talk e.g., hey, how are you, nice day, are all phatic expressions. In CMC, emoji can assist with replacing certain nonverbal acts, and this might differ depending on whether the message is positive or negative in valence which is an important dimension for this thesis.

Similarly, Li and Yang (2018) found that positive emoji were used to create a positive atmosphere and boost rapport in group chats. They found that emoji were of high frequency, and positive emoji were used more often than negative emoji. They classified emoji into 7 functions: attitude/emotion signal, attitude/emotion intensity enhancer, illocutionary force modifier, humour, irony, turn taking/giving, and backchannel device. Of the messages containing emoji, a 'thumbs up' was the most frequently used. Their data suggests a variety of

pragmatic functions and differences depending on whether a positive or negative message is involved.

Rodrigues et al. (2017) examined emoji use in text messages exchanged between romantic partners and their role in managing the rapport and promoting relationship quality. In two experiments, participants evaluated the relationship interest of a romantic partner, based on hypothetical text message exchanges, which were positive or negative in valence, and where emoji were present or absent. They found that interest was highest for positive exchanges regardless of cue. For negative messages, replies with emoji signalled greater interest, but where the exchange was more serious, the presence of emoji signalled less interest by increasing the message negativity. These findings suggest that emoji play a complex role in the perception of the relationship and in rapport management. This is explored in the present thesis.

1.8.3 Media Richness Theory

Media Richness theory (MRT) was proposed by Daft and Lengel (1986) as a framework to describe how different communication mediums have the ability to change users' understanding of a message. Daft and Lengel (1986) proposed that the more unclear and confusing an instruction or message is, the richer the format of media will need to be to gain a collective understanding (Robert & Dennis, 2005). For example, as a communication medium a phone call is affected by the absence of bodily gestures and eye contact and is therefore considered less rich as a medium than a face-to-face (FtF) conversation. Compared to the rich visual cues (i.e. nods, shrugs, winks, smiles) offered in new technologies such as a video calling, text messages are a lean medium and therefore the richness of information is lost in such messages. Messages that are rich with personal and emotive language and other cues promote a quicker understanding, especially when its content is rich with expressions, gestures and tones (Kishi, 2008; Otondo, Scotter, Allen & Palvia; Lee, 1994). It is these non-verbal cues

which are the means to which users respond to and support the others emotion (Wolf, 2000). Text messages using linguistic and non-linguistic (i.e. emoticons, emoji) features may substitute for the non-verbal cues used to express emotions and increase message richness and a sense of connectedness (Utz, 2000; Riva, 2002; Lo, 2008). This suggest that emoji and emoticons have a very important role in transmitting information in a text message and might be expected to improve clarity of the message as well as affecting the overall impression.

Daft and Lengal (1984) proposed that the richness of a message is based on four key principles: feedback, which must be instantaneous and responsive; multiple cues which is the number of channels and cues available (e.g. facial expression, vocal inflection); language variety which provides meaning through symbols and language style; personal focus which provides the sender the opportunity to convey emotion or personality to their recipient. Emoji have the potential to deliver these four key principles for medium richness. For example, emoji enrich the feedback by providing richer replacements or supplementary non-verbal messages in a succinct and rapid manner. The impact of engaging with a wide range of facial and non-facial emoji (i.e. multiple cues) allows for communication to be have a personal focus and an enhancement of language variety. These factors suggest that emoji use will enrichen the text message, but that text messaging overall is a leaner communication medium compared to FtF. However, as CMC has developed, the predictions of media richness have not been borne out and it would seem that in some circumstances CMC creates a stronger social bond, with greater potential for self-disclosure, than FtF situations. This is addressed in the Hyperpersonal Model of CMC.

1.8.4 The Hyperpersonal Model of CMC

Traditional theoretical accounts of communication, when applied to CMC, suggested that it is a less rich medium that face-to-face (FtF) communication, which contains a multitude of verbal

and non-verbal cues that facilitate interpretation of the message. Walther's (1996) hyperpersonal model proposed that CMC allows the user to exceed F2F interactions in some circumstances. The theory was proposed to account for impression management in text-based communications between two individuals. Four characteristics of CMC facilitate impression management (see Scott & Fullwood, 2020). First, users can control how they present the self in CMC compared to the FtF context; second, the asynchronous nature of CMC provides an opportunity for reflection before the message is communicated, also aiding self-presentation; third, the absence of physical proximity to the other person means that we can hide cues we might not be able to in FtF contexts (a yawn, eyeroll, for example) fourth, because of the reduced cues, Walther (e.g., 1996) argues that we make more effective use of our cognitive resources in CMC (Scott & Fullwood, 2020). This means that "CMC senders, unfettered by unwanted cues or multiple conversational demands, may engage in personal and relational optimization. CMC receivers are prone to make flattering constructions from those messages when a relationship commonality is sensed. In addition to the selective self-presentation of the sender and idealization of that source by the receiver due to minimal-cue interaction, there are further affordances for message management and coordination when CMC is asynchronous that may further lead to hyperpersonal communication" (Walther, 1996, p.23).

There is strong evidence to support the hyperpersonal model in online settings (Scott & Fullwood, 2020). However, it is less clear how it applies when there is ambiguity or contradictory information in the message, for example text with an emoji that is perceived ambiguously (e.g., see Cui, 2022).

1.8.5 Processing Fluency

A fifth and final framework guiding this thesis is the Processing Fluency account. Alter and Oppenheimer (2009, p.219) described processing fluency as "the subjective experience of ease

with which people process information." The purpose of texting is to convey a coherent short message. Much of the language in text messages is consistent with other contexts in which a brevity-speed imperative applies, such as a hastily handwritten note left on the refrigerator door, to use an example from Thurlow and Poff (2013, p.173). The ease, speed and accuracy with which information can be processed is of key importance.

Text messages are concisely written, and the inclusion of an emoji can supplement or replace words in a sentence. Notwithstanding their brevity, text messages should be easily read and may be demonstrate a fluency effect. As Alter and Oppenheimer (2009) explained, people tend to enjoy stimuli more when they are easily processed. If information is presented in a coherent and clear manner, it is easier to understand and therefore more believable (Alter & Oppenheimer, 2009; Daniel & Camp, 2020). It is this preference for cognitive ease and flow that is commonly referred to as processing fluency.

Processing fluency is an "experimental component of mental operations such as perceiving, storing, retrieving, or generating information" (Unkelbach & Greifender, 2013, p.11). Processing fluency is not a one-dimensional cognitive process but rather, an involvement with a wider cognitive process, in the sense that it can involve any form of reasoning, thinking and judgments (Oppenheimer, 2008). This fluency experience is seen when that people make a variety of aesthetic and nonaesthetic judgments, in vision and in decision making.

These effects also extend to language. Daniel and Camp (2020, p.209) cite an example from McGlone and Tofighbakhsh (2000) of rhyming aphorisms. A sentence such as "What sobriety conceals, alcohol reveals" is preferred and accepted as a truthful statement compared to "What sobriety conceals, alcohol unmasks," even though the two statements have the same meaning. The fluency and believability of the statement are affected by the presentation, which changes the way it is perceived. McGlone and Tofighbakhsh (2000) also noted that using short

phrases that rhyme (e.g., “A friend in need is a friend indeed”) facilitates processing in a similar way.

Daniel and Camp (2020) demonstrated that the inclusion of an emoji created a similar effect. They examined Twitter messages which contained congruent, incongruent or no emoji (neutral condition) and they asked participants to rate how understandable and believable the messages were, as indexes of processing fluency, and how likely they were to share it. They found that messages that contained the congruent emoji were rated as easier to understand and more believable than in the incongruent or neutral conditions. This shows that emoji can have a processing fluency effect in a social media message. They suggest that differences between positive and negative valenced information may moderate this effect (p.211), a factor explored in the present thesis.

Studies showing an effect of emoji on communication for rapport management and relationship maintenance (e.g., Sampietro, 2019) have not to date considered the role of processing fluency. It may be that the presence of emoji increases fluency which in turn supports rapport and relationships. This thesis aims to draw these two frameworks – rapport management and processing fluency – together to understand how emoji are perceived in interpersonal text messages. A further aim is to outline the boundary conditions whereby emoji affect processing fluency.

1.9 General aim of the thesis

The general aim of this thesis is to investigate how non-linguistic features of short messaging service (SMS) text messages and other instant messaging (IM) and in particular emoji are perceived by readers of those messages. This thesis focuses on the reader’s perspective. In this thesis, the term ‘text messages’ is used to refer to any private text-based message sent between two users, and as such includes text messages and instant messaging such as Skype messages,

Facebook messaging, WhatsApp, etc. These messages can be sent via phone and other devices including computer.

To date, there has been very little research on the perception of face and non-face emoji that their role in impression management (i.e., self-presentation). Processing fluency is a central focus of the thesis; a fundamental question is how face and non-face emoji could serve as a means to increase fluency in CMC. Over a series of experiments, the role of face and non-face emoji is examined, in positive and negative contexts, in the receiver's ratings of understandability and believability, and efficiency and clarity in transmitting its meaning.

1.10 Outline of the Thesis

In Chapter 2, this thesis sets out to investigate the prevalence of linguistic and non-linguistic features of naturalistic SMS text messages and links to personality. Frequencies of textisms and face and non-face emoji are analysed. It begins by exploring how self-presentation, as explored via personality variables, is reflected in the content of the text message (linguistic and non-linguistic symbols e.g., emoji). The purpose of this chapter is to identify patterns in emoji use that are used to inform the design of subsequent chapters. As such it is the only chapter that examines emoji use from the sender's perspective.

The subsequent chapters contain a series of five experiments which explore how face and non-face emoji affect perceptions of text messages of positive and negative valence. These chapters explore the effect of emoji within text messages on processing fluency and aim to highlight the boundary conditions whereby emoji increase or decrease processing fluency. In each experiment, participants were asked to rate text messages, with or without emoji, for: interest in the friendship; improvement of the friendship (as measures of rapport or relationship maintenance); and efficiency and clarity in transmitting its meaning (as measures of processing fluency). The final two experiments added in two direct measure of processing fluency: ratings of believability and understandability.

The aim of Chapter 3 is to explore whether the presence of face and non-face emoji influences the perception of friendship in text messages. It is based on a study that examined the effect of emoji on the perception of text messages conducted by Rodrigues et al. (2017). Rodrigues et al. (2017) examined the role of emoji in text messages focusing on the perception of messages sent between hypothetical romantic partners. Participants completed an online task where they were asked to read a series of text messages exchanged between romantic partners. In Study 1, Rodrigues et al. (2017) compared the effects of the message valence (i.e., positive vs negative) and emotional cues (i.e., without emotional text vs emotional text vs emoji). In Study 2, Rodrigues et al. (2017) replicated their Study 1 in part but using only negative replies but manipulating the seriousness of the issue. The messages were either positive or negative in valence and consisted of a 3-part exchange to which an additional cue was added in some conditions. Nothing was added in the 'without' condition. In the text condition, a text response was added. For example, if the message was positive "I'm happy*"* was added. In the emoji condition a smiling face emoji was added. Only face emoji were used in their experiment.

Rodrigues et al. (2017) found that positive replies indicated a stronger interest in the relationship regardless of the presence or absence of emoji. Interpreted through the lens of processing fluency this may suggest that the positive messages were sufficiently easy to process, and the addition of emoji did not aid processing further. For negative messages, in Study 1, they found that the presence of emoji signalled greater interested in the relationship. In the negative messages, the presence of an emoji had the effect of making the message appear more positive. They also found a strong correlation between efficiency and ratings of interest in the friendship and positivity. In Study 2 however, for more serious negative messages, the presence of an emoji had a detrimental effect, making the message seem more negative. Chapter Three extends this work by considering both face and non-face emoji in addition to valence.

Chapters 4 will extend the previous chapter by examining whether non face emoji will affect ratings of efficiency and clarity, as well as those of rapport, when they supplement or substitute for words in positive or negative text messages.

Chapter 5 will extend Chapter 4 by examining whether face emoji will affect ratings of efficiency and clarity, as well as those of rapport, when they punctuate or non-punctuate (i.e., interrupt) for words in positive or negative text messages.

Chapter 6 is an extension of a study by Daniel and Camp (2020). Daniel and Camp (2020) examined how the presence of mainly face emoji affects processing fluency when applied to a tweet. Participants completed an online survey where they were asked to rate on a scale of 1 to 7 (e.g., How easy was it to understand the tweet? How believable the tweet was and how likely they were to share the tweet on social media)? Daniel and Camp (2020) included understandability and believability as measures of fluency. Four rating scales used by Rodrigues et al. (2017) to measure rapport were taken and applied to the current study for example: ‘‘In your opinion, to what extent do you consider that the reply ” - ‘‘was positive?”, ‘‘was negative?”, ‘‘was efficient in transmitting its meaning?”, and ‘‘had a clear meaning?”. (1 = Not at all, 7 = A lot).

The majority of tweets presented to participants in Daniel and Camp (2020) study were positive in valence and included the nine most popular emoji identified by using EmojiTracker: e.g., joy, heart, heart eyes, blow kiss, weary, OK hand, smile, unamused and pensive. (*An EmojiTracker is a visualization record of all emoji symbols used on Twitter in real time.)* Daniel and Camp’s (2020) study created three sentence types: congruency; incongruency; and neutral. In the neutral condition, the tweet was presented without an emoji. In the congruent condition, the message was shown with an appropriate emoji. In the incongruent condition, the tweet was shown with a mismatched emoji that conflicted with the message content. For example, in an incongruent condition, a tweet may read “Monday is

looking pretty good so far" followed by a disappointed face emoji, and in the congruent condition, the tweet is followed by a smiley face with heart eyes, and the neutral condition will read "Monday is looking pretty good so far," with no emoji.

Daniel and Camp (2020) showed that when texters use a matching emoji (i.e., congruent condition) in a tweet, readers rated the message as easier to understand and more believable. A tweet with a mismatching emoji (i.e., an incongruent condition) was rated as being more difficult to understand. Congruency also affected how participants would share the tweet on social media. Participants rated messages with a congruent emoji highest compared to messages that were neutral. In addition, Daniel and Camp (2020) hypothesised that participants who used fewer emoji were more likely to be affected by the presence of an emoji in a message and that previous experience with Twitter would affect results. These hypotheses were not supported. The chapter examines whether the presence of a face emoji in positive and negative messages affects understanding and believability, comparing a congruent, incongruent and neutral condition. Where Daniel and Camp selected understandability and believability as measures of processing fluency, the present study includes two additional dependent variables (i.e., efficiency in transmitting its meaning and clarity in meaning) as measures of processing fluency. In addition, Daniel and Camp did not include response times as a dependent measure. Reading times are included as a measure in the present study.

Chapter 7 builds on the previous chapter and examines the influence of non-face emoji in affecting processing fluency.

A concluding chapter, Chapter 8, draws the findings together and outlines the methodological and theoretical contributions made by the thesis.

Chapter Two

Examining the prevalence of face and non-face emoji, and textisms, in relation to measures of sender's self-presentation variables

Abstract

Chapter Two set out to examine the prevalence of face and non-face emoji, and textisms, in relation to measures of self-presentation, specifically self-consciousness, social anxiety and self-monitoring. It is predicted that emoji fulfil a self-presentation function in private text messages. A corpus of 1,490 recently sent text messages were collected from 83 female and 66 male university students, aged 18 to 59 years (average age 21). Participants completed the personality measures and gave details of texting frequency and gender. Participants' text messages were captured by photographing a screenshot of each message and linguistic and non-linguistic features were transcribed verbatim and analysed. Participants completed the revised Self-Monitoring Scale (Snyder, 1974), the Ten Item Personality Measure (TIPI) scale (Gosling, Rentfrow & Swann, 2003) and the Self-Consciousness (SCS-R) Scale (Scheier & Carver, 2013) which measures private self-consciousness (own thoughts), public self-consciousness (impact of their presence on other people) and social anxiety.

The text messages yielded a corpus of 625 naturalistic emoji (463 face;162 non-face) overall. While 76 distinct emoji appeared, the ten most frequently used accounted for over three quarters of the total. Emoji appeared in 28% of text messages of which 74% were face emoji. Overall, textisms appeared in 38% of messages and accounted for 6% of linguistic units with no effects of personality. These data suggest that emoji are prevalent in the text messages of university students and that there are few, or weak associations with measures of personality and self-presentation.

Regression analysis revealed that frequency of emoji was predicted mainly by gender, which with age accounted for 13% of the variance, while personality explained only an additional 5%, with public self-consciousness alone making a unique, if small, contribution. However, separate analysis of face emoji showed a stronger effect, with gender and age

accounting for 12% of the variance and personality a further 10%, with public self-consciousness playing a significant role. Non-face emoji showed only a gender difference. These findings point to differences in the use of face and non-face emoji related to self-presentation preferences.

Further analysis revealed that there are differences in emoji use as a function of message valence with emoji appearing in positive messages more so than neutral, uncoded or negative messages. This is consistent with a processing fluency account and with Spencer-Oatey's (2000) Rapport Management Model. The data suggest that emoji are used in a systematic and context appropriate way to facilitate understanding and that face, and non-face emoji warrant independent investigation.

Chapter Two

2.1. Introduction

The purpose of this chapter was to identify patterns in emoji use that could be used to inform the design of subsequent chapters. As such it is the only chapter that examines emoji use from the sender's perspective. The purpose of this chapter is, first, to examine the prevalence of emoji and other features in interpersonal text messages and, second, to identify any relationship to measures of self-presentation, specifically self-consciousness, social anxiety and self-monitoring from a sender's perspective. Self-presentation relates to the notion that feedback from others is important (e.g., Mead, 1934) and has been shown to be important in a CMC setting (e.g., Ellison et al. 2006; Walther, 2007).

Emoji are a common feature in text messages (Coyle & Carmichael, 2019). Previous research found that 96% of people use at least one emoji in text messages (Marengo et al. 2017). Emoji provide a means of self-expression in CMC and their use may be related to an individual's self-presentation preferences. Emoji type may also be a salient factor. Face and non-face emoji have a wide array of meanings and the potential for ambiguity may be heightened in particular for non-face emoji. Emoji are not unambiguous and there can be considerable variations in people's interpretations of them (e.g., Danesi, 2016). Riordan (2017a) demonstrated that non-face emoji play a role in disambiguating messages and communicating affect and suggested that non-face emoji might allow for more flexible communicative roles compared to face emoji. If this is the case, the choices of face and non-face emoji may differ as a function of self-expression and variations of emoji usage may be linked with self-presentation variables and personality traits such as self-monitoring, self-consciousness and social anxiety. This chapter explores this relationship between use of face and non-face emoji and senders' self-presentation preferences.

2.2 Self-Presentation

One reason people engage in self-presentation is to make an impression on another person (Leary et al. 1988). Those who are high in self-presentation related variables tend to change their behaviour to present themselves in a positive light, while those low in self-presentation tend to present themselves in the same manner regardless of the situation (Leary & Allen, 2011). Emoji fulfil self-presentation functions. Emoji have been shown to "function as subtle self-disclosures" and participants who score highly on measures of emotional intelligence appear to particularly responsive to their use (Volker & Mannheim, 2021, p.2).

Several studies have shown that individuals present various aspects of their self-online to help maintain a rapport, such as their real self, ideal self, and their false self (see Michikyan, Dennis & Subrahmanyam, 2015). This applies to the 'front stage' context of social media but also to CMC text messaging. In Chapter One, Spencer-Oatey's Rapport Management Model of managing and improving social interaction was discussed. In terms of managing linguistic politeness during a face-to-face conversation, understanding and appreciating the tone of conversation is important and is conveyed through face-to-face cues. Face and non-face emoji have been shown to serve as a politeness function in CMC (Sampietro, 2019; McSweeney, 2018, p.46). Texters have a wide repertoire of emoji available to them, to reinforce the tone of a positive or negative message and to protect each other's 'positive face' (see Chapter One). In addition, face and non-face emoji have an influence on processing fluency, which increases clarity and efficiency of the message and helps to regulate the politeness level. A number of self-presentation variables may affect emoji use and are now considered briefly.

2.2.1 Private and Public Self-Consciousness

The private and public self-consciousness constructs refer to the direction of the focus of one's attention, inwards (a focus on the inner self and one's thoughts) or outwards (a focus on what

others might think about oneself; e.g., see DaSilveira et al. 2015). Public self-consciousness reflects a concern with the reactions of others (Fenigstein et al. 1975, p.525), and as noted by Kim Jun and Han (2022) individuals are motivated to share information through self-connection and social connection. Private self-consciousness can be defined as "the tendency to think about and attend to the more covert, hidden aspects of the self…for example, one's privately held beliefs, aspirations, values and feelings" (Scheier & Carver, 1985, p.119).

Private and public self-consciousness differ in their relationship to online self-presentation. Public self-consciousness has been shown to be related to the attention engaged in positive self-presentation in the context of online social networks (Shim et al. 2016). To date, the relationship between self-consciousness as a self-presentation variable and emoji use has not been examined. The present study explores this link and, given the role that face, and non-face emoji play in self-presentation and self-disclosure, it is predicted that an association between face and non-face emoji use, and public self-consciousness will emerge.

2.2.2 Personality: The Big 5

Self- presentation is related to a number of core personality variables. Emoji use has also been associated with personality variables. Marengo, Giannotta and Settanni (2017) using the Big-5 personality traits (extraversion, agreeableness, conscientiousness, emotional stability, and open to new experiences), and confirming previous findings, found that 36 out of 91 emoji they examined were associated with three of the Big-5 (see Table 2.1 below).

The most important model in personality research is the Big Five Factor Model, also referred to as Big Five or OCEAN. The model consists of five broad measurements of the big five personality traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness). Personality traits taken from Mc Crae and Costa, (2003) who revealed; Openness is related to new experiences (i.e., creative, original and imaginative) and people who score

highly on this variable are less likely to shy away from new technology (Devaraj, Easley & Crant, 2008). Conscientiousness (e.g., good natured, trusting and generous) describes individuals who are spontaneous and articulate to the extreme of avoiding chaos are more than likely to ponder over a problematic situation before making a final decision (Weiner & Greene, 2008). Extraversion is characterised by being (e.g., active, fun and affectionate). Moreover, those who score high on the personality scale for extroversion are prone to seeking closer and intimate friendships (Watson & Clark, 1997). Extraversion is associated with lower social anxiety including when interacting online (Rice & Markey, 2009). Agreeableness is associated with individuals who are (e.g., lenient, good natured and trusting), more concerned with an openness to please and satisfy others (Leary & Allen, 2011). Furthermore, it has been shown that individuals with high levels of agreeableness have a certain degree of restraint over their online activities (Sun & Wu, 2011). Neuroticism, also referred to as emotionally stability describes the frequency of experiencing a negative affect. Emotionally instable individuals easily feel (e.g., self-conscious, temperamental and emotional). Studies using Big Five have shown a modest association between personality and emoji use (e.g., Oleszkiewicz et al. 2017).

2.2.3 Self-Monitoring and Social Anxiety

Measures of self-monitoring and social anxiety have been identified as relevant to CMC, the self-monitoring individual being one "who, out of concern for social appropriateness, is particularly sensitive of others in social situations and uses those guidelines for monitoring his self-presentation" (Synder,1974, p.528). In any social interactions, high self-monitors act self-consciously to manage the impression they create, by modifying their behaviours within the interaction in order to adapt to the group dynamics compared to low self-monitors (Ickes, Holloway, Stinson & Hoodenpyle, 2006). In contrast low self-monitors are probably less sensitive to group dynamics and employ an appropriate behaviour that is typical of them, expressing what they regard as 'my usual self' (Ickes et al., 2006, p.682).

Table 2.1 Associations of emoji and personality traits from Table 1 in Marengo, Giannotta and Settanni (2017)

reprinted by kind permission of Michele Settanni, Personal Communication, March the 8th, 2018. The Unicode name refers to a platform specific description

Table 1
Correlations between emoji identification scores and TIPI personality traits.

Emoji	Unicode name	Mean (SD)	Agree.	Extrav.	Em.St.	Open.	Cons.
	Smiling face with smiling eyes	3.14 (1.40)	**0.37**	0.18	0.00	0.07	0.17
	White smiling face	2.94 (1.40)	**0.33**	0.21	0.00	0.09	0.13
	Kissing face with closed eyes	2.37 (1.33)	**0.29**	0.23	−0.11	0.09	0.09
	Smiling face with sunglasses	2.76 (1.39)	0.00	**0.41**	0.07	0.11	0.07
	Winking face	2.87 (1.35)	0.13	**0.37**	0.17	0.07	0.10
	Smiling face with open mouth	2.95 (1.36)	0.12	**0.36**	0.19	0.00	0.15
	Smiling face with open mouth and smiling eyes	2.89 (1.28)	0.18	**0.34**	0.17	0.02	0.11
	Face with stuck-out tongue and winking eye	2.55 (1.42)	0.05	**0.32**	0.13	−0.02	0.09
	Flexed biceps	2.03 (1.31)	0.07	**0.32**	0.10	0.10	0.05
	Face throwing a kiss	2.88 (1.48)	0.23	**0.30**	−0.05	0.13	0.13
	Face with tears of joy	3.14 (1.42)	0.03	**0.29**	−0.01	0.06	0.04
	Face savouring delicious food	2.44 (1.31)	0.10	**0.28**	0.09	0.00	0.19
	Smiling face with heart-shaped eyes	2.91 (1.46)	0.20	**0.28**	−0.1	0.08	0.11
	Party popper	2.39 (1.37)	0.09	**0.28**	0.13	0.01	0.14
	Heavy black heart	3.15 (1.41)	0.23	**0.28**	−0.05	0.16	0.18
	Victory hand	2.38 (1.36)	0.17	**0.28**	0.08	0.04	0.04
	Fisted hand sign	1.96 (1.22)	−0.11	**0.27**	0.09	0.03	0.12
	Face with stuck-out tongue and tightly-closed eyes	2.33 (1.32)	0.03	**0.26**	0.01	0.05	0.09
	Pensive face	2.51 (1.25)	0.07	−0.04	**−0.43**	−0.07	−0.09
	Disappointed face	2.36 (1.19)	0.10	−0.09	**−0.39**	−0.08	−0.10
	Disappointed but relieved face	2.31 (1.23)	0.07	−0.06	**−0.36**	0.00	0.04
	Face with open mouth and cold sweat	2.09 (1.21)	0.00	−0.09	**−0.35**	−0.01	−0.03
	Face with cold sweat	2.18 (1.17)	0.03	−0.12	**−0.34**	−0.06	−0.07
	Crying face	2.23 (1.12)	0.09	−0.03	**−0.34**	−0.06	−0.05
	Confounded face	1.85 (1.15)	0.07	0.00	**−0.33**	0.03	−0.12
	Persevering face	2.03 (1.08)	0.09	−0.13	**−0.32**	−0.10	−0.04
	Tired face	2.09 (1.21)	0.11	−0.05	**−0.30**	−0.02	0.02
	Sleepy face	1.97 (1.12)	0.05	−0.03	**−0.30**	−0.04	−0.02
	Weary face	2.23 (1.22)	0.10	0.03	**−0.28**	−0.07	0.03
	Fearful face	2.11 (1.18)	0.05	0.04	**−0.28**	−0.01	−0.06
	Anguished face	2.15 (1.07)	0.00	−0.06	**−0.28**	−0.1	−0.04
	Face with look of triumph	1.95 (1.18)	−0.14	0.06	**−0.27**	0.06	0.04
	Worried face	2.07 (1.07)	−0.03	−0.03	**−0.27**	−0.06	−0.02
	Face with head-bandage	1.64 (0.95)	−0.07	−0.04	**−0.26**	−0.18	0.02
	Face screaming in fear	2.41 (1.26)	0.04	0.16	**−0.26**	0.07	−0.05
	Astonished face	1.67 (1.02)	−0.01	0.01	**−0.25**	−0.03	−0.14

Note: $N = 234$. In bold: correlations significant at Bonferroni-corrected $p < 0.05$. Agree.: agreeableness; Extrav.: extraversion; Em.St.: emotional stability; Open.: openness to new experiences; Cons.: conscientiousness.

Social anxiety is defined by the concerns, worries and fear of being rejected in social situations (Hofmann, Asnaani & Hinton, 2010). Socially anxious individuals may favour instant messaging over face to face and telephone contexts (Lundy & Drouin, 2016). For example, the time lapse between a text message and reply (asynchronicity) of CMC may reduce feelings of being socially anxious.

The present study focused on text messaging because research has shown that the likelihood of self-disclosure is increased in private messages compared to social media (Bazarova & Choi, 2014). Therefore, a relationship between social anxiety and the use of face and non-face emoji is anticipated.

2.3 Gender and emoji use

The increase in the number and variety of emoji used raises questions about how individuals interpret messages containing emoji and communicate using emoji. Butterworth et al. (2019) found that texts containing affectionate emoji (i.e., blowing kissing-face and red heart emoji) were judged as being more likable when they came from women than from men, whereas text messages containing less affectionate emoji were regarded as more suitable and likeable when they came from male senders. Butterworth et al. (2019) concluded that gender and emoji selection influences perceptions and may have a detrimental or positive outcome for the receiver of text messages.

Gender has also been shown to affect emoji use and preference for emoji from the sender's perspective. A number of studies have reported gender differences in emoji use. Chen et al. (2018) found that female users were significantly more likely to use face emoji, while male users tended to use non face emoji e.g., heart related emoji, compared to female users (see also Chen, Lu, Shen, Lui & Mei, 2018).

Prada et al. (2018) examined the use of emoji and emoticons in text-based messages (e.g., instant messaging). Participants completed an online task where they were asked to complete a series of questions regarding self-reported frequency of use and attitudes (i.e., two-pole items, e.g., “fun” vs “boring”) and motives for using emoji and emoticon (e.g., “express how I feel to others”). Prada et al. (2018) found that females reported using emoji more frequently, as well as having more positive attitudes towards emoji usage and identified more with motives to use emoji compared to men. For emoticon usage no gender differences were detected, and this is consistent with research suggesting that they are being replaced by emoji (Pavalanathan & Eisenstein, 2015).

Koch et al. (2022) examined 309,229 WhatsApp messages for individual differences in social media language (i.e., emoji preference, words and phrases and general message characteristics, e.g., number of words per message, the average number of emoji and emoticons per message) with regard to gender. Koch et al. (2022) found that emoji preferences varied across genders. Women preferred emoji that expressed positive emotions (for example, ☺️ a smiley face emoji and 😍 a smiling face with love heart eyes), whereas men preferred to use a disappointed face 😞 emoji to express negative feelings. Moreover, female participants used emoji frequently and used a broad range of emoji types. This is consistent with previous research showing that women use more emoji than men (Chen et al.,2018 Jones et al., 2020; Prada et al., 2018). It is also consistent with gender differences in the reading of emotional expression from faces per se (e.g., Wingenbach et al., 2018).

These findings suggest that differences in emoji types and frequency of emoji usage but also gender differences need to be considered in emoji research.

2.4 Message Valence

A message may hold a certain valence (hedonic tone) that will persuade people to modify their behaviour (Steinert et al. 2022). Valence is the emotional quality that suggests an underlying positive or negative tone (e.g., see Wansink and Pope, 2014). Given the interactive and communicative nature of sending text messages, the benefits of using face and non-face emoji are likely to depend on the context (e.g., the relationship between the sender and receiver) and the messages' characteristics, including the valence of the message. Emoji are often used in text messages to help determine the illocutionary force of the message (McSweeney, 2018 p.93). The receiver must appreciate the sender's true objectives and intentions in interpreting the message. Understanding the sender's intentions involves recognising the valence of the message and allows the recipient to send an efficient and clear response.

A study by Rodrigues et al. (2017) also examined valence as a mediator of emoji effects. Their study involved participants rating text message exchanges between romantic partners. Messages were positive or negative in valence and were presented with no emoji or with a face emoji. Participants were asked to rate the messages on a number of dimensions, including how strongly the message indicated interest in the relationship. Rodrigues et al. (2017) found that that for positive messages, face emoji contributed to the efficiency and clarity of the message. By comparison when the message was negative, the efficiency and clarity of the message was rated highest when no emoji were present. For ratings of interest in the friendship and improvement of the friendship, positive messages attracted higher ratings, with no effects of the emoji conditions. This would suggest that the valence of the message moderated the effect of the emoji in participants' interpretation of the message which would also indicate a processing fluency capacity. Similarly, Coyle and Carmichael (2019) found no effects of emoji use for negative messages, in a study that examined convergence between sender's and receiver's emoji use.

Cavalheiro et al. (2022) examined how participants reacted to receiving either a negative or a positive message from various types of senders (e.g., friend; manager; colleague). Participants rated in each scenario how much they would like to receive an emoji, and how useful and appropriate they considered the use of an emoji to be. Results revealed that emoji was considered more appropriate when communicating positive information with close friends compared to colleagues or a manager at work. In addition, participants stated that using an emoji to stay in touch with distant relationships versus close relationships was unacceptable for negative messages but not for positive messages. Cavalheiro et al.'s (2022) study supports the view that valence is a mediator of emoji effects (Coyle & Carmichael, 2019; Rodrigues et al. 2017).

Tso and To (2020) examined participants evaluations of text messages by recording their response times and perceived valence from positive or negative messages by valence of situational sentences vs valence of emoji. Such as, congruent (e.g., positive emoji with positive sentence); incongruent (i.e., positive emoji with negative message or neutral emoji with negative message); neutral condition (i.e., neutral emoji with positive sentence or neutral emoji with negative sentence). Results revealed an incongruent condition promoted stronger negative evaluations and produced a longer processing time compared to a congruent or neutral condition. Tso and To (2020) note that text messages and the inclusion of an emoji promote a connectedness to enhance the mood of the message. Inferring the effective use of an emoji plays a vital role in transmitting the messages emotional expressions with clarity and efficiency.

2.5 Face and Non-face Emoji

When emoji originated from emoticons, as depictions of facial expressions, the repertoire was small. The smiley face was used most frequently, usually easily interpreted, and functioned as

indicators of illocutionary force (Dresner & Herring, 2010). As the repertoire of face and non-face emoji has grown, ambiguity in interpretation has become more apparent. The meaning of a particular type of emoji can be challenging to unravel, since the meaning for both sender and recipient is varied and open to interpretation (Cramer et al. 2016).This suggests sensitivity to emoji is context dependent.

Annamalai et al. (2017) examined undergraduate students' interpretations of various face emoji meanings in WhatsApp Messenger. Participants were asked to complete a set of questionnaires to give their perception of the meaning of WhatsApp (72) face emoji. Findings revealed that although the students understood a few face emoji correctly, they did not get the intended meaning of most of the face emoji. Such findings seem to suggest the potential for miscommunication and for decreasing the credibility of the message (Willoughby & Liu, 2018).

While non-face emoji are increasingly used, little research has addressed these specifically and compared face and non-face emoji. The potential for ambiguity may be heightened for non-face emoji (e.g., Danesi, 2016; Riordan, 2017a), which can convey a wide variety of concepts, ideas, objects and be used literally, figuratively or have sound-based meanings. Previous studies suggested that people have different ideas of what each emoji represents (Logan, 2015; Miller et al. 2016). People's overall understanding of a message may differ and not be reliable (Tigwell & Flatla, 2016).

Though previous work on face emoji suggests their main purpose is to communicate an affect, very little has been researched into the communicative purpose of non-face emoji. Two studies by Riordan (2017a,b) have demonstrated that non-face emoji play a role in disambiguating messages and communicate a positive affect. Each participant was asked to rate how much negative or positive emotion they detected in each of the text messages. Results revealed that non-face emoji communicate positive affects, specifically for the emotion joy.

These findings appear to suggest that non face emoji are used to fulfil a similar pragmatic function as face emoji, which, as Riordan (2017b) notes, is surprising given the different representations involved

Similarly, Gibson et al. (2018) found that the 'face covering hand' face emoji had diverse meanings. Given the characteristic cleft, the peach non-face emoji is most commonly used for "buttocks." In certain contexts, the peach non-face emoji may refer to impeachment. Sampietro (2020) reported that messages sent without an emoji are perceived as being 'rude'. What is important, both face and non-face emoji illustrate the variety of ways in which a single type of emoji has the ability to enhance the content of text messages (Luangrath et al., 2017).

Likewise, Tigwell and Flatla (2016) examined the use of face emoji and investigated the variation in their interpretation of face emoji. They too found the differences in face emoji interpretation between participants. Results revealed the use of face emoji very much depended on both the context and the social surroundings the sender and receiver situate themselves. However, they did not take into consideration non-face emoji when referring to their findings. Tigwell and Flatla (2016, p .1) mentioned "people need to share the same understanding of what each emoji symbolises, otherwise communication can breakdown". Assuming by each emoji they mean each type of emoji, as in the difference interpreted between a face and non-face emoji.

This is one of the first experimental naturalistic studies to examine the splitting of face and non-face emoji. This thesis argues that by defining the similarities and differences between face and non-face emoji and as all text messages are not equal. Face and non-face emoji have a means to increase fluency in positive and negative text messages which this thesis will continue to explore in the remaining chapters.

It is important to understand the role of processing fluency and the type of emoji used to communicate from a senders perspective. Little research has addressed the use of face and

non-face emoji in positive and negative text messages in relation to processing fluency. It is the simplicity and ease by which a face emoji is believed and understood clearly. The suggestion is put forward that while non-face emoji are increasingly used to moderate effectiveness and contact (Cavalheiro et al. 2022). Emoji are used frequently in positive messages to enhance the understanding or relationship and also affect processing fluency by helping with the interpretation of the text message. This is consistent with processing fluency account. Because positive valence sent to the receiver may speed up the reading process, a more negative valence may slow reading down. In addition, negative valence that takes time to read can lead to misinterpretation, which leads to uncertainty and misunderstanding and run the risk of being disregarded.

The present study addresses the following questions: (1) how prevalent are textisms and non-linguistic characteristics of text messages, including face and non-face emoji; (2) is there a link between these and the self-presentation variables, self-monitoring, self-consciousness and social anxiety; and (3) are gender differences evident in the type of linguistic and non-linguistic features in text messages? (4) Does the type of message valence increase the affect of processing fluency when an emoji is present?

2.6 Methodology

2.6.1 Participants

Text messages were collected from a convenience sample of 150 students attending university in Ireland (83 females, 67 males) aged 18 to 59 years (M= 21.31, SD = 6.56). The average age of the receiver of participants' text messages was 26 years (SD = 6.13). One participant's data was removed from analysis as they were automated promotional adverts rather than interpersonal text messages and may have been inbox rather than outbox messages. Overall, participants presented 1,490 recently sent text messages for analysis. Before giving informed

consent, participants received an information sheet detailing the aims of the study and the requirements of participation.

2.6.2 Materials

Participants completed the revised version of Snyder's (1974) Self-Monitoring Scale, which consisted of 25 statements (such as "I guess I put on a show to impress or entertain people.") which participants marked as True or False to give an overall score. The Revised Self-Consciousness Scale (Scheier & Carver, 2013) was used to assess participants' level of private (one's own thoughts) and public self-consciousness (impact of their presence on other people). This scale also provides an index of social anxiety as an extension of the public self-consciousness scale. Using a 4-point Likert scale, participants rated their agreement for each of the 22 statements (such as "I usually worry about making a good impression"). The Ten Item Personality Inventory (TIPI; Gosling, Rentfrow & Swann, 2003) which measures the Big Five personality traits of extraversion, neuroticism, openness, conscientiousness and agreeableness was also administered. The measure consists of 10 items (2 items per trait) which participants rated using a 7-point Likert scale. This measure has been found to have good reliability (Gosling, Rentfrow & Swann, 2003).

A demographic questionnaire was also presented which asked each participant to disclose his/her age and gender, and the age and gender of the text message recipient. Participants also provided information on their mobile phone usage including texting frequency.

2.6.3 Procedure

A preliminary investigation (n = 15) was conducted to anticipate any matters that might arise with the booklet of materials and the disclosure of text messages. Participants were asked to transcribe each one of ten text messages into a booklet. These messages were to be

representative of the texts that they would send typically, and they were to contain no personal information. Messages should be texts, SMS or instant messages sent to one individual and not public messages such as Tweets. The completion of self-report measures (e.g., scales, transcription of messages, age, gender etc.) and transcribing each of the ten text messages was effective and successful. Participants identified no serious issues occurring from each of the sections within the booklet. The main study followed the same procedure. The completion of the self-report measures and submission of text messages was carried out in individual sessions in the presence of the experimenter. Participants submitted a sample of ten text messages that they had recently sent from their mobile phone. Participants selected which message they wished to provide and were asked to provide a message that they were happy to share. Bernicot et al. (2012) noted the difficulties with participants producing accurate transcriptions of text messages; in this study the researcher photographed the messages, with participants' consent, and transcribed them later to ensure accuracy. Participants' text messages were transcribed in electronic format and were anonymised, with mobile phone numbers and personal names omitted. Participants had full control over which text message they divulged, and they were assured of the confidentially and anonymity of their responses. Participants also completed the self-presentation measures and the demographic questionnaire in one in-person session (see Section 2.5.2).

2.6.4 Ethical Considerations

This research was subject to review and approved by the University Research Ethics Committee. The researcher submitted an ethics proposal detailing ethical practices necessary for this research. This research observed several research practices in accordance with the *Code of Professional Ethics of the Psychological Society of Ireland* (2011). No identifiable data was used during the course of this research. Participants signed a consent form agreeing for their text message samples to be used in a final report or any future publications. Participants were

informed that the purpose of the study was to investigate linguistic and non-linguistic features of SMS and instant messages, the contextual factors that influence their use, and the role of user characteristics such as personality. Each participant was informed that they could voluntarily select and submit for analysis 10 text messages from his/her outbox (sent messages). Participants decided which message to divulge. The researcher took a screen shot of the actual content from each text message. In collecting the screen shots of text messages, care was taken so that any personal identifying material was not accidently photographed. Participants were informed that mobile numbers or personal details will not be exchanged or recorded. Participants were asked to complete a brief survey regarding text message use (e.g., number sent per day) and mobile phone use along with three brief personality inventories.

Given the nature of the measures no physical stress/reactions or psychological emotional distress or reactions would be anticipated. If participants felt a degree of discomfort after the study, participants were given several contact numbers and email addresses for support if required. All participants were informed that the study would take about 30-45 minutes of their time. After the experiment ended a short debriefing session highlighted the objectives of the study and participants were also informed of the research questions.

2.7 Results

2.7.1 Frequency and type of emoji

The first research question addressed the frequency and type of face and non-face emoji in the participants' text messages. Overall, there were 13,631 linguistic units (12,815 words) in the 1,490 text messages along with 45 emoticons, 12 GIFs and 625 emoji. Data are summarised in Table in 2.2.

Table 2.2 Word count and non-linguistic representations by participants across the ten text messages contributed.

Category	N	Mean	SD	Sum
Word Count		81.80	29.40	5399
		89.35	39.47	7416
	Total 149	**86.00**	**35.45**	**12815**
Textisms		5.23	3.16	345
		5.67	4.42	471
	Total 149	**5.45**	**3.79**	**816**
GIFs		0.03	0.17	2
		0.12	0.45	10
	Total 149	**0.08**	**0.31**	**12**
Emoticons		0.15	0.53	10
		0.42	1.65	35
	Total 149	**0.30**	**1.09**	**45**
Emoji		2.47	2.54	163
		5.57	4.84	462
	Total 149	**4.01**	**3.69**	**625**
Face Emoji		1.79	1.95	118
		4.16	4.08	345
	Total 149	**2.98**	**3.01**	**463**
Non-Face Emoji		0.68	1.47	45
		1.41	2.11	117
	Total 149	**1.04**	**1.79**	**162**

Of the 1,490 text messages in the sample, 22 text messages contained emoticons, with 45 emoticons overall. The smiley face emoticon was by far the most frequently used, accounting for 71% of the total (see Table 2.3). There was no gender difference in emoticon and in GIF frequency. A total of just 12 GIFs was recorded across 1,490 text messages and are not considered here.

Table 2.3 Total number of emoticons across 1,490 messages

Position	Emoticon Type	Symbol	Number of Occurrences	% of Occurrences
1	Happy	**:)**	32	71
2	Wink	**;-)**	4	8
3	Laugh	**XD**	2	4.4
4	Heart	**<3**	2	4.4
5	Big Smile	**:D**	1	2.2
6	Shoulder Shrug	**\-(:-)-/**	1	2.2
7	Smiley	**:>**	1	2.2
8	Tongue Out	**:-p**	1	2.2
9	Surprised	**:-S**	1	2.2
			45	100%

Emoji appeared in 28% of the messages, while 22% of participants used no emoji in their text messages; 42% of this group were women. Across the 1,490 text messages, a total of 625 emoji were recorded with between 0 and 21 occurrences (across ten text messages) per user (M =4.20; SD = 4.26). Figure 2.1 shows the top ranked emoji by gender. Emoji were categorised as face or non-face emoji. Face emoji were defined as any depiction of a face, with the exception of animal faces which were small in number (n=14) and were coded as non-face emoji. Non-face emoji were defined as any emoji depicting something other than a (human-like) face; this category included objects, body parts and gestures, as well as animal faces.

The top ten most frequently used face and non-face emoji used accounted for 76% of the total (see Tables 2.4 and 2.7). The crying tears of joy was the most popular face emoji accounting for 24% of the total. The Love heart was the most frequently use non face emoji with 41 occurrences. The data revealed 76 individual emoji used across 1,490 text messages; only 17 of these individual emoji occurred 5 times or more.

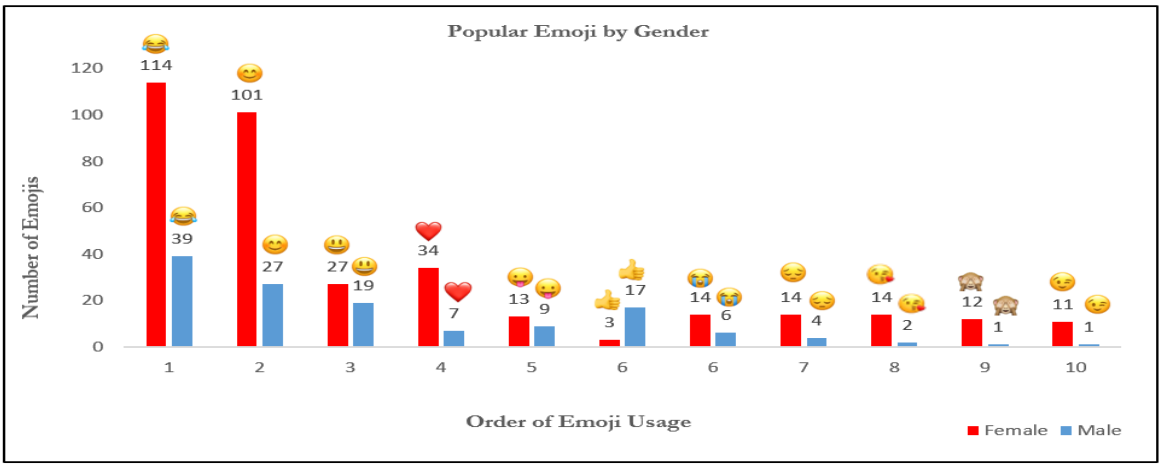


Figure 2.1 Top ten most frequently used emoji by gender

Table 2.4 Top ten emoji across 1,490 text messages

Position	Emoji Type	Symbol	Number of Occurrences	% of Occurrences
1	Crying Tears of Joy	😂	153	24.56
2	Smiley Face	😊	128	20.55
3	Laughing Face	😃	46	7.38
4	Red Love Heart	❤️	41	6.58
5	Sticking Out Tongue	😛	22	3.53
6	Thumbs Up	👍	20	3.21
6	Loudly Crying Face	😭	20	3.21
7	Sad Face	😔	18	2.89
8	Blowing Kisses	😘	16	2.57
9	See No Evil	🙈	13	2.09
10	Winking Face	😉	12	1.93

Of the 1,490 text messages, a total of 1,070 (72%) of messages contained no emoji as shown in (Table 2.5). Of the 149 participants, a total of 33 (22%) of participants used no emoji. However, of the remaining participants used an emoji as shown in (Table 2.6).

