Emotional and Cognitive Interpersonal Processes Associated with Online Social Networking

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Doctor of Philosophy

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</tbody>
</table>
TABLE OF CONTENTS

CHAPTER ONE: INTRODUCTION ................................................................. 6
  Social Relationship Development ................................................... 10
  Online Impression Formation and Communication ....................... 13
  Cognition and Emotions when Engaging with SNS ......................... 15
  Personality Factors and Engagement with SNS Posts ....................... 17
  The Current Thesis ........................................................................... 18

CHAPTER TWO: PSYCHOLOGICAL FACTORS AFFECTING THE USE OF
SOCIAL NETWORKING WEBSITES FOR BUILDING AND MAINTAINING
NON-ROMANTIC RELATIONSHIPS: A SYSTEMATIC REVIEW OF THE
LITERATURE .............................................................................................. 22
  Method .................................................................................................. 25
  Results .................................................................................................. 38
  Discussion ............................................................................................. 44

CHAPTER THREE: THE IMPACT OF NEGATIVE ONLINE SOCIAL
NETWORK CONTENT ON EXPRESSED SENTIMENT, EXECUTIVE
FUNCTION, AND WORKING MEMORY ....................................................... 50
  Method .................................................................................................. 55
  Results .................................................................................................. 60
  Discussion ............................................................................................. 68

CHAPTER FOUR: THE INFLUENCE OF EMPATHY AND SELF-
PRESENTATION ON ENGAGEMENT WITH SOCIAL NETWORKING
WEBSITE POSTS ...................................................................................... 73
  Method .................................................................................................. 76
  Results .................................................................................................. 82
  Discussion ............................................................................................. 90

CHAPTER FIVE: INTERACTIONS THROUGH SOCIAL NETWORKING
WEBSITES .................................................................................................. 94
  Method .................................................................................................. 98
  Results .................................................................................................. 103
  Discussion ............................................................................................. 108

CHAPTER SIX: DISCUSSION ................................................................. 115
  Key Findings ......................................................................................... 115
  The Impact of Cognition, Emotion, and Authentic Communication on
  Relationship Building and Maintenance .............................................. 124
  Directions for Future Research ............................................................ 125
TABLES

Table 2.1 Peer-Reviewed Empirical Research (2000 to 2015) Examining Psychological Factors Influencing SNS Use for Social Relationship Maintenance

Table 3.1 Sentiment Level Within Posts

Table 3.2 Descriptive Statistics for Demographic, Personality, and Situational Variables

Table 3.3 Correlations Between Variables - Study 1

Table 3.4 Mean Levels of Positive, Negative, and Overall Sentiment in Text Responses to the Neutral and Negatively Valenced Posts

Table 3.5 Mean Executive Function and Working Memory Performance Before and After Exposure to the Negatively Valenced Post

Table 3.6 Hierarchical Multiple Regression Model Predicting Sentiment Level Within Text Response to Negatively Valenced Post

Table 4.1 Sentiment Analysis Scores for SNS Posts Within Each Simulated Environment

Table 4.2 Descriptive Statistics for Demographic and Personality Variables

Table 4.3 Correlations Between Variables – Study 2

Table 4.4 Descriptive Statistics for Engagement with Negative, Neutral, and Positive Posts

Table 4.5 Hierarchical Multiple Regression Model Predicting Engagement with Negative Posts

Table 4.6 Hierarchical Multiple Regression Model Predicting Engagement with Neutral Posts

Table 4.7 Hierarchical Multiple Regression Model Predicting Engagement with Positive Posts

Table 4.8 Thematic Analysis of Qualitative Responses

Table 5.1 Number of Posts Depicting Negative, Neutral, or Positive Sentiment

Table 5.2 Descriptive Statistics for Demographic, Personality, and Situational Variables

Table 5.3 Correlations Between Variables – Study 3

Table 5.4 Hierarchical Multiple Regression Model Predicting Engagement with Posts

Table 8.1 Qualitative responses to negatively valenced post

Table 8.1 Engagement differences across condition

Table 8.2 Qualitative responses – study 2
Table 8.3 Engagement with Posts ........................................................................................................146
Table 8.4 Mean physiological response across conditions .................................................................146
Table 8.5 Effect of Exposure to Negative and Neutral Posts on Mood and Physiological Responses ........................................................................................................147
Table 8.6 Effect of exposure to negative and neutral posts on cognitive load ....147
Table 8.7 Core posts included in simulated SNS environment.................................................................164
Table 8.8 Neutral posts included in simulated SNS environment ..........................................................166
Table 8.9 Negatively valenced posts included in simulated SNS environment ........170

FIGURES

Figure 2.1. MOOSE flow diagram of the article review process...............................27
Figure 2.2. Proposed model of relationship development and maintenance process in SNS................................................................................................................................................46
Figure 6.1. Proposed process of SNS relationship development and maintenance. 118
Figure 6.2. Revised process of SNS relationship development and maintenance. 125
Figure 8.1. Neutral SNS posts - study 1 ........................................................................154
Figure 8.2. Digit memory test - study 1 ........................................................................155
Figure 8.3. Continuous performance task - study 1 .........................................................156
Figure 8.4. Emotional trigger - study 1 ........................................................................156
ABSTRACT

This thesis explores the use of social networking sites (SNSs) from social and cognitive psychological perspectives. It focuses on the interpersonal processes associated with interacting with emotionally negative SNS posts, and the use of SNSs for the development and maintenance of social relationships. The thesis aims to answer five key research questions. First, what are the main psychological factors emerging in the existing literature that are associated with social relationship building and maintenance through online social networks? Second, how does the personality trait of empathy affect users’ engagement with SNS content? Third, how does impression management affect users’ engagement with online social networking content? Fourth, what is the relationship between the valence of SNS content (negative or neutral), a secondary cognitive task and engagement with posts? Fifth, how does the amount and type of sentiment contained in SNS content affect users’ engagement? To address these research questions, a systematic review of the literature and three pieces of original research are presented in this thesis.

To address the first research question, the systematic review investigated the psychological factors associated with the use of SNSs for building and maintaining non-romantic relationships. It focused on websites that specifically facilitated personally identifiable interactions, and excluded social networks that focused on professional or romantic relationships. Literature was searched using keywords associated with SNSs and relationships. Studies included were those that empirically investigated psychological factors relating to use of online SNSs to form or maintain relationships. A search of full-text peer-reviewed research published in the English language revealed 21 papers, which focused on five main psychological factors: information overload, impression management, emotional contagion, perceived intimacy, and perceived social support.
Study 1 examined the impact of negatively valenced SNS content on the amount of sentiment included in participants’ text responses to such posts, as well as on their performance on executive functioning and working memory tasks. It was predicted that, after exposure to a SNS post containing negative sentiment, participants’ text responses to the negatively valenced post should have higher levels of sentiment than their responses to the neutral posts. It was also predicted that the level of sentiment that participants used in their responses to the negatively valenced post should be predicted by their initial mood, initial executive functioning performance, level of social desirability, and trait empathy (after controlling for demographic variables). Finally, it was predicted that after exposure to the negatively valenced post, participants should engage in emotion regulation strategies and, as a result, should score higher on executive functioning tasks and lower on working memory tasks compared to when they were exposed to neutral posts. Eighty participants aged between 18 and 67 ($M = 29.39$, $SD = 11.21$ years) completed baseline mood and cognitive measures (working memory and executive functioning) before exposure to four simulated SNS posts: three (neutral) control posts and one negatively valenced post. For each post, participants completed a free-text response or indicated that they would not respond. Participants then completed mood and cognitive measures a second time. After exposure to the negatively valenced post, participants’ mood was lower, and their performance on executive functioning tasks improved (as measured by reaction time and number of incorrectly identified target words). Participants’ responses to the negatively valenced post contained higher levels of sentiment than their responses to the control posts. After controlling for demographic variables, participants’ mood and trait empathy predicted the level of sentiment that they included in their responses to the negatively valenced post. These findings suggested that mood, executive function, and trait empathy contributed to
individuals’ engagement when faced with emotionally negative SNS posts.

Study 2 examined participants’ engagement with SNS posts containing positive, neutral, or negative sentiment. It was hypothesised that participants should show lower levels of engagement with negatively valenced posts than with positively valenced posts due to the increased cognitive and emotional effort associated with responding to negative posts. It was also hypothesised that trait empathy should predict participants’ engagement with SNS content. Motivation for engagement with posts was investigated through qualitative measures. Ninety-seven participants (18-63 years; $M = 26.32$, $SD = 8.68$) interacted with a simulated Facebook environment and were asked to describe the aspects of posts that encouraged them to comment. Participants then completed trait empathy, social desirability, and demographic measures. Results showed that participants liked, shared, and commented more on negatively valenced posts than positively valenced posts, however they hid more negatively valenced posts than positively valenced or neutral posts. Trait empathy and age significantly positively predicted engagement with negatively valenced and neutral posts; trait empathy and SNS environment predicted engagement with positively valenced posts. Participants described a number of aspects that encouraged them to comment on posts, including personal connections with the poster, humour or novelty of topic, personal interest in the topic, concern for or support for the poster, a positive message from or experience by the poster, and self-presentation concerns. Results suggest that if a poster wishes to increase the number of comments or the amount of engagement made in response to their SNS content, they should post neutral content aimed at close family and friends, which should encourage the highest level of engagement.

Finally, drawing upon findings from Studies 1 and 2, Study 3 examined associations between emotionally negative SNS posts, authentic communication,
self-presentation biases, and engagement with SNS content. It was predicted that if participants’ responses to negatively valenced posts were authentic, then their mood and engagement with the posts should decrease, and their cognitive load and physiological responses (heart rate and skin conductance) should increase. The 97 participants that participated in Study 2 also participated in Study 3. They completed baseline mood, cognitive load, and physiological measures before random assignment to a simulated neutral ($n = 47$) or negatively valenced ($n = 50$) SNS environment. After interacting with the environment, participants completed the mood, cognitive load, and physiological measures again, as well as trait empathy and social desirability scales. Results showed that participants in the negatively valenced SNS condition liked and shared fewer posts than those in the neutral condition. After interacting with the simulated SNS environments, participants’ moods were significantly lower, and their skin conductance increased; however, it did not matter whether they interacted with the negative or neutral environment. Participants in the negatively valenced SNS condition reported greater task difficulty, suggesting that negatively valenced posts increased the perceived difficulty associated with responding. Participants’ age, mood, social desirability, and self-reported cognitive load significantly predicted their engagement with SNS posts. Findings suggested that participants’ responses to the negatively valenced SNS posts were somewhat authentic as participants were less likely to engage with the content, and reported higher cognitive loads, than participants in the neutral condition. Overall, the valence of posts within the SNS environment influenced users’ interactions and judgments of task difficulty. Interactions with negatively-valenced posts appeared more authentic than interactions with neutral posts.

The main findings emerging from this original research are then discussed, including the key psychological factors associated with SNS engagement.
information overload, impression management, emotional contagion, perceived intimacy, and perceived social support); the impact of trait empathy on SNS engagement; the importance of authentic communication and impression management in SNSs; the impact of negatively valenced SNS content on cognitive functioning; and the impact of emotional SNS content on motivation to engage with content. Finally, the impact of cognition, emotion, and authentic communication in relationship building and maintenance are discussed.
CHAPTER ONE: INTRODUCTION

Online communication through social networking websites is changing the ways in which social relationships develop. No longer is it necessary to physically see or speak with a friend; it is now possible to stay up to date with day to day occurrences by idly scrolling through a website newsfeed. Social media and social networking website (SNS) use has increased considerably since 2003, when the SNS MySpace was established. It further increased with the establishment of other SNSs, such as Facebook in 2004 and Twitter in 2006. At the end of 2015, there were 305 million active Twitter users in 2015, and 72% of Facebook’s 1.5 billion users visited the website daily (Statista, 2015, 2016). Before the establishment of online social media websites, early online social communication methods were restrictive, text-based, and one-way asynchronous websites that provided little opportunity for users to engage (Beer & Burrows, 2007; Henderson, Edwards, Henderson, & Bowley, 2010). The development and public acceptance of social media has presented users with the unique opportunity to engage in synchronous conversations with other users, share media, and develop social or romantic relationships in new ways (Henderson et al., 2010).

The term “social media” refers to a broad group of interactive and collaborative websites and technologies that enable participation, connectivity, user-generated content, and sharing of information amongst a community of users (Henderson et al., 2010). Social media includes SNSs, social review sites, wikis, blogs, podcasts, vlogs, and online virtual worlds, and are used by people of all ages, however young people (20-29 years) are the majority of users (Statista, 2015). SNSs comprise any website that enables users to create or share a public or semi-public profile with the specific purpose of engaging in social networking with other users who may be previously known or unknown to them (Beer, 2008; boyd & Ellison,
These websites and associated applications provide a platform that allows users to construct a list of connected “friends” or those with whom they wish to share content, and the ability to view a list of their friends’ connections (boyd & Ellison, 2007; Kietzmann, Hermkens, McCarthy, & Silvestre, 2011). Users can personalise their profile by uploading photos, they can show preference for sporting teams or political parties, share videos or links to other websites, interact with celebrities or brands, and communicate publicly or privately with others, among other actions (Henderson et al., 2010).

There has been some debate around the definition of SNSs, as boyd and Ellison (2007) proposed that SNSs include any website that allows for a personal profile, provides a list of friends or connections, and that the connections can be made publicly available. They also proposed that social networking is not necessarily the primary function of many SNSs. However, Beer (2008) disagreed and argued that boyd and Ellison (2007)’s definition was too broad; instead, the definition should only encompass websites where networking (social or otherwise) is the primary aim. According to Beer’s definition, then, websites such as Facebook, Twitter, and the employment-related site LinkedIn are SNSs, whereas the video-sharing social media website YouTube and the scrapbooking website Pinterest are not SNSs, even though social networking is possible through those sites. Beer’s definition of SNSs was adopted in the current thesis.

Before the use of SNSs, a major barrier to the spread of information was the financial cost associated with the technology required to reach a large number of people (Stieglitz & Dang-Xuan, 2013). Information now spreads rapidly via SNSs, but its accuracy relies on the way in which it is passed on by each user as they

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1 Note, the lower case presentation of ‘boyd’ is intentional and in line with the preference of the author.
transmit the information through their personal list of connections (Chen, Sin, Theng, & Lee, 2015; Guille, Hacid, Favre, & Zighed, 2013; Kumar & Geethakumari, 2014). The mainstream acceptance and use of SNSs and other social media has changed not only the way that information is diffused throughout a community, but also the intentions behind, and structure of, the communication (Chen et al., 2015; Guille et al., 2013; Taylor, 2010).

One example of this change is that SNSs are increasingly utilised as a platform for increasing brand awareness in users through targeted marketing (Henderson et al., 2010), leading to an abundance of advertising within the sites, which is often disguised as user-generated material. This advertising has two main impacts on SNS users. First, if targeted marketing is integrated within a SNS news feed intelligently, users can mistake advertisements for the personal preferences of friends, thus influencing the brand awareness and shopping habits of users. The second impact of advertising is of a cognitive nature; if users are looking to genuinely connect with other users, then the distracting nature of targeted marketing may reduce the cognitive resources that users have available to engage with other people. Users who are already devoting their cognitive resources elsewhere (e.g., in communicating with their friends) are more likely to evaluate targeted advertisements as genuine than those who are entirely focused on the advertisement (Campbell & Kirmani, 2000).

Most SNSs, Facebook being a prime example, provide users with almost complete control over the information that they can disclose to others, which allows users to employ strategic self-presentation management (Ong et al., 2011). Users high in trait narcissism – that is, the trait inclination to have a highly positive or inflated self-concept (Campbell, Rudich, & Sedikides, 2002) – or self-objectification have been found to enhance their self-image by frequently posting photos depicting
extravagant events, as well as by editing their profile photos, posting “selfies” (that is, photos that users take of themselves that typically reflect their image positively), only posting particular status updates, and adding a large number of connections to their profile (Fox & Rooney, 2015; Ong et al., 2011). Furthermore, those with high levels of trait empathy – that is, the natural ability to understand the emotions of others or to shift one’s own emotion to match those of others (Kunyk & Olson, 2001) – have been shown to use SNSs primarily for interacting with others in positive ways and to use the private chat function more frequently than those with lower levels of trait empathy. Those with higher trait empathy also spend more time on Facebook, and have a greater emotional connection with Facebook (they either feel emotionally positive or negative about using the site) in comparison to those lower on trait empathy (Collins, 2014). Since narcissism is negatively associated with trait empathy (Ali, Amorim, & Chamorro-Premuzic, 2009; Watson, Grisham, Trotter, & Biderman, 1984), SNSs provide an ideal environment for those who have lower trait empathy to engage in narcissistic type behaviours, as these behaviours are often normalised and accepted by others within the online environments (Casale, Fioravanti, & Rugai, 2016).

Considering the rapidly changing nature of online social interaction, it is important to examine the impact that SNS use has on interpersonal relationships. Therefore, the aim of this thesis was to explore the use of SNSs from social and cognitive psychological perspectives, focusing on the interactions between personality factors, cognitive performance, mood, and situational aspects of SNSs (such as their valence). The following sections of this introductory chapter describe the factors that were examined in the original research contained in this thesis, including social relationship development, impression management, communication styles, cognitive load, and trait empathy.
Social Relationship Development

People have a fundamental desire to feel a sense of belonging with others, and this desire is typically achieved through the development and maintenance of social relationships (Baumeister & Leary, 1995). The ways in which relationships develop are learnt and adapted through people’s perceptions of others’ thoughts and feelings (Taylor, 2010). Relationships also develop through changes to social behaviours based on the norms of the social group (Taylor, 2010). In SNSs, users can interact one-to-one, one-to-many, and many-to-many; therefore, there is no one simple theory to explain why and how online social development processes occur (Lin & Lu, 2011; Taylor, 2010). However, several theories may help to contextualise the reasons that users choose to develop and maintain online relationships rather than (or in addition to) face-to-face relationships. These theories include individual and group based theories (self-efficacy theory, social identity theory) and social system theories (social penetration theory, social capital theory, social exchange theory).

Individual and group based theories such as self-efficacy theory and social identity theory provide a theoretical framework to identify the factors that lead SNS users to interact through the websites. Self-efficacy is a social cognitive theory that focuses on the concept of a person’s belief that they have influence over the outcomes of events in their lives (Bandura, 2004). A high level of self-efficacy is associated with higher levels of perceived freedom to pursue goals, and determines a person’s feelings, thoughts, motivations, and behaviours (Bandura, 2004). In SNSs, high levels of impression management self-efficacy (that is, the belief in one’s ability to control the impressions other have of them) were related to having a greater number of friends or connections on the site, a greater level of detail in users’ profiles, a higher number of public group memberships, and profile photos more
likely to depict the user at a party or posing for the photo (Krämer & Winter, 2008).

Social identity theory proposes that social groups provide people with social identities, that is, aspects of their self-concept corresponding to particular group memberships (Tajfel, 1974). When a particular social identity is salient, group members behave in accord with group norms, and are more positive towards, feel more cohesiveness towards, and are more influenced by in-group members than by out-group ones (Hogg, Abrams, Otten, & Hinkle, 2004; Tajfel & Turner, 1979). It is also possible that the nature of online communication can interact with social identity development, as research has found that sharing a common social identity can increase susceptibility to group influence and general discrimination in anonymous online communication (Postmes, Spears, & Lea, 1998).

If applied to SNS use, self-efficacy theory and social identity theory suggest that individuals, especially those high in impression management self-efficacy, are likely to use the controllable asynchronous nature and reduced availability of social cues in SNSs to manage the impressions that they present online, including to develop and display particular personal and social identities (Lim, Nicholson, Yang, & Kim, 2015; Taylor, 2010).

Social system theories such as social penetration theory, social capital theory, and social exchange theory allow for the understanding of the impact of interpersonal processes upon SNS relationship development. Social penetration theory (Altman & Taylor, 1973) suggests that relationships are built layer by layer through self-disclosure, where relationship partners first exchange superficial information (the orientation stage), then progress to sharing more personal information as intimacy develops (affective and stable stages). In online environments such as blogging websites, users are more likely to disclose personal information first to friends and parents before disclosing online (Tang & Wang, 2012).
Social capital theory proposes that a person’s social networks are an asset, typically measured by the structure of the social network and the resources available as a result of the social network (DiClemente, Crosby, & Kegler, 2009; Lin & Lu, 2011; Seibert, Kraimer, & Liden, 2001). In terms of SNS use, the number of connections publicly displayed on a website can allow a user to keep track of their social capital while sharing and comparing that capital with other users.

Similar in nature to social capital theory, social exchange theory (Emerson, 1976) applies a cost versus reward equation to relationship development, proposing that friendships are goal oriented, and that people only develop intimate social relationships with those who can return the same or a greater level of beneficial intimacy or support. Trust is included in the calculation of perceived benefit, with high trust between individuals resulting in low perceived cost of the relationship. High trust then leads to greater self-disclosure between friends in order to develop deeper intimacy (Metzger, 2004). In online interpersonal interactions, SNS users might be more likely to trust another user if their friend reciprocates online interaction (for example, likes or comments on posts), and therefore feel more comfortable disclosing personal information within the platform. In addition to this, the lack of nonverbal cues online may also encourage self-disclosure through reduced self-consciousness (Schouten, Valkenburg, & Peter, 2007).

These individual, group, and social system based theories form a foundation for understanding the type and frequency of communication in online environments. If a SNS user has high impression management self-efficacy, can manipulate the social cues associated with their personal and social identities, and perceives their “friend” list as part of their social capital, then the persona presented online may differ remarkably from that shown in face-to-face interactions (Bandura, 2004; Hogg et al., 2004; Lim et al., 2015; Postmes et al., 1998; Tajfel, 1974; Tajfel & Turner,
Online Impression Formation and Communication

The ease with which people can manipulate what they show to others on SNSs impacts the type and depth of communication exchanged online (Lim et al., 2015; Taylor, 2010). It also affects the impressions that people form when they engage in this communication. People form impressions of others using a variety of processes. The foundational impression formation model proposed by Asch (1946) proposes that people have an innate ability to develop an understanding of another person by cognitively processing and collecting the information gathered about them into a package. Social cognition models build upon Asch’s theory and place greater emphasis on the interactions between the information presented by other people and an individual’s prior knowledge or assumptions about those people that are based on related schemas (or categories of information) (Baldwin, 1992; Brewer, 1988; Fiske & Pavelchak, 1986). Social cognition theory allows for an understanding of how SNS users fill the gaps in the personas presented by other users, by applying generalisations developed through past experience of online interactions.

In traditional, or face-to-face, interpersonal relationship development, impression formation is strongly influenced by nonverbal communication including the gestures expressed by others, posture, tone of voice, dress style, and level of eye contact (Berger & Calabrese, 1975; Kraan et al., 2006; Ljepava, Orr, Locke, & Ross, 2013). When interacting online, there are fewer nonverbal cues to help people recognise emotion and the tone in which information is communicated (Walther, 1996, 2007); therefore, impression formation and management relies on limited nonverbal cues, such as the photos uploaded by the user and their typical online
Given the limited availability of nonverbal cues in online communication, people may put greater emphasis on the implied meaning behind each available cue. For example, Ellison, Heino, and Gibbs (2006) examined how nonverbal cues were used by individuals to give the best impression of themselves in their online dating profiles. Participants were critical of spelling and grammatical errors (which might suggest a lack of interest or education) and the mention of sexuality (which might indicate promiscuity) in online profiles. The researchers also examined nonverbal cues in potential partners’ communications, such as the time a message was sent, length of message, last login date, and photograph content.

In addition to impression formation, online communication also impacts group decision making and inhibition of communication. Online communication is often less restrained, leading to a greater depth of personal information being divulged and a relatively greater level of argumentative and inflammatory language being used (Suler, 2004). Research has shown that groups who communicate through a computer produce more divided decisions than do groups who communicate face-to-face (Lea & Spears, 1991). It is possible that, in online environments, users are more likely to express their uninhibited opinions in a way that they would usually censor when interacting in person.

An uninhibited online communication style is often referred to as the online disinhibition effect (Suler, 2004). This effect suggests that the online medium provides users with an opportunity to go against the social norms of polite conversation with strangers. Suler (2004) identified eight aspects that affect the quantity and quality of information exchanged through online text based communication: anonymity, lack of nonverbal cues, asynchronicity of conversation, estimation of tone, imagination of unknown partner characteristics, minimisation of
status and authority, stereotyping, and the ease of showing one’s true feelings. The online disinhibition effect indicates that communicating effectively online can be easier in some ways, but this communication may be misconstrued by the many factors that influence users’ choice of phrase in any given situation.

The impact of SNS use on how people communicate and the impressions that they form is complex, as there are many differences between online and face-to-face interactions. Since SNSs are often used to extend and make publically known pre-established offline social networks (boyd & Ellison, 2007), it can be expected that the friendships made visible online may differ to those experienced in person. The only requirement to be considered “friends” in an online space is a public presentation of the relationship (Tong, Van Der Heide, Langwell, & Walther, 2008). In contrast, face-to-face relationships can require an emotional give and take, with higher levels of practical support and trust (boyd, 2006). Such a process of emotional give and take in an online environment is likely to require attention and cognitive effort. Therefore, when considering the development of relationships in SNSs, and the communication that occurs in these relationships, it is also important to consider levels of emotion and cognitive effort.

**Cognition and Emotions when Engaging with SNS**

Engaging with emotionally laden SNS posts can be both cognitively and emotionally demanding for the users who read and interact with them. SNS posts containing high levels of sentiment (that is, the emotional tone that a person intends to convey) require more attention, which may lead to increased engagement with, and responses to, the emotional posts (Bayer, Sommer, Schacht, & Yovel, 2012; Berger, 2011). Since SNSs present a continuously updating news feed of information, the attention required to choose a post and respond to it appropriately may be high. In other words, users might experience a high cognitive load.
Cognitive load theory states that when people try to engage in more than one cognitive task at a time, there will be a reduction in their performance on both tasks, as working memory can only process a limited amount of information at once (Brunken, Plass, & Leutner, 2003). The ability of a user to process information is influenced by many factors, including the way or structure in which the information is presented, a user’s working memory ability, the sequencing of the information presented, and the user’s interest in the subject (Brunken et al., 2003; Paas, 1992; Paas & Van Merriënboer, 1994). There are three types of cognitive load: intrinsic, extraneous, and germane (Brunken et al., 2003; Pollock, Chandler, & Sweller, 2002). Intrinsic cognitive load is dependent upon the structure and complexity of the information presented; in SNSs, if a webpage is unstructured, complex, or cluttered, then a user needs to hold a larger number of units in their working memory in order to understand the information presented, and may find interacting with others on the site difficult (Pollock et al., 2002). Extraneous cognitive load is the overarching load associated with the format in which the information is presented, and the number of instructions required to engage in the content, rather than the understanding of the material itself (Brunken et al., 2003). In SNSs, extraneous cognitive load may be caused by a high number of advertisements or other distractions on the page that compete with actual content for the user’s attention. Finally, germane cognitive load refers to the effort required to process and comprehend the material being presented (Brunken et al., 2003). In SNSs, this load may be the user’s desire to pay attention to a particular post even if attending to the post requires greater effort than attending to other content.

When engaging with SNS content, the cognitive impact of a task can be reduced if a SNS user has experience with a particular website, and if they can anticipate the type of, and level of, emotion that they will encounter in the online
environment. If a SNS user has a high level of prior knowledge of the subject matter being discussed on the SNS, then the amount of cognitive load associated with the interaction may be reduced due to their ability to use available schemas (Brunken et al., 2003; Kalyuga, Ayres, Chandler, & Sweller, 2003). Additionally, if a SNS user can anticipate the level of cognitive load required before engaging in an online conversation, then the user may prime the associated emotion, and then regulate the associated emotional reaction, by employing protective strategies (Vaschillo et al., 2008). For example, if a user expected to have an upsetting online conversation, then he or she could imagine how they might feel upon encountering the negative emotion and prepare an appropriate emotional response.

In conjunction with the cognitive demands associated with engaging with emotional posts in SNSs, some personality factors are likely to influence the level of users’ engagement with SNS posts, regardless of the cognitive demands required.

**Personality Factors and Engagement with SNS Posts**

The personality of an SNS user affects the ways in which they use, or avoid using, websites for interpersonal relationships. SNS engagement has been associated with high levels of trait narcissism, low levels of trait empathy, high attachment anxiety, and low self-esteem, especially in relation to behaviours such as multiple profile photo posting, frequent status updates, general self-promotional behaviour, and overall online activity (Mehdizadeh, 2010; Ong et al., 2011; Trub, Revenson, & Salbod, 2014). Users with higher levels of extraversion, narcissism, self-esteem, and self-worth find using SNSs easier and rate their use as a more favourable pastime than do users with lower levels (Krishnan & Atkin, 2014; Ryan & Xenos, 2011). Interestingly, it has also been shown that users with both higher levels of narcissism and lower levels of self-esteem use SNSs more frequently, especially for self-promoting content (Mehdizadeh, 2010). These seemingly conflicting results suggest
that other personality factors, such as trait empathy, may affect how users with high levels of trait narcissism and low levels of self-esteem present themselves online.

Empathy is a complex process in which an individual (or observer) attempts to understand the emotions experienced by someone else (the target). Trait empathy is an innate natural ability to understand and experience empathy, while state empathy is the experience of empathy during a particular moment (Kunyk & Olson, 2001). The six most common features of empathy include feeling what someone else feels (affective matching), caring about the wellbeing of someone else, being emotionally affected by someone else’s emotions and experiences though not necessarily experiencing the same emotions (emotional empathy), imagining oneself in another’s situation (other-oriented perspective taking or cognitive empathy), imagining being another in that other’s situation (self-other differentiation), and making inferences about another’s mental states (cognitive empathy) (Coplan, 2011).

Although some of the associations between personality types—especially trait narcissism and SNS engagement—have been established, the impact of other personality types have not been. For instance, the role of trait empathy in users’ propensity to engage with SNS content is unclear and in need of further investigation. It is important to examine the role of personality types, such as trait empathy, in how users engage with SNS content because the related personality construct of trait empathy may impact on the type of self-presentation engaged in on SNSs, with those who exhibit high levels of narcissism and low levels of empathy potentially engaging in less authentic online communication styles.

**The Current Thesis**

This thesis explores the use of social networking websites (SNSs) from social and cognitive psychological perspectives. It specifically focuses on how users engage with and respond to particular types of SNS content, especially SNS posts imbued
with emotional content. In particular, the thesis aims to answer five broad research questions:

1. What are the main psychological factors emerging in the existing literature that are associated with social relationship building and maintenance through online social networks, including SNSs?

2. How does the personality trait of empathy affect users’ engagement with SNS content?

3. How does impression management affect users’ engagement with online social networking content?

4. What is the relationship between the valence of SNS content (negative or neutral), a secondary cognitive task and engagement with posts?