Table 2.5 Number of messages with number of emoji

(N) Emoji	0	1	2	3	4	5	6 or more	
(N) Messages	1070	297	81	26	8	3	5	1,490
%	71.81%	19.93%	5.44%	1.74%	0.54%	0.20%	0.34%	100%

Table 2.6 Number of participants with number of emoji used

(N) Emoji	0	1	2	3	4	5	6	7	8	9	10	>10	
(N) Participants	33	16	20	11	12	9	17	5	3	5	1	17	149
%	22	11	13	7	8	6	11	4	2	4	1	11	100%

2.7.2 Textisms

Textisms were analysed using the categories set out in Thurlow and Brown (2003) and adapted in Lyddy et al. (2014) and in Verheijen (2013). The following types of textisms were recorded: Onomatopoeic; Accent Stylization; Contractions; Shortenings; Acronyms; Letter Homophones; G-Clippings; Non-Conventional Spellings. Of the 1,490 text messages collected, a sample of 10% was crossed checked and verified by an independent coder and 100% consensus between both coders was reached.

Of the 13,788 linguistic units in the 1,490 text messages, 12,815 were words and 816 were textisms giving an overall 'textism density' in the sample of 6%. Table 2.8 summarises the frequency of textism types. Accent stylizations, onomatopoeic and contractions accounted for 61.5% of the textisms. Overall, textism use in keeping with previous estimates and the meaning of the text message is clearly recoverable. No gender differences were evident in overall word count or in the number of textisms use and there was no association with emoji use ($p<.01$).

Table 2.7 Total of face and nonface emoji types across 1.490 text messages

1 😂	**2** 😊	**3.** 😃	**4** ❤️	**5** 😛	**6** 👍	**7** 😭
153 (24.48%)	128 (20.48%)	46 (7.36%)	41 (6.56%)	22 (3.52%)	20 (3.2%)	20 (3.2%)
8 😔	**9** 😘	**10** 🙈	**11** 😉	**12** 😢	**13** 😱	**14** 👌
18 (2.88%)	16 (2.56%)	13 (2.08%)	12 (1.92%)	9 (1.44%)	9 (1.44%)	8 (1.28%)
15 💔	16 🎉	17 😍	18 💖	19 🌟	20 💕	21 🙃
5 (0.8%)	5 (0.8%)	4 (0.64%)	4 (0.64%)	4 (0.64%)	4 (0.64%)	3 (0.48%)
22 😎	23 💋	24 😐	25 🤗	26 👏	27 🎊	28 🍦
3 (0.48%)	3 (0.48%)	3 (0.48%)	3 (0.48%)	3 (0.48%)	3 (0.48%)	3 (0.48%)
29 💤	30 🍔	31 😮	32 💳	33 ☕	34 🔔	35 😗
3 (0.48%)	2 (0.32%)	2 (0.32%)	2 (0.32%)	2 (0.32%)	2 (0.32%)	2 (0.32%)
36 🍾	37 🙄	38 🍕	39 🤔	40 🔥	41 😊	42 💛
2 (0.32%)	2 (0.32%)	2 (0.32%)	2 (0.32%)	1 (0.16%)	1 (0.16%)	1 (0.16%)
43 💚	44 💜	45 💙	46 🍝	47 💰	48 💩	49 🇮🇹
1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)
50 ❣️	51 😈	52 🎓	53 👿	54 💪	55 🤓	56 🤲
1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)
57 🚂	58 🚌	59 ☝️	60 🚗	61 😇	62 👊	63 🍹
1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)
64 👆	65 💃	66 😜	67 🎈	68 🎁	69 😨	70 ✌️
1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)
71 🏈	72 ✅	73 💁	74 📹	75 🐻	76 ✈️	**Face 463 (74%)**
1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)	1 (0.16%)	**Non-Face 162 (26%)** **Total 625 (100%)**

Table 2.8 Frequency of Textism use

Type	Definition	Example	Number of Occurrences	% of Total Occurrences
Onomatopoeic	A non-word sound-based exclamation.	ha, arrgh	243	30
Accent Stylization	A word is spelled as it is pronounced.	gonna, cudn	153	19
Contractions	Omitting letters from the middle of words.	b.day, wrk	106	13
Shortenings	Omitting the end of a word losing more than one word.	hun, nt, bro	98	12
Acronyms	Abbreviation from the initial letter of other words pronounced and as a word.	lol, omg	75	9
Letter Homophones	A letter or number used to take place of a syllable or word of the same sound.	4, 2mrow	71	9
G-Clippings	Omitting the final g in a word ending ‘ing’.	lookin, comin	12	1
Non-Conventional Spellings	A spelling of a word from sound.	wer, ur, luv	57	7
Miscellaneous	Other	Not categorised	1	0.12
		Total	816	100%

2.7.3 Message Valence

Regarding message valance, each participants' submitted text messages were read as individual isolated text messages. Each text message was analysed and coded as either positive, negative or neutral or uncoded/unknown category. Coding was based on the text only (including letter strings such as xxx and hahaha), without considering the emoji. Positive valence included messages of thank you (e.g., "thanks", "thanks very much",), affection (e.g., "I love it", "so cute") and acknowledgement ("Cant wait", "I look forward to it", "ye definitley"). For negative valence, messages included dismissive comments (e.g.,"Nope", "I can't sorry", "Ah tough"), and rude comments ("they don't seeem arsed", "he's so chub", "it was shit").

Of the 1,490 text messages collected, coded and analysed, 477 were recorded as positive, 147 as being negative, 866 were neutral/ uncoded. Emoji type was examined as a function of message valence. Face emoji occurred more often in positive messages compared to neutral or uncoded and negative messages, as shown in (Table 2.9).

Table 2.9 Number of Face and Non-face Emoji across Positive /Negative /Neutral/Uncoded messages

	Positive message	Negative message	Neutral message	Total
(N) Face emoji	227	56	180	(463)
(N) Non-Face emoji	85	7	70	(162)
(N) Emoji in each message type	312	63	250	(625)

Of the 1,490 text messages the number of face, non-face emoji per positive/negative/neutral/ uncoded messages are displayed in (Table 2.10).

Table 2.10 Number of Face and Non-Face emoji per Positive/Negative/Neutral/Uncoded messages

	Per Positive message	Per Negative message	Per Neutral
(N) of Face emoji	**0.48**	0.38	0.21
(N) of Non-Face emoji	0.18	0.05	0.08

Table 2.11 shows the number of positive and negative messages by male and female participants. Independent samples t tests revealed that there was gender difference in the number of messages coded as positive (t (147) = 2.3, p = .022). However, there were no gender differences in the number of negative messages (t (147) = 1.1, p =.30).

Table 2.11 Positive & Negative Messages by Gender

	Gender	N	Mean	Std. Dev	Std.Error Mean
Pos Msgs	Male	66	**3.59**	1.78	.22
	Female	83	2.89	1.88	.21
Neg Msgs	Male	66	.88	1.03	.13
	Female	83	**1.07**	1.17	.13

2.7.4 Self-report measures

Participants self-reported sending an overall total of 12,199 text messages ranging between 1 and 600 texts on a daily basis (M = 81.34; SD = 104.84). Female participants sent a total of 6,478 text messages (M = 78.04;SD = 91.46) ranging from 3 to 500 texts, while male participants sent a total of 5,641 (M = 85.46;SD = 120.19), ranging from 1 to 600 text messages. However, a highly skewed distribution, with some participants self-reporting sending 500 to 600 text messages per day. Two male participants were reported to have sent 600 texts on a daily basis. Over a 24-hour period that would equate to 25 text messages per hour, every hour.

The most frequent reason given for sending the text message was to give information or reply to a message, accounting for 85% of all the text messages. Sending requests (13.4%) appear to serve as a function to seek further information, while the function type '*other*' had a frequency of only (2%). This sample of text messages therefore would seem to represent those sent for the purposes of maintaining or contacting friends as summarised in (Figure 2.2). Participants indicated that they would send text message to their friends (M = 6.23; SD = 2.50). Exchanging messages with a family member was rated second at (M = 2.57; SD = 2.16) and

Colleagues ranked third (102) (*M* = .684: *SD* = 1.10). Partners (*M* = .497; *SD* = .984), while only (3%) of the recipients chose the function '*Other*' (*M* =.020; *SD* =.246).

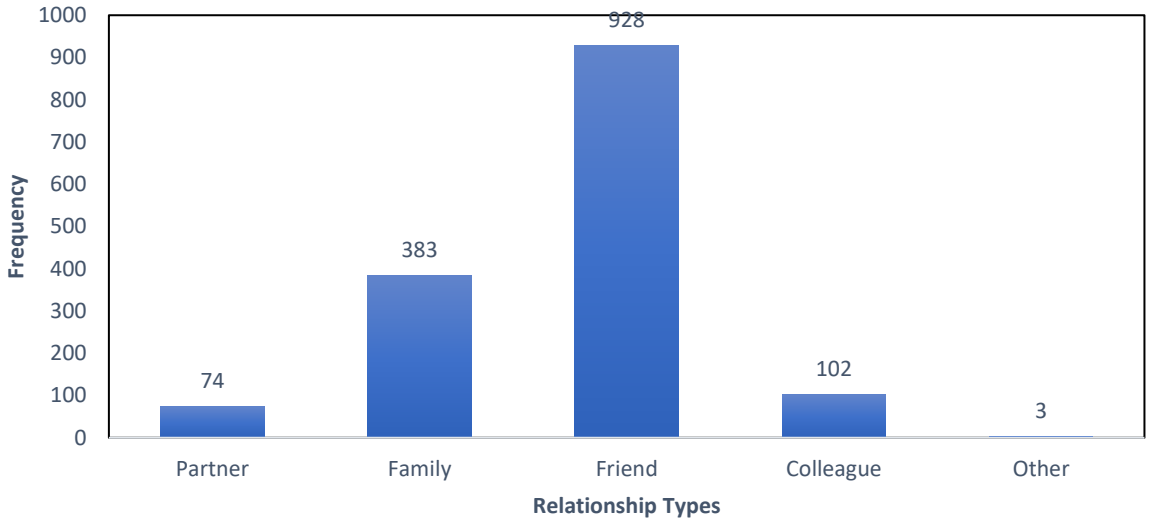


Figure 2.2 Frequency of Texts by Relationship Type

2.8 Gender

An independent sample *t*–test was conducted to examine gender differences in use of linguistic and non-linguistic features. There was significant difference in emoji use between females (*M* =5.64, *SD* =4.93) and males (*M* = 2.35, *SD* =2.51; *t* (147) = -5.024, *p* =.001, n^2 *p* = .03 There was no gender difference for emoticons, GIFs, or in word count.

Prior to running ANOVA analyses, assumptions were tested. The skewness and kurtosis values of the outcome values were within acceptable range and therefore the assumption of normality was met. Outliers were noticed and were not removed.

A 2 x 2 between groups analysis of variance was conducted to examine the interaction of sender gender (male, female) and emoji type (face, non-face). There was a main effect of emoji type, with 463 face emoji (*M*=3.11; *SD*=3.51) and 162 non-face emoji (*M*=1.08; *SD*=1.88); *F* (1, 147=42.2, *p*<.001). There was a significant gender difference in emoji use,

with female participants more likely to use emoji than males overall F (1,147=22.2, p< .001 n^2 p = .04. Females sent 345 face emoji (M = 4.2; SD = 4.1) and 117 non face emoji (M = 1.4; SD = 2.11). Male participants sent 118 face emoji (M = 1.79; SD = 1.95) and 45 non face emoji (M = 0.68; SD = 1.47). A significant interaction effect reflected the larger gender differences for the face emoji type, F (1, 147) = 7. 6, p = .006 .

A 2 x 2 between groups analysis of variance was conducted to examine the interaction of sender gender (male, female) and receiver gender (male, female) on emoji use. Gender of receiver was not associated with emoji frequency, and there was no main effect of receiver or interaction effect for emoji usage or the other variables : F (1,145) =.035, p = .85; emoticon, F (1,145) = 1.241, p = .267: GIF, F (1,145) =.158, p =.69 and words, F (1,145) =.119, p = .73. There was a statistically significant effect for gender of the sender and the variable '*emoji*', F (1,145) = 17.875, p <.001. However, the effect size was small (partial eta squared = .11).

2.9 Emoji and Self-presentation

Hierarchical multiple regression was carried out in order to explore the relationship between the personality measures and specifically the measures of self-consciousness, social anxiety and self-monitoring, and the number of face and non-face emoji used by participants.

The second research question asked whether there is a relationship between the personality measures, and specifically the measures of self-consciousness, social anxiety and self-monitoring, and the number of face and non-face emoji used by participants. To address this, a hierarchical regression analysis was carried out. The first model (Model A) tested the effect of personality on the number of emoji used. Step 1 used two control variables (age and gender) and Step 2 added in participants' scores on the self-presentation measures (self-consciousness, social anxiety and self-monitoring). Step 3 added participants' scores on the Big Five personality traits. A change in R2 between Steps 1 and 2 (ΔR2) represented the variance in

emoji use explained by the self-presentation measures alone (i.e., beyond the effects of gender and age). A change in R2 between Steps 2 and 3 (ΔR2) represented the variance in emoji usage explained by the Big Five traits. A second model (Model B) re-examined these relationships using face emoji only as the dependent variable. A third model (Model C) verified the robustness of these effects by controlling for self-reported frequency of text messaging.

Model A showed that gender and age explained 13.3% of the variance in emoji frequency, with gender alone making a significant unique contribution to the dependent variable. The self-presentation variables accounted for a further 3.8% of the variance, with the Big 5 accounting for just 1.3%. Of the personality variables, only public self-consciousness came close to contributing uniquely to the variance in emoji frequency (p =.04). Overall, Steps 2 and 3 of Model A did not reach statistical significance.

The second model (Model B) re-examined these relationships using face emoji only as the dependent variable. Overall, Steps 1 and 2 of Model B reached statistical significance. Model B showed that gender and age explained 12% of the variance in emoji frequency, with gender alone making a significant unique contribution to the dependent variable. The self-presentation variables accounted for a further 8.3% of the variance, with the Big 5 accounting for an additional 2% of the variance. Of the personality variables, only public self-consciousness was found to make a unique contribution to variance in emoji frequency ($p<0.01$).

A third model (Model) verified the robustness of these effects by controlling for self-reported frequency of text messaging and did not change the overall pattern of results. The control variables (age, gender, number of text messages sent daily) accounted for 12% of the variance with the self-presentation variables contributing an additional 9.2%. By this model public self-consciousness again provided the only unique contribution on this occasion, again emerging at both Step 2 and 3 of the analysis (at $p<.01$).

Table 2.12 Model A: Hierarchical multiple regression analysis summary predicting frequency of emoji use with age, gender, self-presentation measures and the Big Five.

Step and predictor variable	**B**	**SE B**	**Beta**	**sr**	**Change in R^2**	**R^2**
Step 1					.133***	.133
Constant	6.244	1.165				
Age	-.031	.05	-.048	-.052		
Gender	-3.114	.66	-.364***	-.364		
Step 2					.038	.414
Constant	3.003	2.38				
Age	-.021	.051	-.032	-.034		
Gender	-3.056	.700	-.357***	-.344		
Public SC	.183	.096	.180	.159		
Private SC	-.015	.080	-.016	-.016		
Social Anxiety	.035	.084	.037.	.035		
Self- Monitoring	.037	.106	.031	.029		
Step 3					.013	.430
Constant	2.525	3.744				
Age	-.015	.053	-.024	-.025		
Gender	-3.243	.771	-.379***	-.338		
Public SC	.201	.098	.198*	.173		
Private SC	-.022	.082	-.023	-.023		
Social Anxiety	.026	.103	.028	.022		
Self -Monitoring	.084	.115	.069	.062		
Extraversion	-.246	.260	-.095	-.081		
Agreeableness	-.103	.333	-.027	-.026		
Conscientiousness	-.042	.277	-.013	-.013		
Stability	.366	.303	.109	.103		
Openness	.003	.321	.001	.001		

Note: sr = semi partial correlation coefficient; SC = self-consciousness ***p<.001 * p<.05

Table 2.13 Model B: Hierarchical multiple regression analysis summary predicting frequency of face emoji with age, gender, self-presentation measures and the Big Five

Note: sr = semi- partial correlation coefficient; SC = self-consciousness ***p<.001 * p<.05

Step and predictor variable	**B**	**SE B**	**Beta**	**sr**	**Change in R^2**	**R^2**
Step 1					.119***	.119
Constant	5.053	.966				
Age	-0.42	.041	-.078	-.083		
Gender	-2.391	.547	-340***	-.340		
Step 2					.202	.083
Constant	1.914	1.921				
Age	-.036	0.41	-.067	-.074		
Gender	-2.17	.565	-.308***	-.307		
Public SC	.210	.077	.251**.	.222		
Private SC	.020	.064	.026	.026		
Social Anxiety	.043	.068	.057	.054		
Self-Monitoring	-.037	.086	-.037	-.037		
Step 3					.222	.020
Constant	.088	3.008				
Age	-.039	.043	-.072	.072	-.077	
Gender	-2.293	.620	-.326	-.301		
Public SC	.222	.079	.265***	.234		
Private SC	.007	.066	.009	.009		
Social Anxiety	.041	.083	.054	.042		
Self -Monitoring	.013	.092	.013	.012		
Extraversion	-.169	.209	-.079	-.069		
Agreeableness	.196	.267	.062	.062		
Conscientiousness	-.098	.223	-.036	-.038		
Stability	.366	.243	.133	.128		
Openness	.025	.258	.008			

2.10 Discussion

The current study examined emoji use in personal text messages and the relationship between personality variables, including self-presentation variables and emoji use. The study provided some useful initial data on emoji use from the sender's perspective.

The first finding was that a majority of participants used emoji in their text messages. A large majority of participants used emoji, with 78% using at least one emoji in their sample of ten text messages. It appears that emoji are a stylistic choice adopted by the majority of users. This is consistent with other studies that show that emoji commonly occur in CMC (Sampietro, 2021; Manganari, 2021 & Beattie et al., 2020). Participants mainly sent text messages to friends and for the purposes of information exchange.

A second finding is that emoji are context dependent, and users selectively employ them in their messages. Across the 1,490 text messages, emoji appeared in 28% of the text messages with 72% of the text messages showing no emoji. Only 3% of participants used emoji in all ten of their text message sample. This suggests that message characteristics affect emoji use and they are not used indiscriminately.

A third finding is that there are differences in emoji use as a function of message valence. Of the 1,490 text messages collected, 32% were coded as being positive, 10% as being negative plus 58% were neutral or uncoded. Further analysis revealed emoji appeared more frequently in positive messages than in neutral, uncoded or negative messages. This is consistent with both a processing fluency account and with Spencer-Oatey's (2000) Rapport Management Model. Emoji can support interpretation of a positive text message and would be associated with increased processing fluency, but as negative text messages are perceived as more threatening to face, emoji may compromise communication, therefore they are less likely to be used. All these issues point to the need to consider emoji in their context, as they may have a detrimental effect regarding perception of rapport and processing fluency, in negative messages but not for positive messages.

A further finding concerns the prevalence of face emoji compared to non-face emoji in the sample. While 625 emoji were present in the data collected, face emoji accounted for 74% of the total. This suggests that the category 'emoji' requires breaking down into face and non-

face types in related research, where few studies to date have considered these as separate categories (e.g., Riordan, 2017a, b). In addition, while 76 unique emoji were present in the sample, only 17 of these occurred 5 times or more and the ten most frequently used emoji accounted for 76% of the total. The data revealed that while emoji are commonly used, only a small repertoire are used in private text message communications, and these tend to be depictions of faces as the present results revealed. This suggests that they are being employed deliberately by users in certain contexts to facilitate comprehension. This is consistent with findings showing that emoji are open to interpretation and given the varied emoji alternatives available in the emoji repertoire, there is the likelihood of misinterpretations (Miller et al. 2016).

With regard to gender and the personality variables, only modest effects were found. Results revealed females used more emoji in their messages than males. This pattern of emoji use is consistent with Chen et al.'s (2018) observation that female users were significantly more likely to use face related emoji and concurs with findings on self-reported emoji use (Annamalai, & Salam, 2017; Chen et al. 2018). Thirteen per cent of the variance in emoji frequency was explained by age and gender, less than the 16% reported by Oleszkiewicz et al. (2017) for Facebook posts. Personality played a small role in emoji use with public self-consciousness alone emerging as playing a unique contribution to the variance in emoji use. This pattern was stronger for face emoji compared to the non-face category. However, overall, the contribution made by personality variables to emoji use was low, accounting for an additional 5% of the variance for emoji overall and an additional 10% for face emoji considered alone.

A number of limitations to this study must be considered. While collection of naturalistic text messages is the optimal method to examine features of communication (e.g., see Kemp & Clayton, 2017), the sample of text messages were private, and perhaps participants

were biased in their selection. The instruction to offer up ten recent text messages may have led to selectivity in responses. However, participants were unaware that emoji were a focus of the analysis and therefore were unlikely to have selected messages with this in mind. Nevertheless, it is possible that the proportion of emoji and in particular face emoji reflected a certain degree of selectivity in the type of messages contributed from a senders perspective. This may also account for the lower number of messages coded as negatively valenced in the sample.

A further limitation concerned the coding of message valence. Given that individual messages were coded in the absence of the context created by the text conversation, coding messages as positive, negative or neutral was challenging and may account for the low number of negative messages compared to neutral and uncoded messages. For example, reading 'have a good day' in isolation suggests a positive valence whereas the message could be genuine or sarcastic in tone depending on the surrounding context of the conversation. However, a decision was made to collect a large sample of individual text messages rather than collecting conversational data, which would have required the other parties' consent and created an ethical dilemma.

Based on this analysis, the remaining chapters will examine readers' perceptions of text messages, focusing on messages between friends, of an informational / relational type, and considering both message valence and type of emoji.

Chapter 3

The effect of emoji type and message valence on the perception of messages between hypothetical friends

Abstract

Results from Chapter Two suggested that emoji are prevalent in text messages, with only weak associations with personality and self-presentation variables. The findings suggested that emoji serve a communicative function and that there may be important differences between face and non-face emoji. Chapter Three explored this issue by investigating whether the presence of face and non-face emoji influences the perception of messages between friends, from the reader's perspective. This study is a part replication of a study by Rodrigues et al. (2017); where that study focused on texts between romantic partners, and only included face emoji, the current study focuses on friendship and contrasts face and non-face emoji. The focus on friendships reflects the frequency of messages of this type seen in Chapter One (see Fig. 2.2).

Research has shown that high processing fluency can affect variables such as liking (Reber, Winkielman, & Schwarz, 1998). It is important to understand the role of processing fluency in promoting relationship quality when emoji are used as a means to communicate. The current study examines processing fluency for positive and negative valence as well as face and non-face emoji. A 2 x 3 between-subjects design was employed, with university students (N = 120), to assess the perception of text messages between hypothetical friends, using positive or negative text messages varying in cues (i.e., face vs non-face vs no emoji). Following Rodrigues et al.'s method, participants read the hypothetical messages and rated them for: interest in the friendship; improvement of the friendship; positive or negative valence; efficiency in transmitting its meaning; and clarity of meaning. Results showed that, for positive valence, face emoji contributed to the efficiency and clarity of the message. However, when the message was negative, the efficiency and clarity of the message was rated highest when no emoji were present. For ratings of interest in the friendship and improvement of the friendship, positive messages attracted higher ratings, with no effects of the emoji conditions. The findings

point to differences between the perception of messages with positive and negative valence as well as differences in perception of messages containing face and non-face emoji, which may be accounted for using a processing fluency approach.

Chapter Three

3.1 Introduction

As discussed in Chapter 1 and found in Chapter 2, emoji are now a common feature of communication between friends, and they serve a number of functions. Emoji have been described as including "mood enhancers, generally communicating, maintaining, or reinforcing a sense of togetherness among interlocutors" (Danesi, 2017, p.95–116). Emoji have been shown to build rapport (Pohl, Domin & Rohs, 2017) and can signal relationship quality and help to create an impression (Rodrigues et al. 2017; Coyle & Carmichael, 2019). Emoji can however be ambiguous (Kaye et al. 2017) and this might apply particularly to non-face emoji (Riordan, 2017a,b). Li and Yang (2018) identified 7 functions of emoji: attitude/emotion signal, attitude/emotion intensity enhancer, illocutionary force modifier, humour, irony, turn taking/giving, and backchannel device. A number of further studies have shown that emoji facilitate communication (Pohl, Domin & Rohs, 2017; Tauch & Kanjo, 2016) and word reading (Barach, 2021). Tang and Hew (2019) suggested emoji have two main functions; (a) facilitating the understanding the message and (b) maintaining friendships and intimacy. Therefore, emoji can been seen to have both self-presentation and processing fluency functions.

One study that examined the effect of emoji on the perception of text messages was conducted by Rodrigues et al. (2017). Rodrigues et al. (2017) examined the role of emoji in text messages focusing on the perception of messages sent between hypothetical romantic partners. Participants completed an online task where they were asked to read a series of text messages exchanged between romantic partners. In Study 1, Rodrigues et al. (2017) compared the effects of the message valence (i.e., positive vs negative) and emotional cues (i.e., without emotional text vs emotional text vs emoji). The messages were either positive or negative in valence and consisted of a 3-part exchange to which an additional cue was added in some

conditions. Nothing was added in the 'without' condition. In the text condition, a text response was added. For example, if the message was positive "I'm happy" was added. In the emoji condition a smiling face emoji was added. Only face emoji were used in their experiment.

In Rodrigues et al. (2017) experimental study participants were presented with the text message exchanges and asked to indicate on a 7-point Likert scale their responses to the following questions: ''Do you think the person is interested in the romantic relationship?" (1 = Not interested at all, 7 = Very interested), ''Do you think this reply helps improving the romantic relationship?" (1 = This definitely does not help, 7 = This definitely helps). As manipulation checks, Rodrigues et al., (2017) added four further questions: ''In your opinion, to what extent do you consider that the reply " - ''was positive?", ''was negative?", ''was efficient in transmitting its meaning?", and ''had a clear meaning?". (1 = Not at all, 7 = A lot).

In Study 2, Rodrigues et al. (2017) replicated their Study 1 in part but using only negative replies but manipulating the seriousness of the issue. Messages were in Portuguese and participants were first language Portuguese speakers.

Rodrigues et al. (2017) found that positive replies indicated a stronger interest in the relationship regardless of the presence or absence of emoji. Interpreted through the lens of processing fluency this may suggest that the positive messages were sufficiently easy to process, and the addition of emoji did not aid processing further. For negative messages, in Study 1, they found that the presence of emoji signalled greater interest in the relationship. In the negative messages, the presence of an emoji had the effect of making the message appear more positive. They also found a strong correlation between efficiency and ratings of interest in the friendship and positivity. In Study 2 however, for more serious negative messages, the presence of an emoji had a detrimental effect, making the message seem more negative.

The rationale for replicating Rodrigues et al.'s (2017) study in the context of hypothetical friendships reflects the large proportion of text messages that are sent between friends. For example, in Chapter Two, of the full sample of text messages, 62% were categorised by senders as between friends (see Fig.2.2). Studies have shown that individuals frequently use emoji in their communication with close friends, family members, or work colleagues (e.g., Jones et al., 2020, Kaye et al., 2016). Moreover, the advantages of using emoji are likely to depend on the type of relationship and message characteristics (e.g., the valence of the message). In addition, Rodrigues et al. (2017) focused on face emoji or emotional text messages which is appropriate to communication between romantic partners. The present study widened the scope and considered a range of message and emoji types (face and non-face). To date, studies have not thoroughly examined how the influence of face and non-face emoji is perceived as a means to increase processing fluency and ratings of rapport in positive and negative contexts. The present study aims to examine perception of private text messages between hypothetical friends, using positive or negative text messages varying in cues (i.e., face vs non-face vs no emoji).

As was discussed in Chapter One, Spencer-Oatey's (2000; 2002) Rapport Management framework has provided one means of understanding the effect of emoji in managing relationships in CMC. Sampietro (2019) demonstrated that emoji serve a number of functions consistent with the rapport management model, including the illocutionary domain (upgrading or downgrading speech acts), discourse domain and stylistic domains. While Rodrigues et al., did not use the rapport management framework, their findings might be interpreted using this model, in that the use of emoji in negative messages serve a speech act function in helping to downplay the negativity in negative message thereby allowing the users to save face. Alternatively, their data might be interpreted in line with the processing fluency account. They found a strong correlation between efficiency and ratings of interest in the friendship and

positivity. This suggests that messages that are perceived as more efficient and also perceived as showing more interest in the friendship. Rodrigues et al.'s finding in Study 1, that emoji in negative messages had a softening effect in making the message seem more positive is consistent with the processing fluency account. Their finding in Study 2, however, that in more serious messages there is a detrimental effect of emoji, which signal less interest by increasing negativity, is also consistent with a fluency interpretation, in that once the message passes a threshold of seriousness, it become more complex to interpret and adding an emoji complicates instead of facilitating processing. If the ease of processing fluency is decreased, there is every chance the message becomes very complicated and may be misinterpreted, difficult to read and leading to a negative perception of rapport.

The present study is a part replication Rodrigues et al. (2017). Where that study focused on perception of text messages between romantic partners, the present study examines perceptions of text messages between hypothetical friends. Furthermore, where Rodrigues et al. used face emoji or emotional text, the present study uses face and non-face emoji, in positive and negative messages.

The hypotheses for the present study are:

H1: there will be a main effect of valence, with positive replies rated as signalling greater interest in friendship than negative replies.

H2: there will be an effect for emoji, with messages with emoji rated as signalling greater interest in friendship than those without.

H3: An interaction effect is predicted based on Rodrigues et al.'s (2017) findings in Study 1, in that emoji in negative messages may have a 'softening' effect. However, it is possible that they could have a detrimental effect in more serious messaged (consistent with Rodrigues et al., Study 2). Consistent with Rodrigues et al. (2017) emoji are not predicted to have an effect in positive messages, which are expected to produce high ratings with or without emoji, which Rodrigues et al., refer to as a ceiling effect.

H4: The effect of emoji may be moderated by emoji type, with stronger effects for face emoji given their emotional content. However, given the lack of literature base on face versus no-face emoji no strong predictions are made here.

H5: A relationship is expected to emerge between efficiency/clarity and interest/ positive, consistent with Rodrigues et al.'s (2017) findings.

3.2 Methodology

3.2.1 Participants

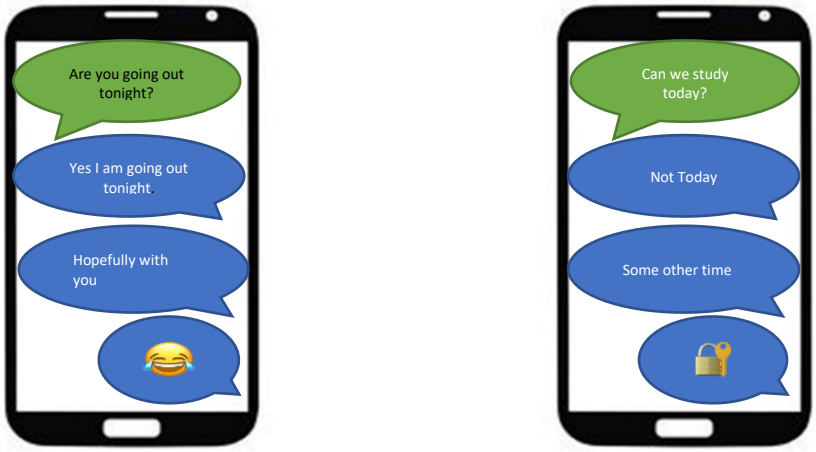
Participants were 120 English speaking undergraduate students (50% females and 50% males, aged 18 to 41 years, M = 20.00, SD = 3.40) attending university in Ireland. Participants formed an *ad hoc* convenience sample. They consented to providing a sample of ten text messages that they had recently sent and to reading a selection of text message conversations and completing the relevant Likert scale measures described in Section 3.2.3. Participants were asked to

contribute messages that were texts, SMS or instant messages sent to one individual and not to include group of public messages such as tweets or WhatsApp group chats. Participants also indicated the age of the receiver of participants' text messages (average age *M* = 26; *SD* =6.99

3.2.2 Materials

Ten text message conversations, consisting of a message and reply, were presented in a standard mock-up of an image depicting a mobile screen and displayed in a booklet format This arrangement replicated the standard structure of most responses in many messaging apps between sender and receiver and followed the format used by Rodrigues et al. (2017) using a 3-part text exchange with or without an emoji. The booklet showed a five-point Likert scale, on which participants were to rate six questions relating to: the perceived interest in the friendship, improvement of the friendship, and manipulation check ratings of positivity and negativity and the clarity and efficiency of the message.

Following the standard convention, received texts were indicated by a green quote bubble (e.g., *"*how are you"), and replies were indicated by a blue quote bubble (e.g., "I am fine"). In one screen shot example participants saw a received positive message; (Are you going out tonight?") followed by a reply, ("Yes I am going out tonight")., ("Hopefully with you"), followed by an emoji – i.e., positive non-face emoji (e.g.,). Two examples of the messages seen by participants are presented in Figure 3.1.



Positive/Face Negative/Non-Face

Figure 3.1 Example of positive and negative mobile screen shots used in Experiment 2

Participants were also required to select ten text messages from his/her outbox (sent messages) and to transcribe them verbatim into a section provided in the booklet, and indicate the type of receiver (e.g., work, friend, best friend); age of receiver and function of the text message (e.g., greeting, reply). A short questionnaire in the booklet contained a brief general set of questions (gender, age, and number of text messages sent and received).

3.2.3 Design

Participants were assigned to one of three conditions in a 2 (i.e., Positive or Negative message valence) x 3 (Face, Non-Face or No emoji) between participant experimental design. Conditions were balanced for gender; for example, where 20 participants were allocated to positive message exchanges, 10 were female, and 10 were male.

3.2.4 Procedure

A preliminary investigation (N=30) was conducted to validate the face or non-face emoji selected in advance of the main study to ensure they were perceived as either positive or negative. In addition, of the 30 participants, participants (n=5) were selected to read ten text

messages displayed in Section 2 of the booklet and report on any inconsistencies or give general feedback with regard to size, format and comprehensibility. The investigation was conducted to estimate important parameters needed for the main study as well as to understand resource implications. The above participants did not participate in the main study in order to avoid a biasing effect on the results.

For validation, participants were shown (10 positive and10 negative) face emoji as well as (10 positive and 10 negative) non-face emoji. Participants were asked to indicate which face or non-face emoji was either positive or negative by placing a 'tick' inside the relevant box. Findings showed no concerns as participants agreed that the face and non-face emoji displayed matched with being either positive or negative respectively. Of the thirty participants (n=5) participants were selected to read each of the ten text messages displayed. Two participants showed slight concerns over the number of mobile screen shots presented in the booklet and the time it took to read ten messages and answer all questions presented. This did not warrant immediate attention as participants were happy to continue and completed each of the required sections.

Participants were informed that they would be exposed to a set of text messages exchanged between friends. The aim was to read each of the text messages as they appeared and focus on the replies in order to make a series of judgements about the friendship. Participants were asked to rate the extent of agreement with each of the six questions concerning the perception of friendships. Ten text message images of 3-part exchanges were shown to participants, the content of these varying depending on which condition participants were assigned to. To clarify, 'received' text messages were indicated in '*green*' and replies to a text message were indicated in '*blue*' as indicated in Figure 3.1 above. Mobile screen shots (i.e., stimuli) presented to participants were informed by a convenience sample of participants' text messages in Chapter 2. The text messages were constructed using messages from published

research and adapting them to a local user group using the analysis of naturalistic messages in Chapter 2. The purpose of collecting participants' text messages was to create a database that would support the design or adaptation of stimuli for subsequent experiments.

For each of the ten conversations, participants indicated the agreement on a five-point Likert scale with the following questions: "Do you think the person is interested in the friendship?" (1 = not interested at all; 5 = very interested); "Do you think the reply helps to improve the friendship?" (1 = definitely does not help; 5 = definitely helps). As manipulation checks, participants were presented with four additional questions in random order following the procedure in Rodrigues et al. (2017): "To what extent do you consider that the reply was – positive; negative (reverse coded); was efficient in transmitting its meaning; had a clear meaning".

Participants were also required to select ten text messages from his/her outbox (sent messages) and to transcribe them verbatim into a section provided in the booklet, and indicate the type of receiver (e.g., work, friend, best friend); age of receiver and function of the text message (e.g., greeting, reply). A short questionnaire in the booklet contained a brief general set of questions (gender, age, and number of text messages sent and received). Participants' text messages were also captured by the researcher photographing a screenshot of each message with the participants' permission and transcribing them later to ensure accuracy. The messages were subsequently transcribed into an electronic document. The text messages were transcribed by the researcher for analysis and the number and type of non-linguistic features (face and non-face emoji) were recorded. The data were added to the 1,490 text messages collected in Chapter Two, and provided a naturalistic source for the design of subsequent chapters and may be reported separately.

Participants had full control over which text message to divulge and they were assured of the confidentially and anonymity of their responses. All comments and symbols transcribed from each of the participants' text messages were reassigned to numeric data in electronic format from the booklets final section. Of the full set of 1,200 text messages, a sample of texts (10%) was crossed checked and verified by an independent rater in order to determine inter-rater reliability.

3.2.5 Ethical Considerations

The research was approved by the University Research Ethics Committee. No identifiable data were used during the course of this research. Participants selected which text messages they were happy to share. Participants gave consent for the messages to be analysed and/or reproduced in published form if appropriate. All participants were informed that the study would take about 20 to 30 minutes to complete. After the experiment ended a short debriefing session highlighted the objectives of the study and participants were informed of the research questions.

3.3 Results

Data consisted of mean ratings for each of the 6 conditions on each of 6 Likert scales representing judgments about the friendship. Table 3.1 shows Means and Standard Deviations for message valence (coded as Positive Negative or PosNeg below) and sentence type i.e., face emoji, non-face emoji, no emoji, coded as FNFN below).

*Table 3.1 (Positive-Negative * FNFN) means and standard deviations (and standard error of the means) for judgements about the friendship across the 6 measures.*

(n =120)		Interested	Improving	Positive	Negative	Efficient	Clear
Positive	Face	4.21	4.14	4.25	1.77	4.07	4.09
		(.33)	(.34)	(.28)	(.34)	(.38)	(.37)
Negative	Face	2.42	2.09	2.18	3.61	3.75	3.63
		(.52)	(.41)	(.36)	(.43)	(.46)	(.39)
Positive	Non-Face	4.20	3.88	4.09	1.82	3.94	3.91
		(.46)	(.50)	(.43)	(.60)	(.45)	(37)
Negative	Non-Face	2.42	2.21	2.22	3.68	3.88	3.83
		(.34)	(.38)	(.36)	(.45)	(.30)	.48
Positive	No Emoji	3.99	3.79	3.92	2.14	3.91	3.84
		(.43)	(.38)	(.43)	(.54)	(.40)	(.51)
Negative	No Emoji	2.22	2.05	2.00	3.87	4.13	4.08
		(.50)	(.45)	(.42)	(.44)	(.41)	(.41)

A 2 x 3 between participant analysis of variance was conducted in order to examine the influence of two IVs (valence: Positive vs. Negative; sentence type: Face vs. Non-Face vs. No emoji) on the 6 dependent variables i.e., responses on the 5-point Likert scales. Each of these DVs are analysed separately in what follows;

Q1. Do you think the person is interested in the friendship?

Results revealed no interaction effect between PosNeg* FNFN for ratings of interest in the friendship, F (2, 114) = .003, p = .99. A main effect was shown for positive replies, F (2, 114) = 501.479, p = .001, $\eta 2_p$ = .81 (large effect size); replies were rated as signalling greater interest in the friendship in positive text messages compared to negative messages. A main effect was also found for FNFN, F (2, 114) = 3.074, p = .05, $\eta 2_p$ = .05, (very small effect size), showing that messages with emoji received higher ratings than messages without emoji. (See Figure 3.2).

Q2. Do you think this reply helps to improve the friendship?

Results revealed no interaction effect between PosNeg* FNFN for ratings of improving the friendship F (2, 114) = .2.378, p = .09). There was a main effect for positive replies, F (2, 114) = 598.274, p = .001; replies were rated as helping to improve the friendship in positive text messages compared to negative text messages. There was no main effect for FNFN, F (2, 114) = 2.354, p = .10 (See Figure 3.3).

Q3. In your opinion to what extent do you think that the reply was positive?

Results revealed no interaction effect between PosNeg* FNFN for ratings of positivity of replies, F (2, 114) = .703, p = .497). There was a main effect for valence with positive messages rated more highly than negative, F (2, 114) = 783.637, p = .001. There was a main effect for FNFN, F (1,114) = 4.80, p = .01, $\eta 2_p$ =.80 (large effect size). Messages were rated as more positive when they contained an emoji compared to messages with no emoji (See Figure 3.4).

Q4. In your opinion to what extent do you think that the reply was negative?

The results revealed no interaction effect between PosNeg*FNFN for ratings of reply negativity, F (2, 114) = .209, p = .81. There was a main effect for valence, with negative replies being rated as more negative , F (2, 114) = 441.800, p = .001. There was a main effect of reply for FNFN, F (1,114) = 5.041, p = .008, $\eta 2_p$ = .08, (very small effect size). Messages without an emoji were rated as less negative than the messages containing text alone. (See Figure 3.5).

Q5. In your opinion to what extent do you think that the reply was efficient in transmitting its meaning?

Results revealed a statistically significant interaction effect for PosNeg * FNFN for ratings of efficiency in transmitting its meaning, F (2.114) = 4.480, p =.013, $\eta 2_p$ = .07, indicating a very small effect size. There was no main effect of replies for message valence, F (2, 114) = .524, p = .471. There was no main effect for FNFN, F (2, 114) = 1.083, p = .34. *Post hoc* comparisons

were conducted using the Tukey HSD test indicated that efficiency in meaning was rated highest for negative messages with no emoji (M = 41.30; SD = 4.13, p < .009). There were no group differences for ratings for efficiency between face and non-face negative messages, p > .56 and between non-face and no emoji messages p >.11. The interaction effect showed that there was no emoji effect for positive messages, i.e., no difference between positive replies that had face, non-face or no emoji, but when the message was negative, it was rated as more efficient when there was no emoji present (See Figure 3.6).

Q6. In your opinion to what extent do you consider that the reply had a clear meaning?

The results revealed a statistically significant interaction effect for PosNeg * FNFN for clarity in meaning F (2.114) = 6.450, p =.002, $\eta 2_p$ = .10, indicating a small effect size. There was no main effect of valence, F (2, 114) = 1.546, p = .22. There was no main effect of sentence type/ FNFN, F (2, 114) = .667, p = .51. *Post hoc* comparisons conducted using the Tukey HSD test indicated that clarity in meaning was rated highest for negative messages with no emoji (M = 40.80; SD = 4.12, p < .005). There were no group differences for ratings for clarity in meaning between face and non-face negative messages, p > .31 and between non-face and no emoji messages p >.17. The interaction effect shows that when the message was negative, the clarity was rated highest when no emoji were present (See Figure 3.7). For positive messages, there was no difference between messages with face, non-face or no emoji.

In summary, emoji have a detrimental effect on the efficiency and clarity of a message when the message is negative. When the message is positive, the presence or absence of emoji has no effect on the efficiency and clarity of a message as rated by participants.

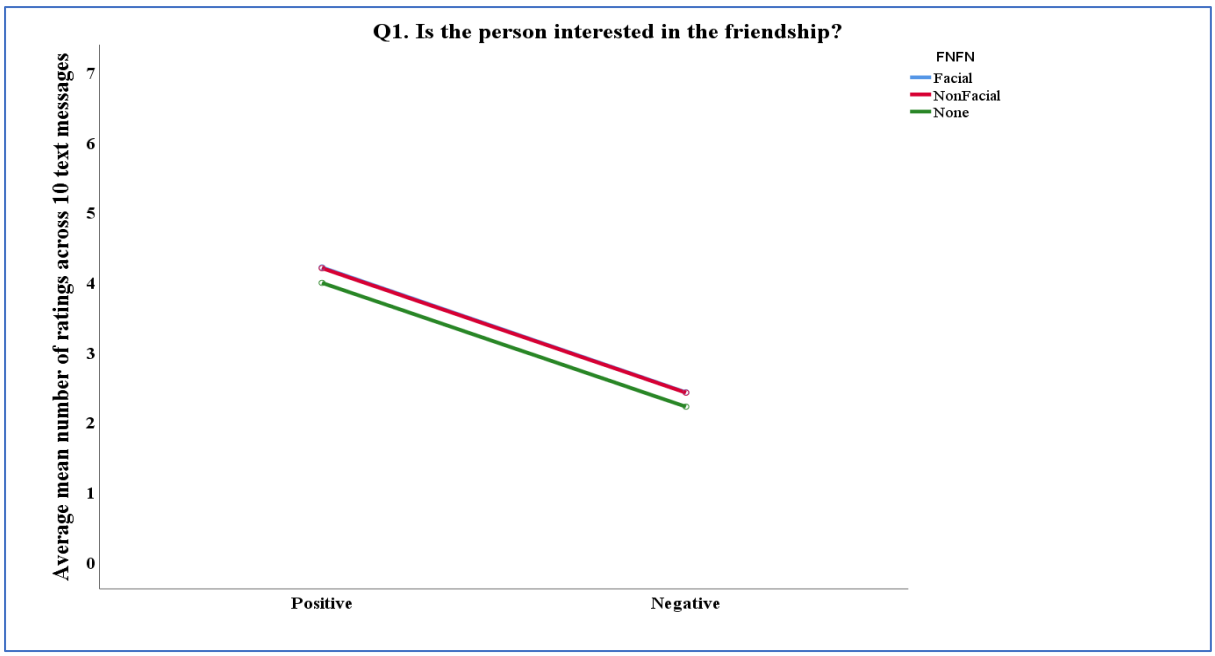


Figure 3.2 ***Interested in the friendship****: Mean ratings for the six measures for positive and negative replies with face, non-face and no emoji*

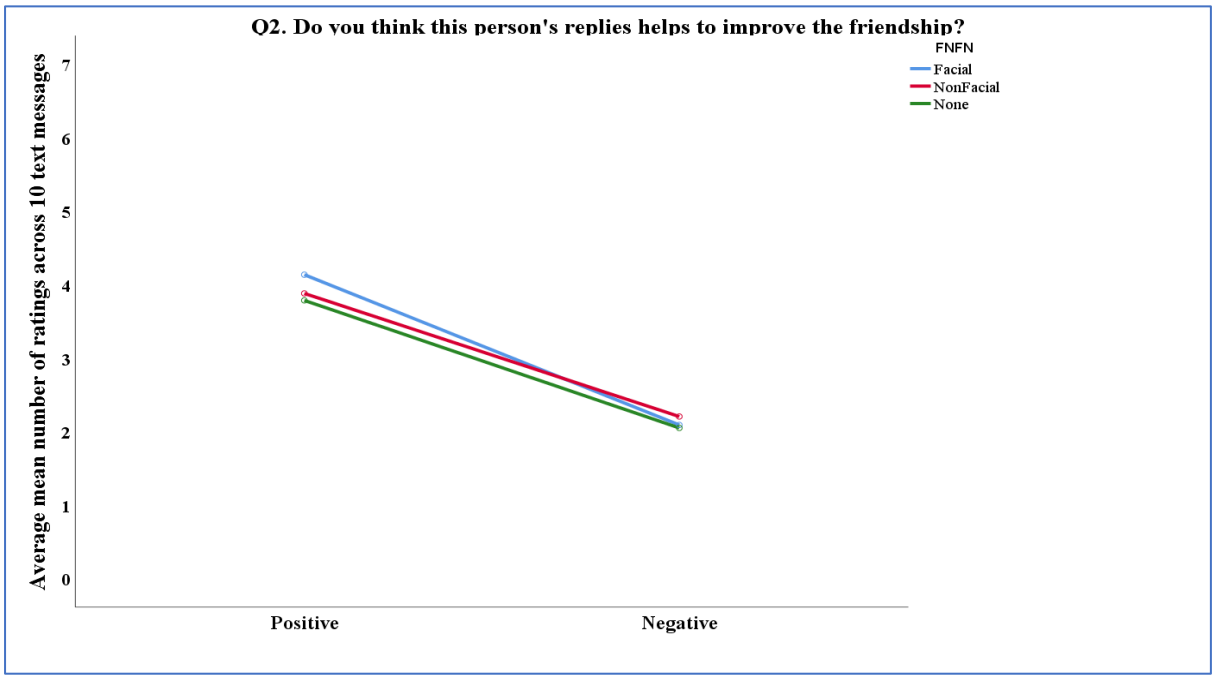


Figure 3.3 ***Helps to improve the friendship****: Mean ratings for the six measures for positive and negative replies with face, non-face and no emoji*

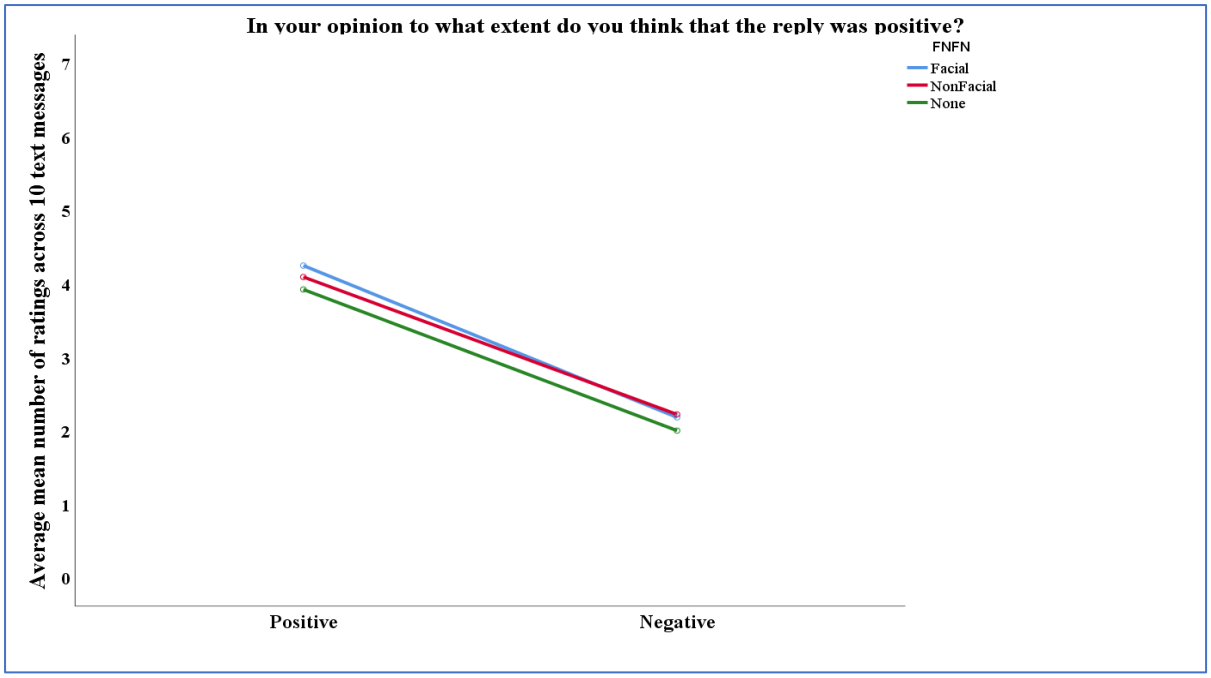


Figure 3.4 ***Considered the reply was Positive****: Mean ratings for the six measures for positive and negative replies with face, non-face and no emoji*

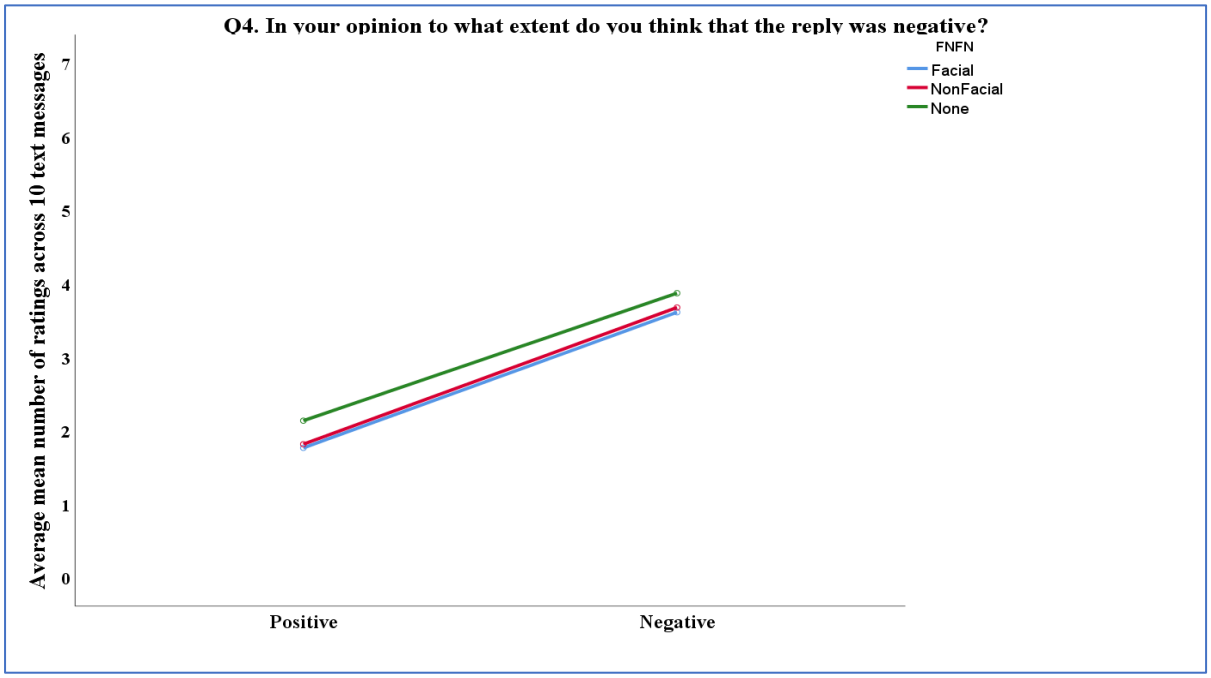


Figure 3.5 ***Considered the reply was Negative****: Mean ratings for the six measures for positive and negative replies with face, non-face and no emoji*

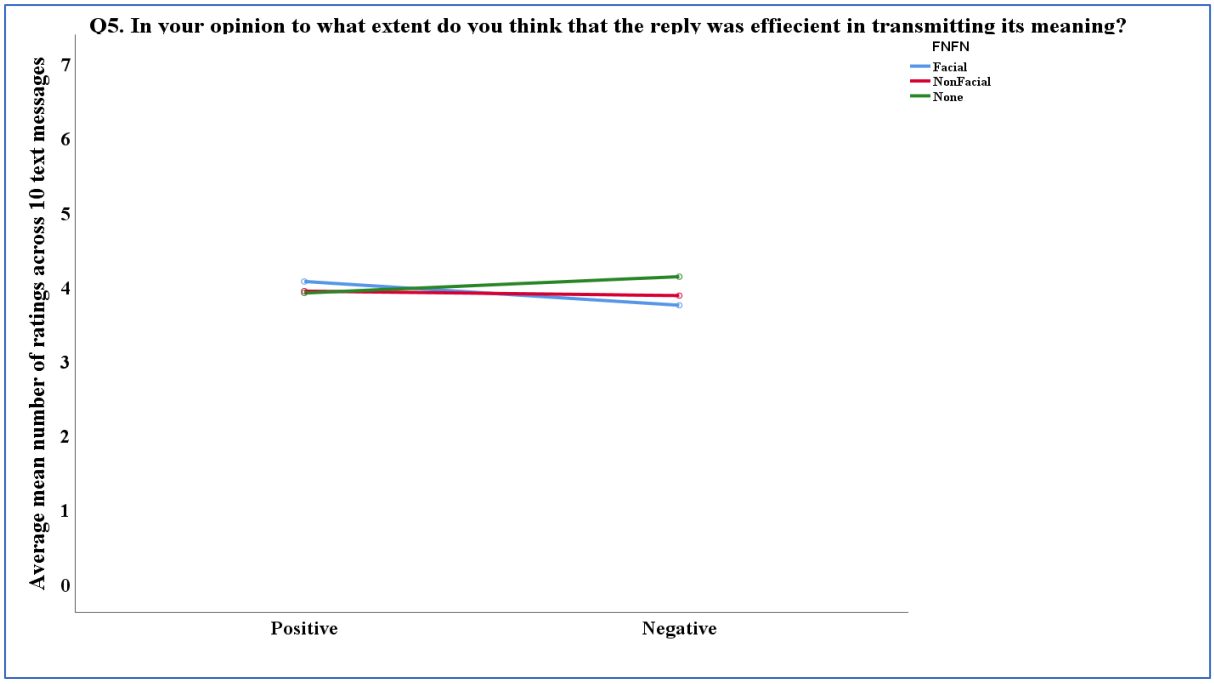


Figure 3.6 ***Considered efficient in transmitting its meaning****: Mean ratings for the six measures for positive and negative replies with face, non-face and no emoji*

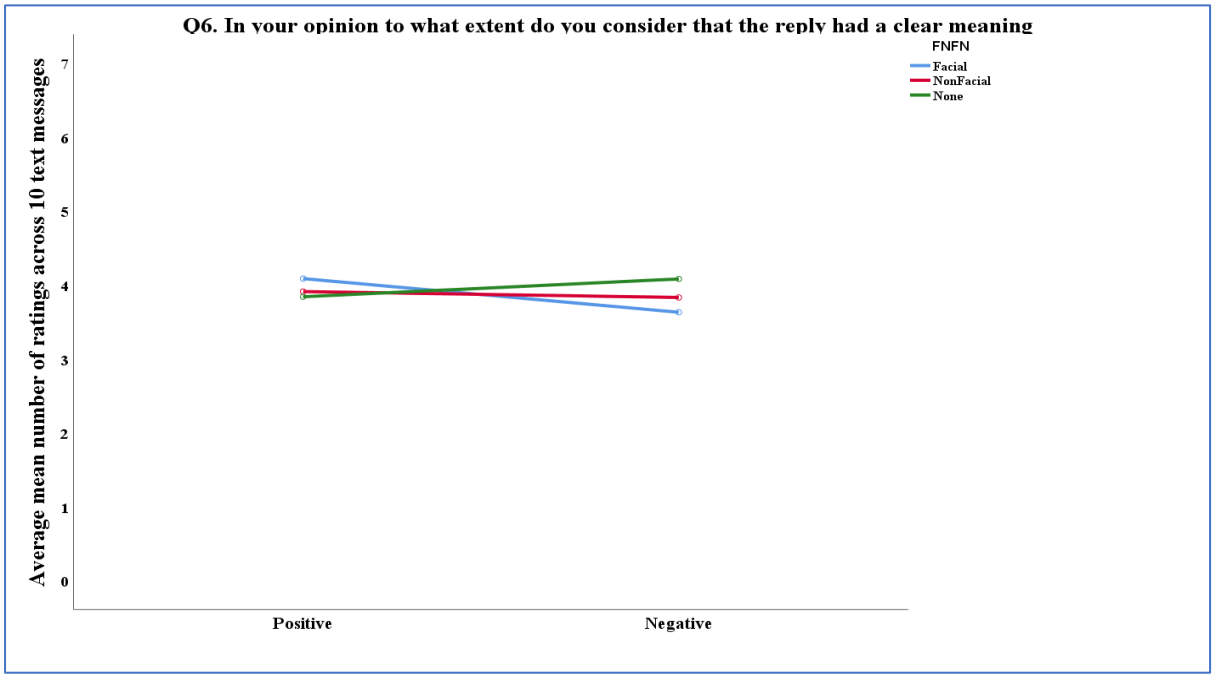


Figure 3.7 ***Considered the reply was clear in meaning****: Mean ratings for the six measures for positive and negative replies with face, non-face and no emoji*

3.3.1 Bivariate Correlational Analyses

Bivariate Correlational analyses were used to explore any overall relationship between the six dependent variables (see Table 3.2). The dependent variables of rapport, (Q1 and Q2) correlated highly with each other and with ratings of positivity and negativity (negative correlation). There is a strong relationship between perceived clarity and efficiency (Q5 and Q6; r = .73). This suggests that, overall, ratings of efficiency and clarity correlated moderately with each other, but not with the other variables.

As a control measure an additional bivariate correlational analyses was used to examine the relationship between the number of emoji used by the participants themselves and participants' ratings for the six dependent variables signalling perceived interest in friendship. From the text messages collected, 80% of participants used emoji in their own messages, with use per participant varying between 0 and 26 (M = 4.26;SD = 4.89). Correlational analysis revealed no statistical significant relationship to the six variables showing the participants' own emoji use did not affect results.

Table 3.2 Bivariate Correlation for the six ratings

	Means	**Std.Dev**	**1**	**2**	**3**	**4**	**5**	**6**
1 Interest in the friendship	32.39	9.94	1					
2.Improving the friendship	30.24	10.02	.943**	1				
3.Positivity of replies	31.09	10.55	.945**	.964**	1			
4.Negativity of replies	28.11	10.3	-.927**	-.928**	-.956**	1		
5.Efficiency in its meaning	39.45	4.13	.09	.14	.12	-.14	1	
6.Clarity in meaning	38.95	4.52	.12	.14	.13	-.14	**.72****	1

**. Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

3.4 Discussion

The current study examined the effect of adding a face or non-face emoji to a text conversation between friends and the effect of this for ratings of interest and improvement in the friendship and the perceived clarity and efficiency of the text messages. The text messages were positive or negative in valence.

The first finding was that positive messages were rated more positively and signalled greater interest in the friendship regardless of emoji presence. This converges with findings from Rodrigues et al. (2017) study which showed positive messages were rated more positively and signalled greater interest in a romantic relationship irrespective of emoji presence. This suggests an element of redundancy in the use of emoji within positive messages which already attract high ratings. However, while Rodrigues et al. (2017) found a 'softening' effect for emoji, in that negative messages with emoji were rated as signalling greater interest in the friendship and as being more positive, this was not found in the present study. However, in Rodrigues et al. (2017) Study 2, for more serious messages the presence of an emoji was detrimental for ratings of interest and positivity, which is consistent with the findings here. Given that Rodrigues et al. (2017)'s study was in Portuguese, this inconsistency in findings may reflect language differences between the two studies or it may be the case that emoji use is highly context sensitive and dependent on the message content. Differences in participants' age and student/worker status may also be relevant here.

Contrary to the hypothesis, no differences were found between face and non-face emoji conditions in the present study. This is unanticipated, particularly given the differences between the emoji types highlighted in the literature (e.g. Riordan, 2017a,b). Further experiments will explore the effect of emoji type further.

The ratings of efficiency and clarity showed no effect of emoji in positive messages and a detrimental effect in negative messages. While this initially appears to be inconsistent

with a processing fluency account, the effect in negative messages suggests that processing fluency is enhanced when the emoji is absent. When the message is negative, additional cognitive effort is needed to process the message; in such messages the addition of an emoji may lead to ambiguity, reducing processing fluency.

In the present study, in contrast to Rodrigues et al. (2017), there was no correlation between the ratings of efficiency and clarity and the other four measures. Rodrigues et al., (2017) had reported a correlation of r=0.3 (p<01) between efficiency and interest in the relationship and a correlation of r=.64, p<.01 between positivity of reply and efficiency. It is not clear why no correlation was found in the present study. It may be that language or message differences affected results or it may reflect the participants' perception of the exchanges as being between friends as compared to romantic relationships in Rodrigues et al. (2017). Rodrigues et al. (2017) used messages that were more emotive, consistent with the kinds of messages that pass between romantic partners. However, in the present study, messages were between hypothetical friends and were of a more general type, including chit-chat and other dialogue.

A number of limitations to this study must be considered. The lack of effect of face versus non-face emoji may have resulted from the message design. For example, in the non-face condition, in a negative message ("*when are you going in holidays?*"), the reply ("*I am going on my own"*) was accompanied by a corresponding emoji (i.e., ☂). The narrative of the text message and non-face emoji presented may not have been compatible or directly related to judgements about the friendship. Emoji are multi-layered and context specific and presented challenges in constructing ecologically valid stimuli. Furthermore, the choice of face emoji may have been problematic at times. For example, the '*eyes rolled up'* face emoji depicted in one of the ten text messages may be perceived as sarcastic or funny and is therefore ambiguous and may have been misinterpreted. The appearance of the emoji as a separate 'message' in the conversation may have appeared artificial and have influenced results.

A further issue concerns the response format used. As the study was a part replication of Rodrigues et al. (2017), a similar method was used. However, an important difference between the studies is that Rodrigues et al. (2017) used an online Qualtrics survey, whereas the present study was conducted face-to-face. Further research will be required to examine whether the lack of association between the efficiency/clarity measures and the interest/positive measures stand. Furthermore, responses times were not collected, and it may be the case that a more sensitive measures such as response times may be required, particularly in differentiating between effects of face and non-face emoji. The following chapters explore these issues further.

Chapter 4

The effect of supplementing or substituting non-face emoji and message valence on the perception of messages between hypothetical friends

Abstract

Findings from Chapter Three revealed that emoji had no effect on ratings of clarity and efficiency when the message was positive. Negative messages were rated highest for clarity and efficiency when no emoji were present. No overall relationship was found between ratings of rapport and those of fluency and no differences emerged between face and non-face emoji. Previous research has shown that non-face emoji can communicate affect (e.g., Riordan, 2017). The present study investigates whether non-face emoji might affect the efficiency and clarity when supplementing or substituting words in positive and negative messages.

Using an online survey (N = 72), participants were randomly assigned to one of the conditions of a 2 (message valence: positive or negative) x 4 (non-face emoji: Supplement, Substitute, Control, No Emoji) design. Following Rodrigues et al.'s method, as used in Chapter Three, participants read hypothetical text messages and rated them for: interest in the friendship; improvement of the friendship; positive or negative valence; efficiency in transmitting its meaning; and clarity of meaning.

Results showed that no effects of emoji were found regarding fluency. Positive messages were rated more positively and were perceived to be efficient in transmitting meaning irrespective of emoji presence, suggesting an element of redundancy in the use of emoji within positive messages. Message valence did not affect ratings of clarity. Regarding the rapport ratings, results revealed ratings of interest and improving the friendship were higher for positive messages compared to negative messages. An effect of emoji condition was observed, with higher ratings for messages containing substituting emoji versus those without. There was a strong correlation between efficiency and clarity in meaning and a moderate association with the ratings of rapport.

Overall, non-face emoji had a modest effect on readers' perceptions of text messages, suggesting that sensitivity to emoji is context specific. Substituting emoji did have a rapport building effect in ratings of positivity and improving the friendship. This would suggest any subtle changes in the messages could change the perception of the text message. The following chapters examine this further.

Chapter Four

4.1 Introduction

Findings from Chapter 3 revealed that emoji had no effect on ratings of clarity and efficiency when the messages were positive. Negative messages were rated highest for clarity and efficiency when no emoji were present. No overall relationship was found between ratings of rapport (i.e., interest in the friendship and improve the friendship) and those of fluency (clarity and efficiency). Furthermore, in Chapter 3, no differences emerged between face and non-face emoji. However, as noted in the Discussion (Chapter 3), the lack of effect of face versus non-face emoji may have resulted from the message design. The present study will extend the previous chapter by examining whether non-face emoji affect the ratings of efficiency and clarity, as well as those of rapport, when they supplement or substitute for words in text messages. This reflects a more naturalistic use of the non-face emoji type, which tends not to occur alone (Stark & Crawford, 2015; Gawne & McCulloch 2019, see Chapter 1). Based on the findings from Chapter 3, it would be predicted that the use of non-face emoji will have a negative effect on efficiency and clarity in negative messages, but messages with non-face emoji which supplement rather than substitute for words will receive higher ratings of processing fluency (efficiency and clarity) and rapport (interested in friendship) in positive messages. This experiment examines whether this will apply whether the emoji substitutes for or supplements a word in a message. It might be predicted that substitution of a word by an emoji creates more ambiguity, compared to a supplementary emoji, which strengthens the meaning of the word by essentially repeating its meaning.

4.1.1 Non-face emoji can have a disambiguating effect

Riordan (2017a) examined the effect of non-face emoji in disambiguating messages and communicating affect. Participants completed an online task and were asked to rate the emotional content and ambiguity of each message, either with or without a non-face emoji. Riordan (2017a) found that participants rated ambiguous messages as less ambiguous when they included emoji and that including a non-face emoji contributes to disambiguating meaning in a text message in a similar way to face emoji (Riordan, 2017a). This is important as Riordan (2017a) shows that the degree of misunderstanding of face emoji is higher than that of non-face emoji, but that both types reduce information ambiguity. Riordan's findings (2017a) suggest that non-face emoji have better potential as a means of communication than using additional words and may serve more flexible communication purposes compared to face emoji.

To date, no research has explored whether messages with a non-face emoji are perceived as signalling a greater rapport (interest in the friendship and improving in the friendship) or indicating fluency (clarity and efficiency) in messages which are either positive or negative in valence. In addition, such data have not been interpreted through the lens of a processing fluency account.

4.1.2 Emoji and sentence position

Emoji tend to appear in particular positions in sentences. One study that examined the punctuating effect of emoji was conducted by Sampietro (2016). Sampietro (2016) examined the differences between punctuation and the role of emoji in Spanish WhatsApp text messages. The study used a mixed method approach and examined the placement of emoji when substituting or supplementing text, compared to standard punctuation or non-standard punctuation. In their qualitative approach, the focus of the analysis was on messages composed with emoji within a naturalistic sample of data. Four different positions were considered: the

emoji appeared at the beginning of the message; the middle of the message; the end of the message and the message is composed only of an emoji. Results revealed 55% of emoji were placed at the end of the message, 6% placed in the middle, while 37 % of emoji formed the complete message. According to Sampietro (2016) emoji are not simply 'digital punctuation marks'; they are more in line with 'social and positive contexts' serving relational functions. Moreover, Sampietro (2016) suggests that emoji may be used to strengthen or reduce different speech acts, depending on the context or the relationship between the sender and the receiver.

The important difference between emoji and punctuation is that both face and non-face emoji are mainly used in social contexts either with positive speech acts that may strengthen the illocutionary force of an utterance (Dresner and Herring 2010), or in the context of what Sampietro (2019, p.117) suggests is a form of "phatic communion" i.e., small talk, which is evident when emoji are used as a humorous or an expressive emotive tone in text messages. By being placed at the end of the sentence, emoji take on the role of a punctuation mark in CMC Schneebeli (2017), but emoji go beyond this to serve as a positive function. It has been shown that in CMC readers are very sensitive to punctuation; for example, the inclusion of a full stop in a text message is perceived by readers as abrupt (Houghton et al., 2017). Therefore, it is reasonable to assume emoji appearing at the end of a sentence can support and reinforce the meaning and valence of the message (Sampietro, 2016).

4.1.3 Emoji aid comprehension but can slow reading

Scheffler et al. (2022) examined the sematic processing of (mainly non-face) emoji by comparing the lexical retrieval of the emoji compared to words. Participants completed an online reading task where they read stimuli with emoji or words presented in a sentence. Reading times were recorded. Scheffler et al. (2022) found non-face emoji were read with ease and accuracy when words were substituted by emoji within the sentences. This applied even when a homophone noun (i.e., word that sounds the same but has different meanings, e.g.,

"palm (tree)" for "palm (of hand)") was presented in the sentence. This would suggest reading comprehension is not affected when non face emoji substitute for a word in a sentence. However, reading times were significantly slower when emoji were present, and were further slowed for homophonous meanings. Scheffler et al. (2022) propose a context dependent account of emoji. Whether an emoji that substitutes for a word is processed more efficiently will depend on the context of the message and message valence is a key factor here. The processing fluency account suggests a facilitative effect in positive messages; however, in a negative message, a substitution may have a detrimental effect on comprehension and the perception of rapport (interested in the friendship and improving the friendship).

Barach et al. (2021) examined whether emoji are processed like words during reading comprehension. Barach et al. (2021) used eye-tracking device to reveal the time course of semantic processing of (mainly) non-face emoji during sentence reading. Participants were presented with a selection of messages in a randomised order and instructed to read for comprehension. Sentences contained target words and were presented in three different conditions: congruent; incongruent; and no emoji. For the congruent and incongruent conditions, the non-face emoji was placed at the end of the message. Results indicated the total time on the target word (sentence reading times) revealed significant effects, with times reduced when emoji were present. In addition, skipping rates on target words increased when the emoji was present. This would suggest attention is placed towards the emoji in the sentence. In addition, results showed a congruent emoji revealed faster processing compared to incongruent emoji, as recorded by shorter first-fixation duration, gaze durations and shorter total times on the actual emoji in the sentence.

Gustafsson and Hellström (2017) examined the affect of replacing words with emoji and its effect on reading time. The study was completed on a smartphone. Participants were asked to read eight short, scripted texts. Participants were divided into two groups. One group

read the version that had the original text (without emoji) and the other group read the version which had text where one words had been replaced by emoji. Gustafsson and Hellström (2017) found, by calculating the average reading speeds for each reading, it took a longer time to read a text with words replaced by emojis than without. Furthermore, emoji were not ideal for replacing words but more inclined to "enhance the tone or emotion in messaging and not to replace word" Gustafsson et al. (2017, p.78). In summary, replacing words with emoji in texts can make readers spend more time reading than they have to.

Cohn et al. (2018) examined reading of sentences containing emoji which supplemented or substitutes for words (for example, "John loves eating 🍕 every Friday": "John loves eating pizza every Friday 🍕.") They found that substituting emoji for words in text messages increased reading times, but there was no difference in ratings of comprehensibility between word and congruent-emoji substitutions. Their findings suggest that while emoji use involves a processing costs, overall comprehension is unaffected and the advantages of using a multi-modal message outweigh any such cost.

Boutet et al. (2021) examined the impact of emoji on emotion communication, social attributions and information processing. Participants were shown sentences (i.e., representative of IM exchanges) with emoji pairings under 12 different conditions. Emojis were always placed at the end of the text message. Sentences were varied with sentence valence (negative, positive, neutral) and emoji valence (negative, positive, neutral, and no emoji). Boutet et al. (2021) recorded eye movements (i.e., fixation and gazes) that offer a more precise measure of comprehension difficulty and speed of processing of the content of messages. In addition, participants rated each message for its emotional effect (positive/ negative). Results revealed sentences with incongruent emoji generated longer gaze times on the sentence. This suggests that incongruency leads to confusion. Moreover, the presence of a negative emoji intensified the perceived negativity of negative sentences. This converges with Rodrigues et al.'s (2017)

findings were in Study 2, where for more serious messages, the presence of the emoji had a detrimental effect, making the message more negative. However, processing speed and understanding for comprehension of text messages was enhanced by the presence of a congruent emoji. Therefore, the effect suggests that adding a congruent emoji to a text message can aid processing of its content. This will in turns help with comprehension.

4.1.4 The present study

This experiment was designed for in-person data collection and the experimental stimuli were set up using SuperLab software. This had the advantage of allowing reaction times to be measured in addition to the ratings scales. However, following data collection from 50 participants, in-person research had to be abandoned due to the Covid-10 public health crisis. The experiment was re-designed as a Qualtrics online survey, and this version is reported in what follows.

This study investigates whether non-face emoji affect the ratings of efficiency and clarity when supplementing or substituting for words in positive and negative text messages.

The hypotheses for the present study are:

H1: adding a non-face emoji will increase ratings of the efficiency and clarity in positive messages compared to negative messages. Further differences might be predicted between the four emoji conditions, with the control and supplement conditions producing higher ratings than the substitute condition.

H2: adding a non-face emoji will increase the ratings of rapport in positive messages compared to negative messages. Further differences might be predicted with the four emoji conditions, with the control and supplement conditions producing higher ratings than the substitute condition.

H3: there will be a relationship between the ratings of rapport, and efficiency and clarity.

4.2 Methodology

4.2.1 Participants

A total of 72 participants (30 males, 42 females, aged 18 to 30 years, *M* = 21.57, *SD* = 3.17) completed the experiment. All participants were fluent in English. Participants were recruited online through a Qualtrics hyperlink to mailing lists and posts on social networks sites (e.g., Facebook, Twitter). In addition, participants were invited from the psychology department's participant pool. This pool consisted of undergraduate and postgraduate students who at the start of the year expressed interest in participating in psychological research during the academic year.

4.2.2 Materials

The study was delivered using a Qualtrics survey platform and participants were randomly assigned to conditions by the operating system when they consented and agreed to continue in taking part in the online survey**.** Non-face emoji used in each of the mobile screen shots were taken from the experimenter's pre-existing emoji database that were provided by the participants in Experiment 1. Each screen shot consisted of a sender's text and receiver's response with or without an emoji (see Figure 4.1, 4.2) following a standard structure of most messaging apps (e.g., SMS, Instant messages, WhatsApp, etc.). The same eight messages appeared in the positive conditions, with or without emoji depending on condition allocation. A different set of 8 messages appeared in negative conditions, again with or without emoji depending on condition allocation (see Appendix G to J).

The text messages were constructed using messages from published research informed by and adapted using the naturalistic messages collected as described in Chapters Two and Three. In a preliminary investigation, a small number of participants (n=5) rated the stimuli. There was complete agreement as to the valence of the stimuli. All participants rated positive

stimuli positively and negative stimuli negatively. The number of text messages displayed was reduced to suit the move to an online format. Figures 4.1 and 4.2 present a sample of the messages as they appeared on Qualtrics. For each text message exchange, participants were asked to indicate on a 7-point Likert scale their responses (see Section 4.2.3 below).

1.Supplement 2. Substitute 3. Control 4. No emoji

Figure 4.1 Positive non-face emoji mobile screen shots across supplement, substitute, control and no emoji conditions

1.Supplement 2. Substitute 3. Control 4. No emoji

Figure 4.2 Negative non-face emoji mobile screen shots across supplement, substitute, control and no emoji conditions

4.2.3 Design

Participants were randomly assigned to one of four conditions in a 2 (i.e., positive or negative message valence) x 4 (Non-Face emoji type: Supplement, Substitute, Control, No Emoji) between participant experimental design. Participants were randomly allocated to either positive or negative conditions by the software. There were approximately 18 participants randomly allocated to either positive or negative conditions. The gender breakdown is given in Table 4.1 below.

Table 4.1 Gender breakdown for positive and negative messages for supplement, substitute, control or no emoji conditions.

(N=72)	Gender	Supplement	Substitute	Control	No emoji
Positive	Male	2	4	5	4
	Female	7	5	5	3
Negative	Male	4	2	5	4
	Female	5	8	6	3
Total		**18**	**19**	**21**	**14**

4.2.4 Procedure

Participants completed the experiment in their own time, having followed a link to the Qualtrics platform. They provided consent by indicating that they were over the age of 18 years and by clicking on the "I agree to participate" button on the survey. Participants were required to fill in a series of demographic questions (e.g., age, gender, academic status, frequency of texts, and two questions relating to how participants send and receive emojis in their written communication). Unlike previous chapters, where data collection was in person, no text messages were collected here, because of the online data collection method, as the pilot study had shown that participants were not happy to complete this section of the task due to the time commitment. After participants agreed to participate and consented to move forward in the survey a set of instructions were displayed. Upon clicking on the "I have read and understood

the instructions clearly and happy to proceed," the survey randomly assigned each participant to one of the eight conditions.

Following the allocation to conditions participants were informed that they would be exposed to eight individual mobile screen shots showing eight different brief conversations (see for examples Figure 4.1 and 4.2 above). Order of presentation was randomised by the software.

Participants were instructed to read each text message carefully. Participants were informed there were no right or wrong answers. There were no time restrictions. Participants were presented with the text messages exchanges and for each question were asked to indicate on a 7-point Likert scale their responses to the following questions, ''Do you think this person is interested in the friendship?" (1 = Not interested at all, 7 = Very interested), ''Do you think this reply helps to improve the friendship?" (1 = This definitely does not help, 7 = This definitely helps). As manipulation checks, Rodrigues et al. (2017) added four further questions, which are also included here: ''In your opinion, to what extent do you consider that the reply " - ''was positive?", ''was negative?", ''was efficient in transmitting its meaning?", and ''had a clear meaning?" (1 = Not at all, 7 = A lot).

Once they had rated the 8-text conversation using the rating scales, a screen appeared thanking participants and some brief debriefing information was presented.

4.2.5 Ethical Considerations

The University Research Ethics Committee approved the research, both for in person data collection (pre Covid-19) and separately for the online survey method. No identifiable data were used during the course of this research; the Qualtrics survey was anonymous. After the experiment ended a short debriefing session highlighted the objectives of the study and participants were informed of the research question.

4.3 Results

Only complete surveys were retained for analysis. Data consisted of mean ratings for each of the 8 conditions on each of 6 Likert scales. Table 4.2 shows Means and Standard Deviations (and standard error of the mean) for message valence (Positive Negative or PosNeg below) and sentence type i.e., Supplement, Substitute, Control and No Emoji (coded as SSCN below)**.**

A 2 x 4 between participant analysis of variance was conducted in order to examine the influence of two IVs (valence: Positive vs. Negative; sentence type: Supplement vs. Substitute vs. Control vs No emoji) on the 6 dependent variables i.e., responses on the 7-point Likert scales. Each of these DVs are analysed separately in what follows.

Table 4.2 Means and Standard Deviations for the effect of clarity and efficiency in meaning when supplementing, substituting for words in positive and negative text messages across six dependent variables. Participants' mean number of ratings on the 7-point scale were summed over the 8 messages.

(n =72)		**Interested**	**Improving**	**Positive**	**Negative**	**Efficient**	**Clear**
Supplement	Positive	5.34	5.11	5.28	2.20	5.73	5.67
		(.865)	(.760)	(1.00)	(1.03)	(1.07)	(.989)
	Negative	4.0	3.44	2.61	4.88	5.24	5.72
		(.866)	(.702)	(1.01)	(1.14)	(1.46)	(1.33)
Substitute	Positive	5.35	5.19	5.67	2.08	6.29	6.24
		(1.41)	(1.33)	(1.11)	(1.78)	(.726)	(.733)
	Negative	4.5	3.86	3.35	4.03	5.26	5.63
		(1.64)	(1.14)	(1.08)	(.775)	(1.11)	(1.14)
Control	Positive	5.05	4.51	5.34	2.08	5.68	5.73
		(1.16)	(1.08)	(.797)	(.683)	(.798)	(.679)
		4.35	3.92	3.10	4.43	5.47	5.40
	Negative	(.934)	(.870)	(1.23)	(1.46)	(1.25)	(1.16)
No Emoji	Positive	4.52	4.27	4.52	2.47	4.73	5.25
		(1.35)	(1.13)	(1.16)	(1.08)	(1.41)	(1.33)
		3.21	2.36	2.00	4.27	4.73	4.91
	Negative	(1.38)	(.775)	(.736)	(1.68)	(1.41)	(1.63)

Q1. Do you think this person interested in the friendship?

Table 4.2 presents a summary of participants' ratings for showing interest in the friendship. The analysis of variance revealed no interaction effect for valence x SSCN, F (3,64) =.29, p >.83. A main effect of valence was found, F (1,64) = 13.11, p < .001 n^2_p = .17 (small effect size), with positive messages rated higher than negative messages overall. There was no main effect for SSCN, F (3,64) = 1.99, p >.08. (See Figure 4.3).

Q2. Do you think this reply helps to improve the friendship?

Table 4.2 presents a summary of participants' ratings for improving the friendship. The analysis of variance revealed no interaction effect for valence x SSCN, F (3,64) = 1.50, p >.22. A main effect of valence was found, F (1,64) =32.91, p <.001 n^2 = .34 (moderate effect size), with positive messages rated higher than negative messages overall. The main effect of SSCN conditions was significant F (3,64) = 4.45, p <.007. n^2_p =.17 (small effect size) in the predicted direction. Post-hoc comparisons using the Tukey LSD test indicated that messages were rated highest for a substituted condition (M = 5.19; SD =1.33) compared to the no emoji condition (M = 4.27: SD =1.13), p < .011. (See Figure 4.4). There were no group differences for ratings to help improve the friendship between supplement (M =5.11; SD =.760) and substitute (M =5.19; SD =1.33) conditions, p >.86, or for substitute (M = 5.19;SD = 1.33) and control (M =4.51; SD =1.08) conditions, p >.80.

Q3. In your opinion to what extent do you think the reply was positive?

Table 4.2 presents a summary of participants' ratings for positivity. The analysis of variance revealed no interaction effect for valence x SSCN, F (3,64) = .162, >.92. A main effect of valence was found, (F (1,64) = 96.40, p <.001 n^2 = .6 (moderate effect size), with positive messages rated higher than negative messages overall. The main effect of SSCN conditions was significant, (F 3,64) = 4.33, p <.008, n^2_p = .17 (small effect size). Post-hoc comparisons

using the Tukey LSD test indicated that messages were rated highest for a substituted condition (*M* = 5.67; *SD* =1.11) compared to the no emoji condition (*M* = 4.52: *SD* =1.16), *p* < .02. (See Figure 4.5). There were no group differences for ratings to help improve the friendship between supplement (*M* = 5.28; *SD* =1.00), substitute (*M* = 5.67; *SD* = 1.11) conditions, *p* >.35, and between substitute (*M* =5.67 ;*SD* = 1.11) and control (*M* = 5.34; *SD* =.797) conditions, *p* >.83.

Q4. In your opinion to what extent do you think that the reply was negative?

Table 4.2 presents a summary of participants' ratings for negativity. The analysis of variance revealed no interaction effect for valence x SSCN, *F* (3,64) = .425, *p* =.73. A main effect of valence was found, *F* (1,64) = 54.48, *p* = .001, n^2 *p* = .46 (moderate effect size), with negative messages rated higher than positive messages overall. There was no main effect for SSCN, *F* (3,64) = .48, *p* = .70 (see Figure 4.6).

Q5. In your opinion to what extent do you think that the reply was efficient in transmitting its meaning?

Table 4.2 presents a summary of participants' ratings for replies efficient in meaning. The analysis of variance revealed no interaction effect for valence x SSCN, *F* (3,64) = .425, *p* =.73. A main effect of valence was found, *F* (1,64) = 4.63, *p* =.04, n^2_p = .07 (very small effect size), with positive messages rated higher than negative messages overall. There were no main effects for SSCN, *F* (3,64) = 1.25, *p* = .30 (see Figure 4.7).

Q6. In your opinion to what extent do you consider that the reply had a clear meaning?

Table 4.2 presents a summary of participants' ratings for clarity in meaning. The analysis of variance revealed no interaction effect for valence x SSCN, *F* (3,64) = .253, *p* =.86. A main effect of valence was not found, *F* (1,64) = 1.28, *p* =.26. There was no main effect for SSCN, *F* (3,43) = 1.62, *p* = .19 (Figure 4.8).

In summary, non-face emoji when substituted for a word influenced the participants' perception of text messages, with regard to ratings of improving the friendship and positivity, compared to messages with no emoji. No other effects of emoji type were evident. However, message valence emerged as an important factor, with effects of valence in five out of the six measures.

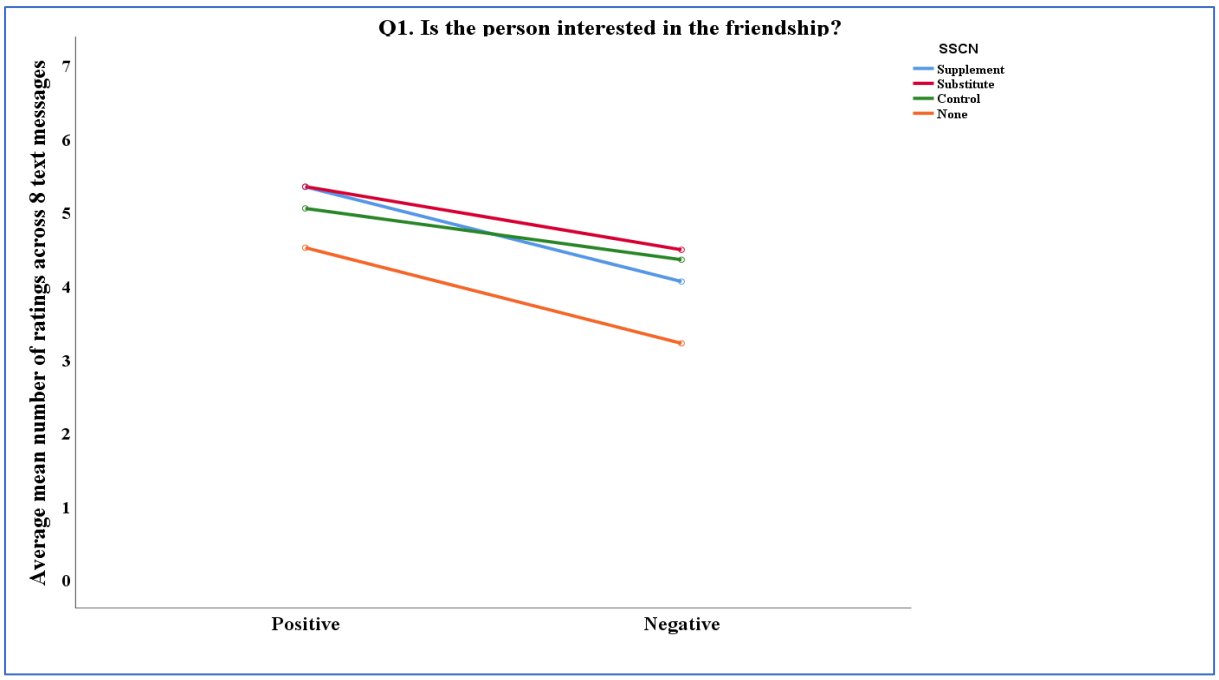


Figure 4.3 ***Interested in the friendship****: The effect of non-face emoji on efficiency and clarity when supplementing or substituting for words in positive or negative messages*

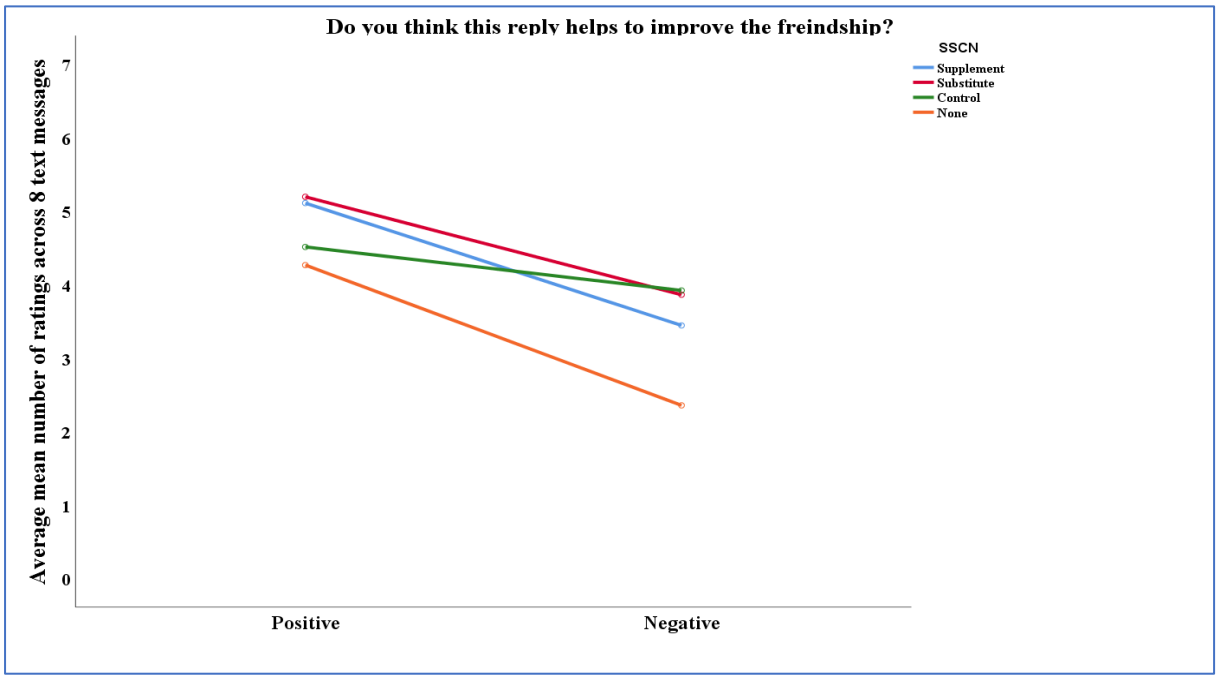


Figure 4.4 ***Helps to improve the friendship****: The effect of non-face emoji on efficiency and clarity when supplementing or substituting for words in positive or negative messages*

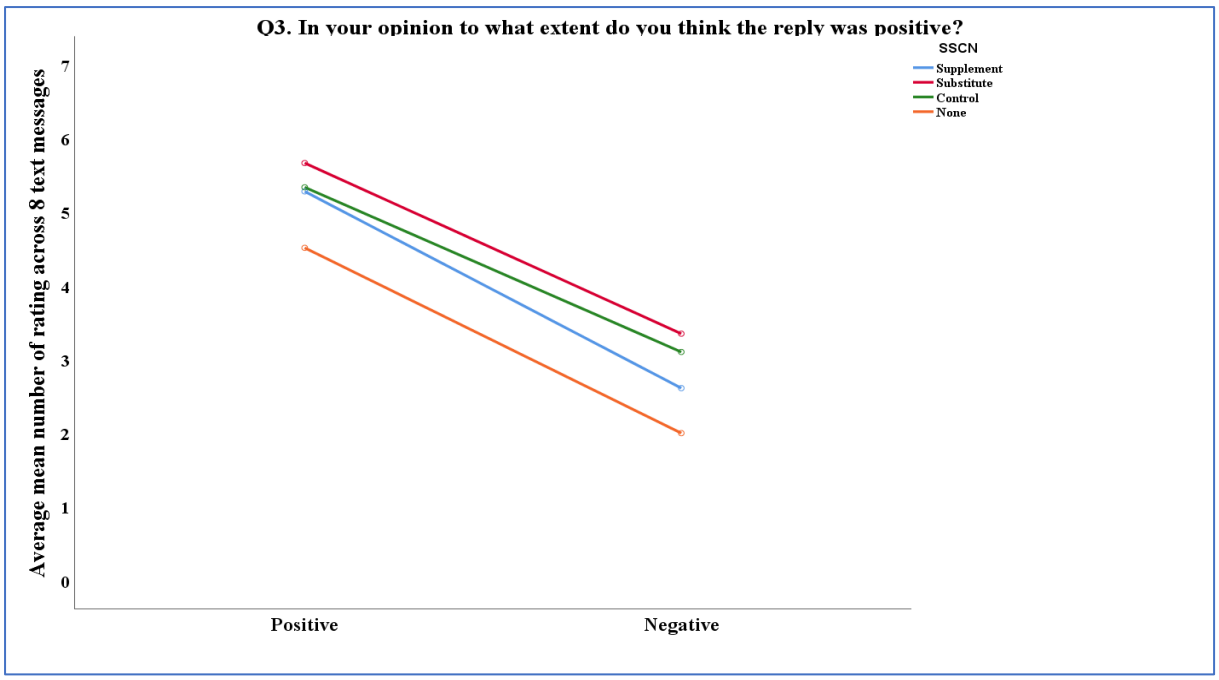


Figure 4.5 ***Considered the reply was Positive****: The effect of non-face emoji on efficiency and clarity when supplementing or substituting for words in positive or negative messages*