5. How does the amount and type of sentiment contained in SNS content affect users’ engagement?

The thesis begins with a systematic review of the existing literature investigating the psychological factors that affect the use of social networks such as SNSs for building and maintaining non-romantic relationships. This review then influenced the development and focus of three original research experiments, each of which contributes to the overarching research questions, but also addresses individual aims. The aim of Study 1 (Chapter 3) was to examine the impact of negatively valenced SNS content on the amount of sentiment included in participants’ text responses to such posts, as well as on their performance on executive functioning and working memory tasks. The aim of Study 2 (Chapter 4) was to identify participants’ motivations for engaging with SNS posts containing negative sentiment, neutral sentiment, and positive sentiment. The aim of Study 3 (Chapter 5) was to determine if participants’ responses to emotional SNS posts were authentic, by examining associations with self-presentation biases. Figure 1, below,
provides a graphical representation of the links between each of the studies and the key research questions. All survey instruments, study advertisement material, ethics approval, and administration documentation are provided in Chapter 8 (Appendices).

An experimental method using simulated SNSs is used within the original research as the focus of this thesis is on the factors influencing responses to emotionally valenced posts, which could not be easily manipulated through engagement with live SNS content. The experimental method allowed for a greater amount of emotional valence to be included within the simulated SNS environments than would normally be encountered within typical SNSs, allowing for cognitive performance interactions to be explored.

This thesis is not presented in a conventional thesis structure but as separate
studies submitted or intended for submission for publication, as a result there are fewer direct links between studies than a conventional thesis, however where appropriate links have been made. The structure of this thesis is as follows. Chapter 2 provides a systematic review of the literature. Original research is presented in Chapters 3, 4, and 5, with one study presented in each consecutive chapter. Chapter 6 summarises findings of the original research, discusses the outcomes associated with the key research questions, and outlines the implications of the findings for future research.
SNSs provide a platform for relationship building and facilitate the development and maintenance of relationships between those who may not have otherwise developed a connection in face-to-face situations (Ellison, Steinfield, & Lampe, 2007; Giota & Kleftaras, 2014). SNSs allow users to develop and monitor their social capital, which is the personal resources gained from possession of social relationships (Bourdieu & Wacquant, 1992; Coleman, 1988), by accruing a publically viewable list of ‘friends’ within their network (boyd & Ellison, 2007). Popular SNSs include Facebook and Twitter, and give users the ability to express thoughts either synchronously or asynchronously, publically or privately (boyd & Ellison, 2007; Kietzmann et al., 2011). Previous studies have examined the psychological components associated with online dating and romantic relationship building (Finkel, Eastwick, Karney, Reis, & Sprecher, 2012); others have focused primarily upon workplace relationships and social media use (De Choudhury & Counts, 2013; Treem & Leonardi, 2013). Although some research has examined the psychological factors that influence the use of SNSs for non-romantic relationships; there is a need to systematically review the findings from this research to integrate the existing findings and identify gaps in research methods.

When establishing face-to-face social relationships, impressions of others are strongly influenced by nonverbal communication through posture, gestures, tone of voice, dress, and eye contact (Kraan et al., 2006). However, when interacting online, nonverbal cues that should assist people in recognising emotion and tone are reduced, so users must rely on other means of detecting sentiment (Ellison et al., 2006; Ellison et al., 2007; Walther, Anderson, & Park, 1994). As a result, users may put greater emphasis on the implied meaning behind any nonverbal cues that are
available. For example, Ellison et al. (2006) examined how people used nonverbal cues to give the best impression of themselves in their online dating profiles. Participants were critical of spelling and grammatical errors (which might suggest a lack of interest or education) or the mention of sexuality (indicating promiscuity) in online profiles. Participants also examined nonverbal cues in potential partners’ communications, such as the time a message was sent, length of message, last login date, and photograph content (pets, friends, etc.).

Although there are several models of relationship building in face-to-face interactions that can be applied to SNS relationships (as outlined in Chapter 1), two main models are social penetration theory and social exchange theory. The first, social penetration theory, suggests that relationships are built layer by layer through self-disclosure, where relationship partners first exchange superficial information (the orientation stage), then progress to sharing more personal information as intimacy develops (affective and stable stages) (Altman & Taylor, 1973). In online situations, the relative lack of nonverbal cues may encourage self-disclosure through reduced self-consciousness (Schouten et al., 2007). The second model, social exchange theory, applies a cost versus reward equation to relationship development, proposing that people only develop intimate social relationships with those who can return the same or a greater level of beneficial intimacy or support (Emerson, 1976). In online situations, the use of text-based linguistic cues allow users to determine if an interaction contributes to the building or maintenance of the relationship, and if the conversation partner is investing the same level of attention or emotion in the interaction (Chan, 2014).

A number of psychological factors affect the development of face-to-face relationships at different stages within these models. These factors include the presence of common interests, level or amount of self-disclosure, attention to
personal details, display of empathy, and levels of perceived intimacy (Fehr, 1995). Some of these psychological factors may also affect the development of online relationships; for example, Preece (1999) demonstrated that displaying empathy, disclosing personal information, and sharing relevant or factual information were important in making users feel emotionally supported in online environments. However, the extent to which these psychological factors affect online relationships may be different to their impact on face-to-face relationships. Indeed, Tang and Wang (2012) found that online bloggers were less likely to disclose personal information such as attitudes, body composition, socioeconomic status, employment details, emotions, interests, or experiences to readers of an online blog, than they were to parents or best friends. The reluctance to disclose such information in an online medium may reduce the likelihood of developing intimate social relationships through social networks. However, over time and more online contact, this reluctance may decrease (Walther, 1992).

Another factor affecting the quantity and quality of information exchanged in online social settings is information overload, which refers to an overabundance of incoming sensory information that negatively affects people’s cognitive abilities and capacity to socially interact (Jones, Ravid, & Rafaeli, 2004). Information overload may occur in online settings due to overly long or plentiful messages, contradictions or inaccuracies in the information presented, a lack of structure in the information presented, and excess advertising surrounding the communication. When people become overwhelmed with information, they may experience social media fatigue and withdraw from social network participation (Bright, Kleiser, & Grau, 2015). In one study, people’s responses to information overload included responding to only short and simple messages, avoiding complex messages, reducing their number of responses as messages increased in complexity, and using simplified or shorter
responses when the environment was too complex (Walther, 1996). These results suggest that information overload may lead to lower quality interactions, which may be detrimental to the formation and maintenance of lasting online relationships.

Given the increasing development of friendships through SNSs, it is important to understand how they develop and are maintained. Psychological factors impact the development and maintenance of face-to-face relationships, and research suggests that they also impact the development and maintenance of online relationships. The aim of the current study was to systematically review the psychological factors affecting the use of SNSs for building and maintaining non-romantic relationships. This review focused specifically on SNSs (e.g., Facebook, Twitter, MySpace) that facilitate personally identifiable interactions and are used primarily for social friendship rather than workplace or romantic relationships.

**Method**

A systematic literature review was conducted according to the Meta-analysis of Observational Studies in Epidemiology (MOOSE) guidelines (Stroup et al., 2000).

**Search Strategy**

A literature search of published studies was conducted in November 2015. The electronic databases of Academic Search Complete, PsycARTICLES, Psychology and Behavioral Sciences Collection, the American Psychological Association Online Database (PsycINFO), PubMed, and Wiley Online Library were searched. Search terms used were *social networking websites, SNS, social networks, social media, online social interaction, relationship building, electronic communication, Facebook, MySpace, Twitter, social relationships, friendship, empathy, social support, psychological factors, cyberpsychology, and online social network*. Each term was searched independently and within a string (e.g., *Facebook AND social support AND psychological factors*). In addition, a manual search of the
reference lists of extracted articles was performed.

**Inclusion and Exclusion Criteria**

Full-text peer reviewed articles that empirically investigated psychological factors affecting people’s use of SNSs, published between January 2003 (to coincide with the launch of MySpace) and November 2015, and written in English, were included. Although the population of interest was not limited to specific age groups, SNSs restrict children under the age of 13 years from registering an account. Therefore, included studies did not investigate early childhood relationships through social networks.

Articles relating to particular SNSs were included if their primary focus was social interactions for friendship (e.g., Facebook, Twitter, MySpace). Professional or employment based websites (e.g., LinkedIn), Usenet groups, support group-based forums or websites, dating websites, and anonymous news sharing forums (e.g., Reddit or Tumblr) were excluded, as their primary aim is not to foster non-romantic social relationship formation. Other exclusion criteria included studies that focused on face-to-face relationship building, cyberbullying, or technological media other than social networking websites.

Articles obtained in the search were evaluated using the MOOSE guidelines. All duplicates of articles were removed and the remaining articles were screened for eligibility based on inclusion criteria. Abstracts of relevant articles were read and assessed for suitability for inclusion in the review. Figure 2.1 below shows the inclusion and study selection process.
Classification of Studies

The initial search identified 2,299 articles. After removing duplicates, 2,155 titles and abstracts were scanned for suitability, with 2,087 being removed as the titles and/or the abstracts indicated that they did not fit within the inclusion criteria (for example, they focused on youth, online dating, or keywords did not match article topic). Relevant full-text articles \( (n = 68) \) were read, resulting in a further 47 being excluded. The remaining 21 articles were included in the review, and are summarised in Table 2.1. They are presented in the table in alphabetical order of the first author’s name.

*Figure 2.1. MOOSE flow diagram of the article review process.*
<table>
<thead>
<tr>
<th>Reference</th>
<th>Factor</th>
<th>SNS used</th>
<th>Design &amp; method</th>
<th>Aims or key variables</th>
<th>Sample</th>
<th>Main findings</th>
<th>Limitations</th>
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<tbody>
<tr>
<td>Akbulut and Günüş (2012)</td>
<td>Perceived social support</td>
<td>Facebook</td>
<td>Self-report questionnaire on past Facebook experiences.</td>
<td>Sources of perceived social support. Subscales: family, friends, or significant others</td>
<td>Country: Turkey 255 adolescents in two provincial state schools. 93 (36.5%) girls and 162 (63.5%) boys. Aged 13-17 years ($M = 14.86, SD = 1.29$).</td>
<td>Perceived social support from significant others was predicted by amount of time spent on Facebook. Where support was provided in person, fewer online friends were required. Reduced family support was associated with additional online friends, often people who were not known in person.</td>
<td>Small number of items included on questionnaire due to time constraints, may not have captured associated confounds. Generalisability of participants from provincial area where technology is not as accessible as metropolitan areas.</td>
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<td>Bowman, Westerman, and Claus (2012)</td>
<td>Information overload</td>
<td>Twitter and Facebook</td>
<td>Self-report questionnaire on past Facebook or Twitter experiences.</td>
<td>Examined amount, frequency, duration, and self-efficacy of use of social media use. Cognitive cost of social media use was measured using the Task Load Index Metric, and perceived benefits of social media use were measured as informational goal attainment and relational goal attainment.</td>
<td>Country: United States 337 participants, 213 males, 124 females. $M$ age $= 20.3$ years, $SD = 1.57$.</td>
<td>Increased task load (cognitive cost) directly negatively influenced Twitter use but only indirectly influenced Facebook use as a function of perceived benefits. Facebook had no cognitive costs associated with its use, while Twitter had salient cognitive cost elements. Older users of Facebook were more likely to judge social media as more cognitively demanding and themselves as having lower self-efficacy in using such sites.</td>
<td>Focussed only on informational and relational benefits of social media use, which may be too narrow to capture all common uses of the websites.</td>
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<td>Bright et al.</td>
<td>Information overload</td>
<td>Facebook</td>
<td>210-item self-report questionnaire.</td>
<td>Measured levels of social media use confidence, social media use helpfulness, and social media use self-efficacy to predict social media fatigue.</td>
<td>Country: United States 750 social media users over a seven-day period. 47.5% (n = 355) male and 52.5% (n = 392) female. Aged 18–49 years (M = 32.52, SD = 9.10).</td>
<td>Privacy concerns and social media confidence have the greatest predictive value for social media fatigue, but all predictors were significant. Privacy concerns increased fatigue, however confidence in the use of social media reduced fatigue.</td>
<td>Self-report measures. Generational differences and general regular use habits of social media users were not considered and may be confounding factors.</td>
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<td>Chan (2014)</td>
<td>Emotional contagion</td>
<td>Facebook</td>
<td>Online self-report survey measuring personality, trait empathy, social media usage, and life satisfaction.</td>
<td>Impact of social media on empathic social skills, life satisfaction, and psychological wellbeing. Looked at whether Facebook interactions suppress or enhance interpersonal competence.</td>
<td>Country: Hong Kong 515 respondents (55% female). Aged 18-24 years.</td>
<td>High levels of Facebook usage appear to be associated with increased neuroticism and suppressed empathic social skills. With appropriate usage levels, Facebook may provide a platform for users to enhance social skills through the identification of appropriate responses and emotional engagement.</td>
<td>Reliance on self-reports of the Big Five measures, empathic social skills, and life satisfaction, and the use of cross-sectional self-report survey data.</td>
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<td>Coviello et al. (2014)</td>
<td>Emotional contagion</td>
<td>Facebook</td>
<td>Quasi-experiment – analysis of actual Facebook posts.</td>
<td>Analysis of the emotional state expressed by users when rainfall was mentioned by another user.</td>
<td>Country: United States Data collected for a set of 1180 days on Facebook from January 2009 to March 2012.</td>
<td>Mention of rainfall increased negative emotional content of Facebook status updates in users who were experiencing rainfall. An average rainy day decreased the number of positive posts by 1.19% and increased the number of</td>
<td>No comparison with other social networking websites.</td>
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<td>Frison and Eggermont (2015)</td>
<td>Perceived social support</td>
<td>Facebook</td>
<td>Self-report survey.</td>
<td>Examined relationship between daily stress, social support seeking through Facebook, perceived social support through Facebook, and depressed mood among adolescents.</td>
<td>Country: Belgium Conducted in spring 2013 at 18 high schools. 910 pupils, 51.9% girls. $M$ age = 15.44 years ($SD = 1.71$).</td>
<td>Daily stress positively predicted adolescents’ seeking of social support through Facebook. When social support was sought on Facebook and subsequently perceived, social support seeking through Facebook decreased adolescents’ depressed mood. When social support was sought on Facebook, but not perceived, social support seeking through Facebook increased adolescents’ depressed mood.</td>
<td>Self-report method used to measure adolescents’ depressed mood.</td>
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<td>Giota and Kleftaras (2014)</td>
<td>Information overload</td>
<td>Facebook</td>
<td>Self-report questionnaires.</td>
<td>Focussed on personality motives, relationship quality, online social support, and socio-demographic factors.</td>
<td>Country: Greece 278 young adults: 132 males (47.5%) and 146 females (52.5%). Aged 18-26 years ($M = 22.5$).</td>
<td>Males in contrast to females were significantly more attracted to online social support. Predictors of online relationship quality were the existence of close relationships, entertainment, and conscientiousness.</td>
<td>Self-report questionnaires. No comparison with other social media websites.</td>
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<td>Greene, Choudhry, Kilabuk, and Shrank (2010)</td>
<td>Perceived social support</td>
<td>Facebook</td>
<td>Qualitative analysis of support based public wall posts in diabetes management Facebook groups.</td>
<td>Looked at how emotional support was exchanged in public forums.</td>
<td>Country: United States 690 individual posts on wall pages and discussion boards written by 480 unique users.</td>
<td>Patients with diabetes, family members, and their friends use Facebook to share personal clinical information, to request disease-specific guidance and feedback, and to receive emotional support. 66% of posts included sharing of diabetes management strategies. 13% of posts provided specific feedback to information requested by other users. 29% of posts featured an effort by the poster to provide emotional support to others as members of a community.</td>
<td>Social networking communities for diabetics may not be representative of groups focusing on other chronic diseases or SNS users in general. Data were collected over a limited time period, and may have missed more longitudinal or seasonal aspects of communication. No comparison with other social networking websites.</td>
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<td>Hancock, Landrigan, and Silver (2007)</td>
<td>Development of intimacy</td>
<td>Simulated social media website</td>
<td>Linguistic analysis of text-based communication in synchronous social network chat.</td>
<td>Focused on how people express and detect emotions during text-based communication, without opportunity for nonverbal cues</td>
<td>Country: United States Eighty undergraduate students in 40 same-sex dyads (14 male and 26 female</td>
<td>Users relied on four strategies to express happiness versus sadness: disagreement, negative affect terms, punctuation, and verbosity. Participants easily distinguished between</td>
<td>Range of emotions was limited to positive and negative simulated emotion. Expressers showed their assigned emotions, so possible participants were simply</td>
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<td>High, Oeldorf-Hirsch, and Bellur (2014)</td>
<td>Perceived social support</td>
<td>Facebook</td>
<td>Experimental – three fictitious Facebook profiles depicting 3 levels of emotional content (low, moderate, high. Self-report, 9 point scale measuring willingness to provide social support, and intent to provide quality support, perceived community, preference for online social interaction, and frequency of Facebook use.</td>
<td>Focused on strategic use of emotional bandwidth (concept suggesting that Facebook enables people to control the transmission or disclosure of information about their affective states), which was expected to correspond with interpersonal rewards, specifically the willingness of others to provide social support.</td>
<td>Country: United States 84 undergraduate students (53% female) from communication courses at a large university. Aged 18–22 years (M = 19.91, SD = 1.19).</td>
<td>Participants who viewed profiles portraying high emotional bandwidth were less willing to provide social support. Females, people who perceived a sense of community in social media, and people who had a preference for online social interaction indicated a greater willingness to provide support.</td>
<td>Enacting their own stereotypical beliefs about communicating positive and negative affect. Profiles used were fictitious, so may have generated a different response from participants that those that were found. Participants were asked about their likelihood of providing supportive communication to someone they never met, however most exchanges of supportive communication do not occur upon a first meeting, and most communication within SNS occurs among people with existing relationships.</td>
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<td>Joiner et al. (2014)</td>
<td>Impression management</td>
<td>Facebook</td>
<td>Self-report questionnaires analysing hypothetical responses to two</td>
<td>Looked at gender differences in language use on Facebook in terms of public or private</td>
<td>Country: United Kingdom 600 undergraduate students. 388 females and 207</td>
<td>Females reported being significantly more likely to ‘like’ a Facebook status update than males. Females were more likely to post a</td>
<td>Hypothetical paper and pencil questionnaires rather than naturalistic responses to Facebook status updates.</td>
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<td>Kramer, Guillory, and Hancock (2014)</td>
<td>Emotional contagion</td>
<td>Facebook</td>
<td>Experimental – analysis of actual Facebook posts. Took place for 1 week, January 11–18, 2012.</td>
<td>Independent variable was the manipulation of posts to contain either negative emotions or positive emotions. Dependent variables were the percentage of all words produced by each user, either positive or negative, during the data collection period.</td>
<td>Country: United States $N = 689,003$ Facebook users. Over 3 million posts were analysed, containing over 122 million words.</td>
<td>4 million words analysed were positive (3.6%) and 1.8 million negative (1.6%). Findings suggest emotional states can be transferred to others via emotional contagion, leading people to experience the same emotions without their awareness.</td>
<td>Ethical issues surrounding manipulation of real world social networking sites without consent from users. No comparison with other social networking websites.</td>
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<td>Ledbetter et al. (2010)</td>
<td>Impression management and development of intimacy</td>
<td>Facebook</td>
<td>Online survey using Facebook friends randomly generated on website.</td>
<td>Tested a theoretical model of communication behaviour with Facebook friends, such that attitudes toward online self-disclosure,</td>
<td>Country: United States 325 participants (75 males, 250 females). 69.5% undergraduate students.</td>
<td>An interaction between self-disclosure and social connection emerged that predicted Facebook communication. It also indirectly predicted a feeling of closeness in relationships</td>
<td>High number of females in comparison to males, therefore gender effects may not be apparent.</td>
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<td>Li and Sun (2014)</td>
<td>Information overload</td>
<td>Simulated Facebook</td>
<td>Development of a model of information diffusion through social networks, when information overload is evident – using the concept of individual influence (average number of times a message is processed after it is communicated).</td>
<td>Whether predictors of engagement with information presented in social media included number of friends (or network), and the typical browsing behaviour of users.</td>
<td>Country: China Friendship information of 4,039 users.</td>
<td>Engagement with useful information related to social relationships in online social networks can be predicted by the individual influence of the user (the more times a message is seen by other users, the more likely that initial user is to engage with social networking posts, despite the overwhelming information presented in the medium).</td>
<td>Study used simulated Facebook environment, therefore predictive model may not be applicable to common social networking websites.</td>
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<td>Niland, Lyons, Goodwin, and Hutton (2015)</td>
<td>Development of intimacy</td>
<td>Facebook</td>
<td>Used social constructionist thematic analysis to qualitatively analyse themes in discussion.</td>
<td>To explore young adults’ conceptualisation of friendship and how this relates to Facebook friendship practices, as well as ways in which</td>
<td>Country: New Zealand 26 women and 25 men, in same and mixed-gender groups. Aged 18–25 years.</td>
<td>Main themes associated with friendship included ‘fun times together’, ‘investment’, ‘protection’ and ‘self-authenticity’. Facebook was used primarily for enjoying friendship and ‘investing in’ friendships. Use of Facebook</td>
<td>Small sample size, with only 10 conversation groups in total. Groups were created by participants to include their own friends, therefore they may be inherent social desirability effects.</td>
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<td>Reference</td>
<td>Factor</td>
<td>SNS used</td>
<td>Design &amp; method</td>
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<td>Park, Jin, and Jin (2011)</td>
<td>Impression management and perceived intimacy</td>
<td>Facebook</td>
<td>Online survey to develop a model of intimacy building in social networking.</td>
<td>To examine association between four dimensions of self-disclosure (amount, honesty, intent, positive personal information) and intimacy in Facebook.</td>
<td>Country: United States 249 students of a US university. 134 females (53.8%) and 111 males (44.6%). $M$ age = 21.60 years, $SD = 3.71$.</td>
<td>Self-disclosure amount and positive personal information were positively associated with intimacy, while honesty and intent were not associated with intimacy.</td>
<td>Did not take into account false information presented on websites, and subsequent impact on intimacy, only self-disclosure.</td>
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<tr>
<td>Rau, Gao, and Ding (2008)</td>
<td>Development of intimacy</td>
<td>Wallop</td>
<td>Self-report online questionnaires about Wallop, a social media website similar to Facebook provided by Microsoft.</td>
<td>Analysis of factors affecting user’s public posting to fulfil social-emotional needs rather than information needs.</td>
<td>Country: China 40 posters and 40 lurkers (people who visited the website but did not post). 48 males, 34 were females. Aged 18-49 years ($M = 24.1, SD = 5.0$).</td>
<td>Significant differences in both verbal and affective intimacy level between lurkers and posters. Levels of verbal intimacy and affective intimacy positively correlated with posting frequency. Significant gender differences in perceived intimacy and posting behaviours, with males experiencing higher levels of perceived intimacy. People may lurk in SNSs because Use of a little known/used social networking website, which may have its own posting culture, differing from accepted cultures in popular sites.</td>
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<td>Shepherd, Sanders, Doyle, and Shaw (2015)</td>
<td>Perceived social support</td>
<td>Twitter</td>
<td>Thematic analysis of Twitter conversations. Electronic search was performed to identify material contributing to an online conversation entitled #dearmentalhealth professionals</td>
<td>Output from the search strategy was combined in such a way that repeated material was eliminated and all individual material anonymised. The remaining textual material was reviewed and combined in a thematic analysis to identify common themes of discussion.</td>
<td>Country: United Kingdom 515 unique communications identified relating to the specified conversation.</td>
<td>Majority of material related to four overarching themes: impact of diagnosis on personal identity and as a facilitator for accessing care; balance of power between professional and service user; therapeutic relationship and developing professional communication; and support provision through medication, crisis planning, service provision and the wider society.</td>
<td>Analysis is limited to descriptive in nature owing to the nature of the subject material. Some participants bypassed the 140 character limit through providing links to external resources. The search strategy adopted for this study sought to capture material generated on only two days.</td>
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<td>Vitak and Ellison (2013)</td>
<td>Development of intimacy</td>
<td>Facebook</td>
<td>Semi-structured self-report interviews about Facebook use.</td>
<td>Focused on how participants use Facebook to request and provide social support and information.</td>
<td>Country: United States 18 adult Facebook users, 11 females and 7 males. Aged 27–55 years ($M = 44$, median = 43).</td>
<td>Facebook use facilitates interactions related to social capital, and users’ beliefs about the potential negative outcomes of these interactions. Users assess potential benefits and risks when making decisions about site use.</td>
<td>Small sample. Self-report on past interactions.</td>
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<td>Walther (2007)</td>
<td>Impression management and information</td>
<td>Simulated social media website</td>
<td>Development of a model of selective self-presentation.</td>
<td>Examined how computer-mediated communication users engage in selective</td>
<td>Country: United States 60 undergraduate students, given</td>
<td>Users spend time crafting messages, editing them, and doing so with greater allocation of cognitive effort.</td>
<td>Small sample, with young age group. Use of general computer mediated communication, not a...</td>
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| Yum and Hara (2005) | Impression management| No particular social media website, as websites differ across countries. | Self-report online survey measuring self-disclosure and relationship development. | Examined cultural differences between self-disclosure in social media, and type of relationship – opposite sex friendships, same sex friendships, and romantic relationships. | Countries: Korea, Japan, and United States  
361 college students, 126 Japanese (40 males and 82 females),  
112 U.S. Americans (69 males, 42 females), and 123 South Koreans (52 males, 61 females).  
Aged 18-31 years ($M = 20$, $SD = 2.74$). | Some cross-cultural differences and similarities in the associations between self-disclosure and relationship qualities were found. For Americans, Japanese, and Koreans, self-disclosure was directly positively associated with online relationship development. The relationship between self-disclosure and trust was positive for Americans, and negative for Koreans. | Differences across social media types may account for some of the findings. Also, self-report nature of study. |
Results

Of the 21 studies reviewed, twelve were self-report questionnaire studies of actual or hypothetical online social networks interactions (Akbulut & Günüç, 2012; Bowman et al., 2012; Bright et al., 2015; Chan, 2014; Frison & Eggermont, 2015; Giota & Kleftaras, 2014; High et al., 2014; Joiner et al., 2014; Rau et al., 2008; Vitak & Ellison, 2013; Yum & Hara, 2005), five were qualitative studies that analysed public SNS conversation data (Greene et al., 2010; Hancock et al., 2007; Shepherd et al., 2015; Vitak & Ellison, 2013), one was a controlled experiment (High et al., 2014), one was a quasi-experiment (Kramer et al., 2014), and two mined and analysed online data (Li & Sun, 2014; Walther, 2007).

Participant demographics were included for 16 of the 21 studies. Two studies included adolescents (13-17 years) (Akbulut & Günüç, 2012; Frison & Eggermont, 2015), ten included younger adults (18-31 years) (Bowman et al., 2012; Chan, 2014; Giota & Kleftaras, 2014; Hancock et al., 2007; High et al., 2014; Joiner et al., 2014; Walther, 2007; Yum & Hara, 2005), and four included adults with a wider age range (18-55 years) (Bright et al., 2015; Rau et al., 2008; Vitak & Ellison, 2013). Across all studies reviewed, 52% of participants were female, 47% were male, and 1% did not specify gender. Only four studies involved a larger percentage of male than female participants (Akbulut & Günüç, 2012; Bowman et al., 2012; Rau et al., 2008; Walther, 2007). The majority of studies were based in the United States (11 studies, 52%), two studies were from the United Kingdom, two from China, and one study from each of Belgium, New Zealand, Greece, Hong Kong, Korea, Japan, and Turkey.

Sixteen of the studies used data from Facebook (Akbulut & Günüç, 2012; Bowman et al., 2012; Bright et al., 2015; Chan, 2014; Coviello et al., 2014; Frison & Eggermont, 2015; Giota & Kleftaras, 2014; Greene et al., 2010; High et al., 2014; Joiner et al., 2014; Kramer et al., 2014; Vitak & Ellison, 2013), two used data from
Twitter (one combining both Facebook and Twitter data) (Bowman et al., 2012; Shepherd et al., 2015), three used simulated social media websites (Li & Sun, 2014; Vitak & Ellison, 2013; Walther, 2007), and one used a little-known and now defunct social media website, Wallop (Rau et al., 2008).

**Findings**

Psychological factors within studies were identified, creating five key themes. A small number of papers \((n = 3)\) (Ledbetter et al., 2010; Park et al., 2011; Walther, 2007) addressed factors fitting into more than one theme. The studies reviewed focused on the five psychological factors of information overload, impression management, emotional contagion, development of intimacy with other social network users, and perceived social support. Each factor will be discussed in turn below.

**Information overload**

Of the studies reviewed, five examined information overload in online social networking (Bowman et al., 2012; Bright et al., 2015; Giota & Kleftaras, 2014; Li & Sun, 2014; Walther, 2007). Overall, these studies showed that cognitive fatigue and privacy concerns influenced relationship development by hindering open and easy communication, thus reducing the opportunity for relationship development. As cognitive fatigue due to information overload increased, users were more likely to generate shorter and simpler responses to posts. This fatigue was compounded by the transparency of the information and data on the SNS, with users experiencing greater cognitive fatigue if they perceived a lack of overall privacy within the website (Bowman et al., 2012; Bright et al., 2015; Jones et al., 2004).

Information overload was related to self-efficacy of SNS use in two studies (Bowman et al., 2012; Bright et al., 2015). Older users reported lower self-efficacy with SNSs and rated their use as more cognitively demanding than did younger
users; however, this relationship was moderated by frequency of use (Bowman et al., 2012). Participants who rated their proficiency in SNS use as low experienced more cognitive fatigue associated with use (Frison & Eggermont, 2015).

The impact of information overload and cognitive fatigue associated with social network use was reduced if the information was deemed to be useful, and if the social network posts were perceived to have a high level of social influence in their network (Li & Sun, 2014). For example, a very popular friend posting about a popular concept was likely to gain a greater number of comments and likes if the SNS user deemed it as socially worthwhile. If a secondary friend (a friend of a friend) happened to see a popular post, then social exchange theory suggests that they might join the conversation in an effort to develop a relationship with the user if the cost versus reward equation yields beneficial results.

**Impression management**

Five studies examined the impact of impression management on online social relationship development (Joiner et al., 2014; Ledbetter et al., 2010; Park et al., 2011; Walther, 2007; Yum & Hara, 2005). Impression management, here manifesting as the intention to appear idealistically desirable in online social networking, leads users to display only information that casts them in a particular light, which may create distorted social relationships (Yum & Hara, 2005). Because online social networking allows more time for constructing and editing messages than is possible in face-to-face social interactions, it has a greater potential for deception (Ellison et al., 2006; Walther, 2007). High social desirability orientation, or the tendency to respond to questions in a socially favourable way, was associated with high levels of self-presentation manipulations including the use of language, sentence complexity, and tone (Walther, 2007).

Attitudes towards self-disclosure and online social connection have been
shown to predict the amount of communication and perceived closeness with online friends, suggesting that if social network users value online social connection and online relationships then they are less likely to engage in impression management techniques (Ledbetter et al., 2010; Park et al., 2011). Participants’ gender affected their impression management through the amount of information that they made publically available, with males less likely than females to respond visibly to a post (Joiner et al., 2014). However, males were more likely to look for and value emotional support shown from online friends. Culture also affected impression management through the amount of self-disclosure to friends and other online contacts on SNSs. Yum and Hara (2005) found that American, Japanese, and Korean users disclosed personal information in exchange for social relationship development, but among American users this disclosure only occurred if there was an established level of trust between users.

**Emotional contagion**

Emotional contagion, or the transfer of moods between individuals and within groups, is well established within face-to-face social networks (Fowler & Christakis, 2008; Rapson, Hatfield, & Cacioppo, 1993), and three of the studies reviewed investigated emotional contagion through online social networks (Chan, 2014; Coviello et al., 2014; Kramer et al., 2014). Kramer et al. (2014) explored the impact of people’s positive or negative mood status on the emotional valence of their subsequent Facebook posts within naturally established friendship circles. Facebook users’ personal news feeds were manipulated for a week. Half the sample were exposed only to posts that represented a negative mood; the other half saw only positive mood posts. Emotional contagion occurred as users replicated the same or similar feelings as their news feed in their own status updates. Kramer et al. (2014) also found users exposed to few emotional posts withdrew from SNS use, which
suggests that emotional expression as expressed in the form of status updates might affect overall online social engagement.

Emotional contagion appears to not only affect people directly involved in an emotive issue, but also those further away, such as those with secondary or tertiary links to the initial social network poster (Coviello et al., 2014; Kramer et al., 2014). Coviello et al. (2014) found that the appearance of rainfall in a city increased the number of negative emotions expressed within Facebook updates of users from the city, spreading across friendship groups. These emotions were then passed on through online social connections, resulting in emotional contagion to those unaffected by the weather conditions. Emotions were typically transferred without the receiver’s awareness, and were not always consistent with the emotion initially projected.

In one study, the ability to empathise with others was negatively correlated with time spent on Facebook, suggesting that the emotional impact of posts may decrease with subsequent social network interactions (Chan, 2014). Chan (2014) suggested that those who frequently use Facebook may have lower life satisfaction and a reduced ability to empathise with others because they place greater emphasis on the ties created online and less emphasis on face-to-face bonds created offline. The more time spent on SNSs appeared to not only reduce the ability to experience empathy towards users’ posts, but also expressed empathy in response to posts, suggesting that emotional contagion may be reduced for those who identify as high level online social network users.

The development of intimacy

Four studies examined the development of intimacy in online relationships (Hancock et al., 2007; Niland et al., 2015; Rau et al., 2008; Vitak & Ellison, 2013). Studies showed that emotional interactions were more likely to occur when there was
a perceived level of intimacy or support, or when users employed linguistic devices in their posts such as the use of punctuation, emotive terms, or self-disclosed personal information (Chuang & Yang, 2012; Hancock et al., 2007). Rau et al. (2008) found that perceived levels of intimacy in online interactions were positively correlated with the number of messages posted on SNSs. Niland et al. (2015) suggested that intimacy between friends is developed and maintained through Facebook by focusing on sharing previous fun times together, posting authentic information, investing in friendships, and protecting relationships.

Perceived intimacy in online interactions has been related to a reluctance to post online (or lurk without interacting), in addition to the level of entertainment provided by the online medium, the privacy concerns of the user, and the benefit-to-risk ratio of initiating or engaging in an emotional interaction (Giota & Kleftaras, 2014; Rau et al., 2008; Vitak & Ellison, 2013). The motivations for responding to emotional support requests of other users was related to the directness of the request (i.e., if a user specifically asked for support publically, other users were less likely to engage in the conversation) (Cheng, Chen, Lin, Chou, & Decety, 2010; Greene et al., 2010). In another study, SNS users were found to be less likely to respond to a post calling for social support when the response required a large amount of concentration to respond in an appropriate emotional way, but this was lessened when there was a sense of community in the network (High et al., 2014).

**Perceived social support**

Of the studies reviewed, five examined perceived social support through SNSs (Akbulut & Günüç, 2012; Frison & Eggermont, 2015; Greene et al., 2010; High et al., 2014; Shepherd et al., 2015), and two related gender to the seeking of social support through SNSs (Giota & Kleftaras, 2014; Rau et al., 2008). Daily stress, time spent on any social media, explicit requests for support in public or
private posts, and the seeking of supportive online groups within SNSs were all positively related to higher levels of perceived social support (Akbulut & Günüç, 2012; Frison & Eggermont, 2015). Adolescents’ online social networking interaction was associated with positive mood and decreased stress levels, which subsequently led to decreased depressed mood (Frison & Eggermont, 2015).

In two studies, gender differences in seeking social support were examined. Males were more likely than females to use the online medium for social support; however, females were more likely to seek social support online than were males if there were high levels of perceived intimacy with online friends and if relationships were perceived to be of high quality (Giota & Kleftaras, 2014; Rau et al., 2008).

High et al. (2014) used the term *emotional bandwidth* to explain the concept of user control over the amount of affective information displayed to other social media users. For example, users could create a status update (employing any of the previously mentioned cues to communicate current emotional state), upload a photo, change personal information such as relationship status, or select from a pre-defined list of ‘I feel’ emoticons and statements to accompany the status update. The number of methods used to relay an affective state was their emotional bandwidth. Interestingly, High et al. (2014) found that when a user viewed a profile with a high emotional bandwidth, they were less likely to provide social support. This finding suggests that there may be a tendency to retract support when the request was overwhelming, or potentially when information overload occurred (Chan, 2014; High et al., 2014).

**Discussion**

This systematic review identified five psychological factors that influenced the use of online social networks for building and maintaining non-romantic relationships: information overload, impression management, emotional contagion,
perceived intimacy, and perceived social support. It is proposed that these five factors run in parallel with the process of relationship development proposed by social penetration theory (Tang & Wang, 2012). Specifically, impression management and information overload primarily influence the initial development of a relationship. Emotional contagion, perceived intimacy, and perceived social support contribute to the later stages of social relationship development. Figure 2.2 shows a proposed model of online social network relationship building and maintenance. This model includes factors from research models proposed by both Park et al. (2011) and Ledbetter et al. (2010), and extends social penetration theory to include additional psychological factors. Where social penetration theory proposes that a friendship develops over four stages (orientation, exploratory, affective, and stable), the revised model proposes that impression management and information overload are involved at the orientation and exploratory stages, and that emotional contagion, perceived intimacy and perceived social support are involved at the affective and stable stages. The interrelations are explained further below.

Information overload or the cognitive fatigue associated with SNS use may encourage users to decrease their emotion-laden communication and adopt a simpler information-based communication style (Chan, 2014). While information overload can reduce the opportunity for relationship development, this reduction can be mitigated if the user perceives social benefit in continuing the relationship. In the early stages of relationship development, impression management (including deception) can be detrimental to further relationship building. However, a user’s ability to maintain a distorted image may decrease as social penetration increases and relationship partners share a greater level of intimacy (Tang & Wang, 2012).
Figure 2.2. Proposed model of relationship development and maintenance process in SNS.

The impact of emotional contagion on relationship building and maintenance appears to be linked with the later stages of social penetration theory, as users are more likely to take on the emotions of those they already know and with whom they have developed a level of intimacy (Kramer et al., 2014). A shared emotional state due to emotional contagion may increase the perceived intimacy of users who are already in the process of relationship development (Shneiderman, 2000). However, if SNS fatigue is present then emotional contagion may not have the same impact, and may instead decrease the penetration of the relationship. Exchanging emotional interactions in online social networks can lead to a greater level of closeness in
friendships, but only if both parties are able to adequately express emotion by responding to subtle cues and posting messages relatively often. In relation to social penetration theory, perceived intimacy is important across the lifecycle of the relationship, but increases as each user discloses greater levels of personal information (Tang & Wang, 2012).

Perceived social support in social networks appears to positively influence relationship development throughout the process of social penetration. As a relationship increases in intimacy, the impact of perceived social support may increase due to the inherent obligation of both parties to provide support (Tang & Wang, 2012). As relationships develop, it is likely that the cost versus reward ratio will change, which should increase the likelihood that users feel compelled to provide a supportive response to a post even if there is a high level of emotional bandwidth (Emerson, 1976; High et al., 2014).

Impression management, emotional contagion, and information overload have potentially different effects in relationships developed online in SNS environments compared to those developed face-to-face. Open and easy communication that facilitates relationships in person can be hindered by privacy concerns associated with SNS use (Bright et al., 2015), cognitive fatigue due to an abundance of information on the webpage (Bright et al., 2015), too much emotion presented online by the other user (Chan, 2014; High et al., 2014), or high levels of deception through the manipulation of online presence (Walther, 2007). However, the potential for healthy relationship development can be enhanced through SNSs if there is a perceived benefit in interacting with a particular user, or if online social status can be improved through regular interaction (Bowman et al., 2012). Relationship development and maintenance can additionally be improved through regular emotional contagion, resulting in shared emotional states (High et al., 2014).
and high levels of perceived social support.

There was one major limitation of the studies reviewed, which was the lack of controlled experimental studies. While online self-report techniques provide large and easily accessible samples, they are limited to retrospective reports of psychological states after the social network interaction has occurred. It should be noted however that running experimental studies in live online environments is often not practical, as it is a great challenge to make an experimental social network a real “social” network for the participants, where they will interact with people they know and trust. Future studies could employ experimental conditions in which the dynamic nature of social media use can be tracked in real time, or in a simulated, but close to real, condition. Additionally, of the studies reviewed, only one looked at SNS use across cultures, and 10 were based on American samples, therefore cultural and social norms were likely to have influenced results.

Another limitation is the restriction to public SNS data. Emotional interactions and relationship development are likely to occur differently in private interactions, therefore experimental studies utilising private and public SNSs may be beneficial. Finally, the age of participants within reviewed studies was limited to those aged 13 to 55 years, with the majority of studies focusing on young adults. Findings may not generalise to older users due to differences in SNS use, therefore future research should investigate the capacity of online social networks to facilitate social relationships between older adults with reduced capacity to physically engage in friendships offline.

When interpreting results from this review, it is important to consider its methodology. Future reviews may choose to integrate research covering social media in its entirety, rather than focusing on websites that are used for social relationship building. Such reviews would allow researchers to reflect on the impact of social
media sharing and abundance of anonymous communication options on social
behaviour and may identify additional psychological factors relating to relationship
building within social media and online interaction. Further, personality is a predictor
of SNS usage (Amichai-Hamburger & Vinitzky, 2010), however it was not a focus of
this review as personality factors are already well-established predictors of intimacy
within social penetration theory in face-to-face relationship building.

Conclusions

This systematic review investigated psychological factors affecting SNS
engagement and relationship development across 21 studies. Five overarching
themes emerged: information overload and its impact on social engagement, the
motivations surrounding impression management in online social network
environments, the transference of emotions across SNSs (or emotional contagion),
the development of intimacy, and the perceived social support experienced in online
interaction. A social networking model of relationship development was proposed,
based on social penetration theory and social exchange theory. The present findings
highlight the importance of psychological factors in building and maintaining online
social relationships. The review reveals that our understanding of why people choose
to interact through SNSs and the impact of this interaction on social development is
limited, and requires further research using experimental or quasi-experimental
methods. Further research is suggested to examine these factors prospectively using
psychometrically validated tools.
The use of SNSs is rapidly growing, with approximately 31% of the global population registered on at least one SNS (Statista, 2015, 2016). SNSs comprise any website that enables users to generate a public or semi-public personal profile, control whom they share content with, and provide the opportunity to engage in social relationship building (boyd & Ellison, 2007; Kietzmann et al., 2011). SNSs can be used for social or emotional support, entertainment, information sharing, or the development and maintenance of social or romantic relationships, depending on the particular website visited (Hampton, Goulet, Rainie, & Purcell, 2011).

Even within particular SNSs, users have varying reasons for visiting; for example, seeking emotional support through SNSs is more common for females, younger social network users, and people connected to members of their family on the websites. Emotional support seeking is also more common when websites have been set up specifically for members of support groups to interact (Akbulut & Günüç, 2012; Bane, Cornish, Ersramer, & Kampman, 2010; Frison & Eggermont, 2015; Pearson, Carmon, Tobola, & Fowler, 2009).

In addition to individual differences in reasons for visiting SNSs, whether users post a message on a site depends on a number of factors including trust in online friends, number of online friends, and satisfaction with online relationships (Bane et al., 2010; Zhao, Ha, & Widdows, 2013). Users are more likely to post emotional messages if they trust other SNS users, if they are confident in their own ability to use the online medium, and if they are able to adopt the perspective of other users (Zhao et al., 2013). Other research has shown that users are more likely to disclose their emotions through SNSs if they have a large number of online friends, if they are satisfied with their online relationships, and if self-disclosure is reciprocal.
between users (Bane et al., 2010).

The level of emotion in SNS posts affects how quickly they are shared and whether other people are likely to respond. People share emotional posts with others more frequently and quickly than they do neutral posts (Stieglitz & Dang-Xuan, 2013). The receivers of these posts must then decide whether to respond and, if so, with what level of empathy. To date, research shows that responses depend on whether the poster is well known to the respondent (Bouchard et al., 2013), whether a photo or avatar accompanies the emotional post (Taylor, 2011), and whether the respondent has previously engaged in cyberbullying behaviour, as cyberbullies make fewer empathic responses than non-bullies (Steffgen, König, Pfetsch, & Melzer, 2011). The emotional state of the poster (which is reflected in the level and direction of sentiment in the post) also affects the type of response, with posts that contain negative sentiment prompting a greater number of comments than posts containing positive sentiment (Stieglitz & Dang-Xuan, 2012).

Engaging with emotional posts is potentially demanding—both cognitively and emotionally—for SNS users. Encountering posts containing higher levels of negative sentiment have been associated with greater levels of attention and physiological arousal, which may increase people’s engagement with, and responses to, these posts (Bayer, Sommer, Schacht, et al., 2012; Berger, 2011). How users regulate their emotional reactions to such posts has also been related to their level of cognitive involvement in the interaction (Bayer, Sommer, Schacht, et al., 2012; Berger, 2011), as well as to age (Bowman et al., 2012). For example, in one study, when older users (59-73 years) encountered negative emotions in SNSs, they were more likely to employ cognitive reappraisal strategies to regulate their emotions (i.e., they chose to interpret the situation in positive terms) than were younger users (19-33 years) (Winecoff, LaBar, Madden, Cabeza, & Huettel, 2011). As a result, older users
paid closer attention to emotions expressed in posts than did younger social network users.

Such emotion regulation, the processes used to influence when and how people experience particular emotions (Hoeksma, Oosterlaan, & Schipper, 2004), involves five factors, and is distinct from coping, mood regulation, and affect regulation (Gross, 1998). First, people must acknowledge the situation involving emotional cues, and select the situation for attention. Second, they must modify the meaning of the situation in some way, to allow for control over their emotional reactions. Third, people must focus their attention on a particular aspect of the situation. Fourth, they need to select a possible meaning and attribute it to the particular aspect of the situation, which induces cognitive change. Finally, when all other stages have been successfully completed, people’s behavioural, experiential, or physiological responses are moderated (Gross, 1998). A study applying these emotion regulation factors to romantic relationships showed that a group of young adults were able to both reappraise and suppress negative emotions relating to their social relationships (Richards, Butler, & Gross, 2003). Following instructions from the researchers, participants held a conversation with their partner about a conflict in their relationship. They were asked to keep in mind that all couples experience conflict, before focusing their attention on the positive aspects of their partner and the relationship. Finally, participants wrote down what occurred in their conversation. This reappraisal process resulted in better memory for what was said in the conversation and poorer memory for the emotions surrounding the conflict.

Gross’s (1998) five factors of emotion regulation rely on an individual’s executive function and working memory capacity (Hoeksma et al., 2004; Schmeichel, Volokhov, & Demaree, 2008; Zelazo & Cunningham, 2007), suggesting that if users engage in emotional regulation in response to SNS posts this
engagement should have a negative impact on their executive function and working memory capacity. Executive function is conceptualised as an individual’s conscious goal-directed problem solving ability and incorporates components of response inhibition, reaction time, and sustained attention (Zelazo & Cunningham, 2007). In relation to emotion regulation and response inhibition, Hoeksma et al. (2004) found that children with higher levels of response inhibition were better able to regulate feelings of anger over longer periods than those with lower response inhibition.

Similarly, adults’ emotion regulation affected their reaction times and therefore their executive function (Deveney & Pizzagalli, 2008). They responded faster and more accurately to negative words than to neutral words, demonstrating that after engaging in an episode of emotion regulation, participants experienced greater cognitive arousal, and were primed to respond to emotional stimuli.

Working memory is also related to emotion regulation (Baddeley, 2012). Working memory is an individual’s ability to hold information in short term memory while simultaneously processing other information or engaging in competing cognitive operations (Baddeley, 2012; Baddeley & Hitch, 1974). Working memory capacity is closely related to executive function performance, with both requiring components of attention and processing speed (McCabe, Roediger, McDaniel, Balota, & Hambrick, 2010). To show that people’s emotion regulation depended on working memory, Schmeichel et al. (2008) measured adults’ working memory capacity and self-regulation of emotional expression. People who had higher working memory capacities suppressed their expression of negative and positive emotions, and expressed less emotion in response to emotional stimuli than those with lower working memory capacities. In another study, participants were asked to complete a series of tasks that placed load on working memory and other cognitive functions. It was found that interaction with a cognitively demanding task reduced subsequent
performance on working memory tasks; if people were asked to control visual attention or emotional expression, working memory was negatively impacted (Schmeichel, 2007).

Although previous research has examined the influence of executive function and working memory on emotion regulation, it has not included other important personality factors, such as empathy. Trait empathy is an inherent understanding of others’ emotions, or the experience of a shift in emotion to match the emotions of others (Lawrence, Shaw, Baker, Baron-Cohen, & David, 2004). Schipper and Petermann (2013) suggested that deficits in trait empathy are related to a poorer ability to regulate emotions, as people with low levels of empathy have difficulty labelling their own and others’ emotions. If emotions cannot be accurately labelled, then the emotion regulation process will not function successfully. Empathy also affects whether people will provide social support to others: people with high levels of trait empathy, females, and those who perceive similarities between their own circumstances and those of someone in distress are more likely to provide social support (Trobst, Collins, & Embree, 1994).

Given the above, the aim of the current study was to examine the impact of negatively valenced SNS content on the amount of sentiment included in participants’ text responses to such posts, as well as on their performance on executive functioning and working memory tasks. In order to induce greater levels of attention and emotional arousal, a simulated negatively valenced post was developed. Participants completed cognitive performance tests before and after being presented with three neutral and one negatively valenced SNS post. Given the evidence regarding their effects on engagement with SNS posts, trait empathy, social desirability, and participant age and gender were assessed as possible predictors of sentiment.
It was predicted that, after exposure to a SNS post containing negative sentiment, participants’ text responses to the negatively valenced post would have higher levels of sentiment than their responses to the neutral posts. It was also predicted that the level of sentiment that participants used in their responses to the negatively valenced post would be predicted first by demographic variables gender and age, and then after controlling for demographics variables, by their initial mood, initial executive functioning performance, level of social desirability, and trait empathy. Finally, it was predicted that, after exposure to the negatively valenced post, participants would engage in emotion regulation strategies and as a result perform better on executive functioning tasks and worse on working memory tasks compared to when they were exposed to neutral posts.

**Method**

**Participants**

Eighty participants were recruited, aged between 18 and 67 years ($M=29.39$, $SD=11.21$ years). Eighteen were male (22.5%) and 62 were female (77.5%); 52 participants (65.0%) were students. All participants were regular SNS users, with Facebook the most commonly accessed SNS.

**Design**

A one-factor (post: neutral or negatively valenced) within-subjects experimental design was used to assess participants’ responses to neutral and negatively valenced simulated SNS posts. Independent variables were demographic factors (gender and age), personality factors (social desirability and trait empathy), and mood. Dependent variables were performance on cognitive tasks (executive function and working memory performance), and sentiment of responses to simulated SNS posts. Participants completed mood and cognitive performance measures before and after interaction with the simulated SNS posts.
Stimulus Material

**Neutral SNS posts:** Three private posts from three hypothetical friends were developed, and presented in the style of Facebook (provided in Appendix II, Figure 8.1). Each post was modelled on common messages posted on SNSs, and presented scenarios that would not typically warrant an emotional response. Participants were able to respond to each post through text, or to select a box that indicated that they would not respond to the post. They also had the option to qualitatively explain why they would not respond to a post.

The first post was from Alice Smith and read: “Hey, last weekend was fun! We should do it again soon. What was the name of that movie you recommended?”

The second post was from Tom Jones and read, “Thought you might know... what features do I need to be looking for when buying a video camera? Zoom, storage, quality, brand? I hear they’re not cheap, but we’re on the hunt for one! Any help would be great!”

The third post was from Alex Williams and read, “Hello old friend! Thanks for adding me. It’s been a long time. Life hasn’t changed much for me, same job, same house, same friends. What’s been happening for you?”

**Negatively valenced post:** Participants were presented with a private message intending to trigger an emotional reaction (provided in Appendix II, Figure 8.4). Only one negatively valenced message was used to ensure that any effect seen would be in relation to this particular message and not a compounded effect of multiple negative posts. It is intended that any results from this study will be used to inform future research using multiple emotionally laden posts. The message conveyed a negative emotional state through the use of short sentences, a lack of punctuation, spelling errors, and negative affect terms (Hancock et al., 2007). The message was developed by combining aspects of real messages taken from online support message boards. Participants were able to respond to the message through
text or to select a box that indicated that they would not respond to the message. They again had the option to qualitatively explain why they would not respond to the post. The message read: “I just found out that Sam was killed in a car accident at about 4am this morning I havent heard any clear details yet, but it sounds like the car was hit by a truck. I know that it was foggy this morning but seriously, how does this happen???? I just dont know what to do. I feel lost”.

Measures

All measures have been provided in Appendix II. Survey forms.

Demographics: Items measured age, gender, current education status (student or not), most frequently accessed SNS, and frequency of SNS use (less than once a month = 1, at least once a month = 2, at least once a week = 3, daily = 4, between 2-5 times a day = 5, more than 5 times a day = 6).

Social desirability: Participants completed the short-form 10-item true/false version of the Social Desirability Scale (Fischer & Fick, 1993), which assesses the tendency to respond to items in a socially desirable way. One point was allocated each time a socially desirable response was selected (e.g., selecting “False” for the item “I like to gossip at times”), with a summed high score indicating that a respondent may be prone to presenting themselves positively, or in a socially desirable way.

Trait empathy: The Empathy Quotient is a measure of an individual’s trait empathy. Developed by Lawrence et al. (2004), it presents 40 items (some reverse coded) surrounding common reactions to social settings where empathic expression is expected (e.g., “I find it easy to put myself in somebody else’s shoes”), and 20 filler items to reduce transparency. Each item was responded to on a 4-point Likert-type scale (strongly agree to strongly disagree), with greater empathic ability represented by a higher summed score.
**Mood:** Mood was measured on a single item visual analogue scale, requesting participants to rate their mood between 0 and 10 (0 = *as low as I could be*, 10 = *really quite good, no problems at all*). Single item visual analogue mood scales have been shown to be reliable with high test-retest reliability when compared with self-rating depression scales, and observed behaviour (Luria, 1975).

**Working memory:** The Digit Span (Backwards) task was based on the digit span (backwards) subtest of the Wechsler Adult Intelligence Scale IV (Wechsler, 1997) and tested participants’ working memory storage and manipulation. Participants were presented with a series of digits (e.g., “8, 3, 4”) and were asked to immediately type them in reverse order (e.g., “4, 3, 8”). Upon successfully entering the correct digits, participants were given increasingly longer series of digits, with the number of digits in the sequence increasing by one digit until the participant failed three trials in a row. Working memory was measured by the number of correctly reproduced sequences, with a higher number indicating higher working memory. The Digit San Backwards test was chosen due to the low ability to develop a practice effect since numbers are different each time.

**Executive functioning:** A version of the Parametric Go/No-Go test (Langenecker, Zubieta, Young, Akil, & Nielson, 2007) was developed to assess executive functioning. Participants were presented with a stream of letters for 4 minutes, each letter presented 500ms after the previous one. They were asked to respond as quickly as possible to target letters “X”, “Y”, and “Z”; however, they could not respond to a particular target when it appeared until another correct target letter appeared. For example, participants who saw the letter “Y” could not respond to this target until the next correct letter, “X”, appeared. This version of the task places a greater level of load on working memory than other versions of the task, which reduces ceiling effects and participants’ ability to anticipate the next correct
response. Executive functioning was measured by participants’ percentage correct target trials (the number of correct targets divided by the total number of possible targets), reaction time to targets (the average response time to correct targets in milliseconds), and response inhibition (percentage of incorrectly identified targets). Parametric Go/No-Go test was also chosen to limit practice effects in participant’s scores.

**Procedure**

Approval for the study was obtained from the Deakin University Human Research Ethics Committee. Participants were recruited through advertisements (see Appendix III) placed around university campuses, on class learning management sites, and on Facebook pages. After gaining informed consent, participants completed an online survey, beginning with demographic information and details about their social network use. Participants then completed measures of social desirability and trait empathy, followed by baseline mood and two cognitive tasks measuring working memory and executive functioning.

Following baseline cognitive and mood measurements, four private simulated SNS messages were presented in the same order to all participants: three neutral posts, followed by one negatively valenced post. For each post, participants either wrote a response or indicated that they would not respond. Following the negatively valenced post, participants rated their mood and completed the working memory and executive functioning tasks a second time. Participants were debriefed about the intention of the study and the simulated nature of the SNS messages and thanked for their time.

**Sentiment Analysis and piloting of posts**

Neutral and negative posts were piloted using a small group ($n = 15$) to ensure they incited the anticipated reaction from SNS users. In addition, the level of
sentiment in the neutral and negatively valenced posts was analysed using SentiStrength, which has been demonstrated to successfully detect positive and negative sentiment strength in SNS posts (Stieglitz & Dang-Xuan, 2013; Thelwall, Buckley, & Paltoglou, 2011; Thelwall, Buckley, Paltoglou, Cai, & Kappas, 2010).

To classify the level of sentiment within a post, SentiStrength compares posts to a list of emotional terms and rules for negations, booster words, amplifications, use of emoticons, and spelling errors. SentiStrength classifies positive sentiment on a scale of 1 (neutral) to 5 (strongly positive) and negative sentiment on a scale of −1 (neutral) to −5 (strongly negative). Each message is given a positive sentiment and a negative sentiment score. Overall sentiment is computed by subtracting negative sentiment from positive sentiment, then further subtracting 2 to rescale the score range from 2-10 to 0-8 (see Stieglitz and Dang-Xuan (2012) for more detail).

An initial analysis was performed to check the sentiment of the posts. Table 3.1 shows the positive, negative, and overall sentiment scores for each post and for the average of the three neutral posts. These numbers show that the negatively valenced post contained three times more overall sentiment than the neutral posts combined, and four times the negative sentiment.

<table>
<thead>
<tr>
<th>Neutral posts (average)</th>
<th>Positive sentiment</th>
<th>Negative sentiment</th>
<th>Overall sentiment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice Smith</td>
<td>2.00</td>
<td>-1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Tom Jones</td>
<td>3.00</td>
<td>-1.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Alex Williams</td>
<td>2.00</td>
<td>-1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Negatively valenced post</td>
<td>2.00</td>
<td>-4.00</td>
<td>4.00</td>
</tr>
</tbody>
</table>

Table 3.1
Sentiment Level Within Posts

Results

Descriptive Statistics
On average, at baseline, participants were experienced internet users having used the internet for almost 10 years; they visited SNSs at least once per week (see Table 3.2 for descriptive statistics). Participants scored in the normal range for trait empathy (Baron-Cohen & Wheelwright, 2004), slightly above average for working memory performance in the backward span task (Myerson, Emery, White, & Hale, 2003), and around the midpoint of the scale for social desirability. Before reading the negatively valenced post, participants’ moods were positive.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>SE</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years using the internet</td>
<td>80</td>
<td>9.85</td>
<td>5.11</td>
<td>0.57</td>
<td>1.00</td>
<td>25.00</td>
</tr>
<tr>
<td>Social network use frequency</td>
<td>80</td>
<td>3.76</td>
<td>(mode: 4.00)</td>
<td>1.03</td>
<td>0.12</td>
<td>1.00</td>
</tr>
<tr>
<td>Trait empathy</td>
<td>80</td>
<td>42.36</td>
<td>12.99</td>
<td>1.45</td>
<td>12.00</td>
<td>68.00</td>
</tr>
<tr>
<td>Social desirability</td>
<td>80</td>
<td>5.05</td>
<td>2.24</td>
<td>0.25</td>
<td>0.00</td>
<td>14.00</td>
</tr>
<tr>
<td>Mood before negatively valenced post</td>
<td>80</td>
<td>7.35</td>
<td>1.79</td>
<td>0.20</td>
<td>3.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Neutral post sentiment</td>
<td>77</td>
<td>1.14</td>
<td>0.83</td>
<td>0.10</td>
<td>0.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Negatively valenced post sentiment</td>
<td>67</td>
<td>2.70</td>
<td>1.76</td>
<td>0.22</td>
<td>0.00</td>
<td>6.00</td>
</tr>
<tr>
<td>Correct numbers backward in WM task</td>
<td>81</td>
<td>7.94</td>
<td>3.42</td>
<td>0.38</td>
<td>0.00</td>
<td>19.00</td>
</tr>
</tbody>
</table>

Note. Social network use frequency was coded as 1 = Less than once a month, 2 = At least once a month, 3 = At least one a week, 4 = Daily, 5 = Between 2-5 times a day, and 6 = More than 5 times a day.

Of the 80 participants, 77 chose to respond to one or more of the neutral posts (65 responded to Alice, 74 to Tom, and 70 to Alex); the remaining three participants did not respond to any of the neutral posts. Sixty-seven participants responded to the negatively valenced post, with the remaining 13 either leaving the space blank (9) or indicating that they would not respond to the message (5). Of those who indicated
that they would not respond to the message, the reasons that they provided suggested that these participants would call their friend rather than respond online or that their friends would be unlikely to contact them in this manner on a SNS.

**Relationships Between Variables**

To investigate possible relationships between independent variables, correlations were conducted. Table 3.3 shows that age was significantly correlated with level of sentiment in response to neutral posts: the older the participants, the less sentiment they expressed in response to neutral posts. Participants’ mood prior to seeing the negatively valenced post was related to their trait empathy and social desirability scores. The more positive participants’ mood, the higher their trait empathy and social desirability scores. Participants’ mood was also negatively related to their percentage of correctly identified targets before exposure to the negatively valenced post and the level of sentiment they used in their response to the negatively valenced post. The more positive participants’ moods, the less correct their target identification, and the lower the level of sentiment in their responses to the negatively valenced post.