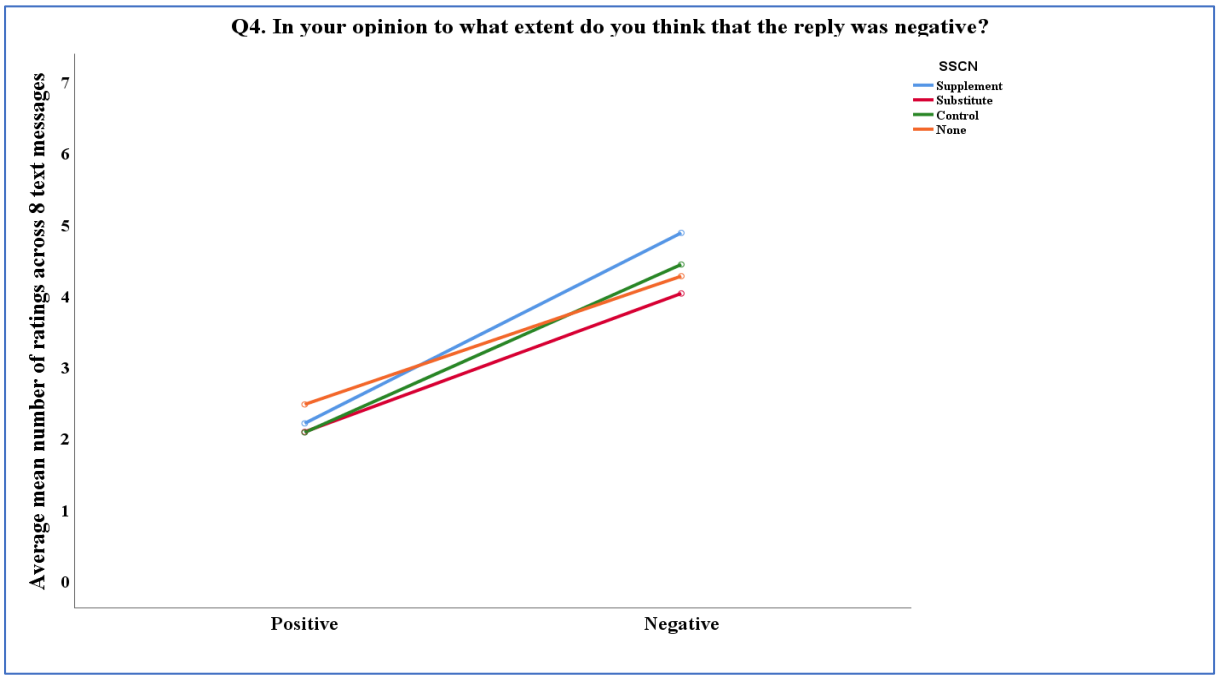


Figure 4.6 ***Considered the reply was Negative****: The effect of non-face emoji on efficiency and clarity when supplementing or substituting for words in positive or negative messages*

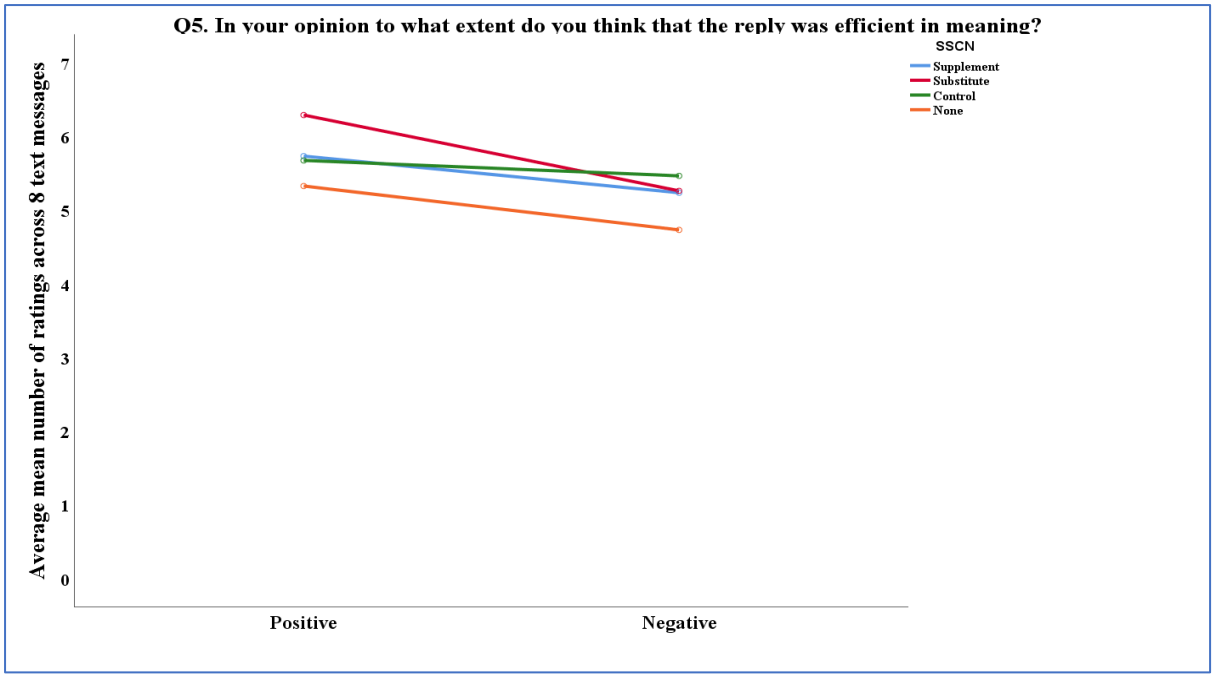


Figure 4.7 ***Considered the reply was efficient in meaning****: The effect of non-face emoji on efficiency and clarity when supplementing or substituting for words in positive or negative messages*

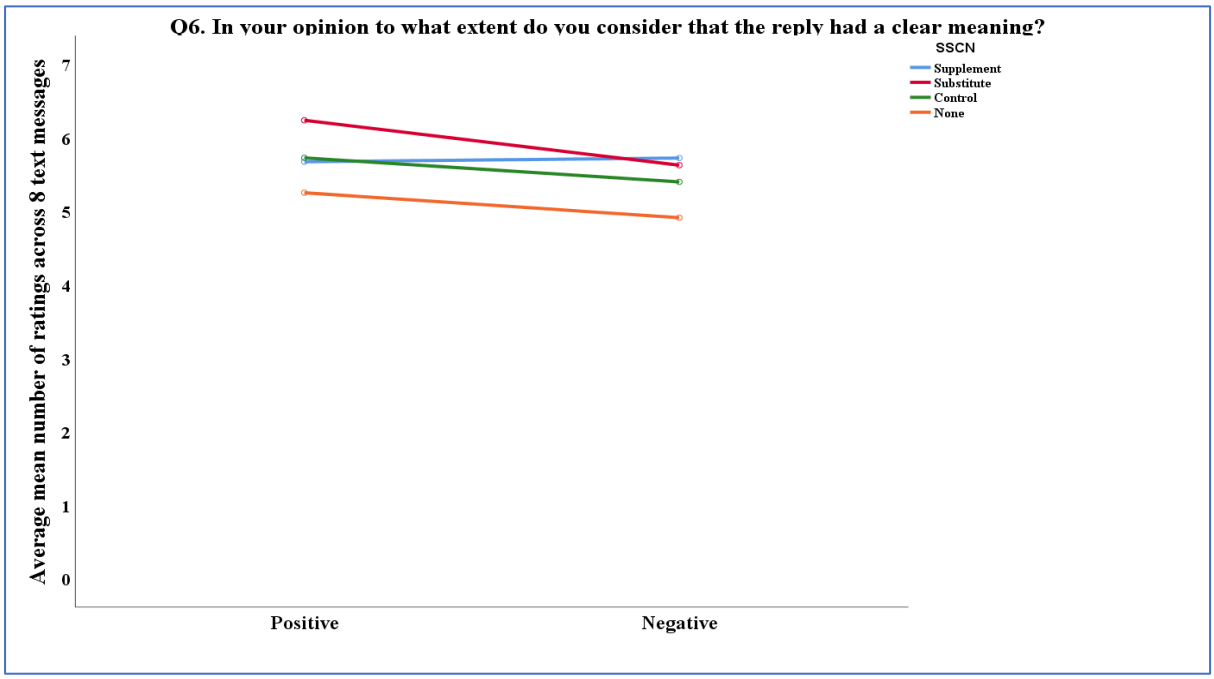


Figure 4.8 ***Considered clear in meaning****: The effect of non-face emoji on efficiency and clarity when supplementing or substituting for words in positive or negative messages*

4.3.1 Bivariate Correlation Analysis

Bivariate correlational analyses were used to explore any overall relationship between the six dependent variables (Table 4.3). The dependent variables of relevance to rapport (Q1 and Q2) correlated highly with each other and with ratings of positivity and negativity (negative correlation). There is a strong relationship between perceived clarity and efficiency (Q5 and Q6; r = .94). This suggests that, overall, ratings of efficiency and clarity correlated highly with each other. The ratings of relevance to rapport (Q1 and Q2) are correlated with those measuring processing fluency (Q5 and Q6; r =.53, .52, .46, .44, p<.01, respectively).

Table 4.3 Bivariate Corelation for six ratings

	Means	**Std.Dev**	**1**	**2**	**3**	**4**	**5**	**6**
Q1. Interested in the friendship	4.63	1.35	1					
Q2. Improved the friendship	4.19	1.29	.842**	1				
Q3. Positive replies	4.09	1.64	.666**	.783**	1			
Q4. Negative replies	3.4	1.71	-.384**	-.472**	-.742**	1		
Q5. Efficient in meaning	5.55	1.25	.525**	.461**	.403**	-0.125	1	
Q6. Clear in meaning	5.68	1.18	.523**	.445**	.341**	-0.081	**.936****	1

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

4.4 Discussion

The present study examined whether non-face emoji affect the ratings of efficiency and clarity, as well as those of rapport, when they supplement or substitute for words in text messages. Based on a processing fluency account, it would be predicted that the use of non-face emoji will have a positive effect on efficiency and clarity in positive messages, but a negative effect in negative messages. However, based on the findings from Chapter 3, it might be predicted that the use of non-face emoji will have a negative effect on efficiency and clarity in negative

messages, but no effect in positive messages. This experiment examines whether this will apply whether the emoji substitutes for or supplements a word in a message.

Regarding fluency (clarity and efficiency), the first hypothesis (H1) was that adding a non-face emoji would affect the ratings of efficiency and clarity, with further differences between the four emoji conditions. However, no effects of emoji type were found. Positive messages were rated more positively and were perceived to be efficient in transmitting its meaning regardless of emoji presence. This suggests an element of redundancy in the use of emoji within positive messages, which already attracted high ratings as presented in Chapter 3 as well as reiterating Rodrigues et al. (2017) as discussed in Chapter 3. Message valence did not affect ratings of clarity.

With regards to the rapport ratings, the second hypothesis (H2) stated that adding a non-face emoji would increase the ratings of rapport in positive messages compared to negative messages. Further differences were predicted with the four emoji conditions, with the control and substitute conditions producing higher ratings than the supplement condition. The results showed that ratings of interest in the friendship and improving the friendship were higher for positive messages compared to negative messages. For ratings of improving the friendship only, there was a main effect of emoji conditions, with higher ratings for messages containing a substituting emoji versus those without. In addition, messages containing a substituting emoji were rated as significantly more positive than the messages without an emoji. This suggests that the substituting emoji is perceived as having a rapport building effect.

Hypothesis 3 was supported. There was a strong correlation of $r = 0.95$ ($p<.01$) between efficiency and clarity in meaning and these were correlated moderately ($r >.4$, $p<.01$) with the ratings of rapport. This pattern is consistent with the findings from Rodrigues et al., (2017) and is in contrast with the findings of Chapter Three, which showed no correlation overall between rapport and processing fluency. Contrasting findings emerged for ratings of efficiency and

clarity. Overall, the ratings on each of the dependent variables were high (see Table 4.3) and it may be that close to a ceiling effect was observed for efficiency and clarity; this may also account for the small valence effect found for efficiency but not for clarity.

Riordan (2017a) explains that non-face emoji have better potential as communication tool than (additional) words, and present more flexible communication purposes compared to face emoji. This was not the case in the present study, as non-face emoji did not influence the participants' perception of text messages for clarity in meaning, regardless of how they were positioned and irrespective of message valence. This is unexpected, given the results of Chapter Three, particularly given the varied distinctions between the emoji types highlighted in the literature (e.g., Riordan, 2017a). There were three key differences between the methods in Chapter Three and Chapter Four: the messages themselves were different in order to accommodate a non-face emoji as against a face emoji and the emoji was embedded into the message, consistent with naturalistic messages but in contrast to the method used in Chapter Three and in Rodrigues et al. (2017). This may account for the difference in findings and reiterates the point that sensitivity to emoji is context dependent. The third difference between the methods was that participants were present in person in Chapter Three but participants in Chapter Four completed an anonymous Qualtrics survey. It may be that that the presence of an experimenter or the impression management aspects of being in person may have made participants more sensitive to the valence of the messages in Chapter Three.

Given the small valence effect found for efficiency but not for clarity non-face emoji did not influence the participants' perception of clarity and efficiency of text messages, regardless of how they were employed within text messages.

According to Gustafsson and Hellström (2017) replacing words with emoji slowed participants' reading times compared to plain written texts. Gustafsson and Hellström (2017) recommended emoji should be used to enhance the tone or emotion, but not to substitute words

in a sentence as they can slow reading comprehension for the reader. This is consistent with the effect here, of strengthened ratings of rapport for substituted emoji, but no effect for ratings of clarity and efficiency. However, the trends in the data suggests a facilitative effect of emoji compared to conditions with no emoji (see Figure 4.3).

Emoji serve as a cognitive function, facilitating the reading of text messages (Barach et al., 2021:Boutet et al. 2021) and convey affective information in interpersonal communication (Erle et al. 2021). Cohn et al. (2018) showed emoji use incurs a processing cost, while overall comprehension is unaffected. Here, ratings of improving the friendship and positivity revealed a main effect of emoji conditions, with higher ratings for messages containing substituting emoji versus those without. This suggests that any processing costs is not sufficient to counteract the rapport building quality of messages with emoji.

Scheffler et al. (2022) proposed a context dependent account of emoji. Whether an emoji that substitutes for a word is processed more efficiently will depend on the context of the message and message valence is a key factor here. However, in the current study, there were no interactions between message valence and emoji type.

Boutet et al. (2021) suggests that adding a congruent emoji to a text message can aid processing of its content. This will in turn help with comprehension, but incongruency leads to confusion (Boutet et al. 2021). However, in the current study, there were no effects of emoji type on ratings of efficiency or clarity. Moreover, the presence of a negative emoji has been found to strengthen the perceived negativity of negative sentences, but not in the current study. This contrasts with Rodrigues et al.'s (2017) findings in Study 2, where for more serious messages, the presence of the emoji had a detrimental effect, making the message more negative. However, Scheffler et al. (2022) found non-face emoji did not influence the readers' perceptions of text messages, regardless of how they were employed within the messages. This along with the current findings suggests that non face emoji do not contribute significantly to

processing fluency capacity within text messages, consistent with the findings in the previous Chapter.

A number of limitations to this study must be considered. The intention was to record participants' reaction times accurately when reading each of the messages across all conditions. Comparing reaction times would have provided a more sensitive measure of efficiency and clarity of meaning. It is possible that the narrative of each of the eight positive and negative text messages presented were not applicable to everyday text conversations, plus the non-face emoji type may not have been a suitable match. The between-subjects design may have obscured differences between the conditions, as participants only saw one type of emoji (For example, e.g., '*I got so many*  *this year').* Further experiments (Chapter Six and Seven) will address this issue by using a within subjects design.

It is possible that emoji have become so prevalent and widespread that they may have lost their influence, or as a stylistic choice are overused. This may account for the lack of differences overall and the finding that positive messages were rated more positively and were perceived to be more efficient in transmitting its meaning regardless of emoji presence. However, substituting emoji did have a rapport building effect in ratings of positivity and improving the friendship. This contrasts with findings from Chapter Three. Sensitivity to emoji is context dependent. The suggestion is put forward that the slight differences in the message (i.e., substitute an emoji for a word), could alter the perception of the text message. The following chapters explore this further.

Chapter 5

The effect of punctuating or non-punctuating face emoji and message valence on the perception of messages between hypothetical friends

Abstract

Findings from Chapter Four revealed few effects of non-face emoji in readers' perceptions of text messages between hypothetical friends. Positive messages overall were associated with higher ratings than the negative messages. Chapter Five builds on the previous chapter by examining the effects of face emoji in positive and negative text messages, manipulating the position where they occur. Face emoji followed a sentence (the standard condition), interrupted a sentence, or were absent in two control conditions. The control conditions involved a punctuation mark (full stop) instead of the emoji and no emoji with no punctuation.

Using an online survey, 55 females and 25 males, aged between 18 to 30 years old (average age 23 years) were randomly assigned to receive either text only, punctuated text, text followed by an emoji, text interrupted by an emoji. Messages were positive or negative in valence, giving a 2 x 4 between subjects experimental design. Following Rodrigues et al.'s method, as used in Chapters 3 and 4, participants read the hypothetical text messages and rated them for: interest in the friendship; improvement of the friendship; positive or negative valence; efficiency in transmitting its meaning; and clarity of meaning.

The only effect of emoji type emerged for the measure of positivity. No other effects of emoji types were evident. However, message valence emerged as an important factor, with effects of valence in four out of six measures (see Figure 5.3).

Chapter Five

5.1 Introduction

Regarding fluency (clarity and efficiency) findings in Chapter 4, Experiment 3, showed positive messages were rated more positively and were perceived to be efficient in transmitting its meaning irrespective of emoji presence. However, no effects of emoji type were found. This indicates an element of redundancy in the use of emoji within positive messages, which already attracted high ratings as presented in Chapter 3 as well as reiterating Rodrigues et al.'s findings (2017) as discussed in Chapter 3. With regards to the rapport ratings, interest in the friendship and improving the friendship were higher for positive messages compared to negative messages. Overall, non-face emoji had a limited influence on participants' perception of text messages, with emojis that substituted for words showing an advantage over texts with no emojis for ratings of positivity and of improving the friendship.

The present study will extend Chapter 4's findings and examine the effect of face emoji regarding fluency (efficiency and clarity) and ratings of rapport (i.e., interest in the friendship) when the emoji position is varied in standard text messages. Based on the hypotheses from Chapter 4, it would be predicted that a face emoji will have a negative effect on efficiency and clarity in negative messages. However, standard text messages followed by an emoji instead of a text interrupted by an emoji will receive higher ratings of processing fluency (efficiency and clarity) and rapport (interested and improving the friendship) in positive messages compared to negative messages. This experiment examines whether this will apply when standard text messages are followed by an emoji compared to a text message interrupted by an emoji. It might be predicted that the interrupting emoji condition may create more ambiguity compared to the standard text followed by an emoji which can create a more obvious punctuated effect in text messages (Alshenqeeti., 2016; Na'aman, 2017).

5.1.1 A punctuated emoji is part of the sentence

Participants have been shown to be highly sensitive to small cues within text messages; for example, a full stop within a text is perceived as abrupt (Houghton et al., 2018). Emoji may produce a similar effect. Previous work has shown that emoji can serve as simple representations of words (Alshenqeeti, 2016) or as non-verbal cues which contribute to the wider content of the message (Alshenqeeti, 2016; Prada et al. 2018). Face emoji tend to occur in positive messages (Thompson & Filik, 2016). If a face emoji is associated and related to the content (Lo, 2008), its meaning should be consistent with the rest of the sentence. There are several ways in which an emoji can influence how readers perceive the impact of a text message.

Arafah and Hasyim (2019) examined the occurrence of emoji as in social media (i.e., WhatsApp) messages. Participants completed an online task where they were asked to complete twenty-five questions concerning WhatsApp mobile phone screenshots that used emoji. Arafah and Hasyim (2019) focused on two key questions; how are emoji used from the perspective of syntax, semantics, and pragmatics, and how do users employ emoji in social media. Their analysis showed that emoji are a part of the text and that participants used a combination of verbal language and emoji. This is apparent in the preparation of a sentence, where the emoji is placed at the beginning or the end of the text message. Arafah and Hasyim's (2019) findings revealed that as many as 77% of the participants use emoji at the end of the sentence, with 14% using emoji in the middle of a sentence, and 9% at the beginning of the sentence. Arafah and Hasyim (2019) concluded that when an emoji punctuates the sentence it is perceived to strengthen both the meaning and social relationship. Therefore, by placing the face emoji at the end of the sentence it can be seen to support and maintain rapport and processing fluency functions.

Novak et al.'s (2015) study of 1.6 million Tweets also found that emoji are usually placed at the end of messages and, in addition, that messages containing emoji tend to be positively valenced. However, Novak et al. (2015) claim negativity and positive sentiments increase or decrease depending on the context of the Tweet between the sender and the receiver. The face emoji appears to reinforce the emotion by appearing at the end of the message. Where Novak et al. (2015) examines multiple Tweet accounts, the present study examines either text only, punctuated text, text followed by an emoji, and text interrupted by an emoji. Messages were positive or negative in valence, giving a 2 x 4 experimental between design.

5.1.2 Interrupting a sentence with an emoji has an effect

When we come across a text message that's reads, "Why don't you ever call me," we can either interpret it as an inquisitive, sad or angry in emotional tone. When an emoji interrupts a sentence, it can have the same effect for example; "Why don't you ever 😡call me," In one study Wu et al. (2021) examined the effect of the angry emoji position on consumers' perceptions of the writer's anger in negative online reviews. Wu et al. (2021) found that when the angry emoji was placed in the middle of the sentence it led to a stronger perception of anger than an angry emoji placed at the end of the message. An eye tracking device was used between three laboratory experiments. Study 1 was a 3 (one emoji at the end of a sentence vs. one in the middle of a sentence vs. no emoji) × 2 (feature description: feature one precedes feature two vs. feature two precedes feature one) between-subjects design. Study 2 was a 2 (the position of the angry emoji at the end vs. in the middle of a sentence) × 2 (feature description: feature one precedes feature two vs. feature two precedes feature one) between-subjects design. Study 2 measured the consumers' perceptions of the sender's anger, the angry emoji sentiment-strengthening perception, and the position conspicuous perception created by the angry emoji.

Study 3 was a 2 (the position of the angry emoji at the end vs. in the middle of a sentence) × 2 (word review extremity: moderate vs. extreme) between-subjects design.

Wu et al. (2021) found the results of Study 1 revealed that an angry emoji placed in the middle of the sentence, compared to an angry emoji placed at the end of a sentence had a stronger effect on the perception of a sender's anger. The position of the angry emoji influenced the participants' attention, as revealed by eye tracking. Study 2 and 3 replicated the results of Study 1. Moreover, the influence of the position of the emoji on the reader's perception of anger was not significant for Study 3 when extreme reviews were considered. However, Wu et al. (2021) findings suggests that the effect of the angry emoji position on consumers' perception of the writer's anger increased when moderate reviews applied. Which is to say, compared with the angry emoji placed at the end of the message, the angry emoji in the middle of a sentence led to a stronger perception of anger, except in extreme reviews. The suggestion is put forward that the angry emoji must correspond with the overall sentiment of text message. Moreover, this reiterates Cohn et al.'s (2018) findings (see Chapter 4) that while emoji use involves a processing cost, overall comprehension is unaltered and the advantages of using a multi-modal message outweigh any such cost. Therefore, an emoji that is perceived to interrupt the sentence may be consistent with a processing fluency account. However, this might differ depending on whether the message is positive or negative in valence which is an important dimension for this thesis.

5.1.3 Effect of position of emoji - emotional valence on reading comprehension.

Robus et al. (2020) examined the effect of the position of emoji on reading comprehension. Robus et al. (2020) examined how the position and emotional valence of emoji in neutral narrative text messages influenced eye movements during reading and perceptions of sentence valence. Participants were asked to read a selection of positive and negative narrative sentences

that were neutral in emotional valence. Two separate sentence reading procedures were used; one that included an emoji at the beginning and the end of the sentence. In the study, the 'slightly smiling face' (🙂) was chosen for positive valence conditions, and the 'slightly frowning face' (😕) for negative valence. Messages with no emoji were added to deter demand characteristics but were removed ahead of statistical analysis. Participants were asked to rate each sentence on a scale of 1 (highly negative) to 9 (highly positive) with 5 being neutral on how emotionally valent they perceived the sentences to be. Eye movements were recorded during the reading of sentences containing emoji at the beginning or end of the sentence, with readers subsequently rating how emotionally valent they appeared. Robus et al. (2020) found that the valence of a face emoji did not influence readers' perception of emotionality, but the effect of an emoji was to enhance reading times, particularly when the face emoji was placed at the end of the sentence. The results indicated that emoji positioned at the end of the sentence had longer fixation gazes than those positioned at the beginning of the sentence. Therefore, readers spent longer reading sentences when emoji were placed at the end of the messages than the beginning. Previous eye tracking research has shown that words placed towards the end of the sentence gain an added cost in cognition as a result of '*wrap-up'* processes, in which late-stage understanding and semantic integration happens once the reader has progressed through the sentence. In this instance, Robus et al. (2020) found it was not a word but an emoji that incurred a cost in the sentence-final position.

Research suggests a different processing cost than for words. Tang et al. (2020) explored the sematic processing of (mainly face) emoji and words in contextually incongruent conditions by means of event-related potentials (ERP), by comparing the N400 and P600 effects of emojis. The N400 is an indicator of semantic processing and the P600 is associated with hearing or reading grammatical errors. These components allowed the researchers to compare the neural basis of semantic processing of emoji. Participants were presented with

short congruent and incongruent sentences with the emoji substituting the word at the end of the sentence and a control condition with no emoji. Tang et al. (2020) found that incongruent words produced robust N400 and P600 effects, while emoji only generated a more 'conspicuous' and repeated N400 effect. Tang et al. suggest that (sentence incongruent) emoji produce more difficulties in terms of semantic retrieval and integration and processing at the sentence level. Congruent emoji were associated with a less negative N400 effect. Both Robus et al. (2020) and Tang et al. (2020) interpret their findings in line with Cohn et al. (2018) who found that in a self-paced reading tasks, emoji produce longer reaction times than words, suggesting that emoji processing is more difficult than word processing. The present thesis examines whether this is always the case.

5.1.4 The present study

The present study will examine either text only, punctuated text, text followed by an emoji, text interrupted by an emoji. Messages are positive or negative in valence. It is predicted that text followed by an emoji will have an effect on efficiency and clarity in positive messages compared to negative messages. However, it might be predicted that a text message interrupted by an emoji may create more ambiguity, compared to standard text message followed by an emoji which reinforces the intended meaning or sentiments (Shardlow et al. 2022).

Similar to Chapter 4, Experiment 3, this experiment was designed for in-person data collection and the experimental stimuli were set up using SuperLab software. This had the advantage of allowing reaction times to be measured in addition to the ratings scales, as well as the experimental control of the laboratory setting. However, following data collection from 50 participants, in-person research had to be abandoned due to the Covid-19 public health crisis. The experiment was re-designed as a Qualtrics online survey, and this version is reported in what follows.

This study investigates whether face emoji affect efficiency and clarity when a standard text message followed by an emoji, or a text message interrupted by an emoji in positive and negative text messages. The hypotheses for the present study are:

H1: adding a face emoji will increase ratings of the efficiency and clarity in positive messages compared to negative messages. Further differences might be predicted between the four emoji conditions, with the control and punctuate conditions producing higher ratings than the emoji interrupting the sentence.

H2: adding a face emoji will increase the ratings of rapport in positive messages compared to negative messages. Further differences might be predicted with the four emoji conditions, with the control and punctuate conditions producing higher ratings than the emoji interrupting the sentence.

H3: there will be a relationship between the ratings of rapport, and efficiency and clarity.

5.2 Methodology

5.2.1 Participants.

A total of 80 participants (55 females, 25 males, aged 18 to 30 years, M = 22.54, SD = 4.11) completed the experiment. All participants were fluent in English. Participants were recruited online through a Qualtrics hyperlink to mailing lists and posts on social networks sites (e.g., Facebook, Twitter). In addition, participants were invited from the psychology department's participant pool. This pool consisted of undergraduate and postgraduate students who at the start of the year expressed interest in conducting psychological research during the academic year.

5.2.2 Materials

The study was delivered using a Qualtrics survey platform and participants were randomly assigned to conditions by the operating system when they consented and agreed to taking part in the online survey**.** Face emoji used in each of the mobile screen shots were taken from the experimenter's pre-existing emoji database that were provided by the participants in Experiment 1. Each screen shot consisted of a sender's text and receiver's response with or without an emoji (see Figure 5.1, 5.2) following a standard structure of most messaging apps (e.g., SMS, Instant messages, WhatsApp, etc.). The same eight messages appeared in the positive conditions, with or without emoji depending on condition allocation. A different set of 8 messages appeared in negative conditions, again with or without emoji depending on condition allocation.

The text messages were constructed using messages from published research including the messages used in Chapter 3 and were also guided by the analysis of naturalistic messages in Chapter 1. In addition, a preliminary investigation was conducted with five participants to ensure that the messages were understood, as in Chapter 3, Experiment 2. Figures 5.1 and 5.2 present a sample of the messages as they appeared on Qualtrics. For each text message exchange participants were asked to indicate on a 7-point Likert scale their responses (see Section 5.2.3 below).

1.Text followed by an emoji (Punctuated) 2. Interrupted by an emoji (Non-Punctuated) 3. Control 4. No emoji

Figure 5.1 Positive face emoji mobile screen shots across Punctuate, Non-Punctuate, Control and No emoji conditions.

1.Text followed by an emoji (Punctuated) 2. Interrupted by an emoji (Non-Punctuated) 3. Control 4. No emoji

Figure 5.2 Negative face emoji mobile screen shots across Punctuate, Non-Punctuate, Control and No emoji conditions.

5.2.3 Design.

Participants were randomly assigned to one of four conditions of a 2 (i.e., positive or negative message valence) x 4 (Face emoji type: Punctuate, Non-Punctuate, Control and No Emoji) between participant experimental design. Participants were randomly allocated to either positive or negative conditions by the software. There were approximately 20 participants

randomly allocated to either positive or negative conditions. The gender breakdown is given in Table 5.1 below.

Table 5.1 Gender breakdown for positive and negative messages across punctuated, interrupted, control or no emoji conditions.

(N=80)	Gender	Punctuated	Nonpunctuated (Interrupted)	Control	No emoji
Positive	Male	2	2	2	5
	Female	9	7	8	5
Negative	Male	4	2	3	5
	Female	7	6	6	7
Total		**22**	**17**	**19**	**22**

5.2.4 Procedure

Participants completed the experiment in their own time, having followed a link to the Qualtrics platform. They provided consent by indicating that they were over the age of 18 years and by clicking on the "I agree to participate" button on the survey. Participants were required to fill in a series of demographic questions (e.g., age, gender, academic status, frequency of texts, and two questions relating to how participants send and receive emojis in their written communication). Unlike previous chapters, where data collection was in person, no text messages were collected here, because of the online data collection method, as the pilot study had shown that participants were not happy to complete this section of the task due to the time commitment. After participants agreed to participate and consented to move forward in the survey a set of instructions were displayed. Upon clicking on the "I have read and understood the instructions clearly and am happy to proceed," the survey randomly assigned each participant to one of the eight conditions.

Following the allocation to conditions, participants were informed that they would be exposed to eight mobile screen shots showing eight different brief conversations (see for examples Figure 5.1 and 5.2 above). Order of presentation was randomised by the software.

Participants were instructed to read each text message carefully. Each text message was followed by a series of six short questions relating to each text message displayed. Participants were informed there were no right or wrong answers. There were no time restrictions. Participants were presented with the text message exchanges and for each message were asked to indicate on a 7-point Likert scale their responses to the following questions, as used by Rodrigues et al. (2017) and in previous chapters: ‘‘Do you think the person is interested in the friendship?” (1 = Not interested at all, 7 = Very interested), ‘‘Do you think this reply helps to improve the friendship?” (1 = This definitely does not help, 7 = This definitely helps). As manipulation checks, Rodrigues et al. (2017) added four further questions and these are also used here, the final two serving as measures of processing fluency: ‘‘In your opinion, to what extent do you consider that the reply ” - ‘‘was positive?”, ‘‘was negative?”, ‘‘was efficient in transmitting its meaning?”, and ‘‘had a clear meaning?”. (1 = Not at all, 7 = A lot). Once they had rated the 8-text conversations using the rating scales, a screen appeared thanking participants and some brief debriefing information was presented.

5.2.5 Ethical Considerations

The University Research Ethics Committee approved the research, both for in person data collection (pre Covid-19) and separately for the online survey method. No identifiable data were used during the course of this research; the Qualtrics survey was anonymous. After the experiment ended a short debriefing session highlighted the objectives of the study and participants were informed of the research questions.

5.3 Results

Only complete surveys were retained for analysis. Data consisted of mean ratings for each of the 8 conditions on each of 6 Likert scales. Table 5.2 shows means and Standard Deviations

for message valence (Positive Negative or PosNeg below) and sentence type i.e., Punctuate, Non-Punctuate, Control and No Emoji (coded as PNPCN below).

A 2 x 4 between participants analysis of variance was conducted in order to examine the influence of two IVs (valence: Positive vs. Negative; sentence type: Punctuate vs. Non-Punctuate vs. Control vs. No emoji) on the six dependent variables i.e., responses on the 7-point Likert scales. Each of these DVs are analysed separately in what follows.

Table 5.2 Means and Standard Deviations for the effect of clarity and efficiency in meaning when supplementing, substituting for words in positive and negative text messages across six dependent variables. Participants' mean number of ratings on the 7-point scale were summed over the 8 text messages.

(n = 80)		**Interest**	**Improve**	**Positive**	**Negative**	**Efficient**	**Clear**
	Positive	5.82	5.36	5.82	2.18	5.36	5.36
Punctuate		(.751)	(.809)	(.982)	(.751)	(.809)	(.674)
(Text followed by an emoji)	**Negative**	3.55	3.00	2.36	5.18	5.27	5.36
		(1.22)	(.894)	(1.20)	(1.25)	(1.34)	(.674)
	Positive	6.00	5.33	5.78	1.78	6.00	5.78
Non-Punctuate		(1.00)	(1.00)	(.972)	(.833)	(.707)	(.833)
(Text interrupted by an emoji)	**Negative**	4.38	3.75	3.37	5.13	5.87	5.63
		(1.06)	(.707)	(1.68)	(1.72)	(1.24)	(1.30)
	Positive	5.30	4.80	4.90	3.30	5.40	5.80
Control		(1.05)	(1.22)	(1.19)	(1.49)	(1.17)	(.789)
(Punctuated e.g., full stop)	**Negative**	4.44	3.22	2.22	5.33	5.67	5.33
		(1.23)	(1.20)	(1.09)	(1.58)	(1.22)	(1.50)
	Positive	5.50	4.90	5.30	3.00	5.50	5.50
No Emoji		(.707)	(.994)	(.949)	(1.49)	(.707)	(.850)
	Negative	4.25	3.33	1.92	5.83	5.92	6.00
		(1.35)	(.985)	(.669)	(.937)	(1.08)	(1.12)

Q1. Do you think the person is interested in the friendship?

Table 5.2 presents a summary of participants' ratings for showing interest in the friendship. Analysis of variance revealed no interaction effect for valence x PNPCN, F (3,72) = 1.66, p = .18. A main effect of valence was found, F (1,72) = 39.28, p = .001, n^2 p = .35 (small effect size), with positive messages rated higher than negative messages overall. There was no main effect of replies for PNPCN, F (3,72) = .727, p = .54 (See Figure 5.3).

Q2. Do you think this reply helps to improve the friendship?

Table 5.2 presents a summary of participants' ratings for improving the friendship. The analysis of variance revealed no interaction effect for valence x PNPCN, F (3,72) = .840, p = .48. A main effect was found, F (1,72) = 62.90, p = .001, n^2 p = .47 (moderate effect size), with positive messages rated higher than negative messages overall. There was no main effect of replies for PNPCN F (3,72) = .954, p = .42. (See Figure 5.4).

Q3. In your opinion to what extent do you think that the reply was positive?

Table 5.2 presents a summary of participants' ratings of positivity. The analysis of variance revealed no interaction effect for valence x PNPCN, F (3,72) = 1.082, p = .36. A main effect of valence was found, F (1.72) =144.56, p = .001, n^2 p = .67 (moderate effect size). The main effect of PNPCN conditions was significant F (3,72) = 3.44, p = .02, n^2 p = .12 (small effect size). Post-hoc comparisons using the Tukey LSD test indicated that messages were rated highest for the non-punctuate condition (M =5.78, SD = .972) compared to the control condition (M = 4.90, SD =1.19), p <.036 and the no emoji condition (M = 5.30, SD = .949) p<.007. (See Figure 5.5).

Q4. In your opinion to what extent do you think that the reply was negative?

Table 5.2 presents a summary of participants' ratings of negativity. The analysis of variance revealed no interaction effect for valence x PNPCN, F (3,72) = .874, p = .46. A main effect of valence was found, F (1.72) =94.877, p = .001, n^2 p = .60 (moderate effect size) with negative messages rated higher than positive messages overall. There were no main effects for PNPCN, F (3.72) =2.655, p = .06. (see Figure 5.6).

Q5. In your opinion to what extent do you think that the reply was efficient in transmitting its meaning?

Table 5.2 presents a summary of participants' ratings for efficiency in meaning. The analysis of variance revealed no interaction effect for valence x PNPCN, F (3,72) = .318, p = .81. A main effect of valence was not found, F (1.72) =.238, p = .63. There were no main effects for PNPCN F (3,72) = .1.183, p = .32. (see Figure 5.7).

Q6. In your opinion to what extent do you think that the reply had a clear meaning?

Table 5.2 presents a summary of participants' ratings for efficiency in meaning. The analysis of variance revealed no interaction effect for valence x PNPCN, F (3,72) = .761, p = .52. A main effect of valence was not found, F (1.72) =.016, p = .89. There were no main effects for PNPCN F (3,72) = .582, p = .63.

In summary, the only effect of emoji type emerged for the measure of positivity. No other effects of emoji types were evident. However, message valence emerged as an important factor, with effects of valence in four out of six measures (see Figure 5.8).

5.3.1 Bivariate Correlational analysis

Table 5.3 Bivariate Corelation for six ratings.

	Means	Std. Dev	1	2	3	4	5	6
Q1.Interested in the friendship	4.89	1.31	1					
Q2.Improving the friendship	4.20	1.33	.822**	1				
Q3.Positive replies	3.93	1.91	.652**	.813**	1			
Q4.Negative replies	3.99	1.93	-.420**	-.583**	-.774**	1		
Q5.Efficient in transmitting its meaning	5.61	1.04	.336**	.273*	0.124	0.135	1	
Q6.Clear in meaning	5.60	1.02	.323**	.346**	0.171	0.087	**.842****	1

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Bivariate correlational analyses were used to explore any overall relationship between the six dependent variables (Table 5.3). The dependent variables of relevance to rapport (Q1 and Q2) correlated highly with each other and with ratings of positivity and negativity (negative correlation. There is a strong relationship between perceived clarity and efficiency (Q5 and Q6) (r = .84). This suggests that, overall, ratings of efficiency and clarity correlated highly with each other. The ratings of relevance to rapport (Q1 and Q2) are strongly correlated with those measuring processing fluency (Q5 and Q6; r = .34, .32, .35, .35, p<.01, respectively).

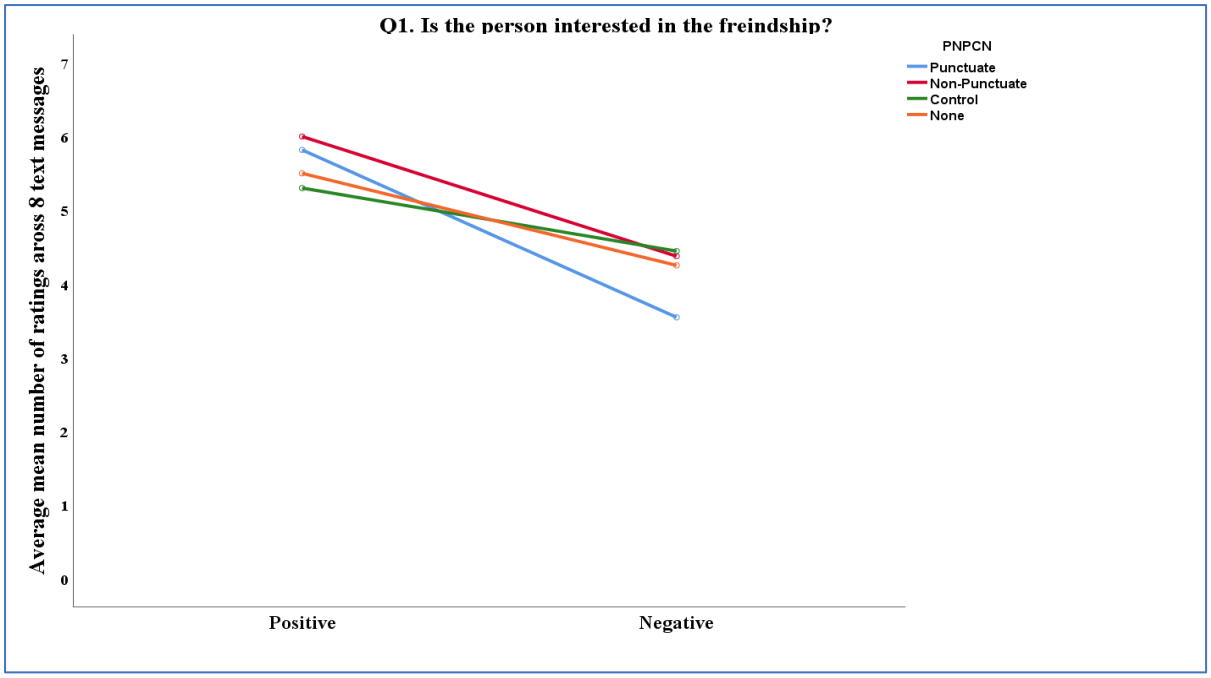


Figure 5.3 ***Interested in the friendship****: The effect of face emoji on efficiency and clarity when punctuating or non-punctuating for words in positive or negative messages*

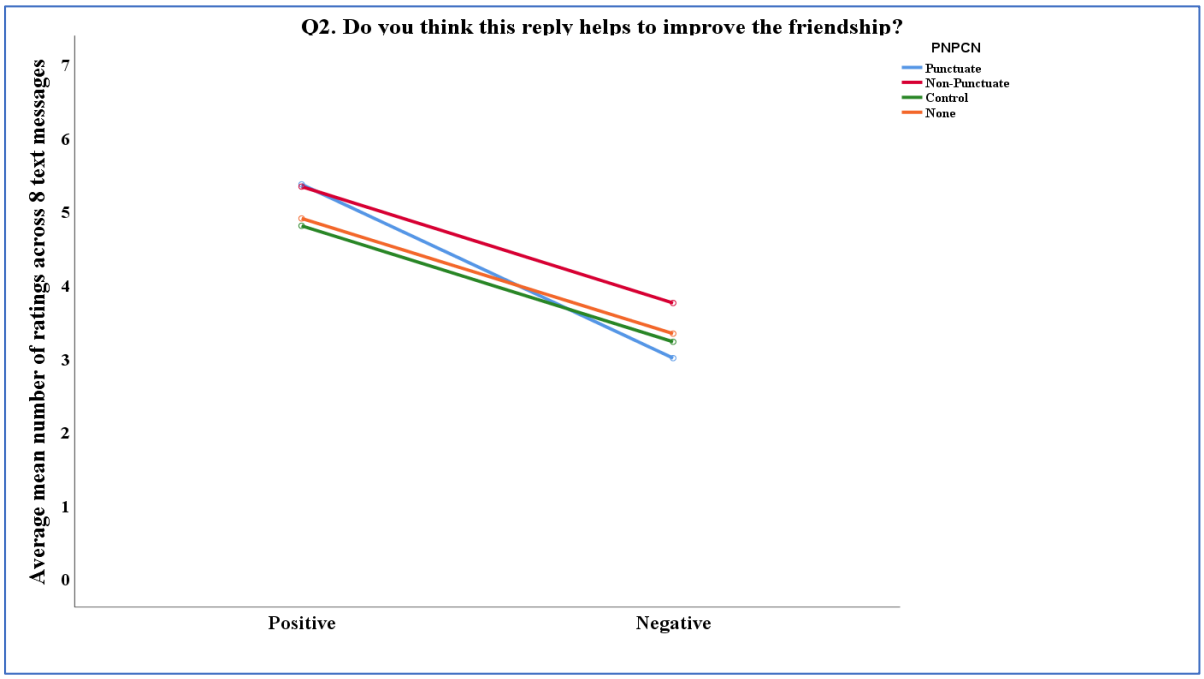


Figure 5.4 ***Helps to improve the friendship****: The effect of face emoji on efficiency and clarity when punctuating or non-punctuating for words in positive or negative messages*

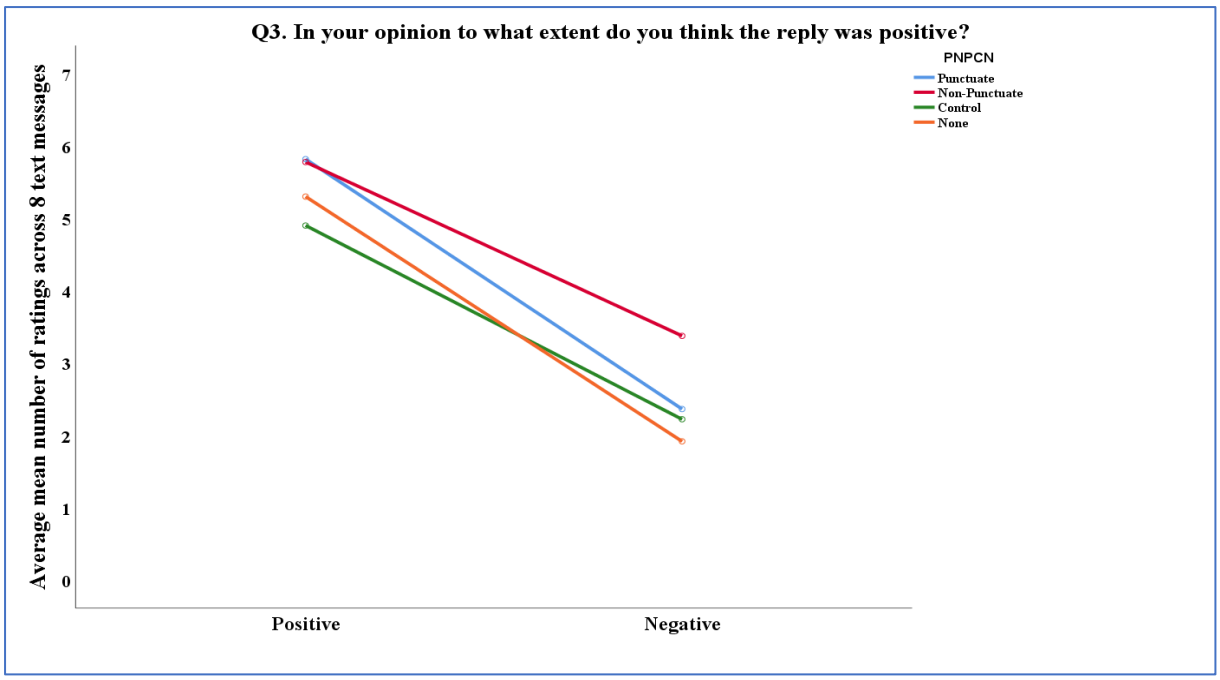


Figure 5.5 ***Considered the reply was positive****: The effect of face emoji on efficiency and clarity when punctuating or non-punctuating for words in positive or negative messages*