Trait empathy was associated with social desirability and levels of sentiment in response to neutral posts. The higher participants’ trait empathy, the higher their social desirability scores and the more sentiment they included in their responses to the neutral posts. Reaction time, percentage correctly identified targets, and percentage incorrectly identified targets before interaction with the negatively valenced post were all significantly correlated, showing that as correctly identified targets increased, reaction time and incorrect targets decreased. Finally, sentiment level in response to neutral posts was associated with sentiment level in response to the negatively valenced post. The greater the level of sentiment that participants included in their response to the neutral posts, the greater the level of sentiment that
participants included in their response to the negatively valenced post.
<table>
<thead>
<tr>
<th></th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>-.11</td>
<td>-.01</td>
<td>.28*</td>
<td>-.08</td>
<td>.03</td>
<td>-.03</td>
<td>-.03</td>
<td>.12</td>
<td>.27*</td>
</tr>
<tr>
<td>Age</td>
<td>.07</td>
<td>.10</td>
<td>.17</td>
<td>-.05</td>
<td>.01</td>
<td>.07</td>
<td>.02</td>
<td>-.33**</td>
<td></td>
</tr>
<tr>
<td>Mood before exposure</td>
<td>.43**</td>
<td>.22*</td>
<td>-.24*</td>
<td>.22</td>
<td>.08</td>
<td>-.29*</td>
<td>-.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trait empathy</td>
<td>.22*</td>
<td>-.15</td>
<td>.12</td>
<td>-.04</td>
<td>.13</td>
<td>.34**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social desirability level</td>
<td>.04</td>
<td>-.05</td>
<td>-.01</td>
<td>-.18</td>
<td>-.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of correctly identified targets before exposure</td>
<td>-.78**</td>
<td>-.27*</td>
<td>.11</td>
<td>-.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reaction time before exposure</td>
<td></td>
<td>.34**</td>
<td>-.01</td>
<td>.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of incorrectly identified targets before exposure</td>
<td></td>
<td></td>
<td>.02</td>
<td>-.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sentiment within text responses to negatively valenced post</td>
<td></td>
<td></td>
<td></td>
<td>.36**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average sentiment within text responses to neutral posts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Gender was coded as Male = 1 and Female = 2. Spearman’s correlations were calculated when at least one variable was categorical; otherwise, Pearson’s correlations were calculated.

**. Correlation is significant at the .01 level (2-tailed).

*. Correlation is significant at the .05 level (2-tailed).
Sentiment Differences in Responses to Neutral and Negatively Valenced SNS Posts

To determine whether participants’ text responses to the negatively valenced post contained different levels of sentiment to their responses to the neutral posts, a repeated-measures ANOVA was conducted. There was a significant main effect for post, $F(2, 113) = 12.70, p < .001, \eta^2_p = .206$. Bonferroni-corrected post-hoc tests revealed that responses to the negatively valenced post contained a higher level of sentiment than did responses to each of the three neutral messages (all $p < .005$; see Table 3.4 for means). There were no significant differences in sentiment level across the responses to any of the three neutral messages (all $p = 1.00$).

<table>
<thead>
<tr>
<th></th>
<th>Positive sentiment</th>
<th></th>
<th>Negative sentiment</th>
<th></th>
<th>Overall sentiment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$</td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Neutral posts</td>
<td>77</td>
<td>2.07</td>
<td>0.64</td>
<td>-1.35</td>
<td>0.46</td>
</tr>
<tr>
<td>Alice Smith</td>
<td>65</td>
<td>2.26</td>
<td>0.89</td>
<td>-1.22</td>
<td>0.67</td>
</tr>
<tr>
<td>Tom Jones</td>
<td>74</td>
<td>2.32</td>
<td>0.89</td>
<td>-1.22</td>
<td>0.58</td>
</tr>
<tr>
<td>Alex Williams</td>
<td>70</td>
<td>1.73</td>
<td>0.78</td>
<td>-1.59</td>
<td>0.77</td>
</tr>
<tr>
<td>Negatively</td>
<td>67</td>
<td>1.81</td>
<td>0.78</td>
<td>-2.90</td>
<td>1.42</td>
</tr>
</tbody>
</table>

Effect of SNS Post on Mood

A paired-samples t-test was conducted to examine whether exposure to the negatively valenced post influenced participants’ moods. Self-reported mood before and after exposure to the negatively valenced post was compared. Participants’ moods were significantly lower after exposure to the post ($M = 6.84, SD = 2.00$) than before exposure ($M = 7.35, SD = 1.79$), $t(79) = 4.08, p < .001$; Cohen’s $d = 1.58$.

---

2 Note that for any ANOVA in which the assumption of sphericity was violated, the appropriate correction (Greenhouse-Geisser or Huynh-Feldt) was applied.
Effect of Exposure to Negatively Valenced Post on Cognitive Performance

To determine whether exposure to the negatively valenced post affected participants’ performance on executive function and working memory tasks, four separate paired-samples t-tests were conducted on the percentage of correctly identified words, the percentage of incorrectly identified words, reaction time, and backwards digit span before and after exposure to the post (see Table 3.5 for descriptive statistics). Both incorrectly identified words and reaction time showed a significant difference: participants reported fewer incorrectly identified target words after exposure to the negatively valenced post than before exposure, \( t(76) = 2.27, p = .030, d = 0.41 \), and participants responded faster to targets after exposure to the negatively valenced post than before exposure, \( t(77) = 1.92, p = .059, d = 0.74 \). There was no significant difference for the percentage of correctly identified targets or the digit backwards span task (all \( p s > .06 \)).

Table 3.5

<table>
<thead>
<tr>
<th>% of correctly identified targets</th>
<th>Before negatively valenced post</th>
<th>After negatively valenced post</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>SD</td>
<td>Min</td>
</tr>
<tr>
<td>72.96</td>
<td>29.80</td>
<td>9.70</td>
</tr>
<tr>
<td>% of incorrectly identified targets</td>
<td>Before negatively valenced post</td>
<td>After negatively valenced post</td>
</tr>
<tr>
<td>M</td>
<td>SD</td>
<td>Min</td>
</tr>
<tr>
<td>70.73</td>
<td>29.76</td>
<td>5.60</td>
</tr>
<tr>
<td>Reaction time (sec)</td>
<td>Before negatively valenced post</td>
<td>After negatively valenced post</td>
</tr>
<tr>
<td>M</td>
<td>SD</td>
<td>Min</td>
</tr>
<tr>
<td>0.55</td>
<td>0.12</td>
<td>0.30</td>
</tr>
<tr>
<td>Number of correct digits backward</td>
<td>Before negatively valenced post</td>
<td>After negatively valenced post</td>
</tr>
<tr>
<td>M</td>
<td>SD</td>
<td>Min</td>
</tr>
<tr>
<td>7.94</td>
<td>3.42</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Predictors of Sentiment Level Within Text Responses to Negatively Valenced SNS Post

Next, it was determined whether participants’ pre-exposure mood, trait empathy, social desirability, and the percentage of correctly identified targets before
exposure to the negatively valenced post predicted the level of sentiment in text responses to the post. Due to high correlations between cognitive variables, only percentage of correctly identified targets was included in the model (see Table 3.3 for full correlations).

A hierarchical linear multiple regression was performed on sentiment in response to the negatively valenced post (see Table 3.6 for full results). In the first step, two demographic variables were entered to control for potentially confounding effects: age and gender. This model was not statistically significant, $F(2, 62) = 0.56, p = .572$. In the second step, mood before exposure to the negatively valenced post, trait empathy, and social desirability were added, which significantly improved the model, $F_{\text{change}}(3, 59) = 4.06, p = .011$, explaining 19% of the total variance in sentiment. This second step of the model was significant, $F(5, 59) = 2.69, p = .029$.

In the final step, the cognitive variable of percentage of correctly identified targets before exposure to the negatively valenced posts was added. This addition did not significantly improve the model, $F_{\text{change}}(1, 58) = 0.51, p = .479$; however, the overall model remained significant, $F(6, 58) = 2.31, p = .046$, and accounted for 19% of the total variance in sentiment. In this final model, two of the six predictor variables were statistically significant: mood before exposure and trait empathy. Mood accounted for 11% of the unique variance in sentiment, and trait empathy accounted for 8%.
Table 3.6
Hierarchical Multiple Regression Model Predicting Sentiment Level Within Text Response to Negatively Valenced Post

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>R²</th>
<th>R² change</th>
<th>B</th>
<th>SE</th>
<th>β</th>
<th>sr²</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>.13</td>
<td>.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>-1.24</td>
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<tr>
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<td>0.71</td>
<td>.48</td>
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</table>

Note. Gender was coded as 1 = Male, 2 = Female.

Discussion
This study examined the impact of negatively valenced SNS content on the amount of sentiment included in participants’ text responses to such posts, as well as on their performance on executive functioning and working memory tasks. As predicted, participants’ text responses to a negatively valenced post contained a higher level of sentiment than did their responses to neutral posts. Participants’ pre-exposure mood and trait empathy predicted the level of sentiment that they expressed in response to the negatively valenced post, which partially supported the hypothesis that the level of sentiment would be predicted by initial mood, initial executive function, social desirability, and trait empathy, after controlling for demographic variables. The prediction that, potentially due to engagement of emotion regulation strategies, performance on executive functioning tasks would improve after exposure to the negatively valenced post and that performance on working memory tasks would decrease after exposure to the negatively valenced post was also partially
supported. Executive function performance improved on two of the four measures—participants selected fewer incorrect targets, and their reaction time decreased, after exposure to the negatively valenced post. Participants’ working memory performance was not affected by the negatively valenced post.

Compared with responses to the neutral posts, participants’ responses to the negatively valenced post contained twice as much overall sentiment and negative sentiment. This increase in sentiment in relation to the negatively valenced post is consistent with previous literature showing that SNS users are likely to emotionally engage more with posts high in sentiment (Bayer et al., 2012; Berger, 2011; Stieglitz & Dang-Xuan, 2012), however, findings also show that 13 participants chose not to respond to the negatively valenced post at all, suggesting that some SNS users may be overwhelmed by the task of an emotionally laden post and might disengage.

An examination of participants’ reasons for not responding to the negatively valenced post (see Appendix I) revealed that many participants would prefer to speak directly to their friend when encountering a negative or distressing post on a social network rather than reply through the website. Non-responses to negatively valenced posts such as these have not yet been sufficiently studied; therefore, it is recommended that future research integrate a measurement of motivation to respond. However, there are two potential explanations for participants in the current study opting not to respond. First, it is possible that they did not want to reply due to the simulated nature of the environment presented in this study, which lacked a photo or avatar of the emotional post writer, and the writer was not a known friend of the respondent, both of which contribute to the likelihood of making an emotional response (Bouchard et al., 2013; Taylor, 2011). Second, it is possible that some participants did not reply due to the distressing nature of the scenario; research suggests that users may find it more socially appropriate to call their friends rather
than respond in an online medium lacking many emotional cues (Walther, 1996, 2007).

This study also showed that higher levels of sentiment within responses to the negatively valenced post were predicted by more positive moods before encountering the negatively valenced post, which is again consistent with prior research (Hoeksma et al., 2004; Westmaas & Silver, 2006). This finding highlights the importance of situational factors in SNS engagement, suggesting that users are more likely to respond to an emotional or distressing post if they are in the right mood when they encounter the post, or if they have higher levels of trait empathy (Bouchard et al., 2013; Hoeksma et al., 2004; Taylor, 2011; Westmaas & Silver, 2006). Surprisingly (Trobst et al., 1994; Winecoff et al., 2011), neither gender nor age significantly predicted sentiment level within responses; however, this may be due to the relatively small number of males in our sample, or the simulated nature of the environment presented to participants. Also contrary to predictions, we did not find a significant impact of initial executive function on the level of sentiment within posts, suggesting that baseline cognitive performance may not influence the type of response left on negatively valenced posts.

Exposure to the negatively valenced post improved both participants’ response times and response inhibition, with participants selecting correct targets significantly faster, and selecting a significantly lower number of incorrect targets. The improvement in reaction time and response inhibition is consistent with the results of Deveney and Pizzagalli (2008), who found that negative stimuli produced improvements in executive function by increasing arousal. The improvements found in the current study may also be attributable to attentional narrowing (Easterbrook, 1959), as following exposure to the negatively valenced post, participants may have tried to focus on only the relevant information contained in the SNS posts.
The lack of impact of the negatively valenced post upon working memory performance in the current study was not consistent with previous findings (Kensinger & Corkin, 2003; Levens & Phelps, 2008). It is possible that, in the current study, the negatively valenced post did not affect participants’ working memory performance because they had slightly higher than average working memory performance at baseline (Myerson et al., 2003). Therefore, participants might have had a better than expected ability to regulate their emotions, which reduced any potential impact of the negatively valenced post on their working memory task performance (Schmeichel, 2007; Schmeichel et al., 2008). Future research could examine this possible explanation by incorporating participants with a range of working memory abilities.

There were a number of limitations to the current study. First, the current sample of social network users may not be representative of typical SNS users, as the convenience sample was recruited through a snowballing procedure across social media websites, potentially resulting in a group of participants who access or use SNSs differently to those who were not sampled. The sample also included a higher proportion of female participants than anticipated, which may account for the lack of gender-based findings. Second, the study did not include any positively valenced posts; therefore, the results should be interpreted with caution as it is unknown if they can be attributed to the negative nature of the post or simply the level of sentiment in the post. Third, emotion regulation was indirectly measured through cognitive performance. It is possible that asking participants to complete a questionnaire about their emotion regulation may have increased the validity of the data.

The current study highlights the importance of trait empathy, mood, and executive function in the processes associated with responses to negatively valenced
SNS posts. If SNS users encounter emotionally negative content within posts, then it is not simply the negativity of the content that impacts on the level of sentiment within text response to such content, but negativity combined with certain personality (specifically, trait empathy) and situational (specifically, mood) factors. Future studies should consider the cognitive load implications for interaction with sentiment laden posts, and the associations of cognitive load with authentic response to online displays of emotion.
CHAPTER FOUR: THE INFLUENCE OF EMPATHY AND SELF-PRESENTATION ON ENGAGEMENT WITH SOCIAL NETWORKING WEBSITE POSTS

Engagement with SNS content is typically defined as any response to content, including liking, commenting, sharing, or even hiding the content from further view (Facebook, 2016). People’s engagement with SNS content depends on factors related to the content, such as the amount of emotion it conveys, and factors related to the users, such as their age, gender, mood, personality, and desire to present a positive online image (Bouchard et al., 2013; Krishnan & Atkin, 2014; McAndrew & Jeong, 2012; Oliveira, Huertas, & Lin, 2016; Stieglitz & Dang-Xuan, 2013). While several studies have focused on identifying people’s motivations to engage with SNS content from a social media marketing perspective (Ashley & Tuten, 2015; Henderson et al., 2010; van Laer, de Ruyter, & Cox, 2013), the psychological aspects of engagement, such as the emotion of the user, are yet to be fully explored. The aim of this study was to examine the effect of emotional SNS content and personality factors on engagement.

SNS users have been shown to engage with Facebook content for four main reasons (Oliveira et al., 2016). First, they engage due to subjective norms, in which the behaviour of a user is influenced by the behaviour of others. Second, they engage for social identity, as the way in which people think about themselves is impacted on by their social groups. Third, users engage for entertainment or the degree of enjoyment associated with the interactions. Finally, they engage for interpersonal connectivity: users seek the benefits associated with establishing and maintaining friendships by selectively engaging in self-promoting online material. For example, younger Facebook users (aged 18-25 years) have been found to show high levels of self-promotion and branding by selectively displaying alcohol use photos as a way of conforming to the norms of their peers and enhancing their online popularity.
SNSs are also used to maintain long-distance relationships, play games, post photos, organise social activities, check up on friends, establish new friendships, and initiate or terminate romantic relationships (Tosun, 2012). Users also visit SNSs and engage with posts if they themselves have recently posted content, in hopes of generating further engagement from others in their own content (Grinberg et al., 2016). Finally, Study 1 of the present thesis showed that participants’ moods were associated with the likelihood of responding to SNS posts; participants in positive moods were more likely to engage with the content than those in more negative moods (Mayshak, Sharman, & Zinkiewicz, 2016).

Personality factors have also been found to influence SNS engagement (Krishnan & Atkin, 2014). Higher levels of trait empathy—that is, the natural ability to understand the emotions of others or to shift one’s own emotion to match those of others (Kunyk & Olson, 2001)—is associated with higher SNS engagement. Activities such as chatting through Facebook or viewing other users’ photos have been linked with higher levels of empathic concern (Alloway, Runac, Quershi, & Kemp, 2014). This link also appears to be related to gender, with females scoring lower than males in concern for other SNS users when chatting with others through Facebook. Other personality factors, such as higher attachment anxiety and self-esteem, and general self-promoting behaviour have also been shown to predict higher frequency of SNS engagement (Mehdizadeh, 2010; Ong et al., 2011; Trub et al., 2014). Higher attachment anxiety and lower self-esteem may lead to SNS users seeking social fulfilment and positive feedback from others through social media. Additionally, the propensity to engage in self-promotive behaviour may lead individuals to use SNSs as an avenue for enhancing perceived popularity; users may post comments or status updates and then visit the site repeatedly in anticipation of
Research has also shown that people who prefer to socialise often have higher vanity (or egotistic admiration of their abilities) and higher positive self-esteem; they therefore report using SNSs easier than those with lower vanity and self-esteem. Socialisers also rate SNS use as more a favourable pastime than those who do not often socialise (Krishnan & Atkin, 2014; Ryan & Xenos, 2011). Again, these personality traits may lead to higher SNS engagement due to the perceived popularity and ego-boosting benefits associated with SNS engagement. Finally, SNS users who show high levels of self-promotional behaviour and who respond to content in socially desirable ways are less likely to establish new social or romantic relationships online (Christofides, Muise, & Desmarais, 2009; Tosun, 2012), raising the possibility that they may not be showing their true personalities, which may have caused other users to be wary of interactions with them.

In addition to personality factors, the emotional content of SNS content is likely to affect people’s engagement with it. Engaging with emotional SNS content can be both cognitively and emotionally demanding; research shows that posts containing higher levels of sentiment are associated with greater levels of required attention than those containing low levels of sentiment (Bayer, Sommer, Schacht, et al., 2012; Berger, 2011). Further, those who interact with emotional posts have the added requirement of needing to decide if they should respond, and what level of emotion to convey in return. The emotional state of the poster, reflected in the level and direction of sentiment in the post, has been shown to impact the type of response received from a SNS user, with posts that contain negative emotion prompting a greater number of comments than posts containing positive emotion (Stieglitz & Dang-Xuan, 2012).

Any response to an emotional post (positive or negative) is also reliant on
whether the poster is well known to the SNS user, with family members and close friends usually receiving a greater frequency of response than others (Bouchard et al., 2013). Research has shown that SNS users share emotionally negative posts with others more frequently and faster than emotionally neutral posts, however in one study there was no impact of emotionally positive posts (Stieglitz & Dang-Xuan, 2013). Further, Facebook frequency of use and empathy for a poster have been shown to be negatively related, suggesting that the emotional impact of posts may decrease with subsequent social network interactions, and users may emotionally disengage from content they experience regularly (Chan, 2014).

Due to the relative lack of research investigating the roles of trait empathy and self-presentation, on engagement with emotional SNS content, this study examined participants’ engagement with SNS posts containing positive, neutral, or negative sentiment in a simulated SNS environment. Similar to Study 1, it also assessed participants’ trait empathy and social desirability as predictors of sentiment.

It was hypothesised that participants will show lower levels of engagement with negatively valenced posts than with positively valenced posts due to the increased cognitive and emotional effort associated with responding to negative posts. It was further hypothesised that trait empathy and social desirability will positively predict participants’ engagement with each of negative, neutral, and positive SNS content, after controlling for SNS environment and demographic variables. Finally, building upon previous research around aspects of SNSs that encourage user engagement, a qualitative measure was utilised, which asked participants what aspects of an SNS post encouraged them to leave a comment on the post.

**Method**

**Participants**
Ninety-seven participants were recruited, aged between 18 and 63 years ($M = 26.32, SD = 8.68$ years). Thirty-five were male (36%) and 62 were female (63%); 72 participants (74%) were university students.

**Design**

This study was part of a larger study containing physiological and cognitive experimental methods. Physiological and cognitive results are presented in Chapter 5, which describes Study 3.

Study 2 was a between-subjects design with two independent conditions: a neutral SNS environment group and a negatively valenced SNS environment group. Independent variables were demographic factors (gender, age), personality factors (social desirability and trait empathy), and mood. Dependent variables were performance on cognitive load tasks and engagement with SNS posts. Participants completed a mood scale before and after interaction with the simulated SNS environment.

**Materials**

All measures have been provided in Appendix II. Survey forms.

**Simulated SNS Environment**

Participants were randomly allocated to one of two simulated SNS environments (**a neutral environment** and **a negatively valenced environment**) containing a mixture of negatively valenced posts, neutral posts, and mildly positive posts. Each environment was made up of core posts, neutral environment posts, and negatively valenced environment posts. All posts are presented in Appendix II, Table 8.7 to Table 8.9. Within Study 2, engagement with posts was examined regardless of SNS environment, as the focus was predominantly on the valence of individual posts rather than the overall environment a participant encountered.

All participants were presented with 10 core posts representing mildly
negative, neutral, or mildly positive sentiment, in line with what might be encountered in a SNS. Core posts were displayed within both environments to create a sense of realism in the environment as it is unlikely that a user would naturally experience a SNS session consisting of entirely negative posts.

The neutral environment functioned as a control condition and consisted of the 10 core posts, and an additional 11 posts dispersed throughout the core posts. The neutral posts contained mildly negative, neutral, and moderately positive emotions.

The negatively valenced environment included the 10 core posts and an additional 11 posts containing moderately to extremely negative, neutral, and mildly positive emotions dispersed throughout the core posts.

Sentiment analysis program SentiStrength (Thelwall, 2013) was used to classify each post as either negative, neutral, or positive to ensure that each condition contained posts depicting the required emotional range. Table 4.1 shows the average sentiment within the posts shown within each SNS environment. The negatively valenced environment contained more negative sentiment and more overall sentiment than the neutral environment, and the negatively valenced posts contained almost twice the amount of negative sentiment as the neutral posts.

<table>
<thead>
<tr>
<th>Table 4.1</th>
<th>Sentiment Analysis Scores for SNS Posts Within Each Simulated Environment</th>
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</thead>
<tbody>
<tr>
<td>Posts</td>
<td>Core</td>
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<td>Number of posts</td>
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<td>Mean sentiment</td>
<td>1.4</td>
</tr>
</tbody>
</table>
Demographics: Items measured age, gender, current education status (student or not), and frequency of social media website use (less than once a month = 1, at least once a month = 2, at least once a week = 3, daily = 4, between 2-5 times a day = 5, more than 5 times a day = 6).

Social Desirability: Participants completed the short-form 10-item true/false version of the Social Desirability Scale (Fischer & Fick, 1993), which assesses the tendency to respond to items in a socially desirable way. Two points were allocated each time a socially desirable response was selected (e.g., selecting “False” for the item “I like to gossip at times”), with a summed high score indicating that a respondent may be prone to presenting themselves positively, or in a socially desirable way (>10 considered high levels of social desirability response bias) (Fischer & Fick, 1993).

Trait Empathy: The Empathy Quotient is a measure of an individual’s trait empathy. Developed by Lawrence et al. (2004), it presents 40 items (some reverse coded) surrounding common reactions to social settings where an empathic expression is expected (e.g., “I find it easy to put myself in somebody else’s shoes”), and 20 filler items to reduce transparency. Each item is responded to on a 4-point Likert-type scale (strongly agree to strongly disagree), with greater empathic ability represented by a higher summed score.

Engagement with Posts: Engagement with posts is a measure of the proportion of posts interacted with by either commenting on the post, liking it, sharing it, or hiding it (Facebook, 2016). When scrolling through the simulated SNS environment, participants were able to indicate below the posts if they would like,
comment upon, share, or hide it. Total engagement with all posts was calculated by adding the number of likes, shares, and comments on a post and subtracting any hides and then dividing by the number of posts in presented to the participant. For example, a participant who was presented 8 neutral posts would have an engagement score of 12.5 if they liked 2 posts, shared 1 post, hid 1 post, and made no comments 

\[((2+1+0)-1)/8\)*100 = 12.5.

**Procedure**

Approval to conduct the study was obtained from the Deakin University Human Research Ethics Committee. Participants were recruited through advertisements (see Appendix III) placed around university campuses and on Facebook pages. After initial contact, participants were invited to attend a one-hour face-to-face session at a Deakin University campus.

As part of a larger study examining the physiological and cognitive impacts of SNS engagement, participants were shown a simulated SNS environment and randomly allocated to either a neutral or negatively valenced condition. Participants could navigate through simulated SNS posts at their own pace and were free to comment on, like, share, or hide the posts.

Once the participant had navigated through all available posts within the simulated SNS environment, they were asked the question “What aspects of a post encourage you to comment?” They then provided demographic details, and completed measures of social desirability and trait empathy. Participants were debriefed by the experimenter about the purpose of the study and nature of the simulated SNS environments, thanked for their time, and reimbursed with a $10 gift voucher.

**Analysis**

As the focus of the current study was to examine participants’ responses to
the positive, negative, and neutral posts themselves, regardless of whether they were presented in the negatively valenced environment or the neutral environment, initial analyses were conducted to determine whether there were any significant differences in engagement between the two environments. There were no significant differences between participants in the negatively valenced and neutral environments for the number of comments, hides, or total engagement, \( ps > .15 \). However, there were significant differences for likes and shares: participants liked more posts and shared more posts in the neutral environment than the negatively-valenced environment, \( ps < .05 \). Full results are provided in Appendix I (see Table 8.1). Therefore, SNS environment was included in the regression analyses to control for these differences.

Inductive thematic analysis of the qualitative short answer responses to the question “What aspects of a post encourage you to comment?” was conducted by two coders (RM and a casual research assistant with experience in qualitative study). Units of analysis were sentences within a participant response; some cases had multiple sentences and hence units of analysis. To conduct the qualitative analysis, each coder first read all responses to familiarise themselves with the data. Next, each coder independently coded the first 30 cases to develop initial codes. Both coders then compared and discussed initial codes to determine consensus, and developed clear code definitions (including inclusion and exclusion criteria) to promote consistency in subsequent coding.

The two coders then returned to independently coding the remaining cases, and met again when finished to determine consistency and to define newly emergent codes. Percentage agreement between coders’ final codes was 88%. Coders discussed discrepant coding cases to determine agreement and consensus. As a team, the coders then collated codes into potential themes, ensuring semantic and hermeneutic agreement of themes. Finally, themes were defined and named with
clear definitions assigned to each theme (Braun & Clarke, 2006).

Results

Demographics

On average, participants visited SNSs between 2-5 times a day (see Table 4.2), scored in the normal range for trait empathy (Baron-Cohen & Wheelwright, 2004), and at the high end of the scale for social desirability (Fischer & Fick, 1993).

Table 4.2
Descriptive Statistics for Demographic and Personality Variables

<table>
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<tr>
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<th>n</th>
<th>M</th>
<th>SD</th>
<th>SE</th>
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<tr>
<td>Trait empathy</td>
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<td>11.53</td>
<td>1.20</td>
<td>19.00</td>
<td>70.00</td>
</tr>
<tr>
<td>Social desirability</td>
<td>92</td>
<td>13.93</td>
<td>1.30</td>
<td>0.14</td>
<td>10.00</td>
<td>17.00</td>
</tr>
</tbody>
</table>

Note. Social network use frequency was coded as 1 = Less than once a month, 2 = At least once a month, 3 = At least one a week, 4 = Daily, 5 = Between 2-5 times a day, and 6 = More than 5 times a day.

Relationships Between Variables

Relationships between variables were examined using Pearson correlations where appropriate (see Table 4.3). Total engagement with negative posts was significantly positively correlated with participant age and trait empathy, showing that older participants and those with higher empathy scores engaged more with the negative posts than younger participants and those with lower empathy. Engagement with negative posts was negatively correlated with social desirability, suggesting that those with lower levels of social desirability were more likely to engage with the negative posts than those with higher levels of social desirability.

Engagement with neutral posts showed a similar pattern to negative posts, with significant positive correlations with participant age and trait empathy; however, engagement with positive posts showed a different pattern. While still positively associated with trait empathy, engagement with positive posts was negatively associated with SNS environment, suggesting that those in the neutral
condition engaged less with positive posts than did those in the negatively valenced condition. The only other significant correlation was between gender and trait empathy, with being female being more positively associated with empathy (i.e., women had greater trait empathy than did males).

Table 4.3
*Correlations Between Variables – Study 2*

<table>
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<tr>
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<td>.23*</td>
<td>-.21*</td>
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<tr>
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<td>.51**</td>
<td>.09</td>
<td>.38**</td>
<td>.01</td>
<td>.31**</td>
<td>-</td>
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</tbody>
</table>

*Note.* Gender was coded as Male = 1 and Female = 2. Environment was coded as 1 = Control and 2 = Emotional. Pearson’s correlations were calculated, however Spearman’s correlations were used when both variables were categorical.

* Correlation is significant at the .05 level (2-tailed).
** Correlation is significant at the .01 level (2-tailed).

Engagement with Negative, Neutral, and Positive Posts

To examine the difference between participants’ engagement with negative, neutral, and positive posts, repeated measures ANOVAs were conducted on participants’ number of comments, likes, shares, hides, and total engagement. The assumption of sphericity was violated for all five analyses, therefore the Greenhouse-Geisser correction was applied. Means, standard deviations, minimum and maximum scores for all variables are presented in Table 4.4.

Table 4.4
*Descriptive Statistics for Engagement with Negative, Neutral, and Positive Posts*

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative posts</td>
<td>2.64</td>
<td>2.15</td>
<td>0.00</td>
<td>8.00</td>
</tr>
<tr>
<td>Neutral posts</td>
<td>3.00</td>
<td>2.16</td>
<td>0.00</td>
<td>9.00</td>
</tr>
<tr>
<td>Positive posts</td>
<td>1.11</td>
<td>1.11</td>
<td>0.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Shares</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Number of likes differed significantly by post type, $F(2, 161) = 35.77, p < .001$, $\eta_p^2 = .28$. Bonferroni-corrected simple contrasts revealed that participants gave significantly fewer likes to positive posts than to either negative or neutral posts, $p < .001$ for both. There was no difference between the number of likes that they gave to negative and neutral posts, $p = .53$.

Number of shares also differed significantly by post type, $F(2, 170) = 8.87, p < .001$, $\eta_p^2 = .09$. Bonferroni-corrected simple contrasts revealed a similar pattern of results to the likes: participants shared fewer positive posts than negative or neutral posts, $p_s < .001$. There was no difference in the number of negative and neutral posts that they shared.

Number of hides differed significantly by post type, $F(2, 150) = 10.16, p < .001$, $\eta_p^2 = .12$. Bonferroni-corrected simple contrasts revealed that there were significantly more hides for negative posts $p = .015$, than for each of neutral posts and positive posts both $p < .001$. Participants also hid more neutral than positive posts, $p < .001$.