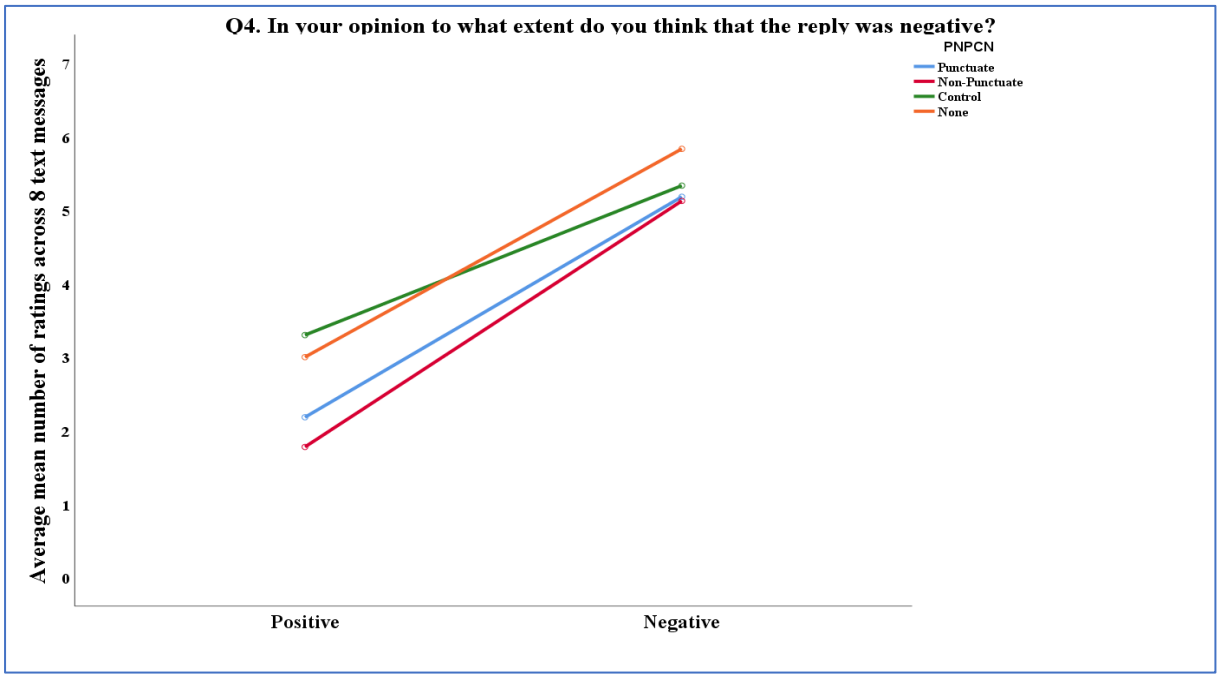


Figure 5.6 ***Considered the reply was Negative****: The effect of face emoji on efficiency and clarity when punctuating or non-punctuating for words in positive or negative messages*

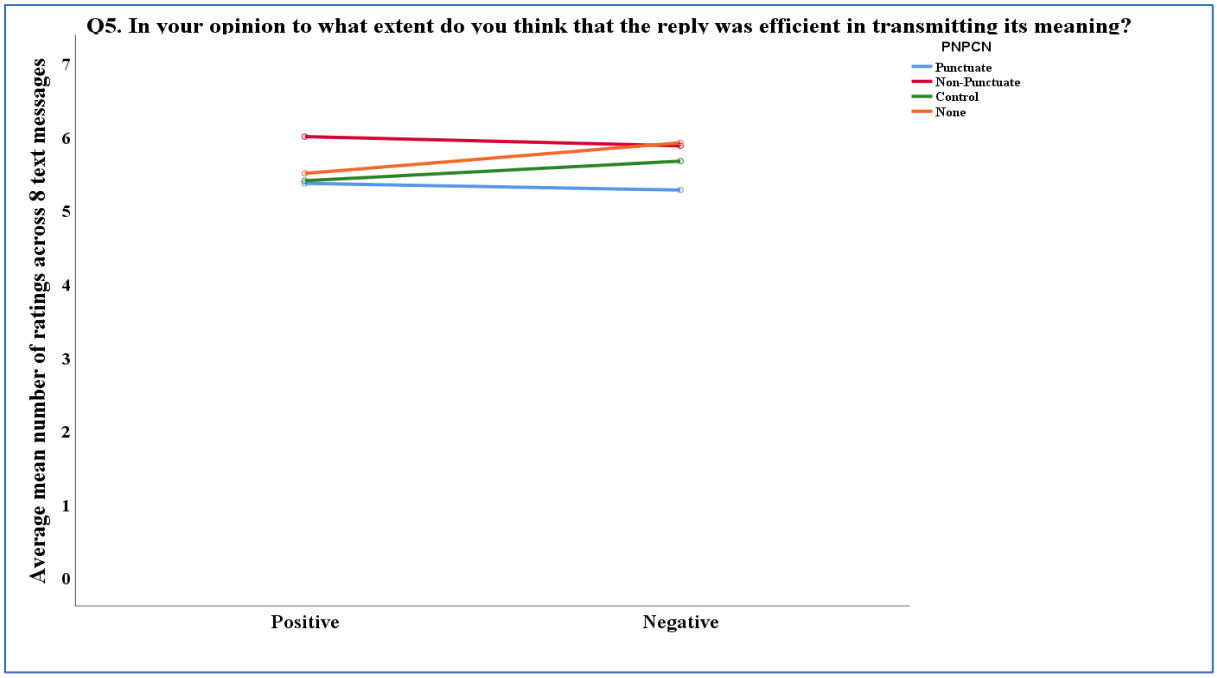


Figure 5.7 ***Considered efficient in transmitting its meaning****: The effect of face emoji on efficiency and clarity when punctuating or non-punctuating for words in positive or negative messages*

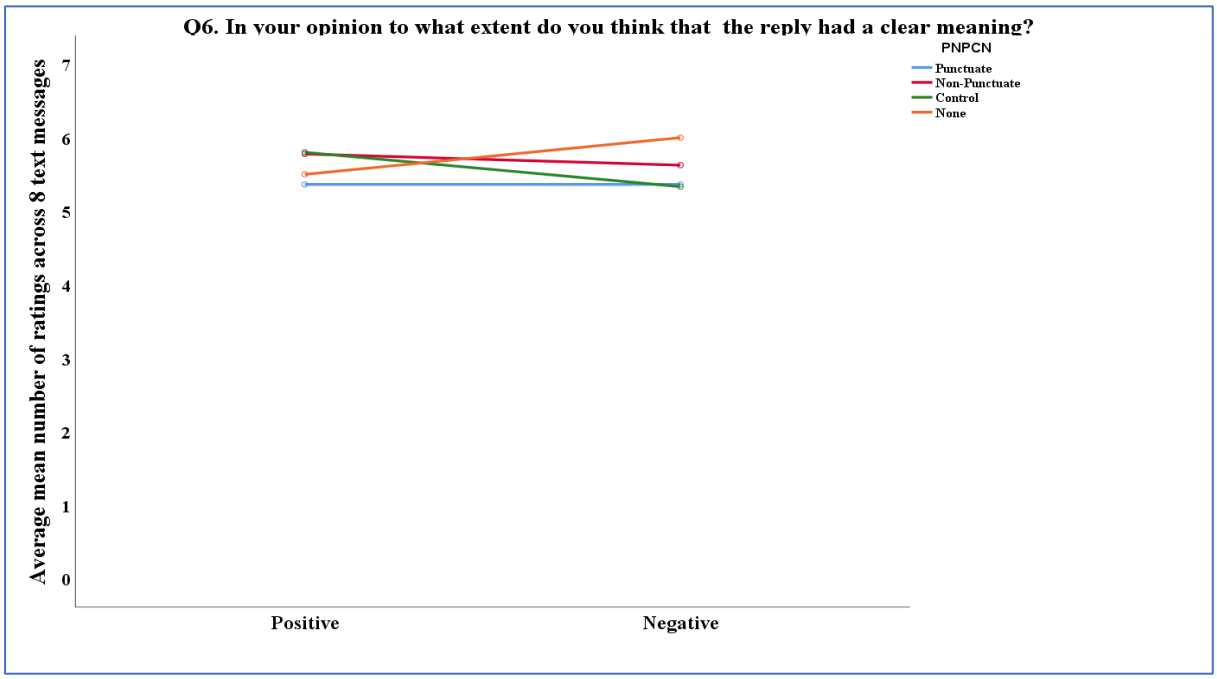


Figure 5.8 ***Considered clear in meaning****: The effect of face emoji on efficiency and clarity when punctuating or non-punctuating for words in positive or negative messages*

5.4 Discussion

The present study examined whether face emoji affect the ratings of efficiency and clarity, as well as those of rapport, when a text message was followed by an emoji or a text message was interrupted by an emoji. Based on a processing fluency account, and the findings from Rodrigues et al. (2017), it might be predicted that the use of face emoji will have a positive effect on efficiency and clarity in positive messages, but a negative effect in negative messages. However, based on the findings from Chapter 4, it might be predicted that the use of a face emoji will have no effect on efficiency and clarity, but a positive effect on the rapport measures, specifically improving the friendship and perceived positivity of the message. This experiment examined whether this would apply when emoji appeared in different sentence positions or were not present.

Regarding fluency (clarity and efficiency) the first hypothesis (H1) was that adding a face emoji will affect the ratings of efficiency and clarity, with further differences between the four emoji conditions. However, no effects of emoji type were found on these two measures. Positive messages were rated more positively overall but there was no effect of emoji on participants' ratings of efficiency in transmitting its meaning or on clarity. Message valence did not affect ratings of efficiency in transmitting its meaning and clarity in meaning.

With regards to the rapport ratings, the second hypothesis (H2) stated that adding a face emoji would increase the ratings of rapport in positive messages compared to negative messages. Further differences were predicted with the four emoji conditions, as the standard text followed by an emoji and interrupted by an emoji would generate higher ratings than the control and no emoji conditions. The results showed that ratings of interest in the friendship and improving the friendship were higher for positive messages compared to negative messages. For ratings of interest in the friendship and improving the friendship, there was no main effect of emoji conditions or interaction effect.

Hypothesis 3 was supported. There was a strong correlation of $r = 0.85$ ($p<.01$) between efficiency and clarity in meaning and these correlated moderately ($r = <.4$, $p<.01$) with the ratings of rapport. This pattern is consistent with the findings from Rodrigues et al. (2017) and while in contrast with the findings of Chapter Three, it is consistent with the findings in Chapter Four, and suggestive of a relationship between rapport and processing fluency.

Overall, the ratings on each of the dependent variables were high (see Table 5.3) and it may be that close to a ceiling effect occurred, particularly for efficiency and clarity. This is similar to the pattern seen for clarity and efficiency in Chapter 4. It may reflect the straightforward nature of the task in a between participants design, or in an online survey context. It also suggests that a more sensitive measure, such as use of reaction times, may be required.

The only emoji-related effect occurred for ratings of positivity (Q.3), with non-punctuating emoji sentences producing higher ratings of positivity overall, contrary to the hypotheses. That is, when an emoji appeared mid-sentence, participants perceived the text as being more positive. This suggest that the text that is interrupted by an emoji suggests a friendly and playful attitude irrespective of whether the text messages is positive or negative. However, of the six measures, the positivity ratings was the only one to show this effect.

The current findings suggest that face emoji are very context specific and sensitive and did not contribute significantly to a processing fluency capacity within these particular text messages, consistent with findings in Chapter Four. The findings also suggest that a more sensitive measure is needed and that perhaps the between subjects design is not conducive to revealing an effect.

A number of limitations to this study must be considered. The original intention was to record participants' reaction times accurately when reading each of the messages across all conditions. Comparing reaction times would have provided a more sensitive measures of

efficiency and clarity of meaning. At the time of conducting the experiment, the country was in lockdown due to the Covid-19 restrictions and the online platform did not allow reaction times to be recorded.

It may be possible that the format of text messages used was too short (as two 'bubbles' within a conversation) and required more by way of narrative or that participants were attending to the initial message rather than the reply as instructed. In addition, the between-participants design may have obscured differences between the conditions, as participants only saw one type of emoji (for example. e.g., '*I'm very happy today* 😂') and it may be that the task was too simplistic and may have produced some ceiling effects. Further experiments (Chapter Six and Seven) will address this issue by using a within participants design.

However, regarding processing fluency (i.e., efficiency and clarity), neither valence nor emoji type had any effect. This contrasts with Chapter 4, where positive messages were rated as being more efficient (albeit a small effect). The lack of effect and small effect for these measures likely is due to a ceiling effect in that messages attracted high ratings overall, again suggesting the need for a more sensitive measure.

With regards to the rapport ratings, the results indicated that ratings of interest in the friendship and improving the friendship were higher for positive messages compared to negative messages, with no effect of emoji type. The correlation between ratings of rapport and fluency are suggestive of an effect that might emerge under tighter controls. The following chapter explores this further.

Chapter 6

The effect of face emoji on processing fluency when presented in varying valence comparing congruent, incongruent and neutral conditions

Abstract

Findings from Chapter Five revealed that the only emoji related effect appeared for ratings of positivity with non-punctuating (i.e., interrupting) emoji sentences producing higher ratings overall. However, there was a strong relationship between efficiency and clarity in meaning and these correlated moderately with ratings of rapport, consistent with Rodrigues et al. (2017) and with findings in Chapter Four, suggesting a relationship between rapport and fluency. Chapter Six builds on the previous chapter and examines the influence of face emoji in affecting processing fluency in messages that are positive or negative in valence. Having a face emoji placed in a text message could make the message easier to understand and more believable, if a processing fluency effect occurs.

Using an online survey, 36 males and 71 females aged between 18 to 56 years old (average age 21) were assigned to a 2 (Message Valence: positive and negative) x 3 (Condition Type: Congruent, Incongruent, Neutral) repeated measures design. The order of each block was counterbalanced across the sample. Participants saw a total of twelve, randomly selected mobile screen shots. Response times were recorded for each single mobile screen shot displayed. Participants were asked to rate on a scale of 1 - 7 how understandable the message was, how believable the message was, and what the likelihood was that they would share the message. Understandability and believability were considered as measures of processing fluency. Following Rodrigues et al.'s method, as used in Chapters 3, 4 and 5, participants read four additional hypothetical text messages and rated them for: interest in the friendship; improving the friendship; efficiency in transmitting its meaning; and clarity of meaning.

Results revealed participants' reaction times when reading positive messages were faster than when reading negative messages. High ratings occurred for positive messages across all seven dependent variables contributed significantly to a processing fluency capacity. The

results showed a clear effect of processing fluency for all four fluency measures (understandability, believability, efficiency and clarity), with an interaction effect for efficiency showing an effect of congruency for positive messages. For rapport measures (i.e., improving the friendship) participants' ratings were highest for negative incongruent messages compared to congruent and neutral messages. It appears that the use of an incongruent emoji may help to soften the negative message resulting in a higher rating in that condition. With regard to the reaction times, there was no effect of emoji types, while there was an overall effect for valence with positive messages read more quickly. This supports the finding mentioned above that message valence is a crucial factor when considering fluency effects in text messages. This would suggest that perceptions of face emoji are more complex and context dependent than anticipated by the research literature.

Chapter Six

6.1 Introduction

In Chapter 5, the aim was to examine whether face emoji affected ratings of fluency (i.e., efficiency and clarity) and rapport (e.g., interest in the friendship) when standard text messages were followed by an emoji, interrupted by an emoji, contained text only or a punctuated (i.e., full stop) text message. Messages were positive and negative in valence. Results showed that the only emoji related effect appeared for ratings of positivity, with non-punctuated (i.e., interrupted) emoji sentences producing higher ratings of positivity overall, contrary to the hypothesis. However, there was a strong association between efficiency and clarity in meaning and these correlated moderately with ratings of rapport. This pattern is consistent with findings from Rodrigues et al. (2017) and while in contrast with the findings of Chapter Three, it is consistent with findings in Chapter Four, and suggests a relationship between rapport and processing fluency.

One study that examined the presence of emoji on the effect of processing fluency when applied to a 'tweet' was conducted by Daniel and Camp (2020). Participants completed an online survey where they were asked to rate on a scale of 1 to 7 (e.g., How easy was it to understand the tweet? How believable the tweet was and how likely they were to share the tweet on social media)? Daniel and Camp (2020) included understandability and believability as measures of fluency. The majority of tweets presented to participants were positive in valence and included the nine most popular emoji identified by using EmojiTracker: e.g., joy, heart, heart eyes, blow kiss, weary, OK hand, smile, unamused and pensive. (An EmojiTracker is a visualization record of all emoji symbols used on Twitter in real time.) Daniel and Camp's (2020) study created three sentence types: congruency; incongruency; and neutral. In the neutral condition, the tweet was presented without an emoji. In the congruent condition, the

message was shown with an appropriate emoji. In the incongruent condition, the tweet was shown with a mismatched emoji that conflicted with the message content. For example, in an incongruent condition, a tweet may read “Monday is looking pretty good so far” followed by a disappointed face emoji, and in the congruent condition, the tweet is followed by a smiley face with heart eyes, and the neutral condition will read “Monday is looking pretty good so far,” with no emoji.

Daniel and Camp (2020) showed that when texters use a matching emoji (i.e., congruent condition) in a tweet, readers rated the message as easier to understand and more believable. A tweet with a mismatching emoji (i.e., an incongruent condition) was rated as being more difficult to understand. Congruency also affected how participants would share the tweet on social media. Participants rated messages with a congruent emoji highest compared to messages that were neutral. In addition, Daniel and Camp (2020) hypothesised that participants who used fewer emoji were more likely to be affected by the presence of an emoji in a message and that previous experience with Twitter would affect results. These hypotheses were not supported.

The present study is an extension of the study by Daniel and Camp (2020). Where that study focused on a majority of positive Tweets, with a small selection of seven face emoji and two non-face emoji, the present study examines the effect in text messages that are positive or negative in valence. This chapter examines whether the presence of a face emoji in positive and negative text messages affects understanding and believability, comparing a congruent, incongruent, and neutral condition. A wider range of face emoji are included, and ratings scales used by Rodrigues et al. (2017) to measure rapport are included, as used in previous chapters. Where Daniel and Camp (2020) selected understandability and believability as measures of processing fluency, the present study includes two additional dependent variables (i.e., efficiency and clarity in meaning) as measures of fluency, consistent with the previous

chapters. The rapport measures are included, as in previous chapters, as emoji used in positive messages enhance rapport e.g., interest in the friendship and help to improve the friendship and affects processing fluency by helping with the interpretation of the message. Furthermore, as noted by Daniel and Camp (2020), the lack of response times as a dependent measure may have limited the conclusions drawn about fluency (Daniel & Camp 2020, p. 212). Reading times are included as a measure in the present study.

Stimuli from Daniel and Camp's (2020) study were adapted, creating positive and negative text message mobile phone screenshots for the present study. For purposes of this experiment participants took an online Qualtrics survey where messages were positive and negative in valence, and participants' response times were recorded by the Qualtrics software programme giving a 2 x 3 (positive/negative by congruent/ incongruent/ neutral) repeated measures experimental design.

6.1.1 The ease with which information can be processed

As discussed in Chapter 1, processing fluency refers to the ease or difficulty of processing information (Alter & Oppenheimer, 2009). Fluency is higher in activities we like doing, and it shapes what we trust and believe is correct (Schwarz et al. 2021). Information presented and organised in a succinct way can provide consistent and clear communication that is easy to read. Clear and reliable information can be perceived as easy and straightforward; if there is a hindrance or a 'fuzziness' interrupting the sentence the information will appear less understandable and less believable for the reader. Therefore, the clarity of that information will have an impact on that individual's reasoning and judgment (Chang, 2013).

Past research has shown that processing fluency tends to favour clear information which has measurable effects on liking, familiarity and decision making (Alter & Oppenheimer, 2009). This chapter aims to bring together the rapport management approach suggested by

Rodrigues et al. (2017) and the processing fluency account proposed by Daniel and Camp (2020). A strong relationship between ratings of rapport, clarity and efficiency in meaning is anticipated when emoji are presented in congruent messages. Where Daniel and Camp (2020) used Tweet messages, the present study examines congruent, incongruent and neutral text messages, through the lens of a processing account.

6.1.2 Visual clarity improves perceptual fluency

What is important at this point is the effortlessness and ease at which information can be processed when the information is efficient and clear in meaning. Hur, Lim and Lyu (2020) investigated participants visual appeal of an image belonging to a company's brand on Instagram. Hur, Lim and Lyu (2020) study focused on how viewers' perceived an opinion of an image belonging to a particular brand from a first-person visual perspective as it was perceived to be more effective in generating better attitudinal/behavioural outcomes rather than from a third-person visual perception. Hur, Lim and Lyu (2020) conducted two main experiments. Study 1 examined the mediating effect of imagery fluency on the relationship between visual perception and social media advertising outcomes. Study 2 verified the validity by replicating the findings of Study 1 using a different product, stimuli, and participants. Hur, Lim and Lyu (2020) found that participant's memory recall was much quicker coming from a first-person perspective, than when the brand image was presented from a third persons viewpoint. Moreover, Hur, Lim and Lyu (2020) found that by increasing visual clarity this will improve perceptual fluency for the observer which in turn increases familiarity and liking towards the image and positive attitudes.

This in turn would indicate images that are easy and straightforward to perceive can be regarded as ascetically pleasing and generate more familiarity and positivity for the observer. Daniel and Camp (2020) suggested that differences between positive and negative valence information can moderate the effect of processing fluency (p.211). Emoji are ascetically

pleasing therefore text messages containing emoji compared to neutral messages are found to be more user friendly and they have an increase in likability (Fontein, 2017). Taken that emoji may have a processing fluency effect in social media messages (see Daniel & Camp 2020), they can play a role in influencing a connection between sender and receiver and maintain a rapport given the relationship between rapport and processing fluency found in Chapter Three and Chapter Four.

6.1.3 Easy-to-process information may be increased by emoji

Emoji are frequently used in positive messages to increase the understanding or relationship and also affect processing fluency by helping with the interpretation of the text message. If not, the less information processed the more time and effort to understand which can lead to uncertainty, hence the ambiguity (Walther & D'Addario, 2001). It might be predicted that a text message followed by a mismatched face emoji will be more cumbersome to read and appear not to facilitate comprehension. So, the inference of deciding to include an emoji in a sentence requires an undertaking of matching the word and recognition for the sender and the receiver to understand and believe in the text-based messages integrity. So, it is predicted that the ease with which information is processed, liking and familiarity will mediate the connection between processing fluency and maintain a rapport. On the other hand, a message may hold a certain valence (hedonic tone) that will persuade people to change their behaviour (Steinert et al. 2022). This would imply that the valence of the message could moderate the effect of the emoji in participants interpretation of the message which is becoming obvious given the findings from Chapter 3 and Chapter 4, which show positive messages attracted higher ratings and were perceived to be efficient in transmitting it meaning regardless of emoji presence.

6.1.4 The present study

The purpose of this experiment is to examine how face emoji affect processing fluency when presented in the format of message, varying valence (i.e., positive and negative message) and sentence type (Congruent, Incongruent and Neutral conditions).

The hypotheses for the present study are:

H1: adding a corresponding face emoji that matches with a text message (i.e., congruent) will increase ratings of ease of understanding, believability, efficiency and clarity in positive messages compared to negative messages. Further differences might be predicted between congruency types, with neutral but not an incongruent type producing higher ratings.

H2: adding a non-corresponding face emoji that is mismatched with a text message (i.e., incongruent), will decrease ratings of ease of understanding, believability, efficiency and clarity. Further differences might be predicted between congruency types, with neutral and congruent types having higher ratings than the incongruent type, and between positive messages compared to negative messages.

H3: Ratings of rapport (interest, improving the friendship) will be higher in positive messages with congruent emoji.

H4: there will be a relationship between the ratings of rapport and ease of understanding, believability, and efficiency and clarity.

6.2 Methodology

6.2.1 Participants

A total of 107 participants (71 females, 36 males, aged 18 to 56 years, M =21.56, SD = 5.055) completed the experiment. All participants were fluent in English. Participants were recruited online through a Qualtrics hyperlink posted to mailing lists and posts on social networks sites

(e.g., Facebook, Twitter). In addition, participants were invited from the psychology department's participant pool. This pool consisted of undergraduate and postgraduate students who at the start of the year expressed interest in conducting psychological research during the academic year.

6.2.2 Materials

The study was delivered using a Qualtrics survey platform. Participants consented and agreed to take part in the online survey. Tweets from Daniel and Camp's (2020) study were adapted into positive and negative text message mobile phone screenshots. Each message was adapted so that there was a positive and negative version (see Figure 6.1 and 6.2 for an example). Face emoji used in each of the mobile screen shots were taken from the experimenter's pre-existing emoji database that were provided by the participants in Experiment 1. Each of the 12 (i.e., six positive and six negative) individual messages were presented in congruent, incongruent and neutral condition (see Figure 6.1, 6.2), with participants seeing a particular message only once.

6.2.3 Design

This study used a 2 (Message Valence: positive and negative) x 3 (Condition Type: Congruent, Incongruent, Neutral) repeated measures experimental design.

Table 6.1 Gender breakdown of participants 12 randomised individual messages presented in congruent, incongruent and neutral conditions.

N=107	2 x Pos and 2 x Neg	2 x Pos and 2 x Neg	2 x Pos and 2 x Neg
	Congruent	Incongruent	Neutral
Male	36	36	36
Female	71	71	71
Total	107	107	107

6.2.4 Procedure

Participants completed the experiment in their own time, having followed a link to the Qualtrics platform. They provided consent by indicating that they were over the age of 18 years and by clicking on the "I agree to participate" button on the survey. Participants were required to fill in a series of demographic questions (e.g., age, gender, academic status, frequency of texts, and two questions relating to how participants send and receive emojis in their written communication). Unlike early chapters of this thesis, where data collection was in person, no text messages were collected here, because of the online data collection method, as the pilot study (n=5) had shown that participants were not happy to complete this section of the task due to the time commitment. After participants agreed to participate and consented to move forward in the survey, a set of instructions were displayed. Upon clicking on the "I have read and understood the instructions clearly and happy to proceed," the survey randomly assigned each participant such that stimuli were counterbalanced within a within subjects design. Order of presentation was randomised by the software.

Participants were informed that they would be exposed to a series of mobile screen shots. These trials consisted of 6 positive (2 x congruent, 2 x incongruent, 2 x neutral) and 6 negative (2 x congruent, 2 x incongruent, 2 x neutral) text messages (see Appendix K and L). Ratings and reaction times were recorded.

Each participant had a practice trial to familiarise themselves with the screen layout. The practice trial had no emoji, only plain scripted text in order to avoid a biasing effect on the results. Participants were instructed that their responses in the practice trial and in the subsequent text messages (screenshots) would be timed, that is that their reading of the messages was timed. Response time measures began when text messages (i.e., stimuli) were displayed to participants online. Response times were measured once the participant indicated

by button press that they were ready to proceed to indicate on a 7-point Likert scale their responses to seven questions in relation to the text message.

Participants were presented with the twelve text messages and for each message were asked to indicate on a 7-point Likert scale their responses to the following questions. The following three questions were taken from Daniel and Camp (2020): “How easy was it to understand the message?” “How believable was the text message”, and “What is the likelihood that you would share this message ?” before moving on to the next text message displayed.

The following two questions were taken from Rodrigues et al. (2017), as used in Chapters 3, 4, and 5: ‘‘Do you think the person is interested in the friendship?” (1 = Not interested at all, 7 = Very interested), ‘‘Do you think this reply helps to improve the friendship?” (1 = This definitely does not help, 7 = This definitely helps).

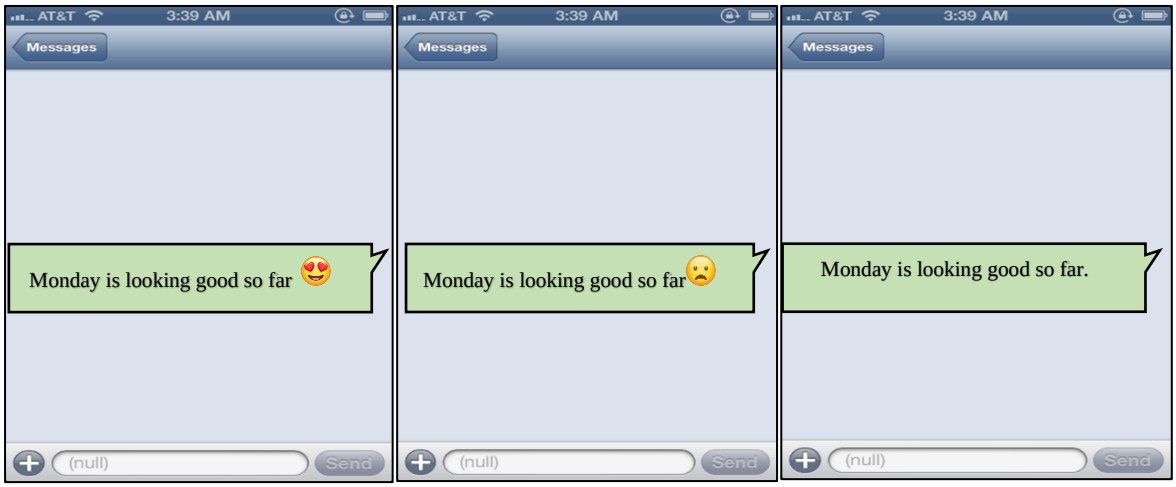
In addition, as in Rodrigues et al. (2017), participants were asked to rate each message on the following questions: “In your opinion to what extent do you consider the reply was efficient in transmitting its meaning?”, and ‘‘To what extent do you consider the reply had a clear meaning?”. (1 = Not at all, 7 = A lot). Ease of understanding and believability were used as measures of processing fluency, as used in Daniel and Camp (2020) and in addition, ratings of efficiency and clarity were included as measures of processing fluency, consistent with the previous chapters.

Once participants had rated each text conversation using the rating scales, a screen appeared thanking participants and some brief debriefing information was presented.

6.2.5 Ethical Considerations

The University Research Ethics Committee approved the research, both for in person data collection (pre Covid-19) and separately for the online survey method. Participants were informed from the outset that the experiment was involved the perception of social media

communication. No identifiable data were used during the course of this research; the Qualtrics survey was anonymous. After the experiment ended a short debriefing session highlighted the objectives of the study and participants were informed of the research questions.



1. Positive Congruent 2. Positive Incongruent 3. Positive Neutral

Figure 6.1 Positive message with face emoji in a congruent, incongruent and neutral condition.

1. Negative Congruent 2. Negative Incongruent 3. Negative Neutral

Figure 6.2 Negative message with face emoji in a congruent, incongruent and neutral condition.

6.3 Results

Data consisted of participants' response times when reading the text messages and their ratings on each of the 7 questions that followed: understandability; believability; shareability; perceived interest; improving the friendship; efficiency; and clarity in meaning. For each of the dependant variables, data were entered into a 2 x 3 (Message Valence: Positive and Negative x Congruency Type: Congruent, Incongruent, and Neutral) within subjects analysis of variance.

6.3.1 Response Times

Table 6.2 presents a summary of participants' response times when reading the text messages. Reaction times when reading the positive messages were faster than when reading the negative messages. A 2 x 3 repeated measures analysis of variance was conducted to determine whether the differences between conditions were statistically significant.

Table 6.2 Response times in seconds per message, by condition (N = 107)

Stimuli Type	Valence	R.T (in Secs) M (SD)	R.T (in Secs) Min	R.T (in Secs) Max
Congruency	Positive	6.35 (2.99)	1.45	18.15
Incongruency	Positive	7.57 (3.98)	1.70	21.88
Neutral	Positive	7.04 (3.74)	1.48	17.96
Congruency	Negative	7.87 (5.50)	1.44	30.96
Incongruency	Negative	8.23 (4.76)	1.55	27.11
Neutral	Negative	8.04 (6.18)	1.22	45.94

Results showed that the interaction effect between valence and congruency was not statistically significant, F (2, 212) = 1.041, p = .35. There was no main effect for congruency, F (2, 212) = 1.818, p = .17. There was a statistically significant main effect for message valence, F (1, 106) = 9.600, p =.002, n^2_p = .08. Participants' responses were faster for positive messages compared to the negative messages overall (M = 8.23, SD = 4.76 as against M= 6.35, SD =2.99).

Data are summarised in Figure 6.3.

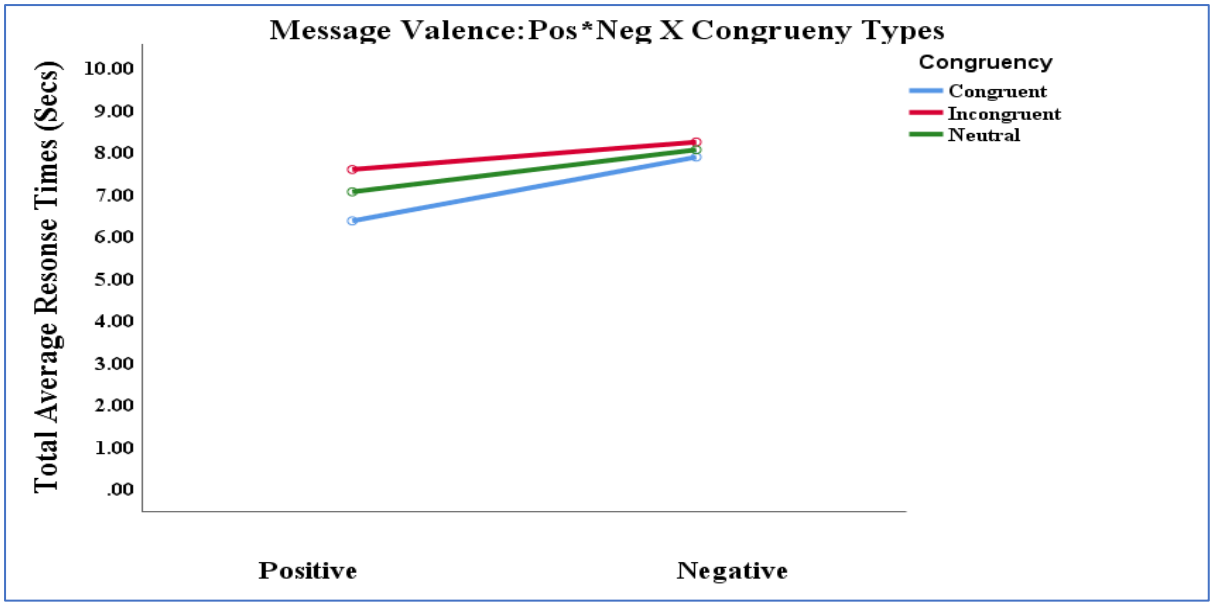


Figure 6.3 R.T (in seconds) for positive and negative messages for congruent, incongruent, and neutral conditions

6.3.2 Ratings

Table 6.3 presents a summary of participants' ratings of the text messages for each of the 7 Likert scale items. These will be analysed separately. For each of the ratings, data were entered into a 2 x 3 (Message Valence: Positive and Negative x Congruency Type: Congruent, Incongruent, and Neutral) repeated measures analysis of variance.

Table 6.3 Summary of participants' ratings of the text messages for each of the 7 Likert scale items

Stimuli Type	Valence	Understand	Believe	Share	Interest	Improve	Efficiency	Clarity
Congruency	Positive	6.25 (1.0)	5.7 (1.2)	5.3 (1.1)	5.7 (1.2)	5.2 (1.1)	5.7 (1.2)	5.7 (1.1)
Incongruency	Positive	5.61 (1.2)	5.0 (1.4)	4.8 (1.3)	5.1 (1.2)	4.6 (1.3)	4.8 (1.4)	4.9 (1.5)
Neutral	Positive	5.8 (1.2)	5.0 (1.7)	5.1 (1.4)	5.1 (1.3)	4.8 (1.3)	5.1 (1.4)	5.1 (1.5)
Congruency	Negative	5.7 (1.3)	5.1 (1.5)	4.7 (1.8)	4.0 (1.6)	3.6 (1.6)	4.9 (1.4)	5.1 (1.4)
Incongruency	Negative	5.39 (1.3)	4.7 (1.3)	4.0 (1.4)	3.99 (1.4)	4.0 (1.1)	4.4 (1.3)	4.5 (1.4)
Neutral	Negative	5.64 (1.28)	5.0 (1.3)	4.0 (1.4)	3.7 (1.5)	3.2 (1.4)	4.9 (1.3)	5.0 (1.4)

Table 6.4 Summary of participants' ratings by sentence type from each of the 7 Likert scale items.

Stimuli Type	Understand	Believe	Share	Interesting	Improve	Efficient	Clarity
Congruency	6.0 (1.2)	5.4 (1.4)	4.7 (1.5)	4.9 (1.5)	4.5 (1.4)	5.40 (1.3)	5.50 (1.3)
Incongruency	5.5 (1.3)	4.9 (1.4)	4.5 (1.4)	4.6 (1.4)	4.40 (1.2)	4.70 (1.4)	4.70 (1.5)
Neutral	5.7 (1.3)	5.0 (1.6)	4.6 (1.4)	4.4 (1.5)	4.10 (1.4)	5.0 (1.4)	5.10 (1.5)

Table 6.5 Main Effects: Positive Vs Negative

Stimuli Type	Understand	Believe	Share	Interested	Improve	Efficient	Clarity
Positive	5.9 (1.2)	5.3 (1.5)	5.1 (1.3)	5.4 (1.3)	4.94 (1.30)	5.3 (1.4)	5.26 (1.41)
Negative	5.6 (1.3)	5.0 (1.4)	4.1 (1.6)	3.9 (1.6)	3.65 (1.46)	4.8 (1.4)	4.90 (1.45)

An analysis of variance was conducted in order to examine the influence of two IVs (Valence: Positive/ Negative; and sentence type: Congruent-Incongruent-Neutral) on the seven dependent variables. Each of these DVs are analysed separately in what follows.

Q1. How easy was it to understand the message?

Table 6.3 presents a summary of participants' ratings of the text messages for understandability. The analysis of variance revealed no interaction effect for valence x congruency, F (2, 212) =1.92, p = .15. A main effect of message valance was found, F (1, 106) =11.702, p < .001, n^2_p = .10 (small effect size). Ratings of understandability were higher for positive messages (M = 5.9, SD = 1.2) compared to negative messages (M = 5.6, SD = 1.3). A main effect for congruency was also found, F (2, 212) =7.324, p < .001, n^2_p = .07, in the predicted direction. Post-hoc comparisons using the Tukey LSD test indicated that understandability of the text messages was rated highest for congruent messages (M = 6.0, SD = 1.2) compared to incongruent (M = 5.5, SD = 1.3), p <.01 and neutral messages (M = 5.7, SD

= 1.3). Ratings for understandability were rated higher for the neutral messages compared to incongruent messages, p<.01 (See Figure 6.4).

Q2. How believable was the text message?

Table 6.3 presents a summary of participants' ratings of the text messages for believability. The analysis of variance revealed no interaction effect for valence x congruency, F (2, 212) = 2.323, p = .100. A main effect of message valance was found, F (1, 106) = 8.868, p =.004, n^2_p = .08 (very small effect size). Ratings of believability were significantly higher for positive messages (M = 5.3, SD = 1.5) compared to negative messages (M = 5.0, SD = 1.4). A main effect for congruency was also found, F (2, 212) = 8.939, p < .001, n^2_p = .08, in the predicted direction. Post-hoc comparisons using the Tukey LSD test indicated that believability of the text messages was rated highest for congruent messages (M = 5.4, SD = 1.4) compared to incongruent (M = 4.9, SD = 1.4, p <.001). Ratings for believability were rated higher for neutral messages (M = 5.0, SD = 1.6, p <.002) compared to incongruent messages. There was no difference between ratings for incongruent and neutral messages p = .88 (See Figure 6.5).

Q3. What is the likelihood that you would share this message?

Table 6.3 presents a summary of participants' ratings of the text messages for shareability. The analysis of variance revealed no interaction effect for valence x congruency, F (2, 212) = 1.260, p = .286. A main effect of message valance was found, F (1, 106) = 117.010, p <.001, n^2_p = .52 (moderate effect size). Ratings of shareability were higher for positive messages (M = 5.1, SD = 1.3) compared to negative messages (M = 4.1, SD = 1.6). A main effect for congruency was not found, F (2, 212) =1.472, p > .23. (Figure 6.6).

Q4. Do you think the person is interested in the friendship?

Table 6.3 presents a summary of participants' ratings of the text messages for interest in the friendship. Analysis of variance revealed a statistically significant interaction effect for Valence x Congruency, F (2, 212) = 3.694, p < .026, $n^2_{p,=}$ .34 (small effect size). Ratings differed for the congruency conditions as a function of whether the message was positive or negative. Ratings were highest in the congruent condition, but only when the message was positive. For negative messages, congruency had no effect. There was a main effect for valance, F (1, 106) = 218.000, p < .001, $n^2_{p,=}$ .67 (moderate effect size) reflecting higher ratings for positive compared to negative messages overall. There was also a main effect for congruency F (2, 212) = 5.248, p = .006, $n^2_{p,=}$ .05 (very small effect size). These are interpreted in light of the significant interaction effect. Post-hoc comparisons using the Tukey LSD test indicated that interest in the friendship was rated highest for positive congruent messages (M = 5.79, SD = 1.28) compared to incongruent (M = 5.11, SD = 1.25), p <.001 and neutral messages (M = 5.18, SD = 1.35) p <.002. There were no group differences for ratings of interest in the friendship between positive incongruent and neutral messages. For negative congruency conditions there were no differences overall (See Figure 6.7).

Q5. Do you think this reply helps to improve the friendship?

Table 6.3 presents a summary of participants' ratings of the text messages for improvement of the friendship. Analysis of variance revealed a statistically significant interaction effect for Valence x Congruency, F (1.826,193.584) = 13.065, p = .001, $n^2_{p,=}$ .11 (small effect size). As Mauchly's' test indicated that the assumption of sphericity had been violated, therefore degrees of freedom were corrected using Huynh-Feldt estimates of sphericity (ε = .91). As Figure 6.8 shows, ratings differed for the congruency conditions as a function of whether the message was positive or negative. There were also significant main effects. There was a main

effect for valance, F (1, 106.000) = 149.773, p < .001, $n^2_{p,=}$ .60 (moderate effect size) reflecting higher ratings for positive (M = 4.94, SD =1.30) compared to negative (M = 3.65, SD = 1.40) messages overall. The results also showed there was a main effect for congruency F (1.877,198.996), = 5.453, p < .006, n^2_p = .50 (moderate effect size).

Post-hoc comparisons using the Tukey LSD test indicated that helping to improve the friendship was rated higher for positive congruent messages (M = 5.26, SD = 1.18) compared to incongruent (M = 4.69, SD = 1.33), p <.001 and neutral messages (M = 4.87, SD = 1.37) p<.001. Though the mean ratings showed no differences among positive incongruent and neutral messages, p >.32. For negative congruency conditions, there were no differences between negative congruent and neutral messages, p >.10. Ratings of improving the friendship were highest for negative incongruent (M =4.02, SD = 1.12) compared to congruent (M = 3.63, SD = 1.62) and neutral (M = 3.29, SD =.141), p<.001.

Q6. To what extent do you consider the message was efficient in transmitting its meaning?

Table 6.3 presents a summary of participants' ratings of efficiency in transmitting meaning. The analysis of variance revealed an interaction effect between PosNeg*Congruency F (2,212) = 3.251, p < .04, n^2_p = .30 (small effect size). As Figure 6.9 shows, ratings differed for the congruency conditions as a function of whether the message was positive or negative in ratings of efficiency in transmitting its meaning. There was a main effect for message valence F (1,106) = 22.590, p <.001, n^2_p = .18 (small effect size) with positive messages rated higher overall. There was a main effect for congruency F (2,212) = 13.741, p < .001, n^2_p = .12 (small effect size) which is interpreted in light of the significant interaction effect.

Post-hoc comparisons using the Tukey LSD test indicated that ratings were highest for positive congruent messages (M = 5.78, SD = 1.21) compared to incongruent (M = 4.88, SD = 1.48), p<.001 and compared to neutral messages (M = 5.16, SD = 1.46) p <.002. The mean ratings for efficiency showed no differences for incongruent messages compared to negative

neutral messages, p =.12. Negative congruent (M= 4.98, SD = 1.46) messages were rated higher compared to negative incongruent messages (M = 4.43, SD =1.36), p < .001. However, negative neutral (M = 4.90, SD = 1.35) messages were rated higher compared to incongruent (M = 4.43, SD = 1.36) messages, p< .007. There were no group differences between negative congruent and neutral messages, p >.61.

Q7. To what extent do you consider the reply had a clear meaning?

Table 6.3 presents a summary of participants' ratings of the text messages clear in meaning. The analysis of variance revealed no interaction effect between PosNeg*Congruency, F (2,212) = 2.412, p < .09. A main effect of message valence was found F (1,106) = 11.693, p < .001, n^2_p = .10 (small effect size). Ratings of clarity in meaning were higher for positive messages (M = 5.3, SD = 1.4) compared to negative messages (M = 4.9, SD = 1.5). A main effect for congruency was found, F (2,212) = 12.990, p < .001, n^2_p = .11(small effect size) in the predicted direction. Post-hoc comparisons using the Tukey LSD test indicated that ratings for clarity were rated highest in the congruent (M = 5.50, SD = 1.33) messages compared to an incongruent messages (M = 4.72, SD =1.46, p < .005). There were no differences between incongruent and neutral messages, p >.26 (see Figure 6.10).