Number of comments differed significantly by post type, $F(1.52, 138.09) = 42.83, p < .001$, $\eta_p^2 = .32$. Bonferroni-corrected simple contrasts revealed that there

<table>
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<th></th>
<th>M</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative posts</td>
<td>0.64</td>
<td>0.99</td>
<td>0.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Neutral posts</td>
<td>0.57</td>
<td>1.15</td>
<td>0.00</td>
<td>6.00</td>
</tr>
<tr>
<td>Positive posts</td>
<td>0.28</td>
<td>0.58</td>
<td>0.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Hides</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative posts</td>
<td>0.76</td>
<td>1.46</td>
<td>0.00</td>
<td>7.00</td>
</tr>
<tr>
<td>Neutral posts</td>
<td>0.39</td>
<td>0.84</td>
<td>0.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Positive posts</td>
<td>0.16</td>
<td>0.40</td>
<td>0.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Comments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative posts</td>
<td>1.84</td>
<td>1.88</td>
<td>0.00</td>
<td>9.00</td>
</tr>
<tr>
<td>Neutral posts</td>
<td>0.88</td>
<td>1.35</td>
<td>0.00</td>
<td>6.00</td>
</tr>
<tr>
<td>Positive posts</td>
<td>0.35</td>
<td>0.75</td>
<td>0.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Total engagement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative posts</td>
<td>42.03</td>
<td>43.21</td>
<td>-50.00</td>
<td>175.00</td>
</tr>
<tr>
<td>Neutral posts</td>
<td>58.77</td>
<td>51.98</td>
<td>-44.44</td>
<td>211.11</td>
</tr>
<tr>
<td>Positive posts</td>
<td>57.79</td>
<td>71.46</td>
<td>-50.00</td>
<td>250.00</td>
</tr>
</tbody>
</table>
were significantly more comments on negative posts $p < .001$, than on neutral posts and positive posts both $p < .001$. Participants also made more comments on neutral than positive posts $p < .001$.

Finally, total engagement with posts was examined. Engagement differed significantly by post type, $F(1.55, 141.06) = 4.91, p = .015, \eta^2_p = .05$. Bonferroni-corrected simple contrasts revealed that there was significantly less engagement with negative posts than with neutral posts, $p < .001$, but no difference between negative and positive posts, $p = .073$, or between neutral and positive posts, $p = 1.00$.

**Predictors of Engagement with Negative, Neutral, and Positive Posts**

Three hierarchical multiple regression analyses were conducted to examine whether participants’ trait empathy and social desirability predicted their level of total engagement with each of negative, neutral, and positive posts, after controlling for demographic variables and the simulated SNS environment condition.

First, a hierarchical multiple regression was performed to predict engagement with negative posts (see Table 4.5 for results). In the first step, the demographic variables of gender and age were entered to control for potentially confounding effects; SNS environment was also entered. This model was not statistically significant. In the second step, trait empathy and social desirability were added, which significantly improved the model, $F_{\text{change}}(2, 81) = 4.45, p = .015$. This model explained 18% of total variance in engagement with negative posts, $F(5, 81) = 3.51, p = .006$. In this final model, two of the eight predictor variables were statistically significant: age and trait empathy. Age accounted for 7% of the unique variance, and trait empathy accounted for 4%, suggesting that older participants and those with higher trait empathy were likely to engage with negative posts.

Table 4.5
Hierarchical Multiple Regression Model Predicting Engagement with Negative Posts

<table>
<thead>
<tr>
<th></th>
<th>$R$</th>
<th>$R^2$ change</th>
<th>$R^2$</th>
<th>$B$</th>
<th>$SE$</th>
<th>$\beta$</th>
<th>$sr^2$</th>
<th>$t$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>.30</td>
<td>.09</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td>9.01</td>
<td>-.04</td>
<td>.00</td>
<td>-0.39</td>
<td>.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>1.27</td>
<td>0.49</td>
<td>.27</td>
<td>.07</td>
<td>2.59</td>
<td>.01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SNS environment</td>
<td>9.92</td>
<td>8.78</td>
<td>.12</td>
<td>.01</td>
<td>1.13</td>
<td>.26</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>$R$</th>
<th>$R^2$ change</th>
<th>$R^2$</th>
<th>$B$</th>
<th>$SE$</th>
<th>$\beta$</th>
<th>$sr^2$</th>
<th>$t$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
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<tr>
<td>Gender</td>
<td></td>
<td></td>
<td>9.01</td>
<td>-.09</td>
<td>.01</td>
<td>-0.81</td>
<td>.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>1.21</td>
<td>0.48</td>
<td>.26</td>
<td>.07</td>
<td>2.53</td>
<td>.01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SNS environment</td>
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<td>8.46</td>
<td>.13</td>
<td>.02</td>
<td>1.30</td>
<td>.20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trait empathy</td>
<td>0.74</td>
<td>0.38</td>
<td>.21</td>
<td>.04</td>
<td>1.96</td>
<td>.05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social desirability</td>
<td>-6.17</td>
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<td>-.20</td>
<td>.04</td>
<td>-1.93</td>
<td>.06</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Gender was coded as Male = 1 and Female = 2. SNS environment was coded as 1 = Neutral and 2 = Negatively valenced.

A second hierarchical multiple regression was performed to predict engagement with neutral posts (see Table 4.6 for results). In the first step, gender, age, and SNS environment were entered. This model was statistically significant, $F(3, 83) = 6.13, p = .001$, and accounted for 18% of the total variance. In the second step, social desirability and trait empathy were added, which significantly improved the model, $F_{change}(2, 81) = 3.73, p = .028$. This model explained 25% of total variance, $F(5, 81) = 5.42, p < .001$. In this final model, two of the eight predictor variables were statistically significant: age and trait empathy. Age accounted for 15% of the unique variance and trait empathy accounted for 5%, suggesting that older participants and those with higher trait empathy were more likely to comment on neutral posts.

Table 4.6

<table>
<thead>
<tr>
<th></th>
<th>$R$</th>
<th>$R^2$ change</th>
<th>$R^2$</th>
<th>$B$</th>
<th>$SE$</th>
<th>$\beta$</th>
<th>$sr^2$</th>
<th>$t$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
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<td>.18</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td>10.54</td>
<td>.13</td>
<td>.02</td>
<td>1.31</td>
<td>.19</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>$R$</th>
<th>$R^2$ change</th>
<th>$R^2$</th>
<th>$B$</th>
<th>$SE$</th>
<th>$\beta$</th>
<th>$sr^2$</th>
<th>$t$</th>
<th>$p$</th>
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</thead>
<tbody>
<tr>
<td><strong>Step 2</strong></td>
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<td>Gender</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td>0.58</td>
<td>.41</td>
<td>.17</td>
<td>4.14</td>
<td>.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A third hierarchical multiple regression was performed to predict engagement with positive posts (see Table 4.7 for results). In the first step, gender, age, and SNS environment were entered. This model was statistically significant, $F(3, 83) = 7.13, p < .001$, and accounted for 21% of the total variance. In the second step, social desirability and trait empathy were added, which did not significantly improve the model, however the model still significantly explained 26% of total variance, $F(5, 81) = 5.59, p < .001$. In this final model, two of the eight predictor variables were statistically significant: condition and trait empathy. SNS environment accounted for 16% of the unique variance and trait empathy accounted for 4%, suggesting that participants allocated to the control condition and those with higher trait empathy were likely to comment on positive posts.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age</th>
<th>SNS environment</th>
<th>Trait empathy</th>
<th>Social desirability</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.79</td>
<td>2.25</td>
<td>-0.82</td>
<td>1.03</td>
<td>-3.98</td>
</tr>
<tr>
<td>10.62</td>
<td>0.56</td>
<td>9.98</td>
<td>0.44</td>
<td>3.78</td>
</tr>
<tr>
<td>0.07</td>
<td>0.39</td>
<td>-0.01</td>
<td>0.24</td>
<td>-.10</td>
</tr>
<tr>
<td>0.00</td>
<td>0.15</td>
<td>0.00</td>
<td>0.05</td>
<td>0.01</td>
</tr>
<tr>
<td>0.73</td>
<td>3.99</td>
<td>-0.08</td>
<td>2.33</td>
<td>-1.05</td>
</tr>
<tr>
<td>0.47</td>
<td>0.00</td>
<td>0.93</td>
<td>0.02</td>
<td>0.30</td>
</tr>
</tbody>
</table>

Table 4.7
Hierarchical Multiple Regression Model Predicting Engagement with Positive Posts

<table>
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<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td>-2.81</td>
<td>14.42</td>
<td>-.02</td>
<td>.00</td>
<td>-0.19</td>
<td>.85</td>
</tr>
</tbody>
</table>
Qualitative Responses Regarding Engagement Motivation

Of the 97 participants, 84 responded to the qualitative question: “What aspects of a post encourage you to comment?”. The majority of participants (73) listed more than one aspect, with 27 listing three different aspects, and 10 listing four aspects that would encourage them to comment. Thematic content analysis of participants’ responses revealed 11 distinct themes. The most commonly occurring themes were personal connection to the poster, humour or novelty of topic, personal interest in a topic, concern for or support for the poster, a positive message from or experience by the poster, and self-presentation measures. Results are presented in Table 4.8, and full qualitative comments are presented as a supplementary table in Appendix I (see Table 8.2).
**Thematic Analysis of Qualitative Responses**

<table>
<thead>
<tr>
<th>Theme</th>
<th>Frequency of theme no.</th>
<th>Example quotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal connection to poster</td>
<td>53</td>
<td>&quot;I would usually only comment on the posts of people who I know reasonably well and know me reasonably well.&quot;</td>
</tr>
<tr>
<td>Humour/novelty</td>
<td>37</td>
<td>&quot;Interesting topics (new articles). Inspirational quotes. Memes&quot; &quot;...Sometimes I may update with a joke or something amusing that has happened.&quot;</td>
</tr>
<tr>
<td>Interest in topic</td>
<td>37</td>
<td>&quot;Interesting topic.&quot; &quot;...if I find the post particularly interesting...&quot;</td>
</tr>
<tr>
<td>Concern/support for poster</td>
<td>24</td>
<td>&quot;when a friend is feeling traumatised/upset&quot;</td>
</tr>
<tr>
<td>Positive message/experience by poster</td>
<td>12</td>
<td>&quot;inspirational posts images or sayings as well as friends and family&quot;</td>
</tr>
<tr>
<td>Self-presentation</td>
<td>12</td>
<td>&quot;if I have an opportunity to be funny I'll post. If it's too heavy I'll probably avoid posting for want of saying something inappropriate accidentally.&quot; &quot;Something I know would get a lot of likes...&quot;</td>
</tr>
<tr>
<td>Self-relevance</td>
<td>9</td>
<td>&quot;Something I relate to...&quot;</td>
</tr>
<tr>
<td>To share information</td>
<td>7</td>
<td>&quot;...or if I see something one of my friends would like&quot;</td>
</tr>
<tr>
<td>Desire to engage poster</td>
<td>3</td>
<td>&quot;I want to contribute something to engage with the poster.&quot;</td>
</tr>
<tr>
<td>Emotional reaction</td>
<td>3</td>
<td>&quot;if it's really moving i will comment regardless&quot; &quot;If have strong emotional reaction to post.&quot;</td>
</tr>
<tr>
<td>Sincere or authentic post</td>
<td>2</td>
<td>&quot;People writing about real issues and representing issues that are important and need attention&quot; &quot;Sincerity and authenticity, especially someone I know&quot;</td>
</tr>
</tbody>
</table>

**Note.** Frequency and percentage of response do not sum to sample size as some participants gave more than one type of response, and unit of analysis was per sentence not per case.

In addition to these themes, ten participants also provided examples of times they would not engage with a Facebook post, with 7% of the total respondents indicating that they ignored posts where there was “oversharing” of personal information, 3% who avoided posts lacking novelty, 1% who would not post if they knew the person, instead opting for a private message, and 1% who avoided any post
that did not directly involve them.

Discussion

This study examined participants’ engagement with SNS posts containing positive, neutral, or negative sentiment in a simulated environment. It was hypothesised that participants would show lower levels of engagement with negative posts than with positive posts due to the increased cognitive and emotional effort associated with responding to negative posts. This hypothesis was not supported, as the opposite relationship was found; participants showed less engagement with positive posts and more engagement with neutral and negative posts. More specifically, the results showed that participants liked, shared, and commented more on negative posts than on positive posts. However, they elected to hide more negative posts than positive or neutral posts. The finding in relation to levels of engagement is in line with previous studies that showed that while users shared and commented on negative posts more frequently than with positive posts, they also found the content more difficult to respond to due to the associated social, cognitive, and emotional pressures (Bayer, Sommer, & Schacht, 2012; Berger, 2011; Stieglitz & Dang-Xuan, 2012, 2013). When looking at total engagement with the posts (the combination of comments, likes, shares, and hides), participants in the current study interacted more with neutral posts than with those containing negative sentiment. This finding suggests that users may have opted to respond to the content that required less emotional engagement. However, responses may differ when users are faced with posts from friends and family instead of posts from individuals with whom they did not have a personal connection.

It was also anticipated that trait empathy and social desirability would predict participants’ engagement with the negative, neutral, and positive posts. Trait empathy significantly predicted engagement with all of these posts; there were
positive relationships between empathy and engagement, which suggests that those with higher trait empathy may be more likely to engage with SNS content no matter the type of sentiment expressed in posts. This result is consistent with previous research; higher levels of trait empathy give users the ability to regulate their emotional reactions to content, understand the experiences expressed by others, and respond in appropriate ways (Schipper & Petermann, 2013).

In the current study, participant age also positively predicted engagement with negative and neutral posts, with older participants more likely than younger participants to engage with each type of post. Interestingly, there was no influence of gender on engagement with posts, contrary to the finding of McAndrew and Jeong (2012) that gender was associated with the level of engagement in SNSs, with females spending more time on Facebook, and more likely to use profile photos for impression management than males. Similar to the results of the current study, McAndrew and Jeong (2012) also found that older SNS users were more likely than younger users to seek out SNS activity with family members over strangers, which would potentially lead to them interacting more with negative posts if they knew the poster well.

Although the multivariate model did not show an influence of participants’ tendency for socially desirable responses on engagement with posts in this study, correlational analysis showed a significant negative relationship between social desirability and engagement with negative posts. This result suggests that users who were likely to respond in self-promotional ways were less likely to engage with negative posts. This relationship may be due to the increased demand associated with responding to negative posts as, when coupled with the demand associated with self-presentation measures, SNS users might find it too difficult or stressful to compose an appropriate response (Bayer, Sommer, Schacht, et al., 2012; Berger, 2011).
Finally, the aspects of posts that encouraged participants to engage with SNS content were investigated qualitatively. The themes identified suggested that participants were more likely to engage with SNS posts if they had a personal connection to the poster, the topic of the post was humorous or novel, they had personal interest in a topic, were concerned for or supportive of the poster, there was a positive message from the poster, or participants were concerned about self-presentation. Some of these themes are consistent with those identified in previous research (Oliveira et al., 2016), as participants in Oliveira’s study were concerned with the subjective norms of the SNS, their own social identity, entertainment, and general interpersonal connectivity. Unanticipated themes from qualitative responses were ‘Positive message/experience by poster’ where participants described specific situations where a post might contain inspirational messages, a special occasion experienced by the poster, or an uplifting quote that would resonate with the SNS user, thus leading to them comment on the content.

There were a number of limitations to the current study. First, participants were asked about the aspects of posts that encouraged them to respond after they had interacted with the simulated SNS environment. Therefore, their responses to this question may have been primed with the content that they had seen. For example, it is possible that participants who were in the negatively valenced SNS environment were more willing than those in the neutral environment to state that they would respond if they were genuinely concerned for the poster or if they felt emotionally engaged by the poster. However, participants in this condition may not have given these responses if they had not been exposed to the SNS environment first. Future studies should investigate participants’ motivations for engaging with posts without exposing them to any information (such as simulated Facebook posts) that might cue them to the hypotheses of the research or prime their responding in line with the SNS
environment condition to which they were exposed.

The second limitation is that the SNS environment presented to participants in the current study was simulated. Therefore, participants were not interacting with posts from people that they knew or had chosen to add to their friendship list, which may have reduced the authenticity of responses shown within the study. However, responses may differ (they may employ less self-presentation measures or greater empathic response) when users are faced with posts from friends and family instead of posts from individuals with whom they did not have a personal connection. Participants also would have been aware that the posts presented were not real-time; therefore, there was no time pressure to respond to any of the posts which may have given more time for consideration of the type of response given.

The current study highlighted the importance of trait empathy and perceived personal connection to SNS users in influencing the likelihood of engagement with SNS content. This study demonstrated that users are more likely to engage in any way with neutral posts, however they are also likely to ‘like’ or ‘hide’ posts containing negative emotions. The results also showed that trait empathy is likely to influence SNS users to engage with any content, not just that which is emotionally laden. These results imply that if a poster wishes to increase the popularity of their own SNS content, then generating neutral content aimed at close family and friends should provide the highest level of engagement.
CHAPTER FIVE: INTERACTIONS THROUGH SOCIAL NETWORKING WEBSITES

The establishment and maintenance of social relationships is a key motivation for people’s use of SNSs (Krishnan & Atkin, 2014; Oliveira et al., 2016). Regular use of SNSs offers several benefits for relationship building, including the ability to gain social and informational support from others, and to manage one’s social network of friends (Kim & Lee, 2011; Lin, Zhang, & Li, 2016). However, there are also problems associated with the use of SNSs, such as lower satisfaction with online relationships than with face-to-face relationships, pressure to interact in socially desirable ways, and insecurities when building new relationships (Elphinston & Noller, 2011; Lindner, 2012; Shafie, Nayan, & Osman, 2012; Thompson & Lougheed, 2012). SNS-related relationship difficulties can also lead to users questioning the authenticity or honesty of communication exchanged, especially when they are engaging with posts of an emotional nature (Lim et al., 2015).

Authenticity in communication is any unobstructed display of the true or core self (Kernis & Goldman, 2006; Reinecke & Trepte, 2014), when communicating oneself or responding to others’ communications. It is related to increased psychological health and well-being, as well as healthy social behaviours, such as accommodation (the monitoring and subsequent reciprocity of emotional cues in others), self-disclosure, and reciprocal trust (Brunell et al., 2010; Reinecke & Trepte, 2014). However, in SNSs, users’ online identities may not be authentic; instead, they may reflect some combination of a user’s real self and/or their ideal self (Lim et al., 2015), a version of their self that they want to be, or the version of their self that they want to project to others (Michikyan, Subrahmanyam, & Dennis, 2014). If online identities are not authentic, then it is likely that other online communication and interpersonal activity will not be authentic.

Authentic communication in SNSs is strongly influenced by users’ self-
presentation biases and pressure to respond to SNS content in a socially desirable way (Walther, Van Der Heide, Hamel, & Shulman, 2009). For example, research has shown that SNS users with a greater desire for popularity online had lower levels of authenticity in their social profiles and interactions with others than did those with a lower desire for such popularity (Christofides et al., 2009; Lim et al., 2015). Other factors related to authenticity in SNSs include age, gender, and an understanding of self (Lim et al., 2015). Lim et al. found that younger users and male users expressed a higher need for popularity than did older users and female users, and younger users and male users also displayed lower levels of authenticity in their online interactions. Users with a better understanding of self (that is, were better able to understand the discrepancy between their real and ideal selves) also had a lower need for popularity in online environments, and a higher level of authenticity in their communication (Lim et al., 2015).

It is possible that authentic communication may be affected by the emotions expressed and experienced in SNSs, especially if emotions or moods are transferred between users (Korpijaakko, 2015). Emotional contagion, or the transference of emotions between users in SNSs, has been related to personality factors such as trait empathy (Chan, 2014; Rosen, Whaling, Rab, Carrier, & Cheever, 2013; Ryan & Xenos, 2011), with users higher in trait empathy more likely to experience the emotions of others when engaging with other through SNSs.

Not only is there a link between SNS use and emotion, evidence shows that engaging with emotional SNS posts can be both cognitively and emotionally demanding for SNS users. The more sentiment (or emotion) that posts contain, the more attention is required, which also causes more physiological arousal for the reader than non-sentimental posts (Bayer, Sommer, Schacht, et al., 2012; Berger, 2011). Increases in cognitive demand have led to increases in reaction times
associated with decision making (Greene, Morelli, Lowenberg, Nystrom, & Cohen, 2008), suggesting that when users are distracted or have a high cognitive load, they may take longer to respond to a SNS post or may deem it too difficult to address and refrain from responding at all.

The cognitive and physiological impact of negative situations may be reduced through unconscious or automatic emotion regulation techniques (Gross, 1998; Richards et al., 2003). Automatic nervous system activity, indicated by changes in skin conductance levels and heart rate, has been associated with people’s expression and experience of emotions (Hughes, Uhlmann, & Pennebaker, 1994; Vaschillo et al., 2008). Furthermore, skin conductance has been established as an indicator of the impact of cognitive load (Nourbakhsh, Wang, Chen, & Calvo, 2012). For instance, Hughes et al. (1994) found that skin conductance level increased when participants expressed negative emotions, whereas it decreased when they expressed positive emotions. If engaging authentically with emotional SNS posts, one might expect that automatic nervous system activity should increase as users engage with the emotional content and their emotional responses are regulated.

In terms of the cognitive demand associated with engaging with emotional SNS posts, cognitive load theory indicates that when more than one task is completed simultaneously, there will be a reduction in performance on both tasks as working memory can only process a limited amount of information (Brunken et al., 2003). The ability of a user to process information is influenced by many factors, including the way in which the information is presented, a user’s working memory capacity, the sequence of the information presented, and the user’s interest in the subject (Brunken et al., 2003; Paas, 1992; Paas & Van Merriënboer, 1994). Dual task approach to cognitive load theory (Brunken et al., 2003) labels tasks as primary and secondary, assuming that any engagement in a secondary task will reduce
performance in the primary task. In SNSs, a primary task may refer to a user’s engagement with posts, while a secondary task may be any distraction from the posts including advertisements, pop-up chat windows, other computer programs, or external interruptions. When responding authentically to an emotional SNS post, this distraction may impact upon working memory, making dual task performance slower and less accurate.

The aim of the current study was to examine the associations between emotionally negative SNS posts, authentic communication, self-presentation biases, and engagement with SNS content. In contrast to the method used in Study 2, rather than examining SNS posts in terms of their individual valence, Study 3 examined participants’ responses to overall SNS environments. In addition, since there is no overarching measure of authenticity in SNS communication, authenticity was examined in the current study through changes in participants’ moods and physiological arousal before and after they interacted with a negatively valenced or neutral SNS environment, and their ability to ignore a second (distractor) task while they were interacting with the posts in this environment. Participants completed measures of mood, cognitive load, skin conductance and heart rate before interacting with a negatively valenced or neutral SNS environment. Participants’ number of likes, shares, hides, and comments for each SNS post were recorded. After interacting with the SNS environment, participants completed measures of mood, cognitive load, skin conductance and heart rate a second time.

Given the level of emotion regulation required to manage the negative emotion experienced, it was hypothesised that after interacting with the SNS environment, participants in the negatively valenced condition will be less likely to engage with the posts, have lower moods, higher skin conductance and heart rates, and self-reported higher cognitive loads than participants in the neutral condition.
Building upon the findings of Study 1, it was also predicted that there would be gender differences in engagement with SNS content due to the underlying gender differences in empathy. Indeed, several studies have shown that there are gender differences in online communication (Klemm, Hurst, Dearholt, & Trone, 1998; Mo, Malik, & Coulson, 2009; Sullivan, 2003), with females preferring discussion on emotional issues and males showing preference for information oriented discussion. Finally, it was hypothesised that, after controlling for demographic factors and SNS condition, greater trait empathy and a stronger tendency to provide socially desirable responses will predict greater levels of engagement with SNS posts.

**Method**

**Participants**

Ninety-seven participants were recruited, aged between 18 and 63 years ($M = 26.32$, $SD = 8.68$ years). Thirty-five were male (36%) and 62 were female (63%); 72 participants (74%) were university students. All participants were regular online SNS users, with 53% visiting a SNS at least twice a day.

**Design**

The study used an experimental 2 (SNS environment) x 2 (time) repeated measures design. SNS had two levels: a neutral SNS environment group and a negatively valenced SNS environment group. Time also had two levels: before and after interaction with the SNS environment. Measured independent variables were demographic factors (gender, age), personality factors (social desirability, trait empathy), and situational factors (mood, physiological arousal [skin conductance and heart rate]). Dependent variables were performance on cognitive load tasks, and engagement with SNS posts. Participants completed mood and physiological arousal measures before and after interaction with the simulated SNS environment.

**Materials**
All measures have been provided in Appendix II. Survey forms.

**Simulated SNS environment:** Since Facebook is the most popular English language social networking website globally (Statista, 2015), the simulated SNS environments were modelled after the Facebook user interface. All SNS posts included in the simulated environment were taken from real public SNS pages with names and profile pictures changed. The environment was split into core posts, neutral environment posts, and negatively valenced environment posts. All participants were presented with 10 core posts representing neutral or emotionally positive SNS content in line with what would be expected to be encountered on a SNS. Core posts were displayed within both environments to create a sense of realism in the environment as it is unlikely that a user would naturally experience a SNS session consisting of entirely negative posts. The neutral environment functioned as a control condition and consisted of the 10 core posts, and an additional 11 posts dispersed throughout the core posts. In line with the core posts, the neutral posts represented neutral and slightly positive emotions. The negatively valenced environment included the 10 core posts and an additional 11 posts depicting negative emotional states dispersed throughout the core posts. All SNS posts used within this study can viewed in Table 8.7 to Table 8.9 in Appendix II. See Table 5.1 for the number of posts in each environment showing each type of sentiment.

<table>
<thead>
<tr>
<th>Number of Posts Depicting Negative, Neutral, or Positive Sentiment</th>
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</thead>
<tbody>
<tr>
<td><strong>Number of posts</strong></td>
</tr>
<tr>
<td>Core posts</td>
</tr>
<tr>
<td>Neutral posts</td>
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<tr>
<td>Negatively valenced posts</td>
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</table>

To check the valence of each post, sentiment analysis program SentiStrength (Thelwall, 2013) was used to classify each post as either negative, neutral, or
positive, to ensure that each SNS condition contained posts depicting the correct emotional range. To classify the level of sentiment within a post, SentiStrength compares posts to a list of emotional terms and rules for negations, booster words, amplifications, use of emoticons, and spelling errors. Each post is given a positive sentiment score and a negative sentiment score, with positive sentiment scored on a scale of 1 (neutral) to 5 (strongly positive), and negative sentiment scored on a scale of –1 (neutral) to –5 (strongly negative).

Polarity of the SNS posts is computed by adding the negative and positive sentiment scores together, indicating the categorisation of the post: with a negative polarity score indicating negative posts, zero polarity indicating neutral posts, and a positive polarity indicating positive posts. Overall sentiment is computed by subtracting negative sentiment from positive sentiment, then further subtracting 2 to rescale the score range from 2-10 to 0-8, for clarity (see Stieglitz and Dang-Xuan (2012) for more detail of the scoring procedure).

Cognitive load task: Cognitive load was measured using both subjective and objective methods, as outlined by Brunken et al. (2003). The objective measure was a dual-task performance method employing a primary task of responding to or browsing SNS posts while a secondary task of simple arithmetic simultaneously appeared on the screen periodically throughout the experiment. Participants were instructed to carry out their primary task while remaining aware of the secondary task, but not to focus on it. This task then produced two outcome variables: response accuracy to the arithmetic task and response speed to the task. For the subjective measure, participants rated how difficult they found the task of responding to both SNS posts and an arithmetic task simultaneously, on a scale from 1 (no effort at all) to 10 (quite a lot of effort).

Measures
Demographics: Items measured age, gender, and frequency of social media website use (less than once a month = 1, at least once a month = 2, at least once a week = 3, daily = 4, between 2-5 times a day = 5, more than 5 times a day = 6).

Social desirability: Participants completed the short-form 10-item true/false version of the Social Desirability Scale (Fischer & Fick, 1993), which assesses the tendency to respond to items in a socially desirable way. Two points were allocated each time a socially desirable response was selected (e.g., selecting “False” for the item “I like to gossip at times”), with a total score greater than 10 indicating high levels of social desirability response bias (Fischer & Fick, 1993), suggesting respondents might be prone to presenting themselves positively on SNSs.

Trait empathy: The Empathy Quotient is a measure of an individual’s trait empathy. Developed by Lawrence et al. (2004), it presents 40 items (some reverse coded) surrounding common reactions to social settings where an empathic expression is expected (e.g., “I find it easy to put myself in somebody else’s shoes”), and 20 filler items to reduce transparency. Each item is responded to on a 4-point Likert-type scale (strongly disagree to strongly agree), with greater empathic ability represented by a higher summed score.

Mood: Mood was measured on a single item visual analogue scale, requesting participants to rate their mood between 0 and 10 (0 = as low as I could be, 10 = really quite good, no problems at all). Single item visual analogue mood scales have been shown to be reliable, with high test-retest reliability when compared with self-rating depression scales and observed behaviour (Luria, 1975).

Skin conductance and heart rate: A PowerLab Acquisition System (ADInstruments, Australia) was used to collect data for heart rate and skin conductance. Skin conductance was recorded by a Galvanic Skin Response amplifier connected to a PowerLab 4/20 data recorder. For both recording periods (before and
after the SNS interaction), the mean frequency of skin conductance responses was calculated. Heart rate, measured by ECG, was sampled at 1000 Hz, using two leads attached to participants’ wrists and one attached to the outside ankle. Average beats per minute across four minutes were computed using LabChart software (ADInstruments, Australia) for both recording periods.

**Engagement with posts.** Engagement with posts was a measure of the amount of interaction that participants had with SNS posts by either commenting on the posts, liking them, sharing them, or hiding them (Facebook, 2016). Total engagement with posts was calculated by taking the number of likes, shares, and comments on a post and subtracting any hides. This number was then averaged across all SNS posts that were presented to the participant (depending upon environment), and could range from -63 if a participant selected to hide all posts and not comment on, like, or share any other posts, to +63 if a participant liked, commented on, and shared all posts without hiding any. Individually, total number of comments, shares, likes, and hides was also calculated.

**Procedure**

Approval for the study was obtained from the Deakin University Human Research Ethics Committee prior to data collection. Participants were recruited through advertisements (see Appendix III) placed around university campuses and on Facebook pages. After initial contact, participants were invited to attend a one-hour face-to-face session at a Deakin University campus. After gaining informed consent, a disposable electrode was attached to participants’ wrists and one ankle to measure heart rate, and a small clip was connected to the index and middle fingers on the left hand to measure galvanic skin response. Heart rate and skin conductance responses were measured through the use of a PowerLab system (ADInstruments, Australia). Participants rated their current (pre-exposure) mood, and then closed their eyes and
sat quietly while baseline heat rate and galvanic skin response measurements were recorded for four minutes.

After the baseline measurements, participants were shown a simulated SNS environment; they were randomly allocated to either the neutral or negatively valenced SNS condition. Participants navigated through the SNS posts at their own pace and were free to comment on, like, share, or hide the posts. While navigating the posts, a simple arithmetic problem appeared on a small section on one side of the screen. Participants were asked to solve the problem whenever they noticed it. Upon solving the problem, it disappeared and was replaced by another problem after 7 seconds. If missed or ignored, the problem disappeared after 15 seconds. Exposure to the simulated SNS environment was completed once a user had viewed all of (and possibly responded to) the posts. At the completion of exposure to the simulated SNS environment, participants were asked to close their eyes and sit quietly while heart rate and galvanic skin response measurements were recorded for another four minutes.

After completing the physiological measurements a second time, participants provided demographic details, and completed measures of social desirability, trait empathy, post-exposure mood, and self-reported cognitive load. Participants were debriefed by the experimenter about the purpose of the study and nature of the SNS environments, thanked for their time, and reimbursed with a $10 gift voucher.

Results

Descriptive Statistics

On average, participants visited SNSs between 2-5 times a day (see Table 5.2), scored in the normal range for trait empathy (Baron-Cohen & Wheelwright, 2004), and at the high end of the scale for social desirability (Fischer & Fick, 1993). Before interacting with the simulated SNS environment, participants’ moods were generally
positive.

Table 5.2

Descriptive Statistics for Demographic, Personality, and Situational Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>M</th>
<th>SD</th>
<th>SE</th>
<th>Min</th>
<th>Max</th>
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<td>Social network use frequency</td>
<td>78</td>
<td>5.01</td>
<td>1.00</td>
<td>0.11</td>
<td>3.00</td>
<td>6.00</td>
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<tr>
<td>Mood before SNS exposure</td>
<td>95</td>
<td>7.92</td>
<td>1.34</td>
<td>0.14</td>
<td>3.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Trait empathy</td>
<td>92</td>
<td>47.85</td>
<td>11.53</td>
<td>1.20</td>
<td>19.00</td>
<td>70.00</td>
</tr>
<tr>
<td>Social desirability</td>
<td>92</td>
<td>13.93</td>
<td>1.30</td>
<td>0.14</td>
<td>10.00</td>
<td>17.00</td>
</tr>
</tbody>
</table>

Note. Social network use frequency was coded as 1 = Less than once a month, 2 = At least once a month, 3 = At least one a week, 4 = Daily, 5 = Between 2-5 times a day, and 6 = More than 5 times a day.

Relationships Between Variables

Possible relationships between predictor variables were examined using Pearson and Spearman correlations (see Table 5.3). Engagement with posts was significantly positively correlated with participant age, mood before SNS interaction, trait empathy, and self-reported cognitive load. Gender was significantly positively correlated with trait empathy, with females scoring higher on the measure of trait empathy. There was a significant positive association between condition and self-report cognitive load, with greater self-reported cognitive load associated with membership in the emotional condition.

Table 5.3

Correlations Between Variables – Study 3

<table>
<thead>
<tr>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
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</thead>
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<tr>
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<td>.30**</td>
<td>.09</td>
<td>.28**</td>
<td>.30**</td>
<td>-.18</td>
<td>.23*</td>
</tr>
<tr>
<td>2 Gender</td>
<td>-.07</td>
<td>.14</td>
<td>-.11</td>
<td>.25*</td>
<td>.05</td>
<td>.19</td>
<td></td>
</tr>
<tr>
<td>3 Age</td>
<td>-.03</td>
<td>-.02</td>
<td>.11</td>
<td>.06</td>
<td>.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Condition</td>
<td>-.14</td>
<td>-.04</td>
<td>.00</td>
<td>.26*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Mood before</td>
<td>.14</td>
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<td>-.12</td>
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<tr>
<td>6 Trait empathy</td>
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<td>.16</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7 Social desirability</td>
<td>.10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Self-report cognitive load</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Note. Gender was coded as Male = 1 and Female = 2. Environment was coded as 1 = Neutral and 2 = Emotional. Spearman’s correlations were calculated when at least one variable was categorical; otherwise, Pearson’s correlations were calculated. * Correlation is significant at the .05 level (2-tailed). ** Correlation is significant at the .01 level (2-tailed).
Engagement with Posts

Participants’ engagement with SNS posts was low ($M = 9.64, SD = 7.93$, range = -7.00-33.00). To examine whether engagement differed in the negatively valenced and neutral SNS environments, five separate 2 (SNS environment: negatively valenced, neutral) x 2 (gender: male, female) ANOVAs were conducted on total engagement scores, number of comments, number of likes, number of shares, and number of hides.

Only number of likes and number of shares showed significant effects of condition, $F(1, 93) = 4.68, p = .03, \eta^2_p = .05$ and $F(1, 93) = 4.32, p = .04, \eta^2_p = .04$ respectively. For number of likes, participants in the negatively valenced SNS environment liked fewer posts ($M = 5.98, SD = 3.32$) than participants in the neutral SNS environment ($M = 7.60, SD = 4.31$). There was no main effect of gender and no interaction between variables, $F$s < 0.31, all $p$s > .60. For number of shares, participants in the negatively valenced SNS condition shared fewer posts ($M = 1.06, SD = 1.38$) than participants in the neutral SNS condition ($M = 1.89, SD = 2.99$). There was no main effect of gender and no interaction, $F$s < 3.11, all $p$s > .081. For total engagement, number of comments, and number of hides, there were no significant main effects of condition or gender and no significant interactions, $F$s < 2.09, all $p$s > .151.

Effect of SNS Interaction on Mood and Physiological Responses

To determine the effects of gender and exposure to the SNS posts on participants’ mood and physiological responses, 2 (time: before exposure, after exposure) x 2 (SNS environment: negative, neutral) x 2 (gender: male, female) mixed effects ANOVAs were conducted. For mood, there was a significant main effect of time, $F(1, 88) = 12.43, p = .001, \eta^2_p = .12$. Participants’ moods were lower after exposure to the SNS environment ($M = 7.36, SD = 1.72$) than before exposure.
There were no main effects of condition or gender and no interactions between variables, all $F$s < 2.88, all $p$s > .09.

For participants’ physiological responses, separate ANOVAs were conducted on skin conductance and heart rate. For skin conductance, there was a main effect of time, $F(1, 84) = 2228.07, p < .001, \eta_p^2 = .96$; participants’ skin conductance was higher after interacting with the SNS environment. There was also a significant interaction between time and gender, $F(1, 84) = 4.15, p = .045, \eta_p^2 = .05$. For males, skin conductance was significantly higher after exposure to the SNS environment ($M = 0.003, SD = 0.025$) than before exposure ($M = 0.001, SD = 0.022$), $F(1, 30) = 872.09, p < .001$. For females, skin conductance was significantly lower after exposure to the SNS environment ($M = 0.013, SD = 0.071$) than before exposure ($M = 0.018, SD = 0.102$), $F(1, 54) = 1602.84, p < .001$. No other main effects or interactions were significant, $F$s < 1.95, all $p$s > .166. For heart rate, there were no significant main effects or interactions, $F$s < 0.92, all $p$s > .340.

**Effect of SNS Interaction on Cognitive Load**

To examine the effect of condition and gender on cognitive load, separate 2 (SNS environment: negative, neutral) x 2 (gender: male, female) ANOVAs were conducted on participants’ number of correct responses to the arithmetic task, response times to the arithmetic task, and self-reported cognitive load. For the number of correct items, there was a significant main effect of gender, $F(1, 92) = 4.04, p = .047, \eta_p^2 = .04$. Males made more correct responses ($M = 13.09, SD = 2.76$) than females ($M = 11.57, SD = 3.66$). Neither the main effect of condition, nor the interaction between variables, was significant, all $F$s < 3.60, all $p$s > 0.61.

For response time, there was a significant main effect of gender, $F(1, 93) = 5.72, p = .019, \eta_p^2 = .06$. Males responded faster ($M = 4.79s, SD = 8.17$) than females ($M = 5.19, SD = 7.76$). There was also a significant interaction between condition
and gender, $F(1, 93) = 5.68, p = .019, \eta^2_p = .06$. For males, there was no difference in response time between conditions, however females responded significantly more slowly in the negatively valenced SNS condition ($M = 5.38\text{s}, SD = 0.75$) compared to the neutral condition ($M = 4.95\text{s}, SD = 0.75$), $F(1, 60) = 5.02, p = .029$. The main effect of condition was not significant, $F(1, 93) = 0.06, p = .813, \eta^2_p = .001$.

For self-reported cognitive load, there was a significant main effect of condition, $F(1, 90) = 4.87, p = .030, \eta^2_p = .05$. Participants in the negatively valenced SNS condition reported more task difficulty ($M = 4.59, SD = 2.41$) than did participants in the neutral condition ($M = 3.31, SD = 2.32$). There was no main effect of gender and no interaction, $Fs < 2.69$, all $ps > .105$.

**Predictors of Engagement with Posts**

Next, it was examined whether participants’ mood, trait empathy, social desirability, and self-reported cognitive load predicted their total level of engagement with SNS posts after controlling for the age and gender of the participant. Other measures of cognitive load were not included in the model due to the high correlation between variables (e.g., number of items correct and response time, $r = -.82, p < .001$).

A hierarchical linear multiple regression was performed (see Table 5.4). In the first step, two demographic variables (age and gender) were entered to account for potentially confounding effects. This model was statistically significant, $F(2, 86) = 5.49, p = .006$. In the second step, SNS environment, mood before interaction with the SNS environment, trait empathy, and social desirability scores were added. The addition of these variables significantly improved the model, $F_{\text{change}}(4, 82) = 5.47, p = .001$, and accounted for 30% of the total variance in engagement with posts, $F(6, 82) = 5.86, p < .001$. At this second step, age, trait empathy, and social desirability all significantly predicted engagement with posts. In the third step, self-reported
cognitive load was added, which again significantly improved the model, $F_{change}(1, 81) = 6.44, p = .013$, and accounted for 35% of the total variance in engagement, $F(7, 81) = 6.28, p < .001$. In this final model, four of the seven predictor variables were statistically significant: age, mood before interacting with the SNS, social desirability, and self-report cognitive load. Age accounted for 8% of the unique variance, mood before interaction accounted for 9%, social desirability accounted for 4%, and self-report cognitive load accounted for 5%. Trait empathy was no longer a significant predictor.

Table 5.4
Hierarchical Multiple Regression Model Predicting Engagement with Posts

<table>
<thead>
<tr>
<th>Step</th>
<th>R</th>
<th>$R^2$</th>
<th>$R^2$ Change</th>
<th>B</th>
<th>SE</th>
<th>$\beta$</th>
<th>$sr^2$</th>
<th>$t$</th>
<th>$p$</th>
</tr>
</thead>
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<td>-1.33</td>
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<td>.68</td>
</tr>
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<td></td>
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<td>0.1</td>
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<td>.11</td>
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<tr>
<td><strong>Step 2</strong></td>
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<td>-.04</td>
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</table>

*Note.* Gender was coded as 1= male = 1 and 2= female. Condition was coded as 1 = Neutral and 2 = Emotional.

**Discussion**

The present study examined participants’ responses to SNS posts through investigating changes in their moods and physiological arousal after they interacted
with the posts, and whether their engagement with the posts was affected by performing a secondary (distractor) task. It was predicted that participants would show less engagement with posts in the negatively valenced SNS environment than the neutral environment. This hypothesis was partially supported, with participants liking and sharing fewer posts in the negatively valenced environment than the neutral environment. This result may be due to the increased cognitive and emotional demand associated with acknowledging and responding to the negative emotions within the posts in the negatively valenced condition (Bayer, Sommer, Schacht, et al., 2012; Berger, 2011); participants may have employed emotion regulation techniques by choosing to ignore the posts entirely.

The prediction that participants in the negatively valenced environment would have lower moods after interacting with the environment than participants in the neutral condition was not supported, however participants’ moods were impacted by their interaction with the SNS posts. Participants’ moods were significantly lower after interacting with the simulated SNS environment than before exposure, indicating that interacting with posts of any valence may lower the mood of the SNS user. Lower moods after interacting with the SNS environments suggests that authentic emotional engagement with the posts may have occurred; however, since mood ratings decreased regardless of the valence of the SNS environment it cannot be attributed to interaction with negatively valenced SNS posts. Rather than simply scrolling through the SNS feed without engaging in content, results from the current study suggest that participants paid attention to the posts and therefore showed emotional engagement with the SNS content displayed (Hancock, Gee, Ciaccio, & Lin, 2008; Lin, Sidani, et al., 2016). Interestingly, participants in the negatively valenced SNS condition did not have different mood ratings from participants in the neutral SNS condition, which suggests that emotional contagion did not occur in the
current study. Instead, any interaction with SNS posts may decrease mood. This finding is supported by a recent study that showed that high frequency SNS users are 1.66 times more likely to experience depressive symptoms or lowered mood than low frequency users (Lin, Sidani, et al., 2016), therefore results from this study may simply reflect a frequency of use association rather than an effect of SNS content.

The hypothesis that there would be an increase in physiological arousal (measured through heart rate and skin conductance) for participants in the negatively valenced SNS condition compared to those in the neutral condition was not supported. Instead, results showed that participants’ skin conductance increased after interaction with the SNS environments, regardless of whether they were in the negatively valenced or neutral condition. There are at least three possible explanations for this finding. First, it is possible that participants regulated their emotions in response to posts in both the negatively valenced and neutral SNS environments because there was a small amount of negative sentiment included in the posts in the neutral environment. Second, it is possible that changes in skin conductance were due to an increased cognitive load rather than arousal associated with emotion regulation (Nourbakhsh et al., 2012). Third, it is possible that due to the somewhat clinical environment of the experimental setting, participants primed themselves through cognitive expectancy for emotional engagement and therefore were able to regulate autonomic arousal similarly to the findings of Vaschillo et al. (2008). Vaschillo et al. (2008) found that autonomic regulation can be influenced by cognitive expectancy, suggesting that if an emotion is primed then a user may be able to regulate the associated emotional reaction and therefore employ protective strategies.

Although participants’ skin conductance showed a change after interacting with the negatively valenced and neutral SNS environments, there was no such
change in their heart rate, which may be due to participants differentiating the simulated SNS environment from their own interactions with friends online, therefore reducing the overall impact of the negative emotional states expressed within the environments. It is surprising to see a change in skin conductance without a corresponding change in heart rate (Hughes et al., 1994; Nourbakhsh et al., 2012), and it is possible that the skin conductance was simply due to the room temperature.

For cognitive load, it was predicted that participants who interacted with the negatively valenced SNS environment would show a higher load than those who interacted with the neutral environment. This hypothesis was partially supported. Participants in the negatively valenced SNS condition reported more task difficulty than participants in the neutral SNS condition (see also Nourbakhsh et al., 2012); however, participants’ accuracy and response times for the secondary task were not affected by condition. This finding suggests that even though performance on the secondary task was not impacted by the negatively valenced environment, participants in this condition reported more difficulty in responding to two tasks simultaneously compared to those in the neutral environment. Greater self-reported difficulty may indicate increased authenticity in responses due to the greater importance of the primary task. However, there was no effect of SNS environment on cognitive load as measured by response accuracy or speed. This finding is not consistent with previous research showing that increasing cognitive load lowers response accuracy and increases reaction time (Dindar, Kabakçı Yurdakul, & İnan Dönmez, 2015; Greene et al., 2008). It is possible that an effect of SNS environment on response accuracy and speed was not found because participants’ engagement with the posts was not as high as it might have been if they were interacting with their own friends rather than unknown SNS users.

The gender effects associated with cognitive load in this study showed that
females in the negatively valenced SNS condition responded more slowly to the secondary task than did males in that condition, and that across both conditions, males responded faster and more accurately to the secondary task than did females. This result suggests that males may have delivered a less authentic response than females as they were using fewer working memory resources when responding to negative posts (Brunken et al., 2003). The result may also be due to the inherent gender difference in cognitive load task ability as some studies have shown that males perform better on reaction time and working memory-related tasks than females (Bell, Willson, Wilman, Dave, & Silverstone, 2006; Speck et al., 2000), however, other studies suggest that females perform better (Hwang, Hong, Cheng, Peng, & Wu, 2013). Further research into this finding is required.

Finally, it was hypothesised that trait empathy and a tendency for socially desirable responding would predict participants’ level of engagement with SNS posts; this hypothesis was partially supported with social desirability, age, and mood significantly predicting level of engagement. Older participants, those in positive moods at the beginning of the SNS interaction, those who were less likely to respond in a socially desirable fashion, and those who reported higher levels of perceived difficulty in responding to posts were more likely to engage with any SNS content. These findings are consistent with those of Oliveira et al. (2016), who found that when employing self-presentation techniques, users engage with Facebook content because of the perceived norms of the environment, their own social identity construction, and a desire for interpersonal connectivity.

Contrary to the hypothesis, trait empathy was not a significant predictor of engagement in posts at the final step of the model. It was, however, a significant predictor before adding in self-reported cognitive load, therefore suggesting—and in line with the results of Van Dillen, Heslenfeld, and Koole (2009)—that trait empathy
may influence the relationship between self-reported cognitive load and engagement with SNS posts.

There were a number of limitations to the current study, which may reduce the generalisability of the findings. First, the SNS environment presented to participants was simulated and therefore users did not interact with posts from people that they know or had chosen to add to their friendship list. They also would have been aware that the posts presented were not real-time; therefore, there was no time-pressure to respond to any of the posts. Future studies may overcome this problem by planting emotional posts within real Facebook newsfeeds; however, with the ever-changing nature of Facebook’s newsfeed algorithm, there is no guarantee that planted posts would be visible to all participants. Second, due to the nature of physiological testing, the total number of participants was limited to those who were available to visit testing centres in person.

The current study highlighted the importance of developing a clear measure for establishing the level of authenticity in SNS communications. Authentic communication leads to positive psychological wellbeing, accommodation of others, disclosure of personal information, and reciprocal trust between users (Brunell et al., 2010; Reinecke & Trepte, 2014). The current results suggested some supporting evidence of authentic emotional engagement in SNS content; however, there did not appear to be a physiological impact of interaction with the posts or an association between overall engagement and SNS environment. It is also evident that SNS users are more likely to engage with content when they are older, in positive moods, and are typically less inclined to employ self-presentation measures to alter their online image. In conclusion, the valence of posts within the SNS environment influenced users’ interactions and judgments of task difficulty. Interactions with negatively valenced posts appeared more authentic than interactions with neutral posts.
CHAPTER SIX: DISCUSSION

This thesis explored individuals’ responses to SNS posts from social and cognitive psychological perspectives, focusing on the use of SNSs for the development and maintenance of social relationships. It aimed to answer the following five research questions: (1) What are the main psychological factors emerging in the existing literature that are associated with social relationship building and maintenance through online social networks? (2) How does the personality trait of empathy affect users’ engagement with SNS content? (3) How does impression management affect users’ engagement with online social networking content? (4) What is the relationship between the valence of SNS content (negative or neutral) a secondary cognitive task and engagement with posts? and (5) How does the amount and type of sentiment contained in SNS content affect users’ engagement? The following discussion chapter summarises the findings of the original research, and relates the findings to the key research questions of the thesis.

Key Findings

Research Question 1: What are the main psychological factors emerging in the existing literature that are associated with social relationship building and maintenance through online social networks?

As presented in Chapter 2, the systematic review of the existing literature revealed five overarching psychological factors associated with SNS use: information overload, impression management, emotional contagion, perceived intimacy, and perceived social support. Information overload was found to affect the opportunity for interpersonal relationships to develop as they would in face-to-face situations through a perceived lack of privacy, an excess of information on the sites, and reduced SNS self-efficacy (Bowman et al., 2012; Bright et al., 2015; Giota & Kleftaras, 2014; Li & Sun, 2014; Walther, 2007). If SNS users had low levels of SNS self-efficacy (i.e., they believed that they were not proficient in using the website),
then their chances for developing and maintaining social relationships were reduced. Low levels of SNS self-efficacy may also lead to low impression management self-efficacy (i.e., the belief in one's ability to control the impressions other have of them) and, coupled with online privacy concerns, may be detrimental to relationships if users disengage from using the website due to the belief that they cannot control the information that is shared with others.

Impression management also emerged from the literature as a factor associated with social relationship development and maintenance. In some cases, social relationships developed and maintained via SNSs may be distorted if users only display information that casts them in a certain light (Yum & Hara, 2005). In line with social exchange theory, if SNS users see value in particular online social relationships, then they are less likely to engage in impression management techniques when presenting information to those people (Ledbetter et al., 2010; Park et al., 2011). However, if SNS users are simply attempting to create social capital by increasing their number of connections on a SNS, then they may be more likely to systematically present information in a way that increases the perceived intimacy felt by other users, which helps to create and maintain false social relationships.

The transference of emotions across social networks, or emotional contagion, also appears to affect online social relationships, as it is linked with the later stages of social penetration where empathy and affect are exchanged between friends (Tang & Wang, 2012). SNS users are more likely to take on the emotions of those with whom they have already developed a level of intimacy (Kramer et al., 2014), therefore the possibility of emotional contagion occurring between SNS users with relatively low intimacy is unlikely.

Another factor that emerged from a review of the literature, perceived intimacy, was closely linked with the concept of emotional contagion. A shared
emotional state due to emotional contagion may also increase the perceived intimacy of users who are already in the process of relationship development (Shneiderman, 2000). Perceived intimacy is important across the lifecycle of the relationship, but increases as each user discloses greater levels of personal information (Tang & Wang, 2012).

Finally, perceived social support from other SNS users has been shown to be a motivating factor for the use of SNSs (Akbulut & Günüş, 2012; Frison & Eggermont, 2015; Greene et al., 2010; High et al., 2014; Shepherd et al., 2015). Linking with social identity theory, if SNS users are looking to develop their individual self-concepts, or identities, then the level of perceived support that they receive from SNS use will depend on the groups they join within SNSs or the people that they add to their contact list.

The five psychological factors identified from the systematic literature review, along with theories about social relationship development, have been used to create a proposed model (see Figure 6.1 below) of social relationship development and maintenance in SNSs. Using social penetration theory (Altman & Taylor, 1973) as a foundation, it is proposed that impression management and information overload associated with SNSs impact relationship development during the orientation stage and exploratory affective stage. During the orientation stage, when users are exchanging peripheral information about themselves in order to assess the prospect of friendship, users may employ impression management strategies in order to shape the formation of the impression another user develops about them. If users are distracted by too much information on a SNS, or misled by targeted marketing masquerading as a target friend’s opinion, then impression management strategies might be less effective and may result in the early termination of a relationships.
Figure 6.1. Proposed process of SNS relationship development and maintenance.

By the exploratory affective stage, if information overload has not negatively impacted on a developing relationship, then impression management strategies might be reduced in order to begin the development of intimacy between users. If SNS users are already friends outside of the website, then it is likely that they might bypass the impression management strategies and move directly to the affective stage of social penetration.

In the affective stage of social penetration, it is proposed that emotional contagion, perceived intimacy, and perceived social support have a greater impact on the further development and maintenance of social relationships. While users may show preference for certain SNSs to meet their intimacy and social support needs
(Akbulut & Günüç, 2012), it is proposed that the seeking and fulfillment of these needs through SNS friendship may result in users more readily adopting the emotions expressed by certain friends online. If emotional contagion, or even something as simple as changed mood, occurs frequently as a result of interacting with another SNS user, then intimacy will increase and the relationship will move from the affective stage into the stable stage of socal penetration.

**Research Question 2: How does the personality trait of empathy affect users’ engagement with SNS content?**

Research shows that high trait empathy is associated with spending longer amounts of time on Facebook (Collins, 2014). Those with higher trait empathy use SNSs primarily for positive social interactions (Fox & Rooney, 2015; Ong et al., 2011), and have a greater emotional connection with using Facebook, in comparison to those scoring lower on trait empathy (Collins, 2014).

Consistent with the research suggesting that empathy is associated with social and emotionally focused interactions, Study 1 of this thesis identified trait empathy as a significant predictor of the level of sentiment expressed in response to a negatively valenced SNS post. Participants higher in trait empathy expressed greater amounts of sentiment in their text responses to the negatively valenced post than did participants lower in empathy.

Building upon these findings, in Study 2, trait empathy significantly predicted participants’ level of engagement with posts (defined as any comment, like, or share), whether they contained negative sentiment, neutral sentiment, or positive sentiment. Participants higher on trait empathy engaged more with the posts than participants lower on trait empathy. The strongest relationship emerged with neutral posts, suggesting that those who were higher on trait empathy may have been trying to help other SNS users feel supported and worthwhile by engaging with any type of
content they posted.

Study 3 showed that while trait empathy was initially a significant predictor of overall engagement with SNS content, when self-reported cognitive load associated with responding to SNS content was included in the model, trait empathy lost its predictive power.

Overall, findings from these three studies suggest that trait empathy influences the relationship between self-reported cognitive load and engagement with SNS posts. Those who have higher trait empathy may find engaging with posts easier, have reduced cognitive load associated with responding, and be more likely to respond.

Research Question 3: How does impression management affect users’ engagement with online social networking content?

SNSs provide users with almost complete control over the information shared with others, allowing for the employment of strategic self-presentation management (Ong et al., 2011). Socially desirable responding is associated with increased likelihood of SNS users presenting information about themselves in a positive light (Tedeschi, 2013). Given this, the role of social desirability in participants’ responses to SNS posts was assessed in each study in this thesis.

Study 1 showed no association between social desirability and the level of sentiment in participants’ text responses to the negatively valenced post. Similarly, Study 2 also showed no relationship between social desirability and total engagement with the neutral or negative posts; however, its association with engagement with positive posts was marginally significant, showing that as social desirability decreased, engagement with positive posts increased.

By contrast, when looking at the overall SNS environment rather than isolating the valence of posts (as measured in Study 2) Study 3 showed that social
desirability was a significant predictor of engagement with posts in both the negatively valenced and neutral environments, with engagement increasing as social desirability decreased.

Authentic, or truthful, communication is also related to impression management, as SNS users can manipulate the level of authenticity they provide in response to other users in order to provide a positive impression of themselves. In previous literature, an overarching method for measuring authenticity in SNS communication has not been developed, therefore Study 3 investigated authentic communication through changes in physiological arousal, cognitive performance, and overall engagement with SNS posts. Results of Study 3 suggest some evidence of authentic emotional engagement in SNS posts through comments, likes, and shares of posts, and also through self-report cognitive load; however, there did not appear to be a physiological impact of interaction with the posts or an association between overall engagement and SNS environment.

Overall, these findings in relation to impression management suggest that individuals who employ self-presentation efforts may be less likely to engage with a post if the topic contains positive sentiment as they may not feel the same pressure to respond if there is less indication of emotional need from the poster. Findings also suggest that authentic communication may be able to be identified through level of engagement with SNS content, as well as through the perceived difficulty associated with responding to a post high in sentiment.

**Research Question 4: What is the relationship between the valence of SNS content (negative or neutral), a secondary cognitive task, and engagement with posts?**

Study 1 showed that exposure to the negatively valenced post improved both participants’ response times and response inhibition, with participants selecting
correct targets significantly faster, and selecting a significantly lower number of incorrect targets. It is suggested that this improvement may be attributable to attentional narrowing (Easterbrook, 1959), as following exposure to the negatively valenced post, participants may have tried to focus on only the relevant information contained in the SNS posts.

The dual task approach to cognitive load theory (Brunken et al., 2003) proposes that when presented with two competing tasks, a primary task will take precedence over a secondary task leaving fewer cognitive resources for the secondary task. In SNS terms, the primary task may be responding to a message or a post from a friend, while the secondary task may be a distraction, such as on-screen advertisements. Study 3 employed the dual process model and demonstrated that participants in the negatively valenced SNS condition reported more overall task difficulty (primary and secondary) than participants in the neutral SNS condition. However, participants’ accuracy and response times for the secondary task were not affected by condition, which suggests that participants were not cognitively affected by the second task.

Taken together, the results from Studies 1 and 3 suggest that engaging with negatively valenced SNS content appears to impact cognitive performance. However, these findings need to be replicated in future studies that use real, rather than simulated, SNS environments.

**Research Question 5: How does the amount and type of sentiment contained in SNS content affect users’ engagement?**

SNS posts containing high levels of sentiment have been associated with greater levels of required attention, which may lead to increased engagement with, and responses to, the emotional posts (Bayer, Sommer, Schacht, et al., 2012; Berger, 2011). Study 1 demonstrated that participants’ responses to the negatively valenced
post contained twice the overall sentiment, and twice the negative sentiment, in comparison to responses to the neutral posts. When predicting the levels of sentiment that participants included in their responses to a negatively valenced post, mood prior to the interaction was a key predictor, suggesting that if users are in negative moods when encountering a post, they are likely to provide greater amounts of sentiment in their responses than users who are initially in positive moods. It is also possible that those initially in negative moods are processing a poster’s need for emotional support at a deeper level (Bless, Fiedler, & Forgas, 2006), thus providing a more emotionally laden response.

Study 2 showed that participants liked, shared, and commented on more negative posts than positive posts. However, they elected to hide more negative posts than positive or neutral posts. They also showed greater levels of total engagement (a combination of likes, shares, comments, or hides) with neutral posts than with negative posts, suggesting that users may have opted to respond to the content that required less emotional engagement and to hide the difficult or problematic posts.

Study 3 found that SNS users were more likely to engage with content when they were older, in positive moods, and less inclined to employ self-presentation measures to alter their online image. Overall, the findings from the three studies presented in the current thesis original research suggest that the sentiment contained in SNS content influences the amount and type of user engagement. The more sentiment within a post, the more a user is likely to engage with the post. The more negatively valenced content within a post, the more likely that a user will like, share, and/or comment on the post.
The Impact of Cognition, Emotion, and Authentic Communication on Relationship Building and Maintenance

To take into account the findings from the original research presented in this thesis, the model presented in Figure 6.1 was revised (see Figure 6.2). The revised model includes the roles of trait empathy, self-presentation and social desirability, cognitive ability and performance, sentiment of SNS posts, and other underlying predictors on the development and maintenance of social relationships.

Alongside impression management and information overload at the orientation stage of social penetration, it is proposed that self-presentation methods, social desirability bias, and cognitive performance affect relationship development. If SNS users show a high propensity for socially desirable responding, then it is likely that they will employ more impression management strategies and be less likely to engage with emotionally laden posts where the development of intimacy might usually occur. These users might remain in the orientation stage of relationship development due to their hesitancy to reduce the use of impression management strategies and form real connections with other users. In addition, if users consider emotionally laden content more difficult to respond to than more neutral content (as they indicated through self-reporting higher cognitive load in Study 3), then this may further reduce the likelihood of relationship development in online environments.
At the affective stage of social penetration theory, it is proposed that the sentiment level and polarity of either the SNS posts that users encounter, or the posts they generate within the site, may sit alongside the contagion of emotions throughout an SNS, and the development of intimacy and perceived social support. If SNS users engage in reciprocal self-disclosure, then they may be more likely to develop and maintain solid relationships with online connections.

Finally, it is proposed that mood, demographics, and trait empathy affect the extent to which users will utilise SNSs for interpersonal relationships, with trait empathy determining the overall amount of engagement that users will have with other users of the site.

**Directions for Future Research**

Following on from the research conducted within this thesis, it is suggested that future research further investigate the motivations behind SNS aversion, including the choice to not respond to emotional content online. It is important to
understand the factors that discourage some people from any SNS engagement as these people may become partially socially isolated as a result of not having online SNS based connections.

Future studies should also employ further qualitative questioning around SNS user engagement motivations. If users can identify their initial reasons for wanting to engage online, as well as their reasons for responding to others online, then researchers may be able to apply some of the same mechanisms to online treatment methods for those who cannot attend psychological treatment in person, including those who may require assistance for social media related addiction.