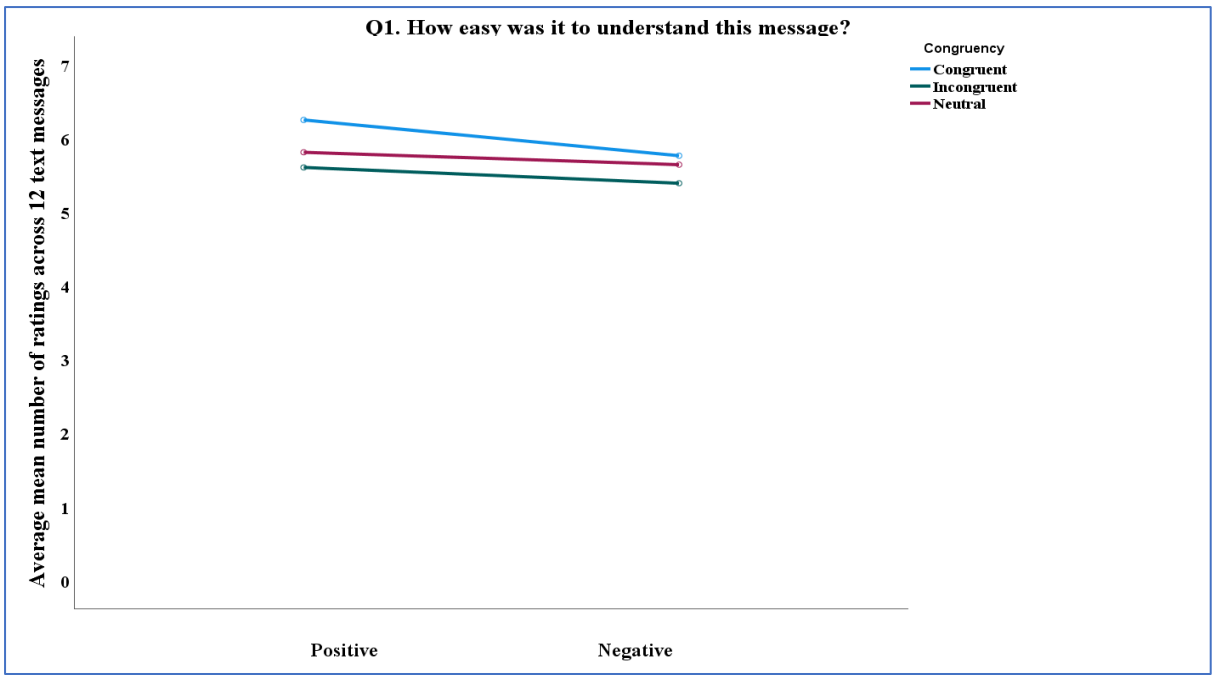


Figure 6.4 ***Understandability*** *- represent Positive*Negative ratings for congruency, incongruency and neutral conditions, plus Likert scale ratings for each of the 7 dependent variables displayed.*

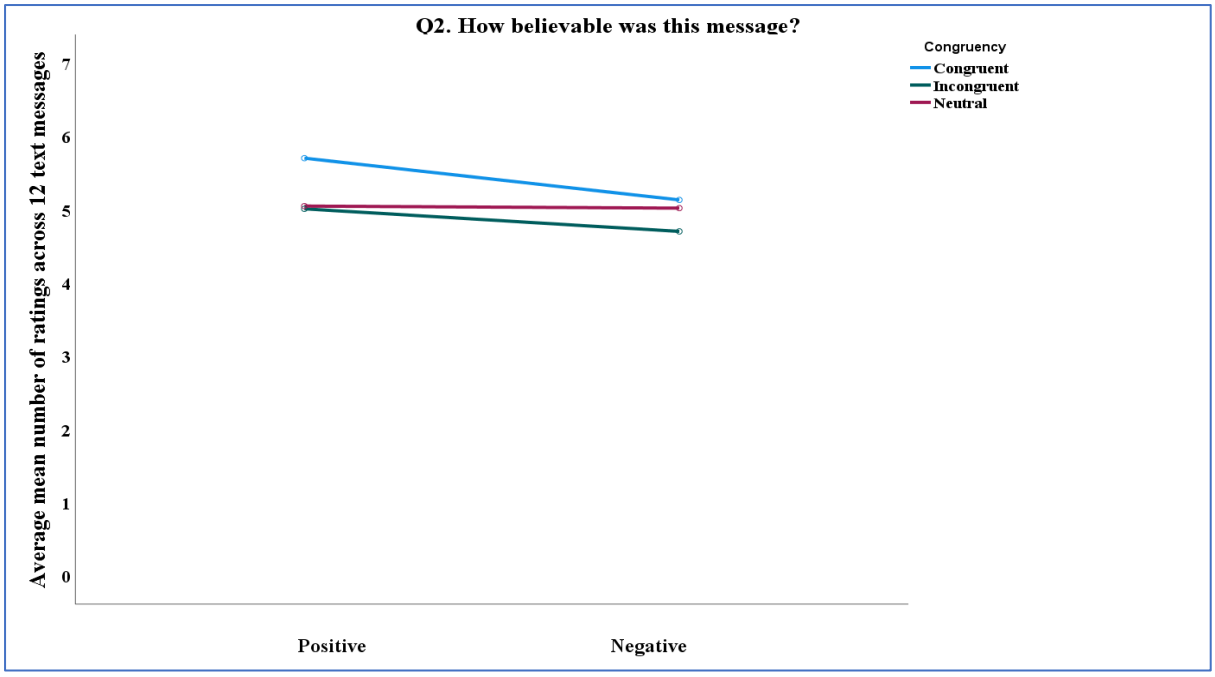


Figure 6.5 - ***Believability*** *- represent Positive*Negative ratings for congruency, incongruency and neutral conditions, plus Likert scale ratings for each of the 7 dependent variables displayed.*

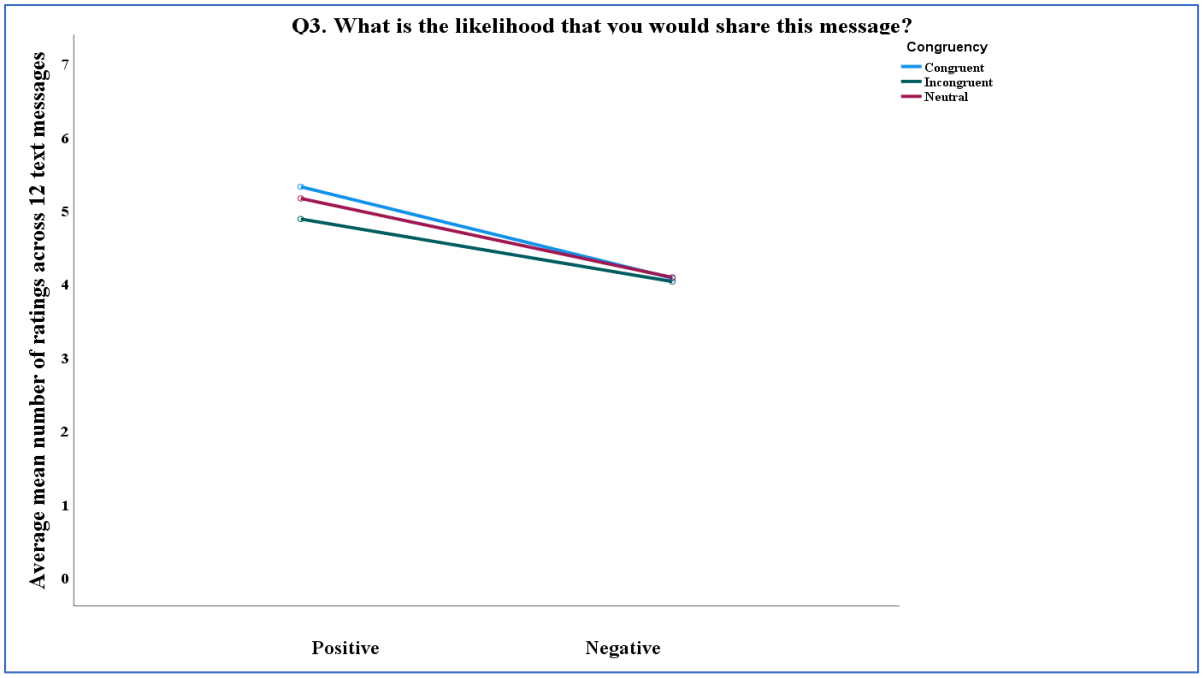


Figure 6.6 - ***Shareability*** *- represent Positive*Negative ratings for congruency, incongruency and neutral conditions, plus Likert scale ratings for each of the 7 dependent variables displayed*

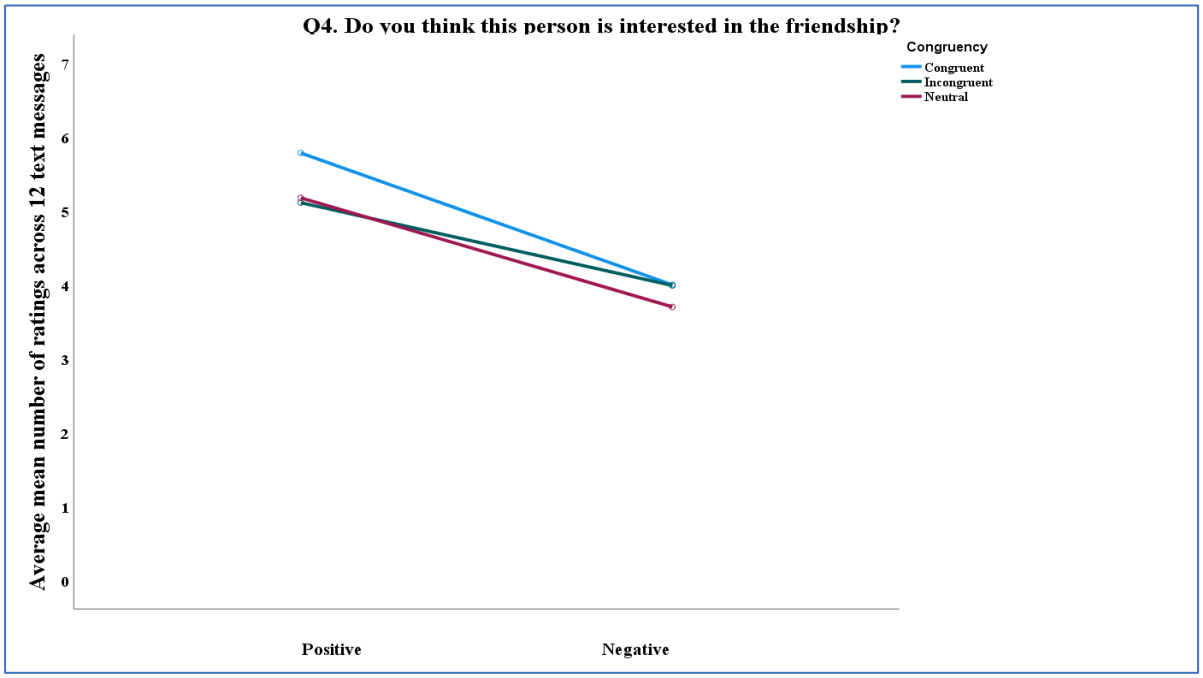


Figure 6.7 - ***Interested in the friendship*** *- represent Positive*Negative ratings for congruency, incongruency and neutral conditions, plus Likert scale ratings for each of the 7 dependent variables displayed*

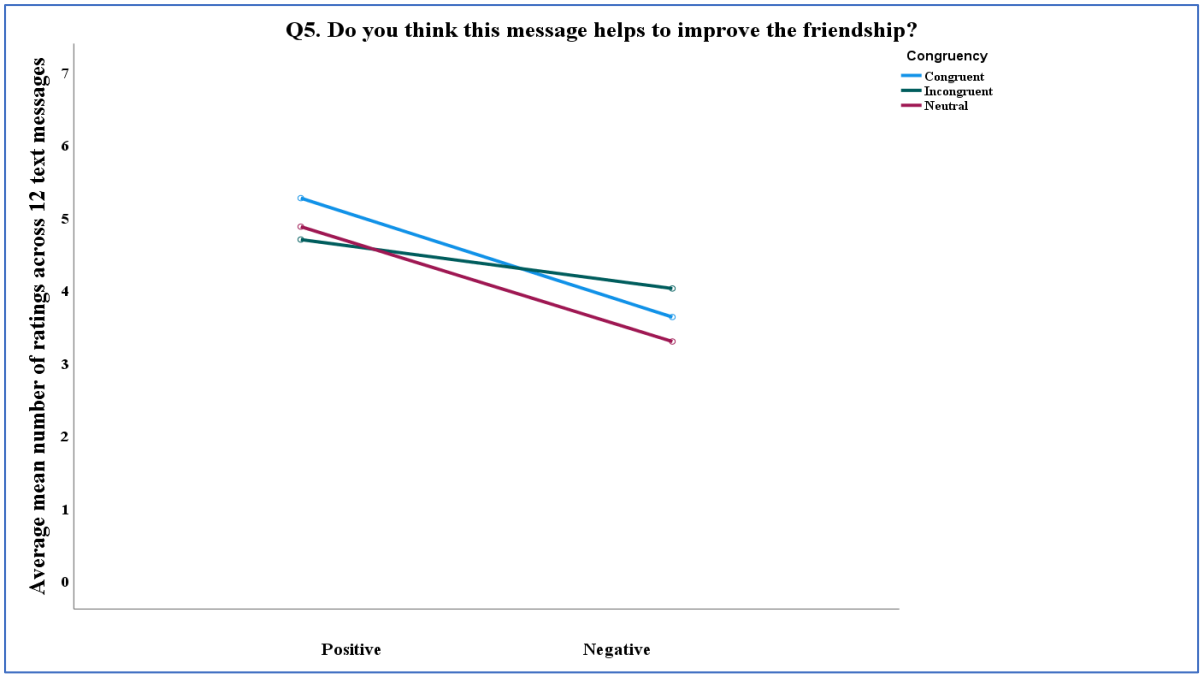


Figure 6.8 - ***Helps to improve the friendship*** *- represent Positive*Negative ratings for congruency, incongruency and neutral conditions, plus Likert scale ratings for each of the 7 dependent variables displayed*

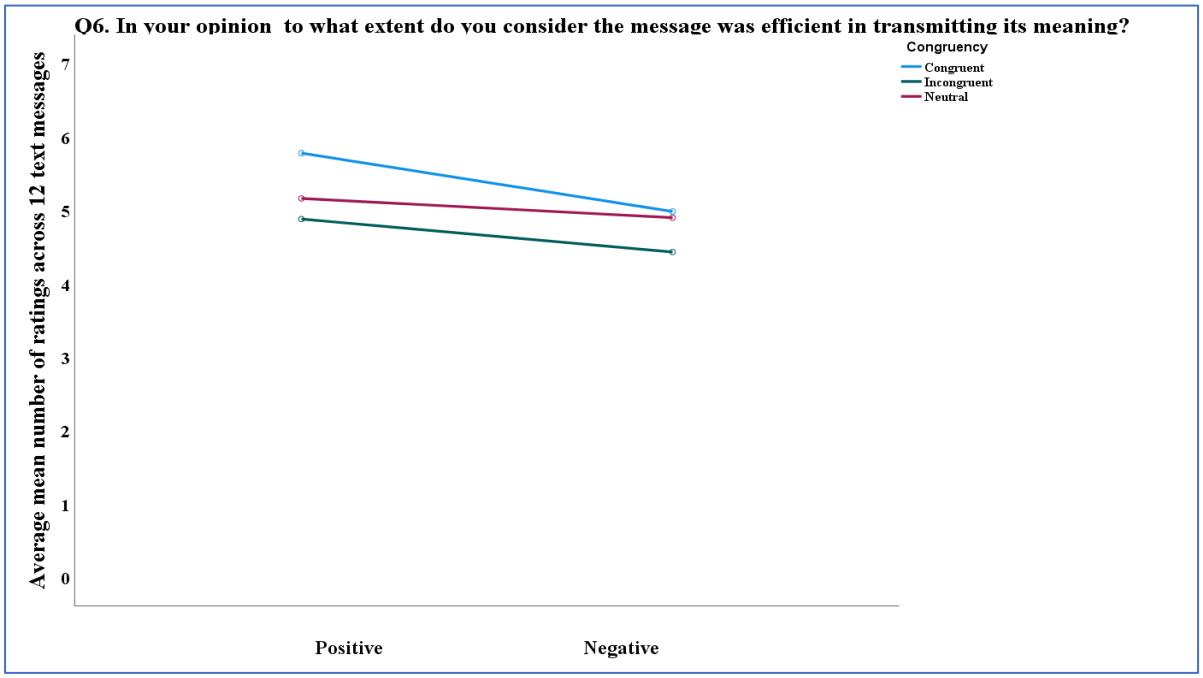


Figure 6.9 - ***Efficient in transmitting its meaning*** *- represent Positive*Negative ratings for congruency, incongruency and neutral conditions, plus Likert scale ratings for each of the 7 dependent variables displayed*

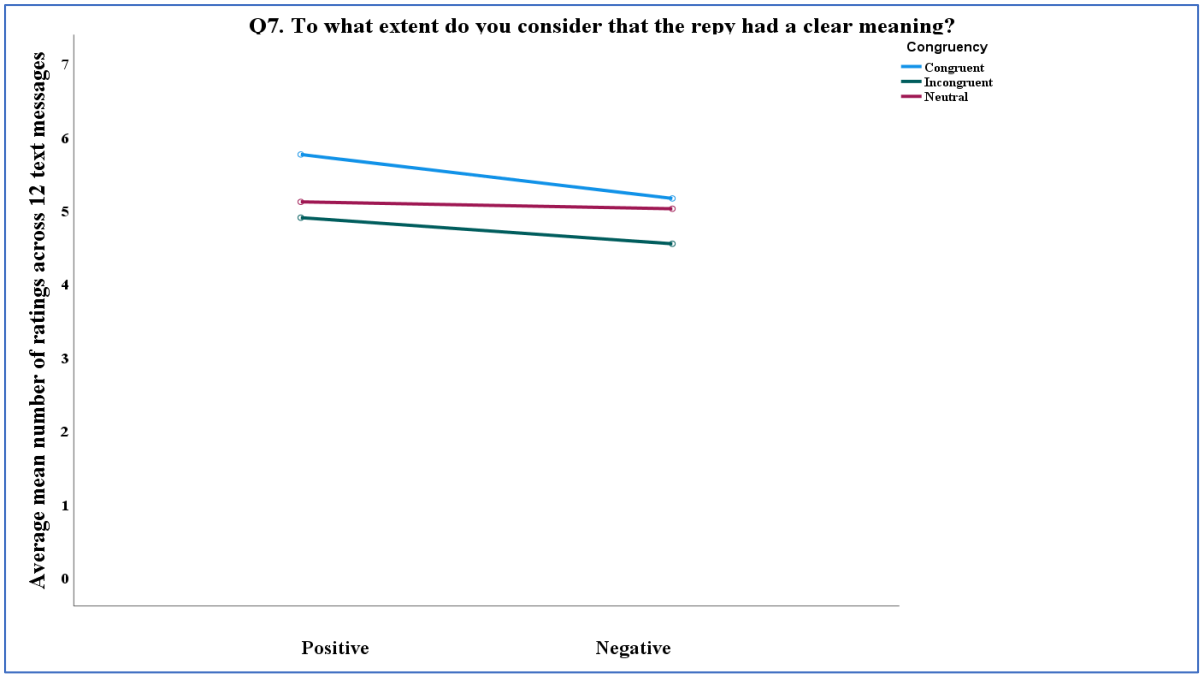


Figure 6.10 - ***Clear in meaning*** *- represent Positive*Negative ratings for congruency, incongruency and neutral conditions, plus Likert scale ratings for each of the 7 dependent variables displayed*

6.3.3 Bivariate Correlational analysis

Bivariate correlational analyses across seven dependent variables.

Table 6.6 Bivariate Correlations for seven ratings – Congruency Type.

	Means	Std.Dev	1	2	3	4	5	6	7
1.Understandability	5.88	1.05	1						
2.Believability	5.27	1.08	**.752****	1					
3.Shareability	4.48	1.21	.543**	.613**	1				
4.Interested	4.69	1.16	.474**	.455**	.677**	1			
5.Improving	4.23	1.11	.444**	.457**	.753**	**.802****	1		
6.Efficient	5.20	1.08	.704**	.659**	.626**	.569**	.588**	1	
7.Clarity	5.30	1.09	.750**	.710**	.523**	.432**	.449**	**.791****	1

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6.7 Bivariate Correlations for seven ratings –Incongruency Type.

	Means	Std.Dev	1	2	3	4	5	6	7
1.Understandability	5.25	1.03	1						
2.Believability	4.64	1.08	**0.087**	1					
3.Shareability	4.22	1.09	0.119	.725**	1				
4.Interested	4.26	1.02	0.008	.460**	.645**	1			
5.Improving	4.11	.949	.279**	.427**	.467**	**.696****	1		
6.Efficient	4.44	1.15	0.116	.667**	.613**	.429**	.372**	1	
7.Clear	4.48	1.19	0.101	.698**	.607**	.461**	.436**	**.862****	1

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6.8 Bivariate Correlations for seven ratings –Neutral Type

	Means	Std.Dev	1	2	3	4	5	6	7
1.Understandability	5.58	1.13	1						
2.Believability	4.92	1.21	**.652****	1					
3.Shareability	4.4	1.16	.618**	.651**	1				
4.Interested	4.24	1.17	.448**	.415**	.685**	1			
5.Improving	3.85	1.12	.464**	.503**	.746**	**.866****	1		
6.Efficient	4.8	1.17	.727**	.618**	.589**	.511**	.533**	1	
7.Clear	4.90	1.27	.715**	.523**	.516**	.395**	.388**	**.828****	1

**. Correlation is significant at the 0.01 level (2-tailed).

Bivariate correlational analysis were used to explore the overall relationship of the two IVs (Message Valence: Positive-Negative; Sentence types: Congruent, Incongruent and Neutral) on the seven dependent variables (Table 6.6, 6.7 and 6.8).

Congruency Type: The dependent variables of relevance to understandability and believability (Q1and Q2) correlated highly with each other (r=.75) and with ratings of shareability, interested in the friendship and improving the friendship (see Table 6.6). The dependent variables of relevance to rapport (Q4 and Q5) correlated highly with each other. Perceived interest in the friendship - correlated strongly with perceived help to improve friendship (r = .80). There is a strong relationship between perceived clarity in meaning and efficiency for congruency sentence types (Q6 and Q7; r = .79). This suggests that overall, ratings of efficiency and clarity correlated highly with each other and with the other variables. The ratings of relevance to rapport (Q4 and Q5) are correlated with those measuring processing fluency (Q6 and Q7; r = .57, .43, .59, .50, p <.01) for a congruency sentence type.

Incongruency Type: The dependent variables of relevance to understandability and believability (Q1and Q2) did not correlate with each other and across the remaining four dependent variables except for helping to improve the friendship (r = 28). (see Table 6.7). The dependent variables of relevance to rapport (Q4 and Q5) correlated highly with each other. Perceived interest in the friendship - correlated strongly with perceived help to improve friendship (r = .70). There is a strong relationship between perceived clarity in meaning and efficiency for incongruency sentence types (Q6 and Q7; r = .86). The ratings of relevance to rapport (Q4 and Q5) are correlated with those measuring processing fluency (Q6 and Q7; r = .43, .46, .37, .44, p <.01) for an incongruency sentence type.

Neutral Type: The dependent variables of relevance to understandability and believability (Q1and Q2, r = .65) correlated with each other and across the remaining five dependent variables (see Table 6.8). The dependent variables of relevance to rapport (Q4 and Q5) correlated highly with each other. Perceived interest in the friendship - correlated strongly with perceived help to improve friendship (r = .87). There is a strong relationship between perceived clarity in meaning and efficiency for neutral sentence types (Q6 and Q7; r = .83). Finally, the ratings of relevance to rapport (Q4 and Q5) are correlated with those measuring processing fluency (Q6 and Q7; r = .51, .40, .53, .39, p <.01, respectively) for a neutral sentence type.

6.4 Discussion

The present study examined whether the presence of a face emoji affects understanding and believability, comparing sentence types, i.e., congruent, incongruent, and neutral, in positive and negative text messages. Based on a processing fluency account, it would be predicted that the use of a face emoji will have an effect on processing fluency and rapport with higher ratings for positive messages compared to negative messages and higher ratings when the messages are congruent. However, incongruent messages may create more uncertainty as they may come across as difficult to read, and therefore decrease fluency compared to neutral messages with no emoji.

In Chapter 5, regarding processing fluency (i.e., efficiency and clarity) neither valence nor emoji type had any effect. This contrasts with findings from Chapter 4, when positive messages were rated more efficient, even though there was a small effect. However, based on the findings from Chapter 5, it might be predicted that the use of a face emoji will have no effect on efficiency and clarity but a positive effect on the rapport measures specifically interested in the friendship and improving the friendship. This experiment examined whether

this would apply when the presence of a face emoji is present in congruent, incongruent, and neutral positive and negative text messages.

Results from Chapter 6 showed that positive messages received higher ratings overall. For ratings of understandability, messages had higher ratings in the congruent compared to the neutral and incongruent condition. Ratings of believability were significantly higher for positive messages and for congruent messages, compared to the neutral and incongruent conditions, with no interaction between the variables. These findings suggest that understandability and believability are increased when the appropriate emoji is attached i.e., congruent to the text message. This is consistent with Daniel and Camp's (2020) findings and with a processing fluency account.

Ratings of clarity of meaning produced a similar effect to those of understandability and believability, with effects for positive messages and for congruent messages, with no interaction between the variables. However, ratings of efficiency showed an interaction effect with higher ratings for positive messages in the emoji-congruent condition. This suggest that the measure used as an index of processing fluency is sensitive to differences in wording. It remains to be established which are the best measures of processing fluency – understandability and believability as used by Daniel and Camp (2020) or efficiency and clarity, as used by Rodrigues et al. (2017) although never explicitly linked to processing fluency. The results show a clear effect of processing fluency for all four fluency measures (Q1, Q2, Q6, Q7), with an interaction effect for efficiency (Q6) showing an effect of congruency for positive messages. This is in line with Cavalheiro (2022) study discussed in Chapter 2 suggesting emoji are appropriate when communicating positive information. This also suggests that valence is an important factor to consider when examining the effect of emoji on processing fluency. Overall, valence of the message was the most influential factor across all the measures. In summary,

the first two hypotheses were partially supported, given that the interaction effect (higher ratings for positive, congruent messages) only emerged in the efficiency measure (Q.6).

With regard to the rapport related measures (interest and improvement, Q4, Q5) and Hypothesis 3, there was an effect of message valence as well as an interaction effect, with the effect of congruency evident for positive messages only. Taken with the correlational data, this suggests a relationship between rapport and processing fluency and that stronger rapport maintenance functions are reflected in positive messages. Therefore Hypothesis 3 was supported. There was a strong correlation between efficiency and clarity in meaning and these correlated moderately across all three sentence types with the ratings of rapport (see Table 6.6, 6.7 and 6.8). This pattern is consistent with the findings from Rodrigues et al. (2017) and while in contrast with the findings in Chapter Three, it is consistent with the findings in Chapter Four, and suggestive of a moderate relationship between rapport and processing fluency for congruent and neutral conditions.

With regards to the rapport ratings (interest in the friendship, improving the friendship) the third hypothesis (H2) stated that adding a face emoji that is incongruent with the text message will produce lower ratings. Interest in the friendship was rated highest for positive congruent messages compared to positive incongruent and neutral messages. For negative messages there was no effect. Similar findings were observed regarding to help to improve the friendship; ratings were highest for congruent and neutral conditions when the messages were positive. However, ratings were highest for negative messages in the incongruent condition e.g., "*Monday is looking really bad so far* 😂" compared to negative congruent and neutral conditions. It appears that the use of an incongruent emoji may help to soften the negative message resulting in a higher rating in that condition (see Figure 6.4).

With regard to the reaction times, there was no effect of emoji type, while there was an overall effect for valence with positive messages read more quickly than negative messages. This supports the finding mentioned above that message valence is a crucial factor when considering fluency effects in text messages. However, the predicted effect, that is faster reaction times in congruent conditions, did not emerge. It is noteworthy that the reaction times are far longer than would be found in laboratory conditions and suggest that this was not a sensitive measure when conducted online by participants without supervision. For example, response times for the negative congruency and negative neutral conditions showed maximum responses of 30.96 and 45.94 seconds respectively, and mean RTs were also slower than would be expected in a laboratory task (see Table 6.1 above).

A number of limitations to this study must be considered. The study took place online (due to ongoing public health restrictions) using a Qualtrics survey platform. As such, the physicality of being in laboratory conditions was lacking. This would ensure better control and isolate extraneous variables such as demand characteristics more effectively (e.g., monotony, fatigue). However, the within participants design and the randomized presentation of stimuli across conditions will have controlled for this to some extent.

Overall, the data suggest that emoji are highly context specific, and that valence and message purpose are key factors. Because of this, emoji should be carefully selected as they could introduce a certain ambiguity that may result in a cost to the receiver, such as additional time needed to process the meaning (although this was not found here). This study suggests that the effect of the presence of a face emoji is much more intricate and complex than Daniel and Camp's (2020) study anticipated. In the following chapter, the same methodology is used to examine whether the findings here extend to messages with non-face emoji.

Chapter 7

The effect of non-face emoji on processing fluency when presented in varying valence comparing congruent, incongruent and neutral conditions

Abstract

Findings from Chapter Six revealed participants rated positive messages highest overall. Ratings for understandability and believability, as used by Daniel and Camp (2020), were significantly higher for positive messages and for congruent messages with no interaction between the variables. Ratings for efficiency in transmitting its meaning showed an interaction effect with higher ratings for positive messages in the emoji congruent condition, whereas ratings for clarity in meaning were higher for positive messages and for congruent messages with no interaction effect. Chapter Seven builds on the previous chapter and examines the influence of non-face emoji in affecting processing fluency, across congruent, incongruent and neutral conditions. A non-face emoji could make the message easier to understand and more believable, a similar effect to that of a face emoji, as suggested by Daniel and Camp (2020).

Using an online survey, 22 males and 74 females and 3 nonbinary aged between 18 to 44 years old (average 22) were assigned to a 2 (Message Valence: positive and negative) x 3 (Condition Type: Congruent, Incongruent, Neutral) repeated measures design. The order of each block was counterbalanced across the sample. Participants saw a total of twelve, randomly selected mobile screen shots. Response times were recorded for each single mobile screen shot displayed. Participants were asked to rate on a scale of 1 - 7 how understandable the message was, how believable the message was, and what was the likelihood they would share the message. Understandability and believability were considered as measures of processing fluency. Following Rodrigues et al.'s method, as used in Chapters 3,4,5 and 6, participants read four additional hypothetical text messages and rated them for: interest in the friendship; improving the friendship; efficiency in transmitting its meaning; and clarity of meaning.

Results revealed participants' reaction times when reading positive messages were faster than when reading negative messages. High ratings occurred for positive messages across

seven variables (i.e., understandability, believability, shareability, interested in the friendship, improving the friendship, efficiency in transmitting its meaning and clarity in meaning), contributing significantly to a processing fluency capacity for positive congruent text messages. For helping to improve the friendship there was a main effect of valence only.

Overall, the current findings suggest that message valence is a key factor with different patterns for positive and negative messages. The present study suggests that emoji are multi layered and more context dependent than originally assumed, pointing to a need map out the boundary conditions for the processing fluency effect that Daniel and Camp (2020) described.

Chapter Seven

7.1 Introduction

The objective of Chapter Six, Experiment 5, was to examine whether the presence of a face emoji affects understanding and believability, comparing sentence types i.e., congruent, incongruent and neutral in positive and negative text messages. Results from Chapter 6 showed that positive messages received higher ratings overall. The ratings of understandability and believability, as used by Daniel and Camp (2020), were significantly higher for positive messages and for congruent messages, with no interaction between the variables. The suggestion is put forward that understandability and believability are increased when the matching emoji is attached i.e., congruent with the message. This is consistent with Daniel and Camp's (2020) findings and with a processing fluency account. Ratings of clarity in meaning were higher for positive messages and for congruent messages with no interaction effect. However, ratings of efficiency showed an interaction effect with higher ratings for positive messages in the emoji congruent condition. In general, the data suggested that emoji are highly context specific, and that the valence of the message was the strongest factor across all the measures. In addition, the first two hypothesis were partially supported, given that the interaction effect (i.e., higher ratings for positive, congruent messages) only appeared in the efficiency measure.

The present chapter replicates the previous chapter but using non-face emoji in place of emoji. It examines whether the presence of non-face emoji presented within the format of a text message varying in valence (i.e., positive and negative message) affects understanding and believability, as well as efficiency and clarity, comparing a congruent, incongruent, and neutral condition. A selection of non-face emoji is included, and rating scales used by Rodrigues et al. (2017) to measure rapport are included as in previous chapters. As mentioned in Chapter Six,

Daniel and Camp (2020) selected understandability and believability as measures of processing fluency, the present study includes two additional dependent variables (i.e., efficiency and clarity in meaning) as measures of fluency, as applied in Chapter Six and previous chapters. The rapport measures are included, as in previous chapters, as emoji used in positive messages increase rapport e.g., interest in the friendship and help to improve the friendship and affect processing fluency by helping with the interpretation of the message. Furthermore, as noted by Daniel and Camp (2020), the lack of response times as a dependent measure may have limited the conclusions drawn about fluency (Daniel & Camp, 2020, p. 212). Reading times are included as a measure in the present study, as in Chapter Six.

Stimuli from Daniel and Camp's (2020) study were modified, creating positive and negative text message mobile phone screenshots for the present study. For the purposes of this experiment, participants took an online Qualtrics survey where messages were positive or negative in valence, and participants' response times were recorded by the Qualtrics software programme, giving a 2 x 3 (positive/negative by congruent/ incongruent/ neutral) repeated measures experimental design.

7.1.1 Non-face emoji can have multiple meanings

Wiseman and Gould (2018) examined the effect of emoji when repurposed for something other than their "intended" (or direct) use between close partners, family members and friends. Participants completed an online task where they were asked to respond to a series of seven short questions e.g., What does that emoji mean? Wiseman and Gould (2018) found the reason given for the chosen emoji when contacting someone was because it represented a word used in participants' real-world conversations. Often this type of emoji was used as a direct interpretation of a "*pet name*" (with penguin emoji being the most popular). Another participant reported using the Pig Face emoji to refer to the local pub, called '*The Three Piggies*.' Other

participants (28%) reported ‘Ease’ as the most common reason for using an emoji in text messages. In addition, participants reported that an emoji was “a lot faster to type”. Participant (27) expressed that using words felt silly with emoji available: “It seemed silly to type the word when there was a little picture of it right there” p.6). Several participants described the need to use a personalised emoji because the idea or sentiment they were trying to express was too complex for words.

Overall, Wiseman and Gould’s (2018) findings revealed that the main reason that non-face emoji were chosen was because the emoji explicitly represented a word visually; for example, the emoji  used for the word ‘*dog*.’ However, as emoji are context specific, as the present results have suggested, these intentional representations can be a little unpredictable in terms of efficiency and clarity of meaning when presented in a text message. For example, the ‘*sign of the horns*’ hand emoji can signify heavy metal or a salute to a favourite rock band (Nowakowski, 2020), but in Italy and Greece is an insult that means ‘*cuckold*,’ or a curse placing the evil eye upon somebody (Gawne & Daniel, 2021, p.3). Similarly, Emojipedia (an emoji cataloguing website) discovered that the peach emoji and the aubergine were frequently used to refer to parts of the human body other than their original intended (direct) meaning as a fruit or a vegetable. So, it is important that, whether direct or indirect in meaning, the information sent must be clear and easily understood from a receiver’s perspective (Unkelbach & Greifeneder, 2013). Emoji are increasingly used in ways to modify decision making by influencing emotions in a similar way than when face to face (Suntwal et al. 2021). This in turn can be perceived to aid processing fluency as well as rapport maintenance but only if the message valence is clear.

7.1.2 The potential for ambiguity may be heightened for non-face emoji

Differences between face and non-face emoji are discussed in Chapter Four (Section 2.4), and in particular Riordan's (2017a) suggestion that non face emoji play a role in disambiguating meaning in a text message in a similar way to face emoji was discussed. The potential for ambiguity may be heightened for non-face emoji because they have literal and non-literal meanings, and further differences of use within friendship pairs, and therefore choices of non-face emoji may differ for the purpose of understanding or ease or difficulty of processing. For this reason, as mentioned by Daniel and Camp (2020), perceived believability and understandability of the message will reflect processing fluency, along with ratings of clarity and efficiency in transmitting meaning, if the content is easy to process. In turn, this will improve the receiver's outlook on the sender, reflecting on them in a positive and sociable manner, and helping to maintain a rapport. Non-face emoji have the ability to convey direct information in either a positive or negative manner given the appropriate context. This can render a text message as one that is easily understood and believable or a message that is difficult to process when the emoji is mismatched in a text message (see Unkelbach & Greifeneder, 2013).

Non-face emoji convey direct and indirect meaning, in contrast to face emoji which allow for communication of many emotional and sentimental states. Individual preferences are important to consider when communicating with non-face emoji. Processing fluency is a significant focus of the thesis; a fundamental question is how non-face emoji could serve as a means to increase fluency in text messages. In this experiment, the role of non-face emoji is examined, in positive and negative contexts, in the participants ' ratings of measures processing fluency (i.e., understandability, believability, efficiency and clarity in meaning) and of rapport (interest and improvement of the friendship).

7.1.3 The present study

The purpose of this experiment is to examine how non-face emoji affect processing fluency and rapport when presented within the format of message varying in valence (i.e., positive and negative messages) and sentence type (Congruent, Incongruent and Neutral conditions).

The hypotheses for the present study are:

H1: adding a corresponding non-face emoji that matches with a text message (i.e., congruent) will increase ratings of ease of understanding, believability, efficiency and clarity in positive messages compared to negative messages. Further differences might be predicted between congruency types, with neutral but not an incongruent type producing higher ratings.

H2: adding a non-corresponding non-face emoji that is mismatched with a text message (i.e., incongruent), will decrease ratings of ease of understanding, believability, efficiency and clarity. Further differences might be predicted between congruency types, with neutral and congruent types having higher ratings than the incongruent type, and between positive messages compared to negative messages.

H3: Ratings of rapport (interest, improving the friendship) will be higher in positive messages with congruent emoji.

H4: there will be a relationship between the ratings of rapport and ease of understanding, believability, and efficiency and clarity (i.e., the measures of processing fluency).

7.2 Methodology

7.2.1 Participants

A total of 99 participants (74 females, 22 males, and 3 non-binary aged 18 to 56 years, M =21.61, SD = 5.156) completed the experiment. All participants were fluent in English. Participants were recruited online through a Qualtrics hyperlink posted to mailing lists and posts on social networks sites (e.g., Facebook, Twitter). In addition, participants were invited from the psychology department's participant pool. This pool consisted of undergraduate and

postgraduate students who at the start of the year expressed interest in conducting psychological research during the academic year.

7.2.2 Materials

The study was delivered using a Qualtrics survey platform. Participants consented and agreed to take part in the online survey. Tweets from Daniel and Camp's (2020) study were adapted into positive and negative text message mobile phone screenshots. Each message was adapted so that there was a positive and negative version (see Figure 7.1 and 7. 2 for an example). Non-Face emoji used in each of the mobile screen shots were taken from the experimenter's pre-existing emoji database that were provided by the participants in Experiment 1. Each of the 12 (i.e., six positive and six negative) messages were presented in congruent, incongruent and neutral condition (see Figure 7.1, 7.2), with participants seeing a particular message only once.

7.2.3 Design

This study used a 2 (Message Valence: positive and negative) x 3 (Condition Type: Congruent, Incongruent, Neutral) repeated measures experimental design.

Table 7.1 Gender breakdown of participants 12 randomised individual messages presented in congruent, incongruent and neutral conditions

N=99	2x Pos and 2 x Neg	2 x Pos and 2 x Neg	2 x Pos and 2 x Neg
	Congruent	Incongruent	Neutral
Male	22	22	22
Female	74	74	74
Binary	3	3	3
Total	99	99	99

7.2.4 Procedure

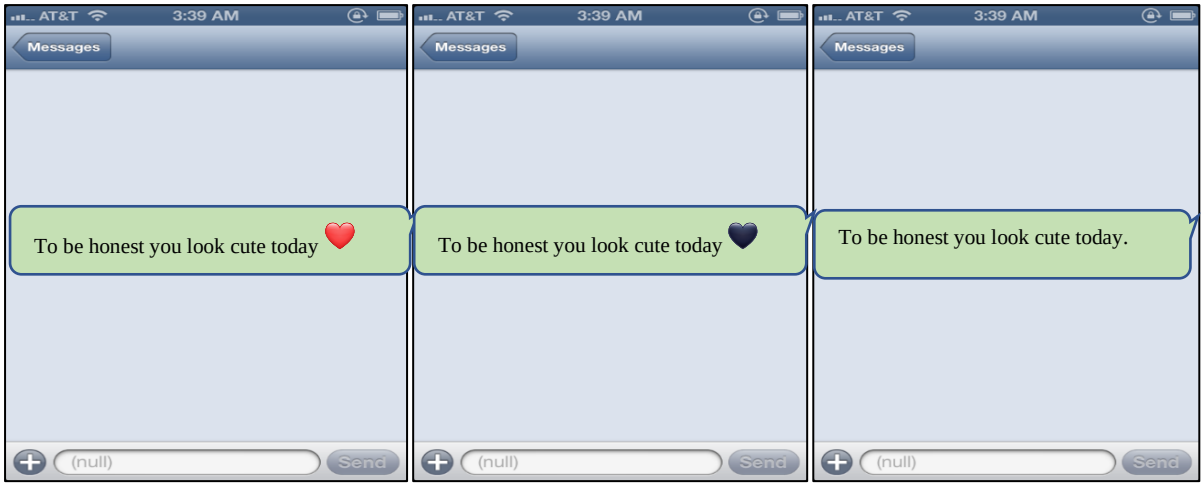
Participants completed the experiment in their own time, having followed a link to the Qualtrics platform. They provided consent by indicating that they were over the age of 18 years and by clicking on the "I agree to participate" button on the survey. Participants were required to fill in a series of demographic questions (e.g., age, gender, academic status, frequency of texts, and two questions relating to how participants send and receive emojis in their written communication). Unlike early chapters of this thesis, where data collection was in person, no text messages were collected here, because of the online data collection method, as the pilot study (n=5) had shown that participants were not happy to complete this section of the task due to the time commitment. After participants agreed to participate and consented to move forward in the survey, a set of instructions were displayed. Upon clicking on the "I have read and understood the instructions clearly and happy to proceed," the survey randomly assigned each participant such that stimuli were counterbalanced within a within subjects design. Order of presentation was randomised by the software.

Participants were informed that they would be exposed to a series of mobile screen shots. These trials consisted of 6 positive (2 x congruent, 2 x incongruent, 2 x neutral) and 6 negative (2 x congruent, 2 x incongruent, 2 x neutral) text messages. (See Appendix M and N). Ratings and reaction times were recorded.

Each participant had a practice trial to familiarise themselves with the screen layout. The practice trial had no emoji, only plain scripted text in order to avoid a biasing effect on the results. Response time measures began when text messages (i.e., stimuli) were displayed to participants online. Response times ended once the participant indicated by button press that they were ready to proceed to use the 7-point Likert scale their responses to seven questions in relation to the text message displayed.

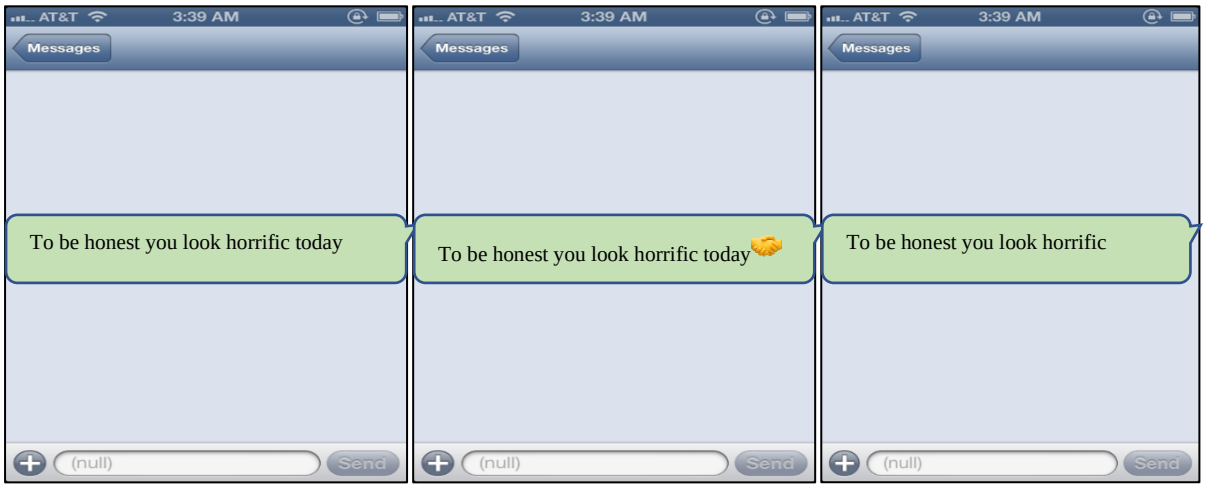
Participants were presented with the text messages and for each message were asked to indicate on a 7-point Likert scale their responses to seven questions before moving on to the next text message display. The first three questions were taken from Daniel and Camp (2020): "How easy was it to understand the message?" (1= Not easy to understand, 7 = Very easy to understand) "How believable was the text message", ?" (1= Not easy to believe, 7 = Very easy to believe) and "How likely they were to share the text message with a third party?" (1= Not likely to share, 7 = Very likely to share). These were used as measures of processing fluency by Daniel and Camp (2020). The next two questions were taken from Rodrigues et al. (2017), as used in Chapters 3, 4, and 5: ''Do you think this person is interested in the friendship?" (1 = Not interested at all, 7 = Very interested), ''Do you think this message helps to improve the friendship?" (1 = This definitely does not help, 7 = This definitely helps).

In addition, participants were asked to rate each message on the following questions: "In your opinion to what extent do you consider the reply was efficient in transmitting its meaning?", and ''To what extent do you think that the reply had a clear meaning?". (1 = Not at all, 7 = A lot). Ratings of efficiency and clarity were used by Rodrigues et al. (2017) (without reference to processing fluency) and were included here as measures of processing fluency, consistent with the previous chapters. Once participants had rated each text message using the rating scales, a screen appeared thanking participants and some brief debriefing information was presented.



1. Positive Congruent 2. Positive Incongruent 3. Positive Neutral

Figure 7.1 Positive message with non-face emoji in a congruent, incongruent and neutral condition.



1. Negative Congruent 2. Negative Incongruent 3. Negative Neutral

Figure 7.2 Negative message with non-face emoji in a congruent, incongruent and neutral conditions.

7.2.5 Ethical Considerations

The University Research Ethics Committee approved the research, both for in person data collection (pre Covid-19) and separately for the online survey method. Participants were informed from the outset that the experiment was involved the perception of social media communication. No identifiable data were used during the course of this research; the Qualtrics

survey was anonymous. After the experiment ended a short debriefing session highlighted the objectives of the study and participants were informed of the research questions.

7.3 Results

Data consisted of participants' response times when reading the presented text messages and their ratings on each of the 7 questions that followed: understandability; believability; shareability; perceived interest; improving the friendship; efficiency; and clarity in meaning. For each of the dependant variables, data were entered into a 2 x 3 (Message Valence: Positive and Negative x Congruency Type: Congruent, Incongruent, and Neutral) within subjects analysis of variance.

7.3.1 Response Times

Table 7.2 presents a summary of participants' response times when reading the text messages. Reaction times were faster when reading the positive messages than when reading the negative messages. A 2 x 3 repeated measures analysis of variance was used to determine whether the differences between conditions were statistically significant.

Table 7.2 Response times in seconds per message, by condition (N= 99)

Stimuli Type	Valence	R.T (in Secs) M (SD)	R.T (in Secs) Min	R.T (in Secs) Max
Congruency	Positive	6.40 (2.9)	1.50	15.81
Incongruency	Positive	6.93 (3.8)	2.19	30.66
Neutral	Positive	7.38 (4.9)	1.26	15.94
Congruency	Negative	7.49 (3.5)	2.09	16.64
Incongruency	Negative	8.23 (4.9)	2.47	31.11
Neutral	Negative	6.93 (4.5)	1.67	37.06

Results showed that the interaction effect between valence and congruency was statistically significant, F (2, 196) = 5.314, p = .006, n^2_p = .05 (moderate effect size). There was no main effect for congruency F (2,196) = 1.417, p =.24. There was a statistically significant main effect

for message valence F (1, 98) = 4.587, p = .04, n^2_p = .05 (moderate effect size). Participants' responses were faster for positive messages compared to negative messages, while responses for negative incongruent messages were slower overall (M = 8.23, SD = 4.86 as against (M =6.40, SD = 2.99). These are interpreted in light of the significant interaction effect.

Post-hoc comparisons using the Tukey LSD test indicated that that the fastest responses occurred for positive congruent compared to negative neutral conditions p<.048. There were no group differences between positive congruent and incongruent conditions, p > .24 nor incongruent and neutral conditions p >.35. For negative messages, fastest responses occurred for incongruent conditions compared to neutral conditions p<.02. There were no group differences between negative congruent and incongruent conditions, p > .11 nor congruent and neutral conditions p >.23. Data are summarised in Figure 7.3.