To overcome the problem of a lack of controlled experimental studies around SNS relationships, future studies could employ experimental conditions in which the dynamic nature of SNS use can be tracked in real time, by asking participants to respond to real life posts while talking through their engagement related decision making processes. It is acknowledged that this task is difficult, as the ethical implications for employing experimental methods within live social media are far reaching, however employing self-report style measures such as ecological momentary assessment that track mobile SNS application usage may sufficiently capture the required level of real experience.

Finally, it is recommended that future studies directly test the proposed model of online social relationship development included in Figure 6.2.

**Conclusions**

This thesis explored the use of SNSs for the development and maintenance of social relationships. Five overarching psychological factors associated with SNS use emerged from a review of the literature that in turn informed the development and focus of the original research. The psychological factors were information overload, impression management, emotional contagion, perceived intimacy, and perceived
social support. The personality trait of empathy was found to be associated with any engagement with SNS posts, suggesting that those with higher trait empathy are more likely to connect with others online than are those with lower trait empathy. Impression management was found to be negatively related to engagement, and authentic emotional engagement was related to higher self-reported cognitive load and greater levels of engagement in SNS posts. Engaging with negatively valenced SNS content appears to have some impact on cognitive performance, however the strongest impact was in terms of increasing the perceived difficulty of performing, rather than decreasing actual ability to perform. Finally, SNS users appear to interact more with negatively valenced posts than with positive or neutral, however users also opt to hide more negative posts than positive posts, suggesting that some users may actively avoid responding to challenging online interactions.
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## Study 1 qualitative comments for posts

**Table 8.1 Qualitative responses to negatively valenced post**

<table>
<thead>
<tr>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Aww, I'm so sorry to hear that. That is absolutely awful, his poor family and friends. I'm always here for you if you want to talk about it.</td>
</tr>
<tr>
<td>2. Holy crap...serious?? re you ok?? Do you need to come over? Do you want me to come over? Who did you hear from?? I'll see if anyone else knows anything...call me when you get this and we can meet up somewhere...</td>
</tr>
<tr>
<td>3. I guess there's not much you can do right now :( Do you need to talk about it?</td>
</tr>
<tr>
<td>4. Oh my god that's horrible news :( :( Where are you, are you ok? Is somebody with you? Please call me if you need to chat xx</td>
</tr>
<tr>
<td>5. Oh sweetie, that's awful :( I'm so sorry to hear about your friend Sam :( Were you close? Where are you? Do you need company? I can come over a bit later for a coffee if you like? I'll send you a text xx</td>
</tr>
<tr>
<td>6. Oh wow, That is absolutely terrible, are you okay? Did you want to talk about it? :( I'm free for you to call if you want to chat buddy, I recently lost a friend, I know what you mean by feeling lost, Trust me things will be okay. Who told you? :(</td>
</tr>
<tr>
<td>7. On no, I'm so sorry to hear this. We're you and Sam close? Give me a call if you want to talk, or would like some company. Take care xo</td>
</tr>
<tr>
<td>8. Xoxo</td>
</tr>
<tr>
<td>9. :O no that is terrible</td>
</tr>
<tr>
<td>10. :O OMG. I am soo sorry to hear about this! Do you need someone?? Wanna hang out today? Good grief, I am so sorry!! :(</td>
</tr>
<tr>
<td>11. Aw man, hugs to you :( Do you want some company? I can come around</td>
</tr>
<tr>
<td>12. Aww... that is terrible, really tragic. Are you ok? I'm here if you need to talk. Have you spoken to anyone else who knows him?</td>
</tr>
<tr>
<td>13. Call me!</td>
</tr>
<tr>
<td>14. Cant say i knew him that well, but i lost a friend a little while ago, so i know what you mean.</td>
</tr>
<tr>
<td>15. Damn...I'm so sorry man - Did you wanna catch up?? Wanna chat about it?? I'm here if you wanna talk or just hang out...let me know - I'll buzz you late r today</td>
</tr>
<tr>
<td>16. Do you want me to come over? I'll buy some Tim Tams on the way and we can talk about it.</td>
</tr>
<tr>
<td>17. Hang in there, remember we are here if you need us</td>
</tr>
<tr>
<td>18. hey sweetie omg i am so sorry to hear about sam if there is anything at all i can do please let me even if its just an listening ear or a shoulder to cry on try to remerber the good times u had with sam sweetie</td>
</tr>
<tr>
<td>19. Hey, I'm sorry but who's Sam? Are you ok? Don't really know what to make of this. Call me xx</td>
</tr>
</tbody>
</table>
Hey, so sorry to hear about this. How about I give you a call and we can talk if you want to. If you don't want me to give you a call that's ok we can talk here or you can call me back when you feel up to it. Hope you are ok.

Hi, oh my goodness. That's terrible, my thoughts are with his family and friend's through this tough time. Sometimes accident's just happen, there's nothing much you can do but be supportive. Stay strong.

Holy shit are you okay? Call me!!!!!!

Hi, oh my goodness. That's terrible, my thoughts are with his family and friend's through this tough time. Sometimes accident's just happen, there's nothing much you can do but be supportive. Stay strong.

I am so sorry to hear that. It is alright to feel lost. He was a good friend to you.

I don't know what to say hun, but if you need anyone I'm here for you

I will just run to get my phone to give you a call darl xx

I would be telephoning this person rather than replying on a social networking site

I would ring them

I wouldn't respond to this message. I'd call them instead

I'm calling you...

i'm coming over

I'm going to call you, are you free?

I'm so sorry to hear that :( Is there anything I can do to help?? Would yo! u like t o catch up for a coffee or pop around just for a chat? Sending you my love xxoo

i'm sorry to hear that. did u know sam well? who is he? do u need anything?

Naaaawwwww, that is so horrible :( It's understandable to feel lost, but you know you have me here. Want me to come over? Xoxox

Oh God! That is terrible news. I am so sorry to hear that Sam has died. Please call me on 'phone number' when you get this message. I would love to have a chat with you, if you would prefer I can come over for a visit. Looking forward to hearing from you.

oh man that's terrible :( r u ok ? Do you need some company??

Oh man, sorry to hear that. I don't really know what to say, but if you need anything just let me know.

Oh my god :( come over today, we'll talk and hug, I never met Sam but I know she was y our world, im here for you <3

Oh my god! i dont know what to say. Thats so horrible :( Im here for you if you want to talk about it.

Oh my god! That's horrible! Wh ere are you? Do you need someone with you? I can come over... Is it an ok time to call you on your mobile? That is such shocking news

oh my goodness that is terrible. I am sorry for your loss. I am here for you to help in any way that i can just let me know
Oh my gosh, seriously? I can't believe it. How are you holding up? I know this is a big shock and that you're obviously sad, but keep your chin up and thing about the good things. As hard as it is to accept, Sam is in a better place now. It's times like these that I go back to the words of God for comfort, maybe you should try that. I don't want to impose any beliefs onto you, but it's always helped me when I felt lost.

Oh no I'm so sorry. If you need to talk I'm here xo

Oh no, that's terrible...how devastating! Let me know if you want to get together to talk..

Oh no. That's terrible news. I am so sorry to hear that. Call me any time. My phone is on all night.

Oh shit. that's awful. come around for a cuppa if you need to talk.

Oh sweety, I am so very sorry for the pain and sorrow you are feeling right now. Do you have someone with you right now, who can comfort you, or someone there for the next few days? I need to study for an exa I am afraid, but after monday i can come by train, and maybe make a nice dinner for you guys.. watch over the kids if you need a day off to grieve on your own.. just let me know, o.k? kisses and hugs, tracey xx

Oh true, thats not good, I dont like driving in fog for that very reason, hope you guys will all be ok, do you want me to come over, I didnt know Sam but I can be there for you while you ring around to get more details, just let me get Taneashah off to school and I will head over, try not to get too upset....praying for you and seeya real soon

Oh, I'm so sorry. That is really sad. I hope that you've got someone to talk to. Let me know if you want to chat x

Oh, shit. Are you okay. Let me know if you are okay to talk now and i'll call you.

Oh, wow. that is horrible. Why do you think youre feeling lost?

Oh, shit. thats not good, I dont like driving in fog for that very reason, hope you guys will all be ok, do you want me to come over, I didnt know Sam but I can be there for you while you ring around to get more details, just let me get Taneashah off to school and I will head over, try not to get too upset....praying for you and seeya real soon

Oh true, thats not good, I dont like driving in fog for that very reason, hope you guys will all be ok, do you want me to come over, I didnt know Sam but I can be there for you while you ring around to get more details, just let me get Taneashah off to school and I will head over, try not to get too upset....praying for you and seeya real soon

Oh, I'm so sorry. That is really sad. I hope that you've got someone to talk to. Let me know if you want to chat x

Oh, shit. Are you okay. Let me know if you are okay to talk now and i'll call you.

Oh, wow. that is horrible. Why do you think youre feeling lost?

Ohh....sad ...... !!! i wil call u :(  

omg babe im so sorry i cant believe it! im shocked this is horrible! i cant imagine how your feeling im so sorry :( please call as soon as u can.

OMG has anyone spoken to Sam's family?? They must be feeling awful!! No point trying to look for answers as to why, it will only do your head in...sometimes bad things happen to good people... the truck driver must feel shattered.... wonder how he is....people are going to be so quick to blame him, hope he has a great support system. Can't believe it about Sam though...... I understand you feel lost and it is okay to feel that way, but we are going to need to band together and be there for his family when they need it. We can grieve together but we have to understand that while this is very sad for us, we cannot take away from the family

OMG I'm so sorry to hear that. I don't really know what to say. Are you okay? I'm here for you if you want to give me a call and talk about it. Just let me know if there's anything I can do. So sad :(

omg that is so sad =( give me a minute and I'll be over... stay calm, turn on the tv or something
OMG that's just awful. I think it's best I give you a call. Hang in there mate!

OMG! Really? Are you okay? Would you like to meet up so we can talk? How did you find out? Keep in touch, if you need to talk call me.

OMG. What awful news... I'm so sorry to hear about Sam. You just never think something like this will happen to someone you know.... Do you want to talk about it?

Really?? Oh my god, I had no idea. I can come around today if you'd like someone to talk to, call me later? I'm so sorry.

Sorry to hear this. Is there anything I can do? Just let me know if you want me in any way.

That's so crazy.. I am stuck at work all day - I hope things go as ok as possible for you today - if you wanna catch up tonight for coffee or a beer just let me know xx

That's horrible news. Unfortunately you'll possibly never find out why or how. Try not to beat yourself up with those questions. Try to think about the good times you had together, let him sit lightly on your shoulder and share a few laughs with him. Find a special spot to dedicate to him and talk to him there. And remember all your friends and family (me too of course) are here to talk whenever you want - but this one it's better to do in person. I'll call

That's such terrible news, I am really sorry to hear this. Give me a call, or we can meet up if you need someone to talk to.

That's terrible, let me know if there is anything I can do.

Was Sam a close friend of yours? That's pretty scary though. No-one ever expects things like that to happen to someone you know. Is there anyone who may feel the same as you who you can talk to about it? If you just want to talk I can listen and try to help.

What you serious Sam who?

Where are you now? Are you at home? I'm going to call you now. Ok?? xox

Where are you? Let's talk.

Would you like me to come over???

### Study 2 supplementary results

#### Table 8.2

<table>
<thead>
<tr>
<th></th>
<th>Neutral condition</th>
<th>Negatively valenced condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Negative engagement</td>
<td>35.80</td>
<td>46.89</td>
</tr>
<tr>
<td>Neutral engagement</td>
<td>58.33</td>
<td>55.12</td>
</tr>
<tr>
<td>Positive engagement</td>
<td>87.88</td>
<td>68.99</td>
</tr>
</tbody>
</table>
Table 8.3
Qualitative responses – study 2

<table>
<thead>
<tr>
<th>What aspects of a post encourage you to comment?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. * someone I know/speak to * aim of post - funny, interesting * photos</td>
</tr>
<tr>
<td>2. 1. some i know has lost someone and needs a shoulder to cry on or some encouragement. 2. funny posts. having a laugh is always a good thing.</td>
</tr>
<tr>
<td>3. 8% of the time someone i know, however if its really moving i will comment regardless, in particular if i feel like i can relate to it.</td>
</tr>
<tr>
<td>4. A person I know posting, feeling passionate about a topic, actually having an opinion on something helps to.</td>
</tr>
<tr>
<td>5. a sad story</td>
</tr>
<tr>
<td>6. being positive, something i'm interested in, funny or cute</td>
</tr>
<tr>
<td>7. close friends, family, humorous or interesting topics</td>
</tr>
<tr>
<td>8. Common ground, so I comment when the persons status is related to a topic that I am familiar with or interested in and I share common ground with that person. Most of the time it would only be with a close friend anyway, not just anyone.</td>
</tr>
<tr>
<td>10. Cute pictures Someone I know having a good time - doing something they enjoy Interesting topic</td>
</tr>
<tr>
<td>11. depends how well I know them and if it is something I feel I should comment on</td>
</tr>
<tr>
<td>12. depends who it is and if i have anything valid to say about their post</td>
</tr>
<tr>
<td>13. Either it's a topic I know something about OR I want to contribute something to engage with the poster</td>
</tr>
<tr>
<td>14. familiar topic and someone I know</td>
</tr>
<tr>
<td>15. friends pics</td>
</tr>
<tr>
<td>16. Friends status, interesting topic (psychology)</td>
</tr>
<tr>
<td>17. generally humour</td>
</tr>
<tr>
<td>18. Helping people that seem like they need someone to talk to</td>
</tr>
<tr>
<td>19. Humor, whether or not it relates to something/someone I know.</td>
</tr>
<tr>
<td>20. I find social and political topics of interest, so I will often comment on such things. If something is of an extremely personal nature and relates to someone close to me I am less likely to post a comment because I prefer the privacy of an inbox message, text message, or phone conversation.</td>
</tr>
<tr>
<td>21. I would only comment on a post if I knew the person and if I felt the need, but that's very rare though.</td>
</tr>
<tr>
<td>22. I would usually only comment on the posts of people who I know reasonably well and know me reasonably well. If the topic is funny or engaging then I would comment on it.</td>
</tr>
<tr>
<td>23. If I felt there was something I could do or some wisdom I could impart. If there was nothing I could offer I did not comment.</td>
</tr>
<tr>
<td>24. If i know the person/like the person. If it is something especially cool. E.g., photos of you on holidays are nice, but meh dime a dozen. I'd comment if it was something new in their life e.g., new dog, house,</td>
</tr>
</tbody>
</table>
What aspects of a post encourage you to comment?

- Marriage. Day to day stuff I tend to avoid. Oversharing will win you an instant "hide"
- If I know them, if it is appropriate, if it is something that is funny. If it is something that doesn't need to be discussed in person.
- If I saw a close friend post something interesting, or a friend doing some sort of event I want to do as well.
- If I was good friends with the person. If I found the post funny enough to tag my good friends in them. If I found the topic to be something that I am interested in.
- If it's someone I know.
- If it's funny, if it's someone I care about.
- If it's someone I know, if someone is struggling or reaching out for help. If I can empathize or if I find the post particularly interesting or funny.
- If someone I know is going through a slight hardship, I'll try and send some love, or if I have an opportunity to be funny I'll post. If it's too heavy I'll probably avoid posting for want of saying something inappropriate accidentally.
- If someone needed help, Beautiful but scary pickie.
- If someone needs help, instead of just venting.
- If someone really needed help - not a petty call out for attention. An interesting topic or a sale item.
- If someone showed it to me in real life and I thought of something witty to say to whoever showed it to me.
- if there funny and humorous
- informative, cute, need to pass on the info
- inspirational posts images or sayings as well as friends and family photos
- Interesting topic Someone I know
- interesting topic, being close friends with the poster
- Interesting topic, clarification of ideas.
- Interesting topic, try to develop some knowledge of a subject that I may be ignorant of, awareness that the poster is a reasonable person. Won't comment if it's likely to offend.
- Interesting topics (new articles) Inspirational quotes Memes Something interesting that has happened in someone's life. Photos
- Interesting, funny, really close friend.
- it's relevance to me, if it's something I want to share with someone else
- My relationship to the person, the subject of the post.
- none
- People writing about real issues and representing issues that are important and need attention, also hilarious posts from hilarious friends.
- Politics, philosophy, if it's thought provoking and not just some mindless ramble that I wouldn't really care too much about. If it relates to me such as a uni assignment.
- sad
- Shit that annoys me - holy christ don't share shit with me from websites I won't read it and I'll hate you for it.
<table>
<thead>
<tr>
<th>What aspects of a post encourage you to comment?</th>
</tr>
</thead>
<tbody>
<tr>
<td>52. Sincerity and authenticity, especially someone I know</td>
</tr>
<tr>
<td>53. somebody I know, serious or interesting post, something i agree or disagree with strongly</td>
</tr>
<tr>
<td>54. Someone asking a question or in distress. Someone I can encourage or help out in some way or another.</td>
</tr>
<tr>
<td>55. Someone I am friends with, interesting topic, something amusing or something positive</td>
</tr>
<tr>
<td>56. someone i know</td>
</tr>
<tr>
<td>57. Someone I know  Interesting development in science/arts/the world etc</td>
</tr>
<tr>
<td>58. someone I know  something funny</td>
</tr>
<tr>
<td>59. Someone I know and interesting point of view</td>
</tr>
<tr>
<td>60. Someone I know, a funny story, interesting news story, if someone is reaching out.</td>
</tr>
<tr>
<td>61. Someone i know, a topic close to me</td>
</tr>
<tr>
<td>62. someone I know, friends, interesting topic, turn silly status’ into a joke.</td>
</tr>
<tr>
<td>63. Someone I know, funny statements or recalling interesting/funny experiences. Photos of beautiful scenery, close friends enjoying themselves. Statements which resonate with me, but usually only in a humorous way, I don't tend to like statuses which are negative or complaining.</td>
</tr>
<tr>
<td>64. someone i know, hot topic, something really good or bad</td>
</tr>
<tr>
<td>65. Someone i know, joyous posts</td>
</tr>
<tr>
<td>66. Someone I know, positivity, originality.</td>
</tr>
<tr>
<td>67. someone i know, really good joke or point to it, to put down a view that was really different to already written</td>
</tr>
<tr>
<td>68. Someone I know, to express sympathy for how they feel. If have strong emotional reaction to post.</td>
</tr>
<tr>
<td>69. Someone I know, topic, funny stuff</td>
</tr>
<tr>
<td>70. Someone I know. If I was involved in the topic/event that they are posting about.</td>
</tr>
<tr>
<td>71. Something I know would get a lot of likes for example, university related topics, or a major life event such as a new job, passing another trimester etc. Sometimes I may update with a joke or something amusing that has happened.</td>
</tr>
<tr>
<td>72. Something I relate to or if i see something one of my friends would like</td>
</tr>
<tr>
<td>73. Something original. If it's someone who really needs some extra support and isn't getting it I'll comment on anything.</td>
</tr>
<tr>
<td>74. Something that is not 'oversharing', something light hearted, something cute (eg picture)</td>
</tr>
<tr>
<td>75. The actual person who posts is more likely to encourage me than the content of the post (making it hard to decide for this study). I'm also more likely to post if there's actually something I can do beyond sympathise</td>
</tr>
</tbody>
</table>
| 76. The level of friendship i have with the person definitely. In my real facebook, i'd be much more likely to comment if i actually knew the person on an emotional level. I don't really interact with posts about inspirational quotes ect. like the post about the friendship quote, i usually scroll straight past those. I tend to look deeper into posts with minimal text, an interesting image if applicable, but the greatest factor
<table>
<thead>
<tr>
<th>What aspects of a post encourage you to comment?</th>
</tr>
</thead>
<tbody>
<tr>
<td>is spelling and grammar, i can't stand people who use 'ur' for 'your' etc., like i saw a few times in this.</td>
</tr>
<tr>
<td>77. The post would have to involve me in order for me to comment, hence I rarely comment.</td>
</tr>
<tr>
<td>78. things where people were obviously struggling and crying out for help</td>
</tr>
<tr>
<td>79. To share an inside joke with a friend/s, to offer support/congratulations.</td>
</tr>
<tr>
<td>80. Topics that interest me, friends that entertain or need support, bizarre or funny things.</td>
</tr>
<tr>
<td>81. Usually interesting topics, or funny posts. I tend not to engage too much with people on facebook and I more or less never make my own posts, I tend to send links and messages to friends privately rather than on their walls.</td>
</tr>
<tr>
<td>82. when a friend is feeling traumatised/upset</td>
</tr>
<tr>
<td>83. When they are posted by people I know personally and am on good and speaking terms with; when they concern loss and success, are funny or provocative.</td>
</tr>
<tr>
<td>84. where someone is in need or interesting topics or sayings</td>
</tr>
<tr>
<td>85. Who it is, Funny, thought provoking, interesting POV, need to know information.</td>
</tr>
</tbody>
</table>
Study 3 supplementary results

Table 8.4
Engagement with Posts

<table>
<thead>
<tr>
<th></th>
<th>F</th>
<th>p</th>
<th>$\eta^2_p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of likes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>5.60</td>
<td>0.02</td>
<td>0.06</td>
</tr>
<tr>
<td>Gender</td>
<td>0.55</td>
<td>0.46</td>
<td>0.01</td>
</tr>
<tr>
<td>Condition * Gender</td>
<td>0.13</td>
<td>0.72</td>
<td>0.00</td>
</tr>
<tr>
<td>Number of shares</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>4.46</td>
<td>0.04</td>
<td>0.05</td>
</tr>
<tr>
<td>Gender</td>
<td>2.90</td>
<td>0.09</td>
<td>0.03</td>
</tr>
<tr>
<td>Condition * Gender</td>
<td>2.87</td>
<td>0.09</td>
<td>0.03</td>
</tr>
<tr>
<td>Number of hides</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>1.82</td>
<td>0.18</td>
<td>0.02</td>
</tr>
<tr>
<td>Gender</td>
<td>2.44</td>
<td>0.12</td>
<td>0.03</td>
</tr>
<tr>
<td>Condition * Gender</td>
<td>0.49</td>
<td>0.49</td>
<td>0.01</td>
</tr>
<tr>
<td>Number of comments</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>1.89</td>
<td>0.17</td>
<td>0.02</td>
</tr>
<tr>
<td>Gender</td>
<td>0.01</td>
<td>0.94</td>
<td>0.00</td>
</tr>
<tr>
<td>Condition * Gender</td>
<td>0.26</td>
<td>0.61</td>
<td>0.00</td>
</tr>
<tr>
<td>Engagement with posts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>0.67</td>
<td>0.42</td>
<td>0.01</td>
</tr>
<tr>
<td>Gender</td>
<td>0.13</td>
<td>0.72</td>
<td>0.00</td>
</tr>
<tr>
<td>Condition * Gender</td>
<td>1.01</td>
<td>0.32</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Table 8.5
Mean physiological response across conditions.

<table>
<thead>
<tr>
<th></th>
<th>GSR Before</th>
<th>GSR After</th>
<th>Heart Rate (BPM) Before</th>
<th>Heart Rate (BPM) After</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N  M  SD</td>
<td>N  M  SD</td>
<td>N  M  SD</td>
<td>N  M  SD</td>
</tr>
<tr>
<td>Neutral</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>19 .001 0.02</td>
<td>19 .004 0.02</td>
<td>19 72.47 13.42</td>
<td>19 73.01 11.40</td>
</tr>
<tr>
<td>Female</td>
<td>28 .003 0.02</td>
<td>28 .004 0.02</td>
<td>28 77.08 12.72</td>
<td>28 77.59 13.15</td>
</tr>
<tr>
<td>Total</td>
<td>47 .002 0.02</td>
<td>47 .004 0.02</td>
<td>47 75.18 13.06</td>
<td>47 75.66 12.51</td>
</tr>
<tr>
<td>Emotional</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>16 .001 0.02</td>
<td>16 .003 0.02</td>
<td>16 69.54 16.19</td>
<td>16 67.54 15.67</td>
</tr>
<tr>
<td>Female</td>
<td>34 .032 0.19</td>
<td>34 .020 0.12</td>
<td>34 75.85 16.68</td>
<td>34 73.51 20.19</td>
</tr>
<tr>
<td>Total</td>
<td>50 .022 0.16</td>
<td>50 .015 0.10</td>
<td>50 73.92 16.62</td>
<td>50 71.64 18.93</td>
</tr>
</tbody>
</table>
Table 8.6
Effect of Exposure to Negative and Neutral Posts on Mood and Physiological Responses

<table>
<thead>
<tr>
<th></th>
<th>$F$</th>
<th>$p$</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mood</td>
<td>12.43</td>
<td>0.00</td>
<td>0.12</td>
</tr>
<tr>
<td>Mood * Condition</td>
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<td>0.09</td>
<td>0.03</td>
</tr>
<tr>
<td>Mood * Gender</td>
<td>1.61</td>
<td>0.21</td>
<td>0.02</td>
</tr>
<tr>
<td>Mood * Condition * Gender</td>
<td>0.07</td>
<td>0.80</td>
<td>0.00</td>
</tr>
<tr>
<td>GSR</td>
<td>2228.07</td>
<td>0.00</td>
<td>0.96</td>
</tr>
<tr>
<td>GSR * Gender</td>
<td>4.15</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>GSR * Condition</td>
<td>1.95</td>
<td>0.17</td>
<td>0.02</td>
</tr>
<tr>
<td>GSR * Gender * Condition</td>
<td>0.32</td>
<td>0.57</td>
<td>0.00</td>
</tr>
<tr>
<td>HR</td>
<td>0.31</td>
<td>0.58</td>
<td>0.00</td>
</tr>
<tr>
<td>HR * Gender</td>
<td>0.00</td>
<td>0.95</td>
<td>0.00</td>
</tr>
<tr>
<td>HR * Condition</td>
<td>0.92</td>
<td>0.34</td>
<td>0.01</td>
</tr>
<tr>
<td>HR * Gender * Condition</td>
<td>0.00</td>
<td>0.97</td>
<td>0.00</td>
</tr>
<tr>
<td>GSR * HR</td>
<td>0.31</td>
<td>0.58</td>
<td>0.00</td>
</tr>
<tr>
<td>GSR * HR * Gender</td>
<td>0.00</td>
<td>0.96</td>
<td>0.00</td>
</tr>
<tr>
<td>GSR * HR * Condition</td>
<td>0.91</td>
<td>0.34</td>
<td>0.01</td>
</tr>
<tr>
<td>GSR * HR * Gender * Condition</td>
<td>0.00</td>
<td>0.98</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Table 8.7
Effect of exposure to negative and neutral posts on cognitive load

<table>
<thead>
<tr>
<th></th>
<th>$F$</th>
<th>$p$</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number correct</td>
<td>1.68</td>
<td>0.20</td>
<td>0.02</td>
</tr>
<tr>
<td>Gender</td>
<td>4.04</td>
<td>0.05</td>
<td>0.04</td>
</tr>
<tr>
<td>Condition * Gender</td>
<td>3.60</td>
<td>0.06</td>
<td>0.04</td>
</tr>
<tr>
<td>Response time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>0.06</td>
<td>0.81</td>
<td>0.00</td>
</tr>
<tr>
<td>Gender</td>
<td>5.72</td>
<td>0.02</td>
<td>0.06</td>
</tr>
<tr>
<td>Condition * Gender</td>
<td>5.68</td>
<td>0.02</td>
<td>0.06</td>
</tr>
<tr>
<td>Self-report cognitive load</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>4.87</td>
<td>0.03</td>
<td>0.05</td>
</tr>
<tr>
<td>Gender</td>
<td>2.69</td>
<td>0.11</td>
<td>0.03</td>
</tr>
<tr>
<td>Condition * Gender</td>
<td>0.17</td>
<td>0.69</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Appendix II. Survey forms

Study 1 survey

Full Project Title: Emotional Reactions to Social Networking
Principal Researcher: Dr Lucy Zinkiewicz
Associate Researcher(s): Miss Richelle Charman, Ms Emma Gould

You are invited to take part in this research project. This Plain Language Statement contains detailed information about the research project. Its purpose is to explain to you all the procedures involved. Please read this document carefully.

The purpose of this project is to determine if emotions can be adequately experienced and conveyed through text based online communication in response to a hypothetical situation. Participation in this project will first involve filling in a questionnaire asking demographic questions (eg. “What is your occupation?”), relationship questions (eg. “how many close friends do you have?”) and questions around social networking use (eg, how many of your social networking friends are family members?). You will then be asked to complete two short cognitive tests. The first will involve correctly repeating a series of digits of increasing length – initially in one order, and then in the reverse order. The second test will ask you to indicate when you see a stimulus on screen, such as the letter X, by pressing the spacebar on your keyboard. You’ll have a practice round before beginning each test. You will then be presented with a hypothetical online social interaction scenario, in which you are asked to provide a response to a message left for you by a friend. The two cognitive tests are then repeated, followed by additional questions about how you normally react in similar online and offline social settings. Possible benefits to participants may include enhanced reflection upon your own communication styles in online environments.

It is unlikely that there will be any risks associated with your participation in this study. Possible risks may include you experiencing some mild distress as a reaction to some of the items in the questionnaires. If you experience any distress as a result of this study we encourage you to contact Lifeline on 131114 (local call). You are free to withdraw from the study at any time.

All information collected for this research project will be securely stored. Only the principle researchers will have access to this data. Record forms, computer files, and surveys will not be labelled with your name and instead will be identified by an anonymous code. All data will be securely stored for a period of six years after final publication, after which time the data will be destroyed.
No information that may identify you will be disclosed. In any publication, information will be provided in such a way that you cannot be identified. Only group data will be presented in such a publication.

Participants can be provided with a written summary of the group results of the research project upon completion. If you wish you can be informed in writing of any publication that arises from this research project. Please contact the researchers if you would like to be provided with this information.

Participation in any research project is voluntary. If you do not wish to take part you are not obliged to. If you decide to take part and then change your mind, you are free to discontinue the survey at any time. At any point should you feel any stress or discomfort arising from the questions, we encourage you to stop completing the survey. Please be aware that once you have submitted your survey, it will not be possible to withdraw your results because there will be no way to identify your questionnaire. Your decision whether to take part or not to take part, or to take part and then withdraw, will not affect your relationship with Deakin University.

Complaints: If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:
The Manager, Office of Research Integrity, Deakin University, 221 Burwood Highway, Burwood Victoria 3125, Telephone: 9251 7129, Facsimile: 9244 6581; research-ethics@deakin.edu.au

Please quote project number HEAG-H 12_2012.