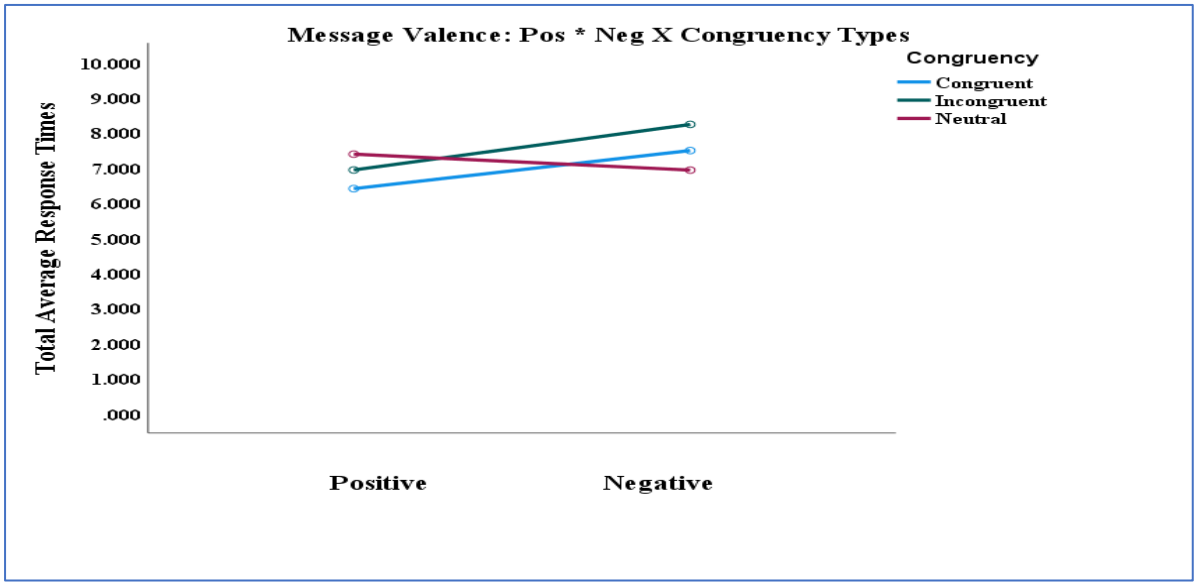


Figure 7. 3 R.T (in seconds) for positive and negative messages for congruent, incongruent, and neutral conditions.

7.3.2. Ratings

Table 7.3 presents a summary of participants' ratings of the text messages for each of the 7 Likert scale items. These will be analysed separately. For each of the ratings, data were entered into a 2 x 3 (Message Valence: Positive and Negative x Congruency Type: Congruent, Incongruent, and Neutral) repeated measures analysis of variance.

Table 7.3. Participants' ratings (mean with SD in brackets) of text messages for each of the 7 Likert scale items.

Stimuli Type	Valence	Understand	Believe	Share	Interest	Improve	Efficient	Clarity
Congruency	Positive	6.1 (1.2)	5.6 (1.3)	5.2 (1.5)	5.4 (1.4)	5.2 (1.5)	5.7 (1.2)	5.6 (1.3)
Incongruency	Positive	5.5 (1.3)	5.0 (1.4)	5.0 (1.4)	5.1 (1.5)	4.7 (1.4)	5.1 (1.3)	5.0 (1.5)
Neutral	Positive	5.6 (1.4)	5.1 (1.5)	4.8 (1.7)	2.4 (0.8)	4.8 (1.3)	5.1 (1.3)	5.2 (1.4)
Congruency	Negative	5.2 (1.5)	4.8 (1.3)	4.0 (1.3)	3.6 (1.3)	3.4 (1.4)	4.7 (1.4)	4.8 (1.4)
Incongruency	Negative	5.1 (1.5)	4.4 (1.4)	3.5 (1.7)	3.7 (1.5)	3.5 (1.4)	4.5 (1.4)	4.5 (1.5)
Neutral	Negative	5.7 (1.3)	5.0 (1.4)	2.0 (0.8)	4.0 (1.6)	3.4 (1.4)	4.8 (1.4)	4.8 (1.4)

Table 7.4 Summary of participants' ratings by stimulus type from each of the 7 Likert scale items (Means with SD in brackets).

Stimuli Type	Understand	Believe	Share	Interest	Improve	Efficient	Clarity
Congruency	5.7 (1.4)	5.2 (1.3)	4.6 (1.4)	4.3 (1.5)	5.2 (1.4)	5.2 (1.4)	5.2 (1.4)
Incongruency	5.3 (1.4)	4.7 (1.4)	4.4 (1.5)	4.1 (1.5)	4.8 (1.4)	4.8 (1.4)	4.7 (1.5)
Neutral	5.7 (1.3)	5.1 (1.5)	3.1 (1.3)	4.1 (1.4)	4.9 (1.4)	4.9 (1.4)	5.0 (1.4)

Table 7.5 Main Effects: Positive Vs Negative (Means with SD in brackets).

Stimuli Type	Understand	Believe	Share	Interested	Improve	Efficient	Clarity
Positive	5.7 (1.3)	5.3 (1.4)	5.0 (1.6)	4.3 (1.3)	4.9 (1.5)	5.3 (1.3)	5.2 (1.5)
Negative	5.3 (1.4)	4.7 (1.4)	3.1 (1.3)	3.7 (1.5)	3.4 (1.5)	4.7 (1.4)	4.7 (1.5)

An analysis of variance was conducted in order to examine the influence of two IVs (Valence: Positive/ Negative; and sentence type: Congruent-Incongruent-Neutral) on the seven dependent variables. Each of these DVs are analysed separately in what follows.

Q1. How easy was it to understand the message?

Table 7.3 presents a summary of participants' ratings of the text messages for understandability. The analysis of variance revealed a statistically significant interaction effect for valence x congruency, F (2, 196) =12.111 , $p < .001$, $n^2_{p=}$ .11 (small effect size). As Figure 7.4 Panel 1 shows, ratings differed for the congruency conditions as a function of whether the message was positive or negative. Ratings were highest in the congruent condition when the message was positive. For negative messages, neutral messages (i.e., no emoji) were rated highest compared to congruent and incongruent messages. There was a main effect of message valance F (1, 98) =20.888, $p < .001$, $n^2_{p=}$ .18 (small effect size) reflecting higher ratings for positive compared to negative messages overall. There was also a main effect for congruency F (2, 196) =4.217, $p < .016$, $n^2_{p=}$ .04 (very small effect size). These are interpreted in light of the significant interaction effect.

Post-hoc comparisons using the Tukey LSD test indicated that understandability of the text messages was rated highest for positive congruent messages (M = 6.10, SD = 1.25) compared to neutral messages (M = 5.64, SD =1.38, p <.006) and incongruent (M = 5.46, SD = 1.34) messages, p <.001. There were no group differences for ratings for understandability between positive incongruent and neutral messages, p > 29. For negative congruency conditions ratings were higher for neutral messages (M = 5.67, SD = 1.28), compared to congruent messages (M =5.21 SD =1.47), p <.008 and incongruent messages, $p < .005$. There were no differences found between congruent and incongruent messages, p>.67.

Q2. How believable was the text message?

Table 7.3 presents a summary of participants' ratings of the text messages for believability. The analysis of variance revealed a statistically significant interaction effect for PosNeg*Congruency F (2, 196) = 4.640, p < , 01 $n^2_{p,}$ = .05 (very small effect size). As Figure 7.4 Panel 2 shows, ratings differed for the congruency conditions as a function of whether the message was positive or negative. Ratings were highest in the congruent condition, but only when the message was positive. Participants rated believability of neutral messages higher compared to congruent and incongruent messages when the message was negative. There was a main effect of message valance F (1, 98) = 26.243, p < .001, $n^2_{p,}$ = .21 (small effect size), reflecting higher ratings for positive compared to negative messages. A main effect for congruency was also found F (2, 196) = 6.673, p < .002, n^2_p =.06 (very small effect size). These are interpreted in light of the significant interaction effect.

Post-hoc comparisons using the Tukey LSD test indicated that believability of the text messages was rated highest for positive congruent messages (M = 5.62, SD = 1.30) compared to neutral messages (M = 5.14 SD = 1.57, p <.02), and incongruent (M = 5.00, SD = 1.42) messages, p <.002. There were no differences found between positive incongruent and neutral messages, p >.43. For negative congruency conditions, ratings were higher for congruent messages (M = 4.76, SD = 1.39), compared to incongruent messages (M =4.40 SD =1.41), p <.02. There were no differences found between congruent and neutral messages, p>.18. Though, ratings were highest for negative neutral messages (M =5.01 SD =1.43) compared to incongruent messages (M = 4.40, SD = 1.41), p <.002.

Q3. What is the likelihood that you would share this message?

Table 7.3 presents a summary of participants' ratings of the text messages for shareability. Analysis of variance revealed a statistically significant interaction effect for Valence x

Congruency, F (1.835,176.866) = 16.477, p = .001, $n^2_{p,=}$ .14 (small effect size). As Mauchly's' test indicated that the assumption of sphericity had been violated therefore degrees of freedom were corrected using Huynh-Feldt estimates of sphericity (ε = .91). As Figure 7.4, Panel 3 shows, ratings differed for the congruency conditions as a function of whether the message was positive or negative. Ratings were highest in the congruent condition but only when the message was positive. Ratings for negative neutral messages were rated the lowest overall, compared to negative congruent and incongruent messages. There was a main effect for message valance, F (1, 98) = 280.5551, p < .001, $n^2_{p,=}$ .74 (moderate effect size) reflecting higher ratings for positive compared to negative messages. A main effect for congruency was also found F (2, 196) = 30.960, p < .001, $n^2_{p,=}$ .24 (small effect size). These are interpreted in light of the significant interaction effect.

Post-hoc comparisons using the Tukey LSD test indicated that shareability of the text messages was rated highest for positive congruent (M = 5.21, SD =.156) compared to neutral messages (M = 4.76, SD =1.74), p < .03. There were no differences between positive congruent and incongruent messages p >.45 and incongruent and neutral messages p > .19. For negative congruency conditions, there was a significant difference between congruent (M = 3.90, SD = 1.36) and incongruent (M = 3.45, SD =1.73, p <.019) and neutral messages (M = 2.07, SD = .860, p < .001) and ratings for incongruent messages (M = 3.45, SD = 1.73) were higher compared to neutral (M = 2.07, SD = .86) messages p <.001.

Q4. Do you think the person is interested in the friendship?

Table 7.3 presents a summary of participants' ratings of the text messages for interest in the friendship. Analysis of variance revealed a statistically significant interaction effect for Valence x Congruency, F (1.921, 188.289) = 90.813, p < .001, $n^2_{p,=}$ .50 (moderate effect size). As Mauchly's' test indicated that the assumption of sphericity had been violated, therefore

degrees of freedom were corrected using Huynh-Feldt estimates of sphericity (ε = .96). As Figure 7.4 Panel 4 shows, ratings differed for the congruency conditions as a function of whether the message was positive or negative. Ratings were highest in the congruent condition, but only when the message was positive. For negative messages, congruency had no effect. There was a main effect for valance, F (1, 98) =34.620, p < .001, $n^2_{p,=}$ .26 (small effect size) reflecting higher ratings for positive compared to negative messages overall. There was a main effect for congruency F (2, 196) = 47.933 p <.001, $n^2_{p,=}$ .32 (small effect size). These are interpreted in light of the significant interaction effect.

Post-hoc comparisons using the Tukey LSD test indicated that messages showing interest in the friendship had no group differences among positive congruent (M = 5,38, SD =.148) and incongruent messages (M = 5.07, SD =1.50), p < .18, though ratings for congruent (M = 5.38, SD =.148) messages were significantly higher compared to neutral (M = 2.38, SD = .87) messages, p < .001. The mean ratings for interest in the friendship showed incongruent messages (M = 5.07, SD =1.50) were rated highest compared to neutral (M = 2.38, SD = .87) messages, p < .001, suggesting a softening effect of an incongruent non-face emoji. For negative congruency conditions there were no group differences.

Q5. Do you think this reply helps to improve the friendship?

Table 7.3 presents a summary of participants' ratings of the text messages for helping to improve the friendship. The analysis of variance revealed no interaction effect for valence x congruency, F (2,196), =2.451, p <.09. A main effect of message valance was found, F (1,98), = 252.774, p < .001 n^2_p = .72 (moderate effect size). Ratings of improving the friendship were higher for positive messages (M = 4.9, SD = 1.5) compared to negative messages (M = 3.4, SD = 1.5). A main effect for congruency was not found, F (2,196), = .946, p < .39 n^2_p = .01 (very small effect size).

Q6. To what extent do you consider the message was efficient in transmitting its meaning?

Table 7.3 presents a summary of participants' ratings of the text messages for efficiency in transmitting its meaning. Analysis of variance revealed a statistically significant interaction effect for Valence x Congruency, F (2,196) = 6.055, $p < .003$, $n^2_p = .06$ (very small effect size). As Figure 7.4, Panel 6 shows, ratings differed for the congruency conditions as a function of whether the message was positive or negative. Ratings were highest in the congruent condition, but only when the message was positive. For negative messages, congruency had no effect. There was a main effect for message valence F (1,98) = 39.585, $p <.001$, $n^2_p = .28$ (small effect size) reflecting higher ratings for positive compared to negative messages overall. There was a main effect for congruency, F (2,196) = 4.125, $p < .018$, $n^2_p = .04$ (very small effect size) in the predicted direction. These are interpreted in light of the significant interaction effect.

Post-hoc comparisons using the Tukey LSD test indicated that messages efficient in transmitting its meaning were rated higher for positive congruent messages (M = 5.66, SD =.127) compared to incongruent (M = 5.06, SD = 1.38, $p < .002$) and neutral messages (M = 5.06, SD = 1.39), $p <.002$. There were no group differences between incongruent and neutral messages, $p > .98$. For negative congruency conditions there were no group differences overall.

Q7. To what extent do you consider the reply had a clear meaning?

Table 7.3 presents a summary of participants' ratings of the text messages for clarity in meaning. Analysis of variance revealed no interaction effect for Valence x Congruency, F (2,196) = 1.608, $p > .20$. As Figure 7.4, Panel 7 shows, ratings differed for the congruency conditions as a function of whether the message was positive or negative. There was a main effect for message valence F (1,98) = 29.586, $p < .001$, $n^2_p = .23$ (small effect size) in the predicted direction. Ratings for clarity were highest for positive messages (M = 5.2, SD = 1.5) compared to negative messages (M = 4.7, SD = 1.5). A main effect for congruency was also found, F (2,196) = 4.608, $p < .011$, $n^2_p = .05$ (very small effect size). Post Hoc comparisons

using the Tukey LSD test indicated that the ratings for clarity were rated highest in the congruent (*M* =5.2 *SD* =1.4) messages compared to incongruent (*M* =4.7 *SD* =1.5).

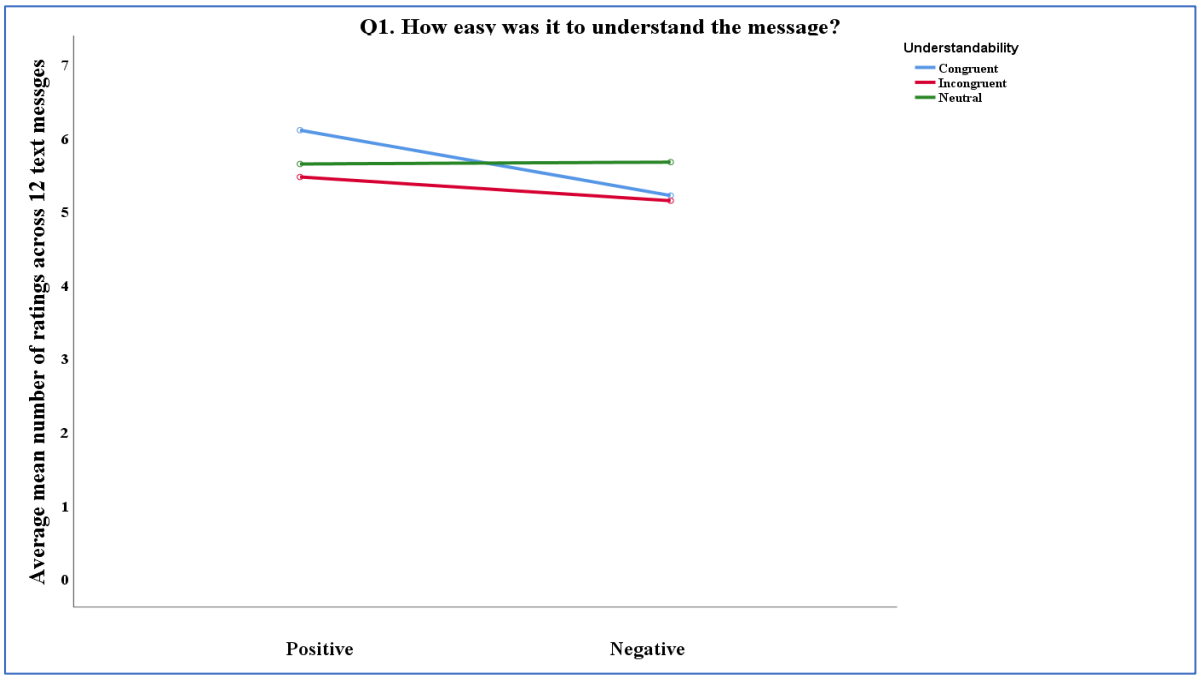


*Figure 7.4 - **Understandability** - represent Positive*Negative ratings for congruency, incongruency and neutral conditions, plus Likert scale ratings for each of the 7 dependent variables displayed.*

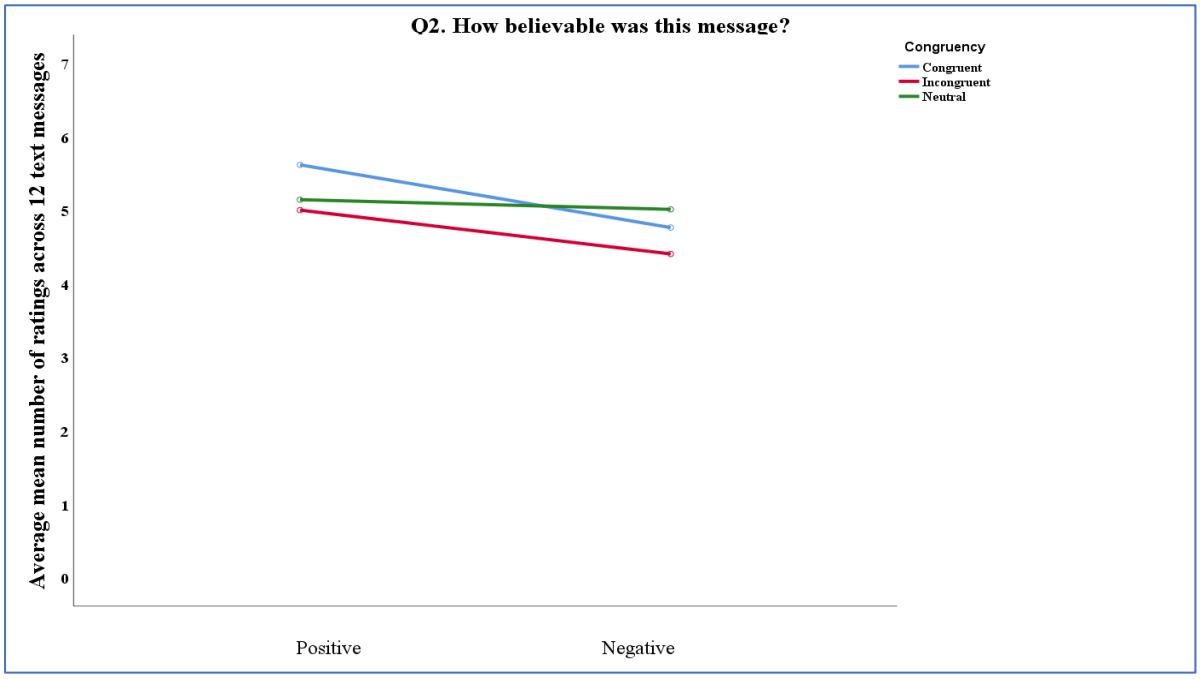


*Figure 7.5 - **Believability** - represent Positive*Negative ratings for congruency, incongruency and neutral conditions, plus Likert scale ratings for each of the 7 dependent variables displayed.*

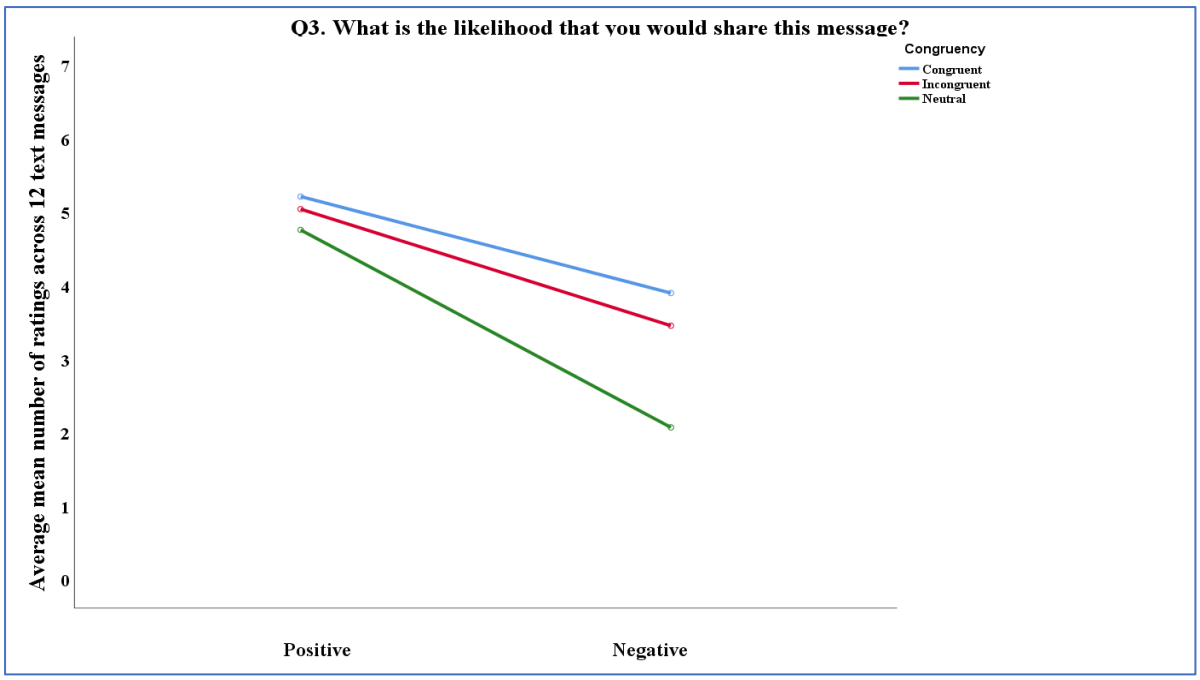


Figure 7.6 - ***Shareability*** *- represent Positive*Negative ratings for congruency, incongruency and neutral conditions, plus Likert scale ratings for each of the 7 dependent variables displayed*

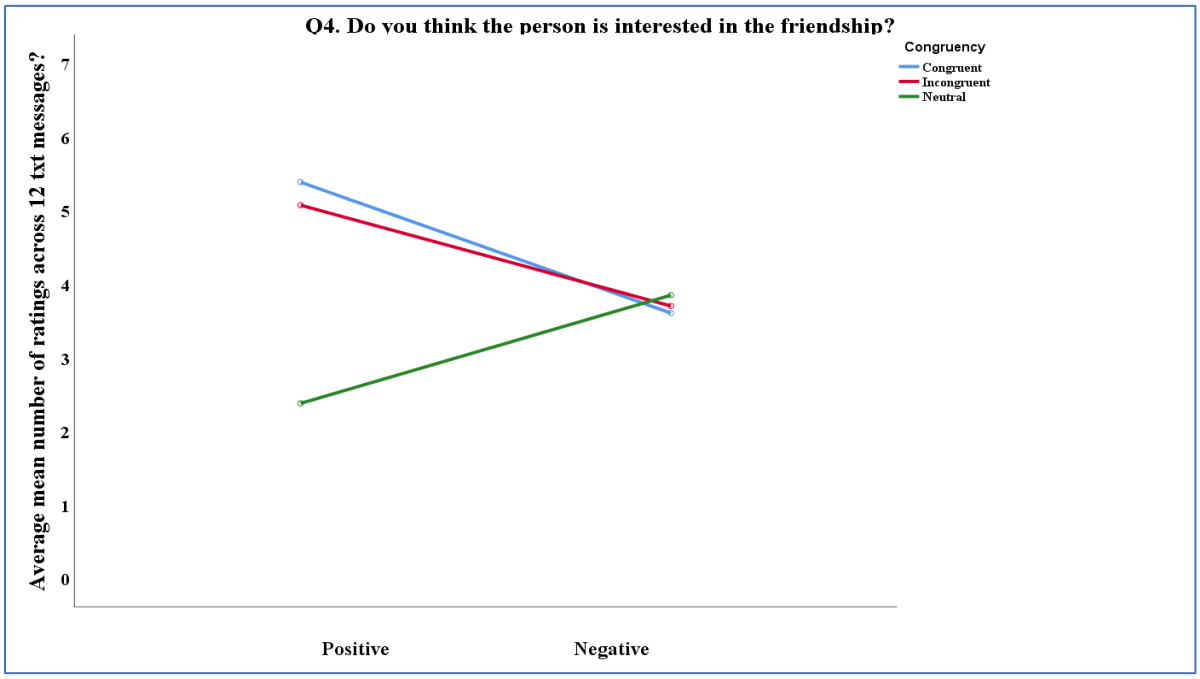


Figure 7.7 - ***Interested in the friendship*** *- represent Positive*Negative ratings for congruency, incongruency and neutral conditions, plus Likert scale ratings for each of the 7 dependent variables displayed*

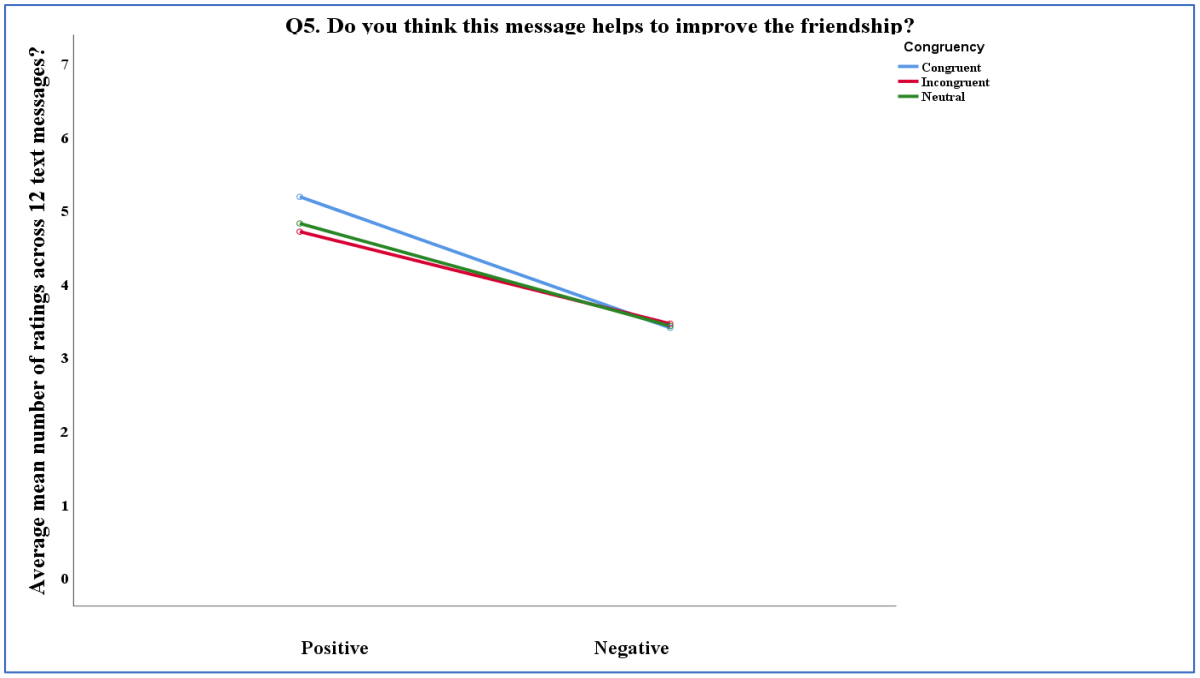


*Figure 7.8 - **Helps to improve the friendship** - represent Positive*Negative ratings for congruency, incongruency and neutral conditions, plus Likert scale ratings for each of the 7 dependent variables displayed*

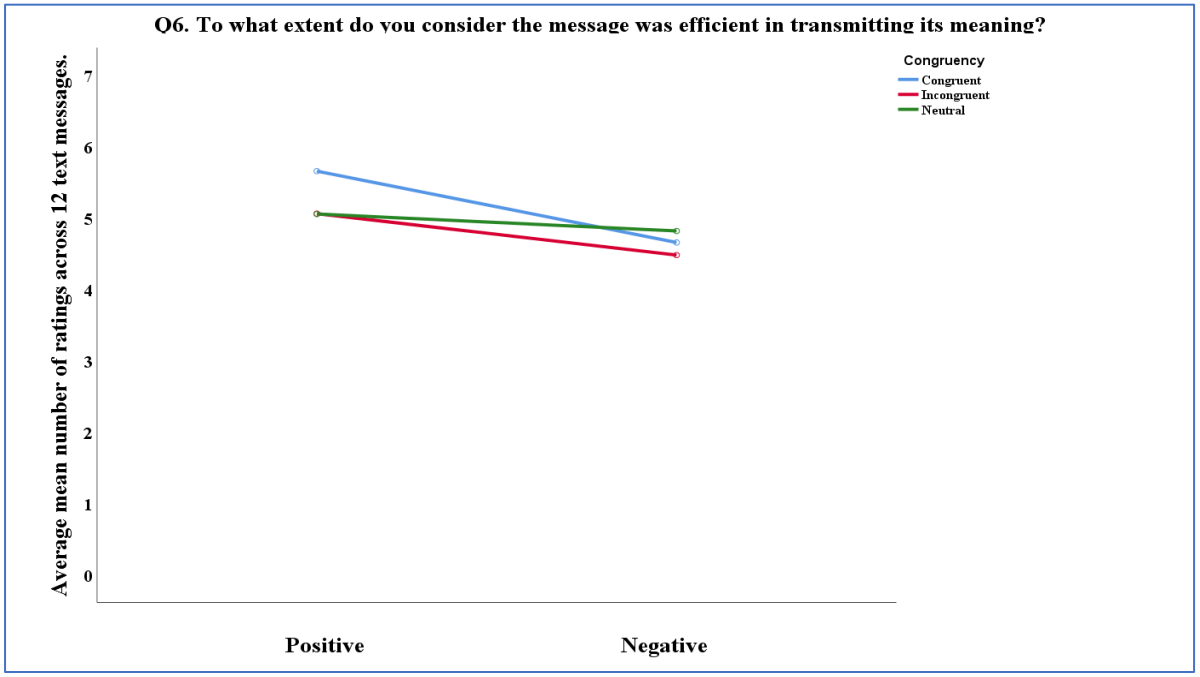


*Figure 7.9 - **Efficient in transmitting its meaning** - represent Positive*Negative ratings for congruency, incongruency and neutral conditions, plus Likert scale ratings for each of the 7 dependent variables displayed*

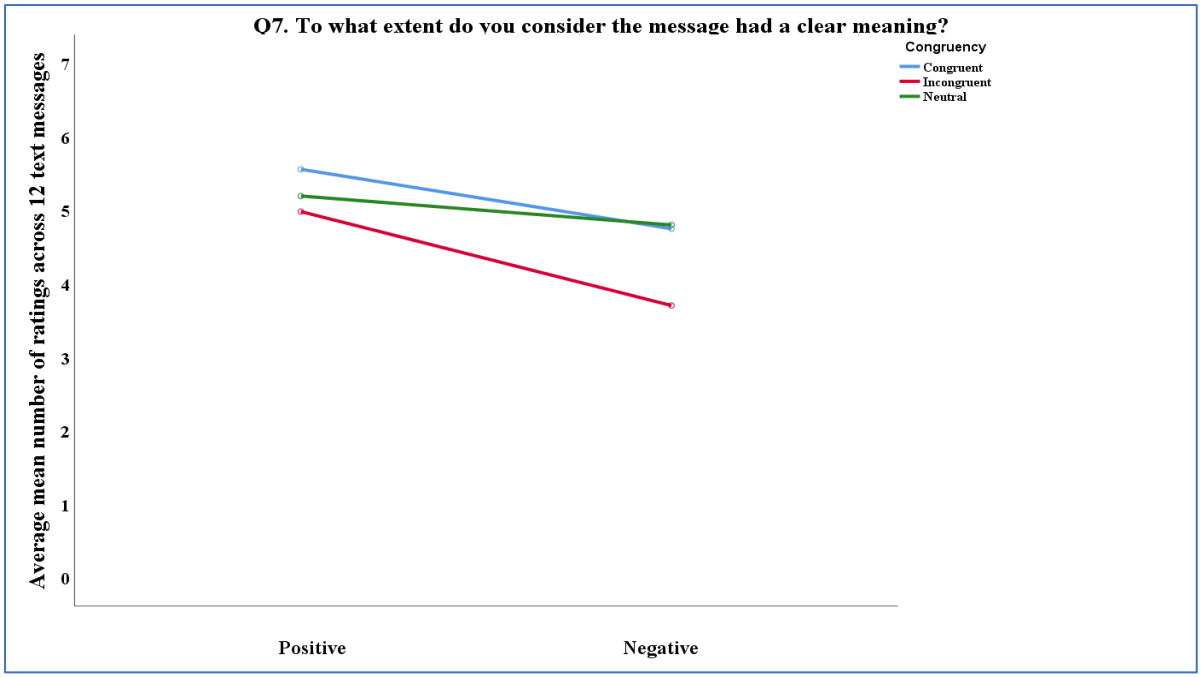


*Figure 7.10 - **Clear in meaning** - represent Positive *Negative ratings for congruency, incongruency and neutral conditions, plus Likert scale ratings for each of the 7 dependent variables displayed.*

7.3.3 Bivariate Correlational analysis

Bivariate correlational analysis were used to explore the overall relationship of the two IVs (Message Valence: Positive-Negative; Sentence Types: Congruent, Incongruent and Neutral) on the seven dependent variables (Table 7.6, 7.7 and 7.8).

Table 7.6 Bivariate correlational analyses for seven dependent variables – Congruency Type

	Means	**Std.Dev**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1. Understandability	5.57	1.15	1						
2. Believability	5.06	1.11	**.764****	1					
3. Shareability	4.41	1,22	.655**	.746**	1				
4. Interested	4.37	1,13	.504**	.593**	.713**	1			
5. Improving	4.16	1.23	.518**	.623**	.724**	**.923****	1		
6. Efficiency	5.03	1.2	.745**	.706**	.675**	.607**	.628**	1	
7. Clarity	5.04	1.15	.738**	.703**	.685**	.638**	.651**	**.908****	1

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7.7 Bivariate correlational analyses for seven dependent variables – Incongruency Type

	Means	**Std.Dev**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1.Understandability	5.2	1.37	1						
2.Believability	4.60	1.08	**.680****	1					
3.Shareability	4.11	1.29	.440**	.693**	1				
4.Interested	4.28	1.16	.510**	.610**	.634**	1			
5.Improving	3.97	1.20	.452**	.543**	.582**	**.907****	1		
6.Efficient	4.64	1.14	.658**	.718**	.485**	.612**	.562**	1	
7.Clarity	4.62	1.25	.701**	.721**	.504**	.595**	.545**	**.917****	1

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7.8 Bivariate correlational analyses for seven dependent variables – Neutral Type

	Means	**Std.Dev**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1. Understandability	5.53	1.14	1						
2. Believability	4.96	1.26	**.783****	1					
3. Shareability	3.31	1.08	.640**	.738**	1				
4. Interested	2.98	1.06	.581**	.667**	.844**	1			
5. Improving	4.01	1.22	.466**	.543**	.662**	**.784****	1		
6. Efficient	4.83	1.12	.642**	.759**	.691**	.637**	.596**	1	
7. Clarity	4.89	1.12	.653**	.753**	.596**	.566**	.511**	**.868****	1

**. Correlation is significant at the 0.01 level (2-tailed).

Congruency Type: The dependent variables of relevance to understandability and believability (Q1and Q2, *r*=.76) correlated highly with each other and with ratings of shareability, interest in the friendship and improving the friendship (see Table 7.6). The dependent variables of relevance to rapport (Q4 and Q5) correlated highly with each other. Perceived interest in the friendship correlated very strongly with perceived help to improve friendship (*r* = .92). There is a very strong relationship between perceived clarity in meaning and efficiency for congruency sentence types (Q6 and Q7; *r* = .91). This suggests that overall, ratings of efficiency and clarity correlated highly with each other and with the other variables. The ratings of relevance to rapport (Q4 and Q5) are correlated with those measuring processing fluency (Q6 and Q7; *r* = .61, .64, .63, .65, p <.01) for the congruency sentence type.

Incongruency Type: The dependent variables of relevance to understandability and believability (Q1and Q2,*r*=.76) correlated highly with each other and with ratings of shareability, interest in the friendship and improving the friendship (see Table 7.7). The dependent variables of relevance to rapport (Q4 and Q5) correlated highly with each other. Perceived interest in the friendship correlated strongly with perceived help to improve friendship (*r* = .91). There is a strong relationship between perceived clarity in meaning and efficiency for incongruency sentence types (Q6 and Q7; *r* = .92). The ratings of relevance to rapport (Q4 and Q5) are correlated with those measuring processing fluency (Q6 and Q7; *r* = .61, .60, .56, .55, p <.01) for an incongruency sentence type.

Neutral Type: The dependent variables of relevance to understandability and believability (Q1and Q2, *r* = .65) correlated with each other with ratings of shareability, interest in the friendship and improving the friendship (see Table 7.8). The dependent variables of relevance to rapport (Q4 and Q5) correlated highly with each other. Perceived interest in the friendship correlated strongly with perceived help to improve friendship (*r* = .78). There is a strong relationship between perceived clarity in meaning and efficiency for neutral sentence

types (Q6 and Q7; r = .87). Finally, the ratings of relevance to rapport (Q4 and Q5) are correlated with those measuring processing fluency (Q6 and Q7; r = .51, .40, .53, .39, p <.01, respectively) for a neutral sentence type.

7.4 Discussion

The present study examined whether the presence of a non-face emoji affected the ratings of processing fluency and rapport, comparing sentence types, i.e., congruent, incongruent, and neutral, in positive and negative text messages. Based on a processing fluency account, it would be predicted that the use of a non-face emoji will have an effect on processing fluency and rapport with higher ratings for positive messages compared to negative messages and higher ratings when the messages are congruent. However, incongruent messages may create more uncertainty as they may come across as difficult to read, and therefore decrease fluency compared to neutral messages with no emoji. In the present study, regarding fluency (clarity and efficiency) the first hypothesis (H1) was that adding a corresponding non-face emoji that matches with a text message (i.e., congruent) would increase ratings of ease of understanding, believability, efficiency and clarity in positive messages compared to negative messages. Further differences might be predicted between congruency types, with neutral but not an incongruent type producing higher ratings.

Results from Chapter 7 are similar to that of Chapter 6 in showing that positive messages received higher ratings overall. For ratings of understandability and believability there was a main effect of message valence and congruency as well as an interaction effect, with the effect of congruency evident for positive messages. These findings suggest that understandability and believability are increased when the matching emoji is attached i.e., congruent to the positive message. The findings are consistent with those in Chapter 6, where ratings of believability were significantly higher for positive messages and for congruent

messages, except that there was no interaction between the variables. This suggests that the effect differs for face (Chapter 6) and non-face (Chapter 7) emoji.

Ratings of clarity of meaning showed no interaction effect; ratings were high for positive messages and for congruent message as found in the previous chapter. However, ratings for efficiency in transmitting its meaning showed an interaction effect with higher ratings for positive messages in the congruent condition. This suggests that a processing fluency effect has more of an influence when the emoji is congruent with messages of positive valence. Overall, the current findings suggest that message valence is a key factor here. This in line with Tso and To's (2020) study, as mentioned in Chapter 2 and Rodrigues et al. (2017) who supported the view that message valence is a moderator of emoji effects.

In summary, the first two hypotheses were partially supported, given that the interaction effect (higher ratings for positive congruent messages) emerged in the understandability, believability and efficiency measures but not for clarity in meaning. Regarding the findings concerning clarity in meaning, it appears the differences between face and non-face emoji are multifaceted and intricate and the differences between the type of emoji selected may have impeded the measures of fluency as seen with both face emoji in Chapter Six and non-face emoji in Chapter Seven. Perhaps a design flaw affected the distinction between the types of emoji used in the messages for Chapters Six and Seven or perhaps, given the wide choice of emoji available, participants may have their own personal choice of emoji and perhaps were unfamiliar with the present stimuli. It may be that the slightest change within a text message may have altered the perception of the message, and that sensitivity to emoji is highly context specific.

With regard to the rapport related measures (interest and improvement) and Hypothesis 3, there were different trends for interest and for improvement. For ratings of interest, there

was an effect of message valence as well as an interaction effect, with the presence of emoji leading to higher ratings in the positive messages. For ratings of improving the friendship, there was a main effect of valence, reflecting higher ratings for positive messages, but no effects of congruency sentence types were found and no interaction effect. Taken with the correlational data, this suggests a relationship between rapport and processing fluency and that stronger rapport maintenance functions are reflected clearly in positive messages. Therefore Hypothesis 3 was supported in part; it was predicted that congruent emoji would have a facilitative effect in positive messages, but the findings show that both congruent and incongruent types have an effect compared to positive messages without any emoji. However, this applied only to the ratings of interest and not improvement.

Hypothesis 4 stated that there will be a relationship between the ratings of rapport and ease of understanding, believability, and efficiency and clarity (i.e., the measures of processing fluency). There was a strong correlation between efficiency and clarity in meaning and these correlated highly across all three congruency sentence types with the ratings of rapport (see Table 7.6, 7.7. 7.8). This pattern is consistent with the findings from Rodrigues et al. (2017) and while in contrast with the findings in Chapter Three, it is consistent with the findings in Chapters Four, Five and Six and suggestive of a strong relationship between rapport and processing fluency overall.

Regarding response times, there was an interaction effect between message valence and congruency. There was no main effects for congruency. However, there was a main effect for message valence which was moderate in size. Participants' responses were faster for positive messages compared to negative messages. The interaction effect showed that congruent conditions had an effect for positive messages with faster responses compared to neutral messages. However, participants' responses were faster for neutral messages when the message was negative compared to an incongruent condition. The findings show that the inclusion of an

incongruent emoji in a negative message has a detrimental effect on reading times resulting in slower response rates (see Figure 7.3). This contrasts with the response times in Chapter Six, which showed an effect of valence only, and again suggests differences between face and non-face emoji that must be considered in emoji research.

Non-face emoji convey direct and indirect meaning in contrast to face emoji which allow for communication of many emotional and sentimental states. If an emoji is used inappropriately, it will take more time and effort to understand, which can lead to hesitation, hence the ambiguity (Walther & D'Addario, 2001). Processing fluency is best served as a direct cue in providing information that is easily applied and absorbed effortlessly in order for people to understand clearly. In other words, non-face emoji appear to enhance positive communication by conveying information, but this role might change given a differing context or differences of use within the type of friendship. Therefore, choices of non-face emoji may differ for the purpose of understanding and may ease or cause difficulty of processing.

A number of limitations to this study must be considered. It is noteworthy that the reaction times were far longer than would be found in laboratory conditions and this suggests that this was not a sensitive measure when conducted online by participants without supervision. In addition, the single message format may have been too brief a presentation given that messages are normally within a thread of conversation and that emoji use is context specific. This may limit generalisations. Notwithstanding these limitations, the observed findings emerged in the within subjects design suggesting that the measures were appropriate.

Daniel and Camp (2020) suggested that emoji could serve as a means to increase fluency. However, the present study and that in the previous chapter suggest that emoji are multi layered and context specific, with differences between face and non-face types, and that there is more complexity in mapping out the boundary conditions for a processing fluency

effect. Message valence emerges as an important factor, with different patterns for positive and negative messages. The findings suggest that the potential processing fluency effect of emoji is much more complex and context dependent than might initially be assumed. This chapter and the previous chapter replicate and extend the findings from Daniel and Camp's (2020) study.

Chapter 8

General Discussion

Chapter Eight

8.1 General Discussion

The main goal of this thesis was to examine the influence of face and non-face emoji as a means to increase processing fluency in positive and negative contexts. This was examined using readers' ratings of processing fluency measures (i.e., understandability and believability, and/ or efficiency in transmitting meaning and clarity in meaning) and measures of rapport (i.e., interest in the friendship and improvement of the friendship). Additionally, this thesis has explored the boundary conditions whereby emoji increase or decrease processing fluency. This is one of the first experimental studies to examine the different effects of face and non-face emoji as a function of message valence.

One of the key objectives of this thesis was to explore how face and non-face emoji affect perceptions of text messages of positive and negative valence. Recognising the valence of the message gives the receiver of the text message the opportunity to understand and acknowledge the sender's intentions, which will enable an efficient and clear response to be reciprocated. Little research has addressed the use of face and non-face emoji and the type of message valence in relation to processing fluency. There is therefore a significant research gap regarding the ease, speed and accuracy with which information can be processed and the conditions when emoji can serve in a processing fluency capacity in text messages. This thesis has contributed to existing literature in a variety of ways. These are outlined in more detail in the next section.

8.2 Overview of Findings

Chapter Two had a dual purpose; firstly, to examine the prevalence of emoji from a sender's perspective as well as other contextual characteristics in text messages and to understand any relationships to measures of self-presentation, particularly self-consciousness, social anxiety

and self-monitoring. It was predicted that emoji would fulfil a self-presentation function in private text messages. Findings revealed that face emoji, but not non-face emoji, correlated positively with public self-consciousness and social anxiety, although overall the contribution of the personality variables to emoji use was modest. The data showed that face emoji were a common feature when sending text messages although there with few to weak associations with measures of self-presentation and personality. Regarding linguistic types, there were a small number of textisms with no effects of personality. A database of frequently used emoji was developed based on the data in Chapter Two and this informed the design of the subsequent chapters.

Overall, these findings are important and add to the literature as they show that face emoji are a common feature in positive messages that serve a number of functions, such as facilitating positive communication (Pohl et al., 2017; Tauch et al., 2016). Further analysis revealed that there were differences in emoji use as a function of message valence with emoji appearing in positive messages more so than in neutral or negative messages. This is consistent with a processing fluency account of emoji use (e.g., Daniel & Camp, 2020) and with Spencer-Oatey's (2000) Rapport Management Model.

The subsequent chapters examined the functionality of face and non-face emoji from a reader's perspective. The focus was now centred on readers' ratings of efficiency and clarity in transmitting its meaning (and in later chapters understandability and believability) in terms of a processing fluency account. The rapport measures were adopted from Rodrigues et al. (2017) study (interest and improvement of the friendship). Experiments 2, 3 and 4 were designed as a between participant experimental design and experiments 5 and 6 used a within participants design.

Chapter 3 was a replication of Rodrigues et al. (2017) study. Regarding the measures of rapport, findings revealed that messages with a face or a non-face emoji received higher ratings than messages with no emoji but only for the ratings of interest in the friendship. Positive messages received higher ratings of rapport (i.e., interest and improving the friendship) compared to negative messages. Though Rodrigues et al. (2017) found a 'softening effect' for emoji in that negative messages with emoji were rated as indicating a greater interest in the friendship and as being more positive, this was not found in the present study, with no interaction effect found. Findings from Rodrigues et al.'s (2017) second study had shown that when a serious message is presented the addition of an emoji had a negative effect on ratings of positivity and interest, but this was not the case in the present study. In relation to the measures of fluency (i.e., efficiency and clarity), an interaction effect was evident between valence and emoji. Both efficiency and clarity in meaning were rated highest in the negative messages when there was no emoji present. There was no difference between face and non-face and no emoji conditions when the message was positive. This would suggest that processing fluency is increased for negative messages when no emoji is present. Therefore, it appears that in a negative message less cognitive effort was required to process the message when there was no emoji in the message. Therefore, emoji can have a detrimental effect on the efficiency and clarity of the message when the message is negative. This is consistent with the findings of Rodrigues et al. (2017)

Based on the findings from Chapter 3, it would be expected that the use of non-face emoji will have a negative effect on measures of fluency in negative messages. In Chapter 4, messages with non-face emoji that supplemented or substituted for words were compared to a no emoji condition and an emoji final condition. Regarding the measures of rapport (i.e., interest in the friendship and improving the friendship), positive messages were rated higher overall than negative messages. For improving the friendship, messages containing emoji

received higher ratings than in the no emoji condition. This would suggest that the use of an emoji has a rapport building effect. Regarding efficiency, positive messages (small effect) were rated higher compared to negative messages. There were no effects found for emoji conditions. However, ratings for clarity in meaning had no effect for message valence or emoji conditions and a ceiling effect may have occurred. In conclusion, the presence of a non-face emoji increased participants' ratings of improving the friendship compared to messages with no emoji. Of the six dependent variables, five showed an effect of valence, showing that message valence is an important factor.

Chapter 5 built on the previous chapter and examined the effect of a face emoji varying in placement in a standard text message. For the measures of rapport, findings revealed positive messages were rated higher than negative messages for both interest and improving the friendship. Moreover, there was no main effect of emoji condition or interaction effect regarding interest or improving the friendship. This would suggest that there was no effect of face emoji on building a rapport. Regarding the processing fluency measures (i.e., efficiency and clarity) no effects of emoji types or messages valence was observed. These findings contrast with those of Rodrigues et al. (2017) and suggest that any effect of face emoji may be specific to the message context.

Chapter 6 was an extension of Daniel and Camp's (2020) study which examined the presence of an emoji on the effect of processing fluency. Chapter 6 examined whether the presence of a face emoji in positive and negative messages affected understanding, believability, comparing congruent, incongruent and neutral conditions using a repeated measures design. Where Daniel and Camp (2020) included two processing fluency measures (understandability and believability), the present study included two additional measures of fluency (efficiency and clarity) as used in the Rodrigues et al. (2017) study and the preceding chapters. Findings revealed that ratings of understandability and believability of the text

messages were highest for positive messages, with no interaction effect evident for the understandability and believability variables. In addition, ratings of understandability and believability were lowest for incongruent conditions. The valence of the message was a significant factor across all seven dependent variables, pointing to differences between positive and negative messages that need to be considered in the design of such studies (e.g., Steinert et al., 2022).

In relation to the rapport measures i.e., interest and improving the friendship, ratings differed for the congruency conditions as a function of whether the message was positive or negative given the interaction effects. Ratings for interest in the friendship and improving the friendship were highest in the congruent condition, but only when the message was positive. For negative messages, congruency had no effect for interest in the friendship. However, ratings of improving the friendship were highest for the negative incongruent condition compared to congruent and neutral conditions. This suggests that an incongruent emoji may help to 'tone down' the negative message resulting in the higher ratings. This is a consistent pattern with a 'softening' effect shown in Rodrigues et al. (2017) and in Chapter 4.

Ratings of efficiency in transmitting its meaning revealed a moderate interaction effect with higher ratings for positive messages in the emoji congruent condition. For clarity in meaning there was no interaction effect; ratings for clarity were rated highest in positive conditions and in congruent messages.

The differences in the patterns seen for measures of understandability, believability, clarity and efficiency suggest that the measure used as an indicator of processing fluency is responsive to differences in wording. It remains to be determined what are the best measures of processing fluency: the measures of fluency used by Daniel and Camp (2020) or efficiency and clarity as presented by Rodrigues et al. (2017) while not explicitly linked by them to

processing fluency. Overall, the results have shown a clear-cut effect for processing fluency (for congruent conditions) for understandability, believability, efficiency and clarity in meaning, with a moderate interaction effect for efficiency displaying an enhanced effect of congruency for positive messages.

Response times showed no effect of emoji type; faster response times in congruent conditions did not occur. There was an overall effect for valence with positive messages read more quickly. Overall, however, the long response times and the use of an online task are a concern.

Finally, in Chapter 7 ratings of understandability and believability showed an effect of message valence as well as an interaction effect with the effect of congruency apparent for positive messages. These findings are consistent with Daniel and Camp (2020) and suggest understandability and believability are increased when an emoji is congruent to the message. It is also in line with Tso and To (2020) who suggested that the inclusion of an emoji promotes connectedness and improves the tone of the message. In relation to one measures of rapport, interest in the friendship, there was an effect for both message valence and an interaction effect with ratings highest for positive messages containing an emoji. There was no effect of congruency types for negative messages in ratings of interest in the friendship. However, emoji had no effect on ratings of improving the friendship. Ratings of improving the friendship showed a main effect of message valence but no effect for congruency types or an interaction effect. The Chapter 7 results suggested that message valence is an important factor with effects showing across all seven dependent variables. Chapter Seven also showed an interaction effect in response times, with faster responses for positive congruent messages.

Ratings of efficiency showed an interaction effect with higher ratings for positive messages in the emoji congruent condition. This suggests a processing fluency effect when the

emoji is matching with messages that are positive in valence. The was no effect shown in negative messages. Clarity in meaning findings were similar to Chapter 6, were there was no interaction effect; ratings for clarity were lowest for incongruent messages.

Taken together, the correlational data suggest a strong relationship between the processing fluency measures and the rapport measures, across the chapters. Chapter Two was the exception; the other experiments show strong correlations between the variables consistent with Rodrigues et al.'s (2017) findings. While Rodrigues et al. noted correlations between their measures of rapport and message efficiency, they did not interpret this relationship using a processing fluency account. Doing so suggests that the effect of text messages on rapport may be related to ease of processing. Processing fluency creates positive affect which in turn has a positive effect on rapport.

8.3. Emoji and message valence

Message valence might be expected to affect perceptions of text messages between friends, given that a negative message will be more threatening to face compared to a positive message (e.g., Brown & Levinson, 1978). Across the six experiments, valence emerged as the most influential factor affecting participants' ratings. This applied to both the measures of rapport and to those of processing fluency. Positive messages had a rapport building function and also were rated highest on measures of fluency. Interactions between valence and emoji were less consistent across the six experiments. In the context of Rodrigues et al. (2017) study, the addition of an emoji was seen to have a detrimental effect in a more serious message. They found that emoji signalled less interest in the relationship when the message content was more serious. Interpreting their results through a processing fluency account, this trend would be expected given that a more serious message is more cognitively demanding and potentially threatening to face. The addition of an emoji would further burden to processing capacity. The findings across the six experiments reported here do not support this pattern of results. In

Chapters Six and Seven, the addition of an emoji affected ratings of interest in positive but not negative messages. It may be the case that the specific messages used, and the choice of language used underlies the effect. Further research would be needed to establish whether the effect of message seriousness stands, as reported by Rodrigues et al. (2017).

Daniel and Camp (2020) found an effect of processing fluency for message congruent emoji but did not manipulate message valence. The current experiments show that valence is an important factor and can interact with emoji in some contexts. This emerged strongly in Chapter Seven using non-face emoji, where the effect of congruency on both understandability and believability was restricted to positive messages.

For the measures of fluency (efficiency and clarity) in Chapter 3, emoji had no effect on ratings of clarity and efficiency when the message was positive. Negative messages were rated highest when no emoji was present, therefore processing fluency was enhanced. The presence of a negative message with an emoji implies further cognitive effort is required, as such this may lead to uncertainty and cause a detrimental effect on perception of the message. Therefore, in a negative message, adding an emoji complicates matters instead of facilitating processing; there is no guarantee that emoji will always be facilitative, and it seems possible that emoji will sometimes impede upon the perception of a sender's intended meaning. However, this pattern was not observed in Chapters Four and Five, with non-face and face emoji respectively. In Chapters Six and Seven, the addition of an incongruent emoji was seen to reduce ratings of efficiency in negative messages, suggesting a similar effect. Overall, it would seem that emoji are used more often in positive messages and users are likely to believe their use facilitates positive communication (Pohl et al., 2017; Tauch et al., 2016). Consistent with Rodrigues et al. (2017), these experiments suggest that emoji can have a less predictable effect when the message is negative.

However, the current findings vary across chapters and overall suggest that emoji are context specific and sensitive to message content. As discussed in Chapter 1, Sampietro (2019, p.117) suggested that emoji are perceived as a form of "phatic communion" and can have a playful, comical function irrespective of the whether the message is positive or negative. Depending on the context and the specific message, the effect may differ.

8.4 Differences between face and non-face emoji

Not only is the boundary set by the type of message valence, but face and non-face emoji also show different effects. The potential for ambiguity may be heightened for various types of face and non-face emoji used. Therefore, the types of emoji may differ as a purpose of understanding the ease or difficulty of processing fluency as discussed in Chapter 1 (Alter & Oppenheimer, 2009). Riordan (2017) suggested that non face emoji have a better way of communication than using extra words and this may provide a more flexible communication purpose as face emoji. Two studies by Riordan 2017 a,b) have demonstrated that non-face emoji play a role in disambiguating messages and communicating affect. Such findings seem to suggest that non-face emoji are used to fulfil a similar pragmatic function as face emoji, which Riordan (2017b) notes is surprising given the different types of emoji which can convey a wide variety of concepts, ideas, objects and be used literally or metaphorically.

Chapter Three compared face and non-face emoji directly. While there were some differences between emoji and no emoji conditions, there were no differences between the two emoji types. In Chapters Four and Five, effects emerged using non-face emoji (Chapter Four) where no effect was evident using face emoji (Chapter Five). As previously mentioned in Chapter One, representations of objects in particular are more concrete (see Table 1.1) and less open to interpretation than face emoji, albeit they can have literal, non-literal and personalised meanings. In Chapter Four, the use of a non-face emoji produced higher ratings for improving the friendship compared to messages with no emoji, but not for face emoji. However, as the

results indicated this may have also been restricted by a ceiling effect, since both measures of fluency (i.e., efficiency and clarity) in Chapters Four and Five reached a mean score of six and above on the 7-point Likert scale. In addition, message valence emerged as an important key factor in both studies, but there was no interaction between valence and either emoji type.

Although in Chapter Six and Seven, interaction effects are evident for non-face emoji but not face emoji on a number of the measures and there are subtle differences evident. This suggests that under some conditions, emoji type interacts with message valence affecting fluency. The findings suggest that effects of emoji type are highly context specific and may well be affected by the particular messages used as well as valence. Therefore, differences in text messages may underlie some of the effects. the data suggest that there is a need to differentiate between the types when designing experiments in this area and to map out the boundary conditions for the effects on processing fluency.

8.5 Rapport building and processing fluency

The experiments reported here bring together the processing fluency account as proposed by Daniel and Camp (2020) with the rapport measures used by Rodrigues et al. (2017) which can be interpreted in light of Spencer-Oatey's (2002) rapport management mode. Across the experiments, in general, ratings of efficiency and clarity correlated highly with each other, and the ratings of rapport were strongly associated with measures of processing fluency. However, there were also differences between the four measures of processing fluency used in Chapters Six and Seven, suggesting that the wording given to participants has an effect on results.

The differences between measures reflect the complexity of the processing fluency construct and the many ways in which the ease with which information is processed might be measured. Understandability and believability appeared to have facilitated the connection between measures of fluency (i.e., Q1, Q2, Q6 and Q7) and measures of rapport (i.e., Q4 and

Q5). In Chapter Six, regarding fluency, ratings of understandability and believability were rated highest for positive messages and for congruent messages, with no interaction effects. This suggest that messages were rated as easier to understand and more believable than messages with no emoji or incongruent for the messages context. This is consistent with Daniel and Camp's (2020) findings and with a processing fluency account. Chapter Six and Chapter Seven showed an interaction effect that emerged in the efficiency measures but not for clarity in meaning. It would appear that the wording used in eliciting participants' ratings is of key importance and that understanding of the key terms – efficiency, clarity, understandability, believability – may require further exploration. The absence of standard measures of processing fluency may also have affected results. As research in this area develops further, such measures may well emerge.

Effects may interact further with emoji types, and individual emoji used, given the contrasting patterns seen for face (Chapter Six) and non-face types (Chapter Seven). Daniel and Camp (2020) used a selection of face emoji along with two common non-face types (a heart and thumbs up). In that study, it is unclear whether the processing fluency effect is attributable to the face or non-face type. The findings in Chapter Six and Seven show that the effect of congruency applies for both face and non-face types. However, in Chapter Seven an interaction with messages valence emerged when using the non-face emoji type alone. The ratings of understandability and believability were highest in the negative messages when no emoji were present i.e., the effect of congruency was restricted to the positive messages. This qualifies the findings from Daniel and Camp (2020) and suggests that the effect noted by Rodrigues et al. (2017) is of relevance here also.

8.6 Limitations

There are a number of limitations to the experiments described here. Due to COVID-19 and related public health guidelines, there were necessary restrictions put in place, particularly around experimental research and recording participants' response times in a laboratory setting was not possible. The experiments were initially designed to record participants' response times when presented with randomised screenshots via a laptop computer using a Super-Lab 4.0 stimulus presentation software program. Following ethical approval, the decision was made to proceed with the remaining experiments and revert to introducing an online Qualtrics survey and maintain a safe and protective environment. This required a complete re-design of the studies and preparation of the materials in a survey format. The survey was to be conducted online, in line with the public health guidelines, and experimental control and collection of precise reaction times therefore had to be completely abandoned. While the laboratory provides more of an experimental controlled environment, the online method was somewhat of a challenge in relation to the remaining chapters. Response times could only be collected in Chapters 6 and 7 (following a change to the survey platform) and they were notably slow. Though the results produced some interesting findings, and a strong effect of valence, it would have been desirable to record more accurate response times.

Another limitation related to the pandemic was the restriction in place that prevented personal contact. This resulted in a complete freeze on collecting naturalistic raw data from participants. The initial plan was to collect a sample of ten text messages from each participant (as in Chapters Two and Three). Participants were unable to submit a sample of ten text messages that they had recently sent from their mobile phone using the online methodology. Additionally, it should be noted that online participation is completely out of the researchers hands with regard to gender balance, age, environment, type of computer device and attentional levels.

8.7 Future Research

In addressing the above-mentioned limitations, any future experiments should aim to collect data in controlled within laboratory conditions. In addressing the limitations of Chapter 6 and 7 it would be interesting to examine more boundary conditions, such as cultural differences (Guntuku et al., 2019), as in comparing different emoji meaning interpretations based on specific emoji across various countries. In addition, other methods might be used. Eye tracking methods may help strengthen the above conclusions by measuring how long participants focused on either face or non-face emoji compared with the text itself. Furthermore, one might suggest that the semantic processing of face compared to non-face emoji in a text message by means of event related potentials may demonstrate whether there is greater activity by comparing the N400 (indicator of sematic processing) and N600 (concerned with reading grammatical errors). In particular, it is beneficial to further examine the text message narratives in its totality rather than focusing on one or two text 'bubbles'. Furthermore, other measures of fluency and rapport which provide a more objective measure might be employed. For example, reaction times tasks, galvanic skin response and eye-tracking, within a laboratory-controlled context, may provide more stringent controls and more sensitive measures. Such alternatives may now be possible in the context of a post-pandemic in-person return to experimental participation.

8.8 Conclusion

In conclusion, this thesis presented six experiments which examined how face and non-face emoji served as a means to increase fluency and maintain a rapport in positive and negative text messages. Overall results supported the processing fluency account of emoji but noted more complex and sensitive perceptions of emoji than originally assumed. Message valence emerged as a key factor with different effects in positive and negative messages. In addition, the findings point to a relationship between measures of fluency and those of rapport. The

findings point to the need to consider both message valence and emoji type when designing studies in this area.

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Appendices

Appendix A: Positive face emoji mobile screen shots used in Experiment 2 (Chapter 3)

Appendix B: Positive Non-face emoji mobile screen shots used in Experiment 2 (Chapter 3)

Appendix C: Positive No emoji mobile screen shots used in Experiment 2 (Chapter 3)

Appendix D: Negative face emoji mobile screen shots used in Experiment 2 (Chapter 3)

Appendix E: Negative non-face emoji mobile screen shots used in Experiment 2 (Chapter 3)

Appendix F: Negative no emoji mobile screen shots used in Experiment 2 (Chapter 3)

Appendix G: Positive non-face mobile screen shots across supplement, substitute, control and no emoji conditions in Experiment 3 (Chapter 4)

Appendix H: Negative non-face mobile screen shots across supplement, substitute, control and no emoji conditions in Experiment 3 (Chapter 4)

Appendix I: Positive face mobile screen shots across punctuate, non-punctuate, control and no emoji conditions in Experiment 4 (Chapter 5)

Appendix J: Negative face mobile screen shots across punctuate, non-punctuate, control and no emoji conditions in Experiment 4 (Chapter 5)

Appendix K: Positive messages with face emoji in a congruent, incongruent and neutral condition in Experiment 5 (Chapter 6)

Appendix L: Negative messages with face emoji in a congruent, incongruent and neutral condition in Experiment 5 (Chapter 6)

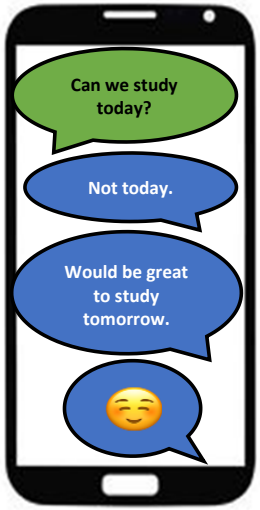
Appendix M: Positive messages with Non-face emoji in a congruent, incongruent and neutral condition in Experiment 6 (Chapter 7)

Appendix N: Negative messages with Non-face emoji in a congruent, incongruent and neutral condition in Experiment 6 (Chapter 7)

Appendix A

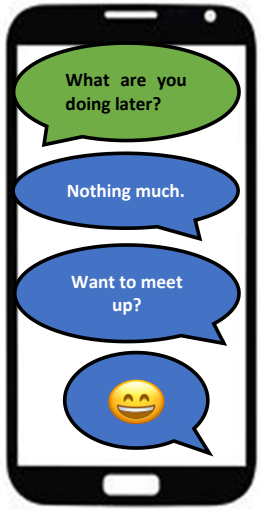
Positive Face Text 1

Positive Face Text 2



Positive Face Text 3

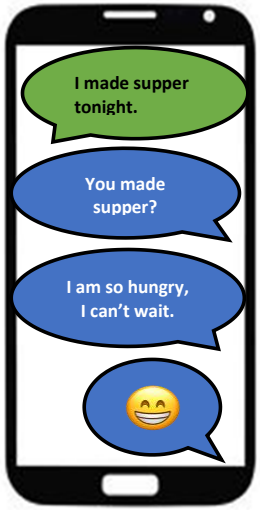
Positive Face Text 4



Positive Face Text 5

Positive Face Text 6

Positive Face Text 7



Positive Face Text 8

Positive Face Text 9

Positive Face Text 10

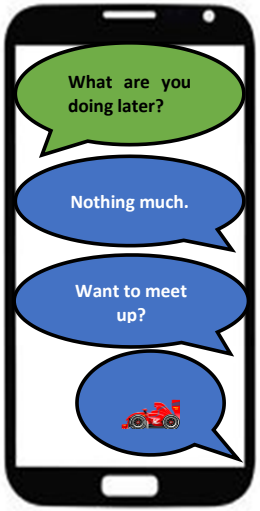
Appendix B

Positive Non-Face Text 1

Positive Non-Face Text 2

Positive Non-Face Text 3

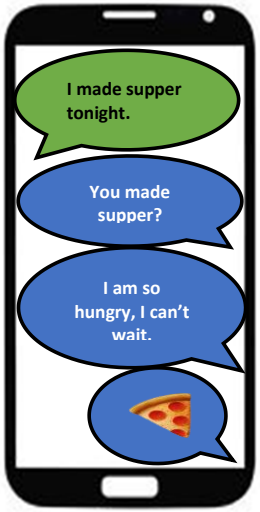
Positive Non-Face Text 4



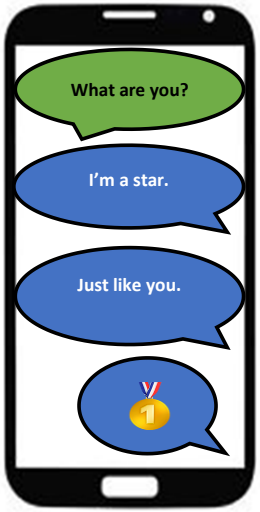
Positive Non-Face Text 5

Positive Non-Face Text 6

Positive Non-Face Text 7



Positive Non-Face Text 8



Positive Non-Face Text 9

Positive Non-Face Text 10

Appendix C

Positive No Emoji Text 1

Positive No Emoji Text 2

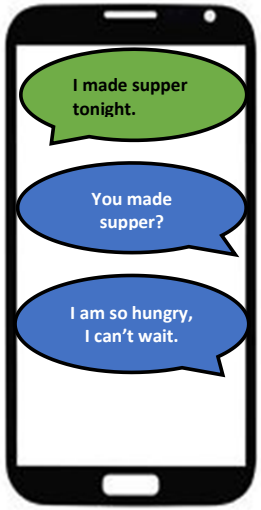
Positive No Emoji Text 3

Positive No Emoji Text 4

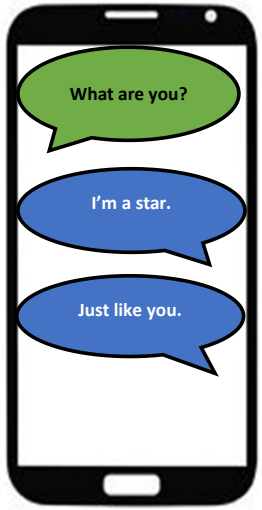
Positive No Emoji Text 5

Positive No Emoji Text 6

Positive No Emoji Text 7



Positive No Emoji Text 8



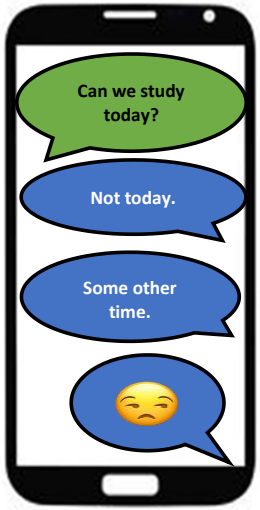
Positive No Emoji Text 9

Positive No Emoji Text 10

Appendix D

Negative Face Text 1

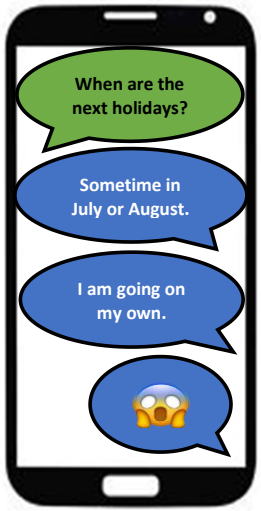
Negative Face Text 2



Negative Face Text 3

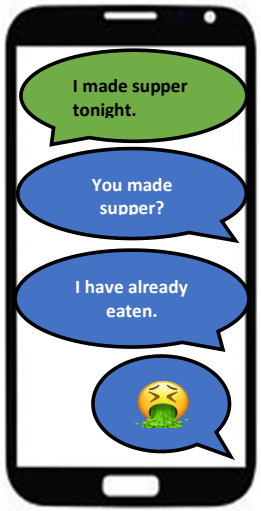
Negative Face Text 4

Negative Face Text 5



Negative Face Text 6

Negative Face Text 7



Negative Face Text 8

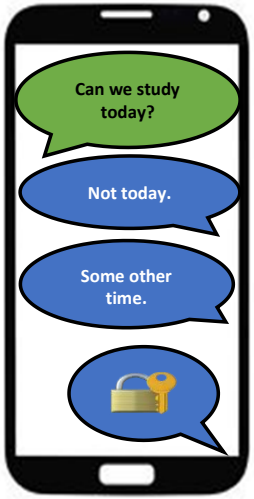
Negative Face Text 9

Negative Face Text 10

Appendix E

Negative Non-Face Text 1

Negative Non-Face Text 2



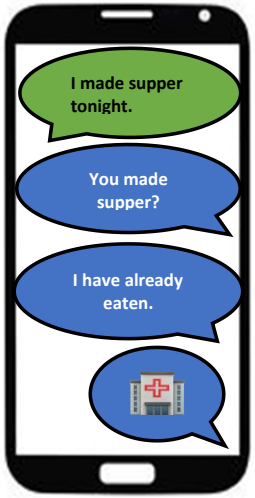
Negative Non-Face Text 3

Negative Non-Face Text 4

Negative Non-Face Text 5

Negative Non-Face Text 6

Neg Non-Negative Face Text 7



Negative Non-Face Text 8

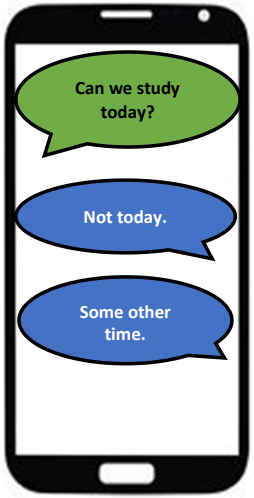
Negative Non-Face Text 9

Negative Non-Face Text 10

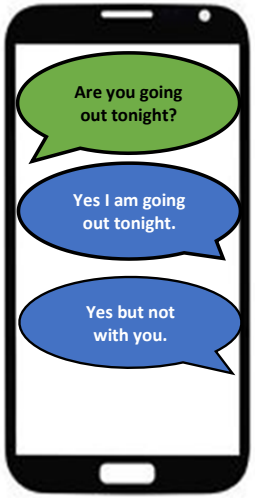
Appendix F

Negative No Emoji Text 1

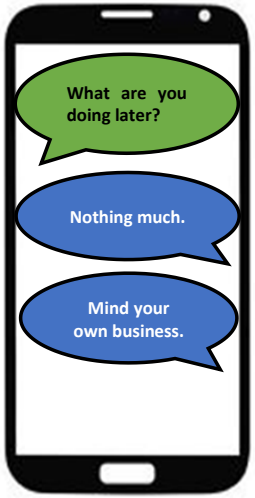
Negative No Emoji Text 2



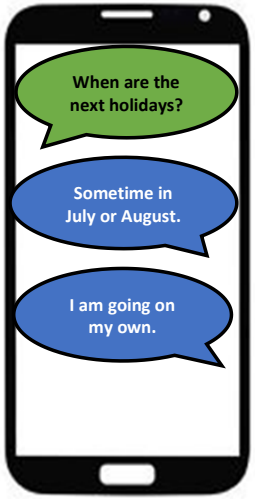
Negative No Emoji Text 3



Negative No Emoji Text 4



Negative No Emoji Text 5



Negative No Emoji Text 6

Negative No Emoji Text 7

Negative No Emoji Text 8

Negative No Emoji Text 9

Negative No Emoji Text 10

Appendix G

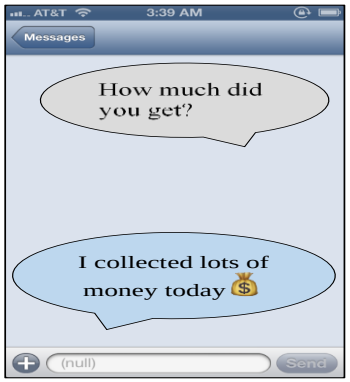
1 PSUPPO

P Supp = Positive Supplement

1 PSUBO

P Sub = Positive Substitute

1 PCONO



P Con = Positive Control

1 PNEO

PNE = Positive No Emoji

2 PSUPPO

P Supp = Positive Supplement

2 PSUBO

P Sub = Positive Substitute

2 PCONO

P Con = Positive Control

2 PNEO

PNE = Positive No Emoji

3 PSUPPO

P Supp = Positive Supplement

3 PSUBO

P Sub = Positive Substitute

3 PCONO

P Con = Positive Control

3 PNEO

PNE = Positive No Emoji

4 PSUPPO

P Supp = Positive Supplement
O = Object / Non-Face emoji

4 PSUBO

P Sub = Positive Substitute

4 PCONO

P Con = Positive Control

4 PNEO

PNE = Positive No Emoji

5 PSUPPO **5 PSUBO** **5 PCONO** **5 PNEO**

P Supp = Positive Supplement **P Sub = Positive Substitute** **P Con = Positive Control** **PNE = Positive No Emoji**

6 PSUPPO **6 PSUBO** **6 PCONO** **6 PNEO**

P Supp = Positive Supplement
O = Object / Non-Face emoji

P Sub = Positive Substitute **P Con = Positive Control** **PNE = Positive No Emoji**

7 PSUPPO

P Supp = Positive Supplement

7 PSUBO

P Sub = Positive Substitute

7 PCONO

P Con = Positive Control

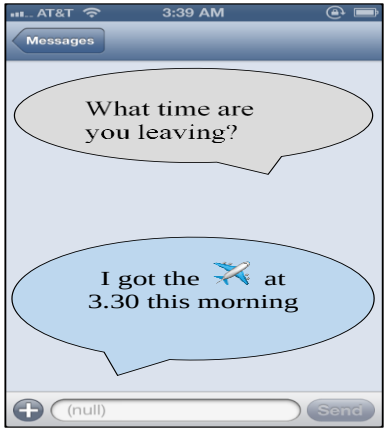
7 PNEO

PNE = Positive No Emoji

8 PSUPPO

P Supp = Positive Supplement
O = Object / Non-Face emoji

8 PSUBO



P Sub = Positive Substitute

8 PCONO

P Con = Positive Control

8 PNEO

PNE = Positive No Emoji

Appendix H

1 NSUPP0

NSupp = Negative Supplement

1 NSUBO

NSub = Negative Substitute

1 NCONO

NCon = Negative Control,

1 NNEO

NNE =Negative No Emoji

2 NSUPPO

NSupp = Negative Supplement
O = Object / Non-Face emoji

2 NSUBO

NSub = Negative Substitute

2 NCONO

NCon = Negative Control

2 NNEO

NNE = Negative No Emoji

3 NSUPP0

NSupp = Negative Supplement

3 NSUBO

NSub = Negative Substitute

3 NCONO

NCon = Negative Control

3 NNEO

NNE = Negative No Emoji

4 NSUPPO

NSupp = Negative Supplement
O = Object / Non-Face emoji

4 NSUBO

NSub = Negative Substitute

4 NCONO

NCon = Negative Control

4 NNEO

NNE = Negative No Emoji

5 NSUPPO **5 NSUBO** **5 NCONO** **5 NNEO**

NSupp = Negative Supplement **NSub = Negative Substitute** **NCon = Negative Control** **NNE = Negative No Emoji**

6 NSUPPO **6 NSUBO** **6 NCONO** **6 NNEO**

NSupp = Negative Supplement **NSub = Negative Substitute** **NCon = Negative Control** **NNE = Negative No Emoji**
O = Object / Non-Face emoji

7 NSUPPO

NSupp = Negative Supplement

7 NSUBO

NSub = Negative Substitute

7 NCONO

NCon = Negative Control

7 NNEO

NNE = Negative No Emoji

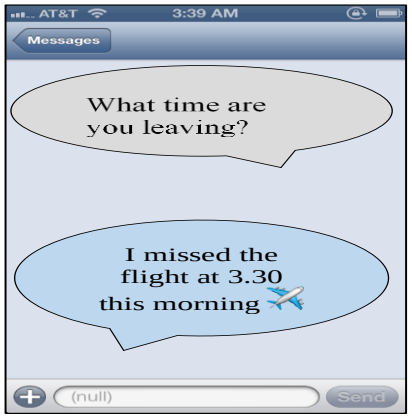
8 NSUPP0

NSupp = Negative Supplement
O = Object / Non-Face emoji

8 NSUBO

NSub = Negative Substitute

8 NCONO



NCon = Negative Control

8 NNEO

NNE = Negative No Emoji

Appendix I

1PPF

PPF=Positive Punctuated

1PNPF

PNPF=Positive Non-Punctuated

1PCONF

PCONF=Positive Control

1PNEF

PNEF=Positive No emoji

2PPF

PPF=Positive Punctuated
F = Face emoji

2PNPF

PNPF=Positive Non-Punctuated

2PCONF

PCONF=Positive Control

2PNEF

PNEF=Positive No emoji

3PPF

PPF=Positive Punctuated

3PNPF

PNPF=Positive Non-Punctuated

3PCONF

PCONF=Positive Control

3PNEF

PNEF=Positive No emoji

4PPF

PPF=Positive Punctuated
F = Face emoji

4PNPF

PNPF=Positive Non-Punctuated

4PCONF

PCONF=Positive Control

4PNEF

PNEF=Positive No emoji.

5PPF

PPF=Positive Punctuated

5PNPF

PNPF=Positive Non-Punctuated

5PCONF

PCONF=Positive Control

5PNEF

PNEF=Positive No emoji

6PPF

PPF=Positive Punctuated
F = Face emoji

6PNPF

PNPF=Positive Non-Punctuated

6PCONF

PCONF=Positive Control

6PNEF

PNEF=Positive No emoji.

7PPF

PPF=Positive Punctuated

7PNPF

PNPF=Positive Non-Punctuated

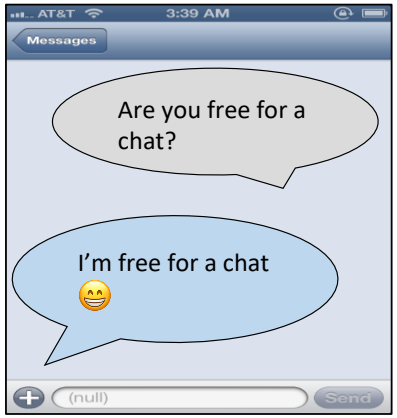
7PCONF

PCONF=Positive Control

7PNEF

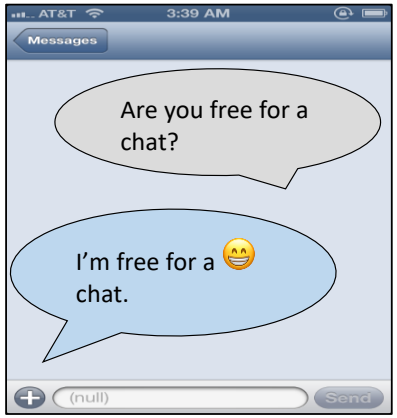
PNEF=Positive No emoji

8PPF



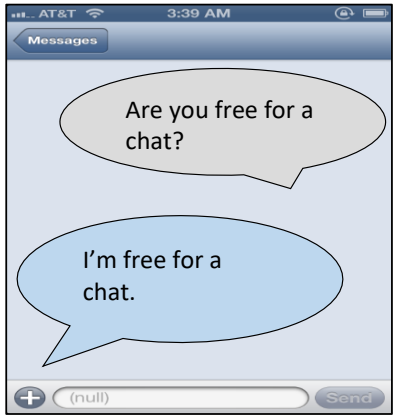
PPF=Positive Punctuated
F = Face emoji

8PNPF



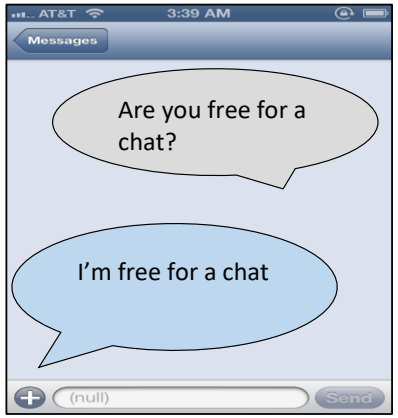
PNPF=Positive Non-Punctuated

8PCONF



PCONF=Positive Control

8PNEF



PNEF=Positive No emoji

Appendix J

1NPF

NPF=Negative Punctuated

1NNPF

NNPF=Negative Non-Punctuated

1NCONF

NCONF=Negative Control

1NNEF

NNEF=Negative No emoji

2PPF

PPF=Negative Punctuated
F = Face emoji

2PNPF

PNPF=Negative Non-Punctuated

2PCONF

PCONF=Negative Control

2PNEF

PNEF=Negative No emoji

3PPF **3PNPF** **3PCONF** **3PNEF**

PPF=Negative Punctuated **PNPF=Negative Non-Punctuated** **PCONF=Negative Control** **PNEF=Negative No emoji**

4PPF **4PNPF** **4PCONF** **4PNEF**

PPF=Negative Punctuated
F = Face emoji

PNPF=Negative Non-Punctuated **PCONF=Negative Control** **PNEF=Negative No emoji**

5PPF

PPF=Negative Punctuated

5PNPF

PNPF=Negative Non-Punctuated

5PCONF

PCONF=Negative Control

5PNEF

PNEF=Negative No emoji

6PPF

PPF=Negative Punctuated
F = Face emoji

6PNPF

PNPF=Negative Non-Punctuated

6PCONF

PCONF=Negative Control

6PNEF

PNEF=Negative No emoji.

7PPF

PPF=Negative Punctuated

7PNPF

PNPF=Negative Non-Punctuated

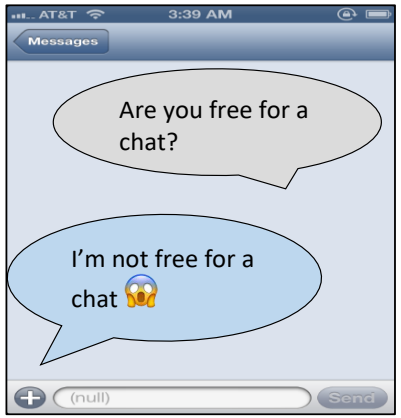
7PCONF

PCONF=Negative Control

7PNEF

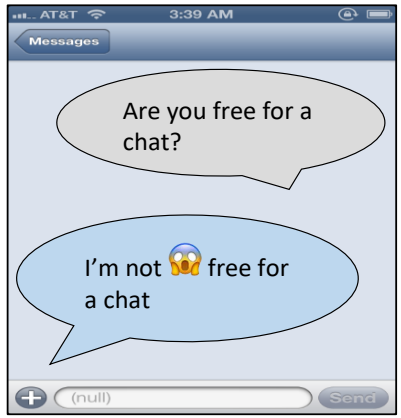
PNEF=Negative No emoji

8PPF



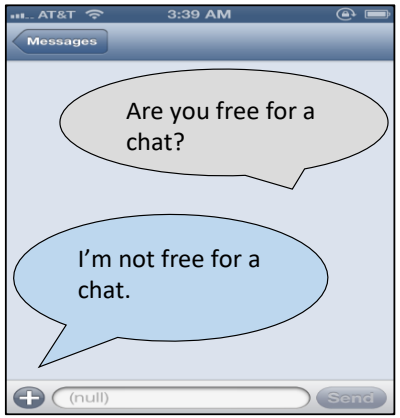
PPF=Negative Punctuated
F = Face emoji

8PNPF



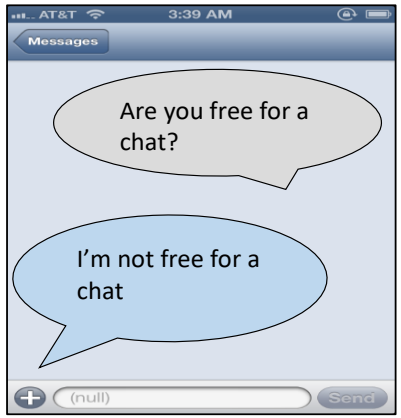
PNPF=Negative Non-Punctuated

8PCONF



PCONF=Negative Control

8PNEF



PNEF=Negative No emoji

Appendix K

	Positive Neutral x 12	Positive Congruent x 12	Positive Incongruent x 12
1	The morning after St Patrick's Day is going to be fun for anyone	The morning after St Patrick's Day is going to be fun for anyone 😂	The morning after St Patrick's Day is going to be fun for anyone 😭
2	Good morning and welcome to another day in paradise	Good morning and welcome to another day in paradise 😂	Good morning and welcome to another day in paradise 😭
3	Monday is looking pretty good so far	Monday is looking pretty good so far 😍	Monday is looking pretty good so far 😒
4	I have reached my 1K tweet mark It is such an achievement for a lazy little thing called me Yay	I have reached my 1K tweet mark It is such an under achievement for a fit little thing called me Ahh 😅	I have reached my 1K tweet mark It is such an under achievement for a fit little thing called me Ahh 😒
5	To be honest you look cute today	To be honest you look cute today 😀	To be honest you look cute today 😤
6	Happy Spring and thank you for all your support and allowing us to do what we love Wishing you a wonderful week	Happy Spring and thank you for all your support and allowing us to do what we love Wishing you a wonderful week 😁	Happy Spring and thank you for all your support and allowing us to do what we love Wishing you a wonderful week 🤔
7	First opinion so cute current opinion You are cute + funny + lovely	First opinion so cute current opinion You are cute + funny + lovely 😍	First opinion so cute current opinion You are cute + funny + lovely 🤔

8

Doritos with melted cheese my kind of night	Doritos with melted cheese my kind of night 😅	Doritos with melted cheese my kind of night 😩

9

Belated Happy Birthday I hope it is a big day God bless take care always	Belated Happy Birthday I hope it is a big day God bless take care always 😂	Belated Happy Birthday I hope it is a big day God bless take care always 😔

10

Would trade my own happiness in any day of the week to see the people I care about happy	Would trade my own happiness in any day of the week to see the people I care about happy 😘	Would trade my own happiness in any day of the week to see the people I care about happy 😤

11

How wonderful is this weather though	How wonderful is this weather though 😁	How wonderful is this weather though 😩

12

I was having a good hair day for once But this glorious sun just wants to see me to prosper I swear	I was having a good hair day for once But this glorious sun just wants to see me to prosper I swear 😁	I was having a good hair day for once But this glorious sun just wants to see me to prosper I swear 😔

Appendix L

	Negative Neutral x 12	Negative Congruent x 12	Negative Incongruent x 12
1	The morning after St Patrick's Day is going to be disastrous for anyone	The morning after St Patrick's Day is going to be disastrous for anyone 😠	The morning after St Patrick's Day is going to be disastrous for anyone 🥰
2	Good morning and welcome to another day in hell	Good morning and welcome to another day in hell 😠	Good morning and welcome to another day in hell 😇
3	Monday is looking pretty bad so far	Monday is looking pretty bad so far 😱	Monday is looking pretty bad so far 🤪
4	I have not reached my 1K tweet mark It is such an under achievement for a fit little thing called me Ahh	I have not reached my 1K tweet mark It is such an under achievement for a fit little thing called me Ahh 😡	I have not reached my 1K tweet mark It is such an under achievement for a fit little thing called me Ahh 😇
5	To be honest you look horrific today	To be honest you look horrific today 😱	To be honest you look horrific today 🤪
6	Happy Spring and thank you for all your disapproval and allowing us to do what we detest Wishing you a crap week	Happy Spring and thank you for all your disapproval and allowing us to do what we detest Wishing you a crap week 😡	Happy Spring and thank you for all your disapproval and allowing us to do what we detest Wishing you a crap week 🥰
7	First opinion so vile current opinion You are rude + ignorant + nasty	First opinion so vile current opinion You are rude + ignorant + nasty 🤮	First opinion so vile current opinion You are rude + ignorant + nasty 😇

8

Doritos with melted cheese my kind of nightmare

Doritos with melted cheese my kind of nightmare

Doritos with melted cheese my kind of nightmare

9

Belated Happy Birthday
I hope it is a crap day God bless take care always

Belated Happy Birthday
I hope it is a crap day God bless take care always

Belated Happy Birthday
I hope it is a crap day God bless take care always

10

Would not trade my own happiness in any day of the week
to see the people I care about happy

Would not trade my own happiness in any day of the week
to see the people I care about happy

Would not trade my own happiness in any day of the week
to see the people I care about happy

11

How dreadful is this weather though

How dreadful is this weather though

How dreadful is this weather though

12

I was having a good hair day for once
But this torrential rain just doesnt want to see me to prosper I swear

I was having a good hair day for once
But this torrential rain just doesnt want to see me to prosper I swear

I was having a good hair day for once
But this torrential rain just doesnt want to see me to prosper I swear

Appendix M

	Positive Neutral x 12	Positive Congruent x 12	Positive Incongruent x 12
1	The morning after St Patrick's Day is going to be fun for anyone	The morning after St Patrick's Day is going to be fun for anyone 👍	The morning after St Patrick's Day is going to be fun for anyone 👎
2	Good morning and welcome to another day in paradise	Good morning and welcome to another day in paradise 🏖️	Good morning and welcome to another day in paradise ☔
3	Monday is looking pretty good so far	Monday is looking pretty good so far 👍	Monday is looking pretty good so far 👎
4	I have reached my 1K tweet mark It is such an achievement for a lazy little thing called me Yay	I have reached my 1K tweet mark It is such an achievement for a fit little thing called me Ahh 🏅	I have reached my 1K tweet mark It is such an achievement for a fit little thing called me Ahh 🎀
5	To be honest you look cute today	To be honest you look cute today ❤️	To be honest you look cute today 🖤
6	Happy Spring and thank you for all your support and allowing us to do what we love Wishing you a wonderful week	Happy Spring and thank you for all your support and allowing us to do what we love Wishing you a wonderful week 🤘	Happy Spring and thank you for all your support and allowing us to do what we love Wishing you a wonderful week 👊
7	First opinion so cute current opinion You are cute + funny + lovely	First opinion so cute current opinion You are cute + funny + lovely ❤️	First opinion so cute current opinion You are cute + funny + lovely 🖤

8

Doritos with melted cheese my kind of night	Doritos with melted cheese my kind of night 🤟	Doritos with melted cheese my kind of night 👊

9

Belated Happy Birthday I hope it is a big day God bless take care always	Belated Happy Birthday I hope it is a big day God bless take care always 👏	Belated Happy Birthday I hope it is a big day God bless take care always 👇

10

Would trade my own happiness in any day of the week to see the people I care about happy	Would trade my own happiness in any day of the week to see the people I care about happy 🎖️	Would trade my own happiness in any day of the week to see the people I care about happy 🎀

11

How wonderful is this weather though	How wonderful is this weather though 🏝️	How wonderful is this weather though 🌂

12

I was having a good hair day for once But this glorious sun just wants to see me to prosper I swear	I was having a good hair day for once But this glorious sun just wants to see me to prosper I swear 👏	I was having a good hair day for once But this glorious sun just wants to see me to prosper I swear 👇

Appendix N

	Negative Neutral x 12	Negative Congruent x 12	Negative Incongruent x 12
1	The morning after St Patrick's Day is going to be disastrous for anyone	The morning after St Patrick's Day is going to be disastrous for anyone 🙊	The morning after St Patrick's Day is going to be disastrous for anyone 💞
2	Good morning and welcome to another day in hell	Good morning and welcome to another day in hell 🙏	Good morning and welcome to another day in hell 👐
3	Monday is looking pretty bad so far	Monday is looking pretty bad so far 🙊	Monday is looking pretty bad so far 💞
4	I have not reached my 1K tweet mark It is such an under achievement for a fit little thing called me Ahh	I have not reached my 1K tweet mark It is such an under achievement for a fit little thing called me Ahh 🙏	I have not reached my 1K tweet mark It is such an under achievement for a fit little thing called me Ahh 👐
5	To be honest you look horrific today	To be honest you look horrific today 👉	To be honest you look horrific today 🤝
6	Happy Spring and thank you for all your disapproval and allowing us to do what we detest Wishing you a crap week	Happy Spring and thank you for all your disapproval and allowing us to do what we detest Wishing you a crap week 👉	Happy Spring and thank you for all your disapproval and allowing us to do what we detest Wishing you a crap week ✌️
7	First opinion so vile current opinion You are rude + ignorant + nasty	First opinion so vile current opinion You are rude + ignorant + nasty 🔥	First opinion so vile current opinion You are rude + ignorant + nasty 💝

8

Doritos with melted cheese my kind of nightmare

Doritos with melted cheese my kind of nightmare

Doritos with melted cheese my kind of nightmare

9

Belated Happy Birthday
I hope it is a crap day God bless take care always

Belated Happy Birthday
I hope it is a crap day God bless take care always

Belated Happy Birthday
I hope it is a crap day God bless take care always

10

Would not trade my own happiness in any day of the week
to see the people I care about happy

Would not trade my own happiness in any day of the week
to see the people I care about happy

Would not trade my own happiness in any day of the week
to see the people I care about happy

11

How dreadful is this weather though

How dreadful is this weather though

How dreadful is this weather though

12

I was having a good hair day for once
But this torrential rain just doesnt want to see me to prosper I swear

I was having a good hair day for once
But this torrential rain just doesnt want to see me to prosper I swear

I was having a good hair day for once
But this torrential rain just doesnt want to see me to prosper I swear