You will not be paid for your participation in this project. If you require further information, wish to withdraw your participation or if you have any problems concerning this project (for example, any side effects), you can contact the principal researchers:

Ms Richelle Charman
School of Psychology, Geelong Waterfront Campus, Deakin University
Locked Bag 20000, Geelong VIC 3220, Australia
Phone: (03) 5227 8419
Email: rcharman@deakin.edu.au

Dr Lucy Zinkiewicz
Phone: 03 5227 8497
Email: lucy.zinkiewicz@deakin.edu.au
Ms Emma Gould
Phone: 03 5227 8492
Email: emma.gould@deakin.edu.au

If you would like to participate in this project, please click the following button to indicate that you have read and understand the terms of the plain language statement and agree to give your consent to participate in the study:

I AGREE

If you do not wish to participate in this project, thank you for your time! You may click on the following button to return to the Deakin University homepage:

I DO NOT AGREE

Please complete the following questions about you (do not provide your name or any other personal identifying information - this survey is anonymous):

1. Gender
   a. Male
   b. Female

2. Please enter your current age:

3. Country of residence

4. Employment
   a. Full Time
   b. Part Time
   c. Casual
   d. Home duties
   e. Not Employed

5. Occupation

6. Are you a student?
   a. Yes
   b. No

7. If yes, what are you studying?
8. Do you have children?
   a. Yes
   b. No

Please complete the following questions about your close relationships:

1. Approximately how many close friends do you have (those friends who you know well and trust with personal information)?
   a. More than 10
   b. Between 6 and 10
   c. 4 or 5
   d. 2 or 3
   e. Only 1 who I would consider close
   f. No friends that I would consider close

2. On average, how often do you interact with any of your close friends (for example, speak with them on the phone; meet with them in person; exchange text messages or emails)?
   a. 5 or more times a week
   b. 3 to 4 times per week
   c. 1 to 2 times per week
   d. Less than once per week
   e. Less than once per month
   f. Less than once per year

3. On average, how often do you see any of your close friends in person?
   a. 5 or more times a week
   b. 3 to 4 times per week
   c. 1 to 2 times per week
   d. Less than once per week
   e. Less than once per month
   f. Less than once per year

4. Please rank the most common ways that you interact with your close friends, 1 being the most common method and 8 being the least common method:
   _ In person
   _ On the telephone
   _ SMS
   _ Online – social networking (such as Facebook, or Twitter)
Online – text chat based interaction – instant messenger (such as Skype or MSN)

Online – video chat based interaction – instant messenger (such as Skype or MSN)

Online – email

Other (please specify)

Please complete the following questions about your social networking use:

1. Approximately how many years have you been using the internet on a regular basis?

2. Do you visit social networking sites?
   a. Yes
   b. No

3. If so, which site(s)?
   - Facebook
   - MySpace
   - LinkedIn
   - Twitter
   - Google +
   - Other (please specify)

4. How many friends do you currently have on <social networking site 1> (an approximate figure is ok)?

5. As a percentage, how many of your close friends are you connected with on <social networking site 1>?

6. As a percentage, how many of your <social networking site 1> friends are family members?

How often do you visit <social networking site 1>?
   a. Less than once a month
   b. At least once a month
   c. At least once a week
   d. Daily
   e. Between 2-5 times a day
   f. More than 5 times a day
7. As a percentage, how many of your <social networking site 1> friends do you regularly interact with offline?

8. Please rank the most common reasons that you usually use <social networking site 1>, 1 being the most common reason and 5 being the least common method:

   _ To share personal information (e.g. what you are doing that day)
   _ To interact with friends and comment on posts
   _ To share links and non personal information
   _ To keep up to date with your friend’s life (e.g. not commenting, just looking)
   _ Other (please specify)
The following section asks you to respond to common private messages that you may encounter when interacting through social networking websites:

Please respond to the following *private messages* as you normally would when interacting online.

**Alice Smith**
Hey, last weekend was fun! We should do it again soon. What was the name of that movie that you recommended?

Write a reply...

☐ I would not reply to this message

**Tom Jones**
Thought you might know... what features do I need to be looking for when buying a video camera? Zoom, storage, quality, brand? I hear they're not cheap, but we're on the hunt for one! Any help would be great!

Write a reply...

☐ I would not reply to this message

**Alex Williams**
Hello old friend! Thanks for adding me. It's been a long time. Life hasn't changed much for me, same job, same house, same friends. What's been happening for you?

Write a reply...

☐ I would not reply to this message

*Figure 8.1. Neutral SNS posts - study 1*

On a scale from 0 to 10, please rate your current mood.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>as low as I could be</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>really quite good; no problems at all</td>
</tr>
</tbody>
</table>

You will now be presented with 2 short tasks. Please note that you will be asked to repeat the tasks a second time towards the end of this study.

**Digit Memory Test – Part 1**

Watch carefully as a sequence of numbers is shown on the screen. Once all numbers
in the sequence have displayed, enter each number in the same order that it was shown. The test will end after 3 errors.

Note that you cannot delete a number once you have entered it.

Figure 8.2. Digit memory test - study 1

Digit Memory Test – Part 2

Watch carefully as a sequence of numbers is shown on the screen. Once all numbers in the sequence have displayed, enter each number in the opposite order that it was shown. The test will end after 3 errors.

For example, if you are shown the numbers 1 2 3, you would then enter 3 2 1. Note that you cannot delete a number once you have entered it.
In this task you will be presented with a sequence of letters. Press the **spacebar** on your keyboard each time a letter appears on the screen – do not press the spacebar when the letter ‘X’ appears on the screen. You will be presented with a practice round before moving onto the task.

*Figure 8.3. Continuous performance task - study 1*

Upon logging into a social networking site, you see the following private message from a close friend about someone you have never met. Please consider the message, and provide a response as if you were typing back to them:

*Figure 8.4. Emotional trigger - study 1*
What are the most likely ways that you might contact the person regarding the message (please rank between 1 and 9 - 1 being the most likely method):

- In person
- On the telephone
- SMS
- Online – social networking (such as facebook, or twitter)
- Online – text chat based interaction – instant messenger (such as Skype or MSN)
- Online – video chat based interaction – instant messenger (such as Skype or MSN)
- Online – email
- I would not contact them at all about the message
- Other (please specify)

On a scale from 0 to 10, please rate your current mood.

as low as I could be
really quite good; no problems at all

<p>| | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

Below is a list of statements. Please read each statement very carefully and rate how strongly you agree or disagree by selecting from ‘Strongly Agree’, ‘Slightly Agree’, Slightly Disagree’, or ‘Strongly Disagree’.

<p>| | | | | | | | | |
|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 1 | I can easily tell if someone else wants to enter a conversation. | strongly agree | slightly agree | slightly disagree | strongly disagree |
| 2 | I find it difficult to explain to others things that I understand easily, when they don't understand it first time. | O | O | O | O |
| 3 | I really enjoy caring for other people. | O | O | O | O |
| 4 | I find it hard to know what to do in a social situation. | O | O | O | O |
| 5 | People often tell me that I went too far in driving my point home in a discussion. | O | O | O | O |
| 6 | It doesn't bother me too much if I am late meeting a friend. | O | O | O | O |
| 7 | Friendships and relationships are just too difficult, so I tend not to bother with them. | O | O | O | O |
| 8 | I often find it difficult to judge if something is rude or polite. | O | O | O | O |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>In a conversation, I tend to focus on my own thoughts rather than on what my listener might be thinking.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>10</td>
<td>When I was a child, I enjoyed cutting up worms to see what would happen.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>11</td>
<td>I can pick up quickly if someone says one thing but means another.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>12</td>
<td>It is hard for me to see why some things upset people so much.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>13</td>
<td>I find it easy to put myself in somebody else's shoes.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>14</td>
<td>I am good at predicting how someone will feel.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>15</td>
<td>I am quick to spot when someone in a group is feeling awkward or uncomfortable.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>16</td>
<td>If I say something that someone else is offended by, I think that that's their problem, not mine.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>17</td>
<td>If anyone asked me if I liked their haircut, I would reply truthfully, even if I didn't like it.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>18</td>
<td>I can't always see why someone should have felt offended by a remark.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>19</td>
<td>Seeing people cry doesn't really upset me.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>20</td>
<td>I am very blunt, which some people take to be rudeness, even though this is unintentional.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>21</td>
<td>I don't tend to find social situations confusing.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>22</td>
<td>Other people tell me I am good at understanding how they are feeling and what they are thinking.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>23</td>
<td>When I talk to people, I tend to talk about their experiences rather than my own.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>24</td>
<td>It upsets me to see an animal in pain.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>25</td>
<td>I am able to make decisions without being influenced by people's feelings.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>26</td>
<td>I can easily tell if someone else is interested or bored with what I am saying.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>27</td>
<td>I get upset if I see people suffering on news programmes.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>28</td>
<td>Friends usually talk to me about their problems as they say that I am very understanding.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>29</td>
<td>I can sense if I am intruding, even if the other person doesn't tell me.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>30</td>
<td>People sometimes tell me that I have gone too far with teasing.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>31</td>
<td>Other people often say that I am insensitive, though I don't always see why.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>32</td>
<td>If I see a stranger in a group, I think that it is up to them to make an effort to join in.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>33</td>
<td>I usually stay emotionally detached when watching a film.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>
I can tune into how someone else feels rapidly and intuitively.

I can easily work out what another person might want to talk about.

I can tell if someone is masking their true emotion.

I don't consciously work out the rules of social situations.

I am good at predicting what someone will do.

I tend to get emotionally involved with a friend's problems.

I can usually appreciate the other person's viewpoint, even if I don't agree with it.

For each of the following items, please decide whether it is true or false for you. Try to work rapidly and please answer all 10 questions.

1. I like to gossip at times.
2. There have been occasions when I have taken advantage of someone.
3. I’m always willing to admit it when I make a mistake.
4. I always try to practice what I preach.
5. I sometimes try to get even rather than forgive and forget.
6. At times I have really insisted on having things my own way.
7. There have been occasions when I felt like smashing things.
8. I never resent being asked to return a favour.
9. I have never been irked when people expressed ideas very different from my own.
10. I have never deliberately said something that hurt someone’s feelings.

Thank you for taking the time to complete this study. If you have any queries or would like to be informed of the overall findings of this project, please contact either Ms Richelle Charman at rcharman@deakin.edu.au, Dr Lucy Zinkiewicz at lucy.zinkiewicz@deakin.edu.au, or Ms Emma Gould at emma.gould@deakin.edu.au.

In the event that any of the content in this study has caused stress or discomfort for you, then please call Lifeline on 131114 to speak to a trained telephone counsellor.
Studies 2 and 3 survey

Full Project Title: Emotional Reactions to Social Networking
Principal Researcher: Dr Lucy Zinkiewicz
Associate Researcher(s): Miss Richelle Charman, Ms Emma Gould, Ms Nicolette Dimitrovski

You are invited to take part in this research project. This Plain Language Statement contains detailed information about the research project. Its purpose is to explain to you all the procedures involved. Please read this document carefully.

The purpose of this project is to determine if emotions can be adequately experienced and conveyed through text based online communication.

Participation in this project will involve attending Deakin University on one occasion for data collection.

At the testing session your will be asked to fill in a questionnaire asking demographic questions (eg. “What is your occupation?”), questions around social networking use (eg, how many of your social networking friends are family members?), and questions around your normal responses to social situations. You will then be asked to browse and respond to a Facebook news feed. The news feed may include typical day to day posts that you would see on your own personal Facebook, or it may include non-typical posts that may make you feel happy or sad. While browsing and responding to the Facebook news feed you will be asked to occasionally complete a basic math problem. Before and after completing the Facebook news feed task, your galvanic skin response (perspiration level) and heart rate will be monitored to determine if you are having a physical response to the Facebook use. The heart rate and galvanic skin responses are measured through the use of a PowerLab system. A disposable electrode will be attached to both wrists and an ankle to measure heart rate and a small clip will be connected to two of the participant’s fingers to measure galvanic skin response. The equipment used is specifically used for the measurement of human physiological responses and is safe. The procedure used in this study has been designed to cause minimal distress or discomfort.

Possible benefits to participants may include enhanced reflection upon your own communication styles in online environments.
Possible risks of involvement in this study may include the experience of some distress as a consequence of the Facebook content. This distress is designed to be mild in nature, however if you experience any distress as a result of this study we encourage you to contact Lifeline on 131114 (local call). If at any time, you experience any discomfort or distress as a result of participating in this research, you may suspend or withdraw your participation in the research project.

All information collected for this research project will be securely stored. Only the principle researchers will have access to this data. Record forms, computer files, and surveys will not be labelled with your name and instead will be identified by an anonymous code. All data will be securely stored for a period of six years after final publication, after which time the data will be destroyed.

No information that may identify you will be disclosed. In any publication, information will be provided in such a way that you cannot be identified. Only group data will be presented in such a publication.

Participants can be provided with a written summary of the group results of the research project upon completion. If you wish you can be informed in writing of any publication that arises from this research project. Please contact the researchers if you would like to be provided with this information.

Participation in any research project is voluntary. If you do not wish to take part you are not obliged to. If you decide to take part and then change your mind, you are free to discontinue the study at any time. At any point should you feel any stress or discomfort arising from the questions, we encourage you to stop completing the study and voice your discomfort to the research staff. Your decision whether to take part or not to take part, or to take part and then withdraw, will not affect your relationship with Deakin University.

Complaints
If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:
The Manager, Office of Research Integrity, Deakin University, 221 Burwood Highway, Burwood Victoria 3125, Telephone: 9251 7129, Facsimile: 9244 6581; research-ethics@deakin.edu.au

Please quote project number 2013-302.
In recognition of your time in participating in this research and as compensation for any inconvenience you will receive 1 movie voucher in appreciation of your participation. Participants will receive one voucher per time that they participate. You will be provided this voucher at the testing session.

If you require further information, wish to withdraw your participation or if you have any problems concerning this project (for example, any side effects), you can contact the researchers:

Ms Richelle Charman
School of Psychology, Geelong Waterfront Campus, Deakin University
Locked Bag 20000, Geelong VIC 3220, Australia
Phone: (03) 5227 8419
Email: rcharman@deakin.edu.au

Dr Lucy Zinkiewicz
Phone: 03 5227 8497
Email: lucy.zinkiewicz@deakin.edu.au

Ms Emma Gould
Phone: 03 5227 8492
Email: emma.gould@deakin.edu.au

Ms Nicolette Dimitrovski
Email: ndimitro@deakin.edu.au

If you would like to participate in this project, please click the following button to indicate that you have read and understand the terms of the plain language statement and agree to give your consent to participate in the study:

I AGREE

If you do not wish to participate in this project, thank you for your time! You may click on the following button to return to the Deakin University homepage:

I DO NOT AGREE
Q1. On a scale from 0 to 10, please rate your current mood.

as low as I could be really quite good; no problems at all

0 1 2 3 4 5 6 7 8 9 10

This initial part of the experiment will test your current heart rate and skin perspiration level. Please follow the instructions given to you by the experimenter.

Read by the experimenter: for the following task, please look at and read each of the Facebook posts. You will see four questions after each post: would you like this post, would you comment on this post, would you share this post, would you hide this post? You will also be given the opportunity to provide a comment. Please take your time and let me know when you have reached the end.
Studies 2 and 3 - core posts shown to all participants

Table 8.8

<table>
<thead>
<tr>
<th>Positive sentiment</th>
<th>Negative sentiment</th>
<th>Polarity</th>
<th>Sentiment level</th>
<th>SNS post</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-3</td>
<td>-2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1</td>
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<td>-2</td>
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<td>-2</td>
<td>-1</td>
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<td>1</td>
<td>-2</td>
<td>-1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Positive sentiment</td>
<td>Negative sentiment</td>
<td>Polarity</td>
<td>Sentiment level</td>
<td>SNS post</td>
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<tr>
<td>--------------------</td>
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<td>-2</td>
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<tr>
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<td>-2</td>
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<td>2</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>-3</td>
<td>-2</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>
Studies 2 and 3 - posts shown to neutral environment

Table 8.9
Neutral posts included in simulated SNS environment

<table>
<thead>
<tr>
<th>Positive sentiment</th>
<th>Negative sentiment</th>
<th>Polarity</th>
<th>Sentiment level</th>
<th>SNS post</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>-2</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Positive sentiment</td>
<td>Negative sentiment</td>
<td>Polarity</td>
<td>Sentiment level</td>
<td>SNS post</td>
</tr>
<tr>
<td>--------------------</td>
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<td>---------</td>
<td>----------------</td>
<td>----------</td>
</tr>
<tr>
<td>3</td>
<td>-1</td>
<td>2</td>
<td>2</td>
<td><img src="167.png" alt="Image" /></td>
</tr>
<tr>
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<td>-1</td>
<td>0</td>
<td>0</td>
<td><img src="167.png" alt="Image" /></td>
</tr>
<tr>
<td>1</td>
<td>-2</td>
<td>-1</td>
<td>1</td>
<td><img src="167.png" alt="Image" /></td>
</tr>
<tr>
<td>Positive sentiment</td>
<td>Negative sentiment</td>
<td>Polarity</td>
<td>Sentiment level</td>
<td>SNS post</td>
</tr>
<tr>
<td>--------------------</td>
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<td>---------</td>
<td>-----------------</td>
<td>----------</td>
</tr>
<tr>
<td>2</td>
<td>-1</td>
<td>1</td>
<td>1</td>
<td><img src="image1" alt="Image" /></td>
</tr>
<tr>
<td>2</td>
<td>-3</td>
<td>-1</td>
<td>3</td>
<td><img src="image2" alt="Image" /></td>
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<tr>
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<td>-2</td>
<td>1</td>
<td>3</td>
<td><img src="image3" alt="Image" /></td>
</tr>
<tr>
<td>Positive sentiment</td>
<td>Negative sentiment</td>
<td>Polarity</td>
<td>Sentiment level</td>
<td>SNS post</td>
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<td>-1</td>
<td>0</td>
<td>0</td>
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<td>-2</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>-1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
### Studies 2 and 3 - posts shown to negatively valenced environment

Table 8.10

Negatively valenced posts included in simulated SNS environment

<table>
<thead>
<tr>
<th>Positive sentiment</th>
<th>Negative sentiment</th>
<th>Polarity</th>
<th>Sentiment level</th>
<th>SNS post</th>
</tr>
</thead>
<tbody>
<tr>
<td>-4</td>
<td>-2</td>
<td>4</td>
<td>-4</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>-3</td>
<td>-2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>-2</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Positive sentiment</td>
<td>Negative sentiment</td>
<td>Polarity</td>
<td>Sentiment level</td>
<td>SNS post</td>
</tr>
<tr>
<td>--------------------</td>
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<td>----------------</td>
<td>----------</td>
</tr>
<tr>
<td>1</td>
<td>-4</td>
<td>-3</td>
<td>3</td>
<td><img src="image1" alt="Image 1" /></td>
</tr>
<tr>
<td>3</td>
<td>-5</td>
<td>-2</td>
<td>6</td>
<td><img src="image2" alt="Image 2" /></td>
</tr>
<tr>
<td>1</td>
<td>-2</td>
<td>-1</td>
<td>1</td>
<td><img src="image3" alt="Image 3" /></td>
</tr>
<tr>
<td>2</td>
<td>-5</td>
<td>-3</td>
<td>5</td>
<td><img src="image4" alt="Image 4" /></td>
</tr>
<tr>
<td>Positive sentiment</td>
<td>Negative sentiment</td>
<td>Polarity</td>
<td>Sentiment level</td>
<td>SNS post</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------------------</td>
<td>---------</td>
<td>-----------------</td>
<td>----------</td>
</tr>
<tr>
<td>1</td>
<td>-4</td>
<td>-3</td>
<td>3</td>
<td><img src="image1.png" alt="SNS post 1" /></td>
</tr>
</tbody>
</table>
|                    |                    |         |                 | **Seeing through the darkness: A look at living with domestic violence through the eyes of children**
|                    |                    |         |                 | EVERY night when my son gets home from school, he goes straight to the front... |
|                    |                    |         |                 | Lisa Comment Share |
|                    |                    |         |                 | Write a comment... |
|                    |                    |         |                 | ![Dimitri Kelner](image2.png) |
| 2                  | -4                 | -2      | 4               | ![SNS post 2](image2.png) |
|                    |                    |         |                 | One of my friends died tonight. She got hit by a drunk driver, he didn’t even stop. She died before the ambulance could come. She even found time to crack a joke whilst she was lying there about to die. She even said Now I won’t get to talk to Dimitry again, I bet he’ll be mad. All I want to do is cry. Her dad. he must be out of his mind. Her mum died too in a car crash. Nothing seems real anymore. I don’t know who I can go to. Why does it have to be unfair... why did she have to go out that night? Why didn’t he just crash his car into a wall and kill himself... she shouldn’t have died. I never did get to tell her how I felt about her, just thinking of the last time we talked... now it was the last... |
|                    |                    |         |                 | Lisa Comment Share |
|                    |                    |         |                 | Write a comment... |
|                    |                    |         |                 | ![SNS post 3](image3.png) |
| 3                  | -1                 | 2       | 2               | ![SNS post 3](image3.png) |
|                    |                    |         |                 | "Just smile and say you’re fine, cause nobody really cares anyway." |
|                    |                    |         |                 | Lisa Comment Share |
|                    |                    |         |                 | Write a comment... |
Q2. After seeing each of the Facebook posts, would you update your own status?
   a) Yes
   b) No
If yes, what would you write?

Q3. What aspects of a post encourage you to comment?
Q4. On a scale from 0 to 10, please rate how much effort you needed to employ overall while interacting with the facebook pages.

<table>
<thead>
<tr>
<th>No effort at all</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>

Q5. On a scale from 0 to 10, please rate your current mood.
   as low as I could be
   really quite good; no problems at all

| as low as I could be | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
Please complete the following questions about you (do not provide your name or any other personal identifying information – your responses to this section should not be able to identify you):

Q6. Gender
   a) Male
   b) Female

Q7. Please enter your current age:

Q8. Are you a student?
   a) Yes
   b) No

If yes, what are you studying?

Below is a list of statements. Please read each statement very carefully and rate how strongly you agree or disagree by selecting from ‘Strongly Agree’, ‘Slightly Agree’, Slightly Disagree’, or ‘Strongly Disagree’.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I can easily tell if someone else wants to enter a conversation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I find it difficult to explain to others things that I understand easily, when they don't understand it first time.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>I really enjoy caring for other people.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>I find it hard to know what to do in a social situation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>People often tell me that I went too far in driving my point home in a discussion.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>It doesn't bother me too much if I am late meeting a friend.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Friendships and relationships are just too difficult, so I tend not to bother with them.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>I often find it difficult to judge if something is rude or polite.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>In a conversation, I tend to focus on my own thoughts rather than on what my listener might be thinking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>When I was a child, I enjoyed cutting up worms to see what would happen.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>I can pick up quickly if someone says one thing but means another.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
It is hard for me to see why some things upset people so much.
I find it easy to put myself in somebody else's shoes.
I am good at predicting how someone will feel.
I am quick to spot when someone in a group is feeling awkward or uncomfortable.
If I say something that someone else is offended by, I think that that's their problem, not mine.
If anyone asked me if I liked their haircut, I would reply truthfully, even if I didn't like it.
I can't always see why someone should have felt offended by a remark.
Seeing people cry doesn't really upset me.
I am very blunt, which some people take to be rudeness, even though this is unintentional.
I don't tend to find social situations confusing.
Other people tell me I am good at understanding how they are feeling and what they are thinking.
When I talk to people, I tend to talk about their experiences rather than my own.
It upsets me to see an animal in pain.
I am able to make decisions without being influenced by people's feelings.
I can easily tell if someone else is interested or bored with what I am saying.
I get upset if I see people suffering on news programmes.
Friends usually talk to me about their problems as they say that I am very understanding.
I can sense if I am intruding, even if the other person doesn't tell me.
People sometimes tell me that I have gone too far with teasing.
Other people often say that I am insensitive, though I don’t always see why.
If I see a stranger in a group, I think that it is up to them to make an effort to join in.
I usually stay emotionally detached when watching a film.
I can tune into how someone else feels rapidly.
I can easily work out what another person might want to talk about.

I can tell if someone is masking their true emotion.

I don't consciously work out the rules of social situations.

I am good at predicting what someone will do.

I tend to get emotionally involved with a friend’s problems.

I can usually appreciate the other person’s viewpoint, even if I don't agree with it.

For each of the following items, please decide whether it is true or false for you. Try to work rapidly and please answer all 10 questions.

1. I like to gossip at times.
2. There have been occasions when I have taken advantage of someone.
3. I’m always willing to admit it when I make a mistake.
4. I always try to practice what I preach.
5. I sometimes try to get even rather than forgive and forget.
6. At times I have really insisted on having things my own way.
7. There have been occasions when I felt like smashing things.
8. I never resent being asked to return a favour.
9. I have never been irked when people expressed ideas very different from my own.
10. I have never deliberately said something that hurt someone’s feelings.

Please complete the following questions about your social networking use:

9. Approximately how many years have you been using the internet on a regular basis?

10. Do you visit social networking sites?
   a. Yes
   b. No

11. If so, which site do you visit most frequently?
Facebook  
MySpace  
LinkedIn  
Twitter  
Google +  
Other (please specify)

12. How many friends do you currently have on <social networking site> (an approximate figure is ok)?

13. As a percentage, how many of your close friends are you connected with on <social networking site 1>? 

14. As a percentage, how many of your <social networking site> friends are family members? 

15. How often do you visit <social networking site>? 
   a. Less than once a month  
   b. At least once a month  
   c. At least once a week  
   d. Daily  
   e. Between 2-5 times a day  
   f. More than 5 times a day 

16. As a percentage, how many of your <social networking site> friends do you regularly interact with offline? 

17. Please rank the most common reasons that you usually use <social networking site>, 1 being the most common reason and 5 being the least common method: 
   _ To share personal information (eg. what you are doing that day)  
   _ To interact with friends and comment on posts  
   _ To share links and non personal information  
   _ To keep up to date with your friend’s life (eg. not commenting, just looking)  
   _ Other (please specify)
Appendix III. Study advertisements

Advertisements - study 1

Do you interact differently with people when you are speaking with them on social networking websites? Do the conversations that you engage in online have the same emotional impact on you that they would when you interact in other situations?

I am conducting a study that will ask you about your friendship groups, social networking habits, and measure your emotional engagement in social networking conversations. It will involve a questionnaire and two short cognitive tasks.

To be eligible to complete this study you must be aged 18 years or over, and have access to the internet. To complete the study, please visit the following website:

The study will take about 20-30 minutes to complete.

Further information can be obtained from Richelle Charman

School of Psychology,
Deakin University (Waterfront Campus)
Geelong, Vic, 3220
Phone: (03) 5227 8419
Email: rcharman@deakin.edu.au

Emotional Reactions to Social Networking

Do you interact differently with people when you are speaking with them on social networking websites?

I am conducting a study that will ask you about your friendship groups, social networking habits, and measure your emotional engagement in social networking conversations. It will involve a questionnaire and two short cognitive tasks.

To be eligible to complete this study you must be aged 18 years or over, and have access to the internet.

To complete the study, please visit the following website: <www.linkgoeshere.com>

The study will take about 20-30 minutes to complete.

Further information can be obtained from Richelle Charman, School of Psychology, Deakin University,
Email: rcharman@deakin.edu.au
Advertisements - studies 2 and 3

Title: Facebook and Emotions - Call for Participants

Body text:
Do you interact differently with people when you are speaking with them on social networking websites? Do the conversations that you engage in online have the same emotional impact on you that they would when you interact in other situations?
I am conducting a study investigating Facebook engagement, video games, and emotions. The study involves being hooked up to a heart rate and skin perspiration monitor while scrolling through a few Facebook pages. You’ll then be asked to fill in a few short surveys.
To be eligible to complete this study you must be aged 18 years or over and able to come to the Deakin Waurn Ponds, Waterfront, or Burwood campus.
The study will take about 30 minutes to complete, and you will receive a $10 jb hifi voucher at the completion of your participation.
Further information can be obtained from Richelle Mayshak (richelle@deakin.edu.au) or Nicolette Dimitrovski (ndimitro@deakin.edu.au).
Appendix IV. Research approval documentation

Research integrity training

CERTIFICATE OF COMPLETION
FOR
Research Integrity Training

This is to certify that

RICHELLE ANNETTE MAYSHAK

has successfully completed the compulsory Research Integrity online training.

Research Integrity – Deakin University
research-integrity@deakin.edu.au
Date: 19/6/2016

Authentication number: 300156803v2
Confirmation of Candidature

Memo

To: Richelle Charman
From: Secretary – HEAG-H
Faculty of Health
CC: Associate Professor Lina Ricciardelli, Dr Lucy Zinkiewicz, Ms Emma Gould
Date: 11 September, 2012
Re: Confirmation of Candidature

Dear Richelle

This is to acknowledge that you have fulfilled the Faculty’s requirements for Confirmation of Candidature, in the Doctor of Philosophy program at Deakin University.

Best wishes for your continuing studies.

Steven Sawyer
Secretary
HEAG-H
Memorandum

To: Dr Lucy Zinkiewicz and Emma Gould  
School of Psychology

From: Secretary – HEAG-H  
Faculty of Health

Subject: HEAG-H 12_2012: Emotional reactions to social networking

Approval has been given for Dr Lucy Zinkiewicz and Emma Gould School of Psychology, to undertake this project for a period of 1 year from 5 April, 2012. The current end date for this project is 5 April 2013.

The approval given by the Deakin University HEAG-H is given only for the project and for the period as stated in the approval. It is your responsibility to contact the Secretary immediately should any of the following occur:

- Serious or unexpected adverse effects on the participants
- Any proposed changes in the protocol, including extensions of time
- Any events which might affect the continuing ethical acceptability of the project
- The project is discontinued before the expected date of completion
- Modifications that have been requested by other Human Research Ethics Committees

In addition you will be required to report on the progress of your project at least once every year and at the conclusion of the project. Failure to report as required will result in suspension of your approval to proceed with the project.

HEAG-H may need to audit this project as part of the requirements for monitoring set out in the National Statement on Ethical Conduct in Human Research (2007). An Annual Project Report Form can be found at http://www.deakin.edu.au/hmbh/research/ethics/ethicssubmissionprocess.php which you will be required to complete in relation to this research. This should be completed and returned to the Administrative Officer to the HEAG-H, Pro-Vice Chancellor’s office, Faculty of Health, Burwood campus by Tuesday 20th November, 2012 and when the project is completed.

Good luck with the project!

Steven Sawyer
Secretary
HEAG-H

cc Richelle Charman
Memorandum

To: Dr Lucy Zinkiewicz
School of Psychology

From: Deakin University Human Research Ethics Committee (DUHREC)

Date: 18 February, 2014

Subject: Impact of online emotional stimuli on cognitive load

Please quote this project number in all future communications

The application for this project was considered at the DU-HREC meeting held on 17/02/2014.

Approval has been given for Dr Lucy Zinkiewicz, School of Psychology, to undertake this project from 18/02/2014 to 17/02/2019.

The approval given by the Deakin University Human Research Ethics Committee is given only for the project and for the period as stated in the approval. It is your responsibility to contact the Human Research Ethics Unit immediately should any of the following occur:

- Serious or unexpected adverse effects on the participants
- Any proposed changes in the protocol, including extensions of time.
- Any events which might affect the continuing ethical acceptability of the project.
- The project is discontinued before the expected date of completion.
- Modifications are requested by other HRECs.

In addition you will be required to report on the progress of your project at least once every year and at the conclusion of the project. Failure to report as required will result in suspension of your approval to proceed with the project.

DUHREC may need to audit this project as part of the requirements for monitoring set out in the National Statement on Ethical Conduct in Human Research (2007).

Human Research Ethics Unit
research-ethics@deakin.edu.au
Telephone: 03 9251 7123