8-2012

How Much Does This Tick You Off? Online Rejection and Criticism Lead to Negative Affect and Retaliatory Aggression

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ABSTRACT

A three-condition (rejection, criticism, control) single-factor experiment (N = 77) on a mock social-networking site similar to Facebook reveals that even a slight rejection – not being allowed to join groups on the site – lead to increases in self-reported negative affect and retaliation against the site and the rejecting groups compared to a control. Subjects who were accepted into the groups but then criticized experienced the same increases in negative affect and retaliatory aggression, as those who were not allowed to join. In addition, men showed heightened retaliatory aggression compared to women and responded differently to criticism than women. However, no significant effects were found by condition in regard to arousal, physiologically measured affect, attempts to restore relational value, triggered displaced aggression, or feelings associated with ostracism. Findings suggest that while rejection and criticism cause emotional pain, they do not hurt as much as ostracism. Results are discussed in relation to the belongingness hypothesis, sociometer theory, the ostracism model, and face theory. Gender differences are explored using social cognitive theory.

Keywords: *Social media, rejection, criticism, gender, retaliatory aggression*

HOW MUCH DOES THAT TICK YOU OFF? ONLINE REJECION AND CRITICISM LEAD TO NEGATIVE AFFECT AND RETALITORY AGGRESSION

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Submitted in partial fulfillment of the requirements of the degree of Doctor of Philosophy in Mass Communications in the Graduate School of Syracuse University

August 2012

ACKNOWLEDGEMENTS

This project could not have occurred but for my loving husband, Peter. Thank you, Peter, for agreeing to let me quit a decent-paying job in the middle of a recession to pursue this crazy dream of mine to earn a doctorate. Your faith in me spurred me on in many moments when my belief in myself lagged. Your willingness to watch the kids, do the grocery shopping, and make many dinners, so I could study or write a paper has not gone unseen or unappreciated. Finally, your willingness to quit your job and move across the country for my new job will never be forgotten.

My children, Ian and Chloe, also deserved special notice. Thank you for all the times you played quietly – or sort of quietly – when mommy had to do "homework." I know that summer or after school was not always as fun as it might be for you because I was so busy, but I hope that you learned from my example that hard work pays off and that you, too, can achieve whatever you set out to do.

I also would be remiss without acknowledging my adviser, T. Makana Chock, and my committee members, Rich Gramzow, Frank Biocca, Robert Lloyd, Dennis Kinsey, and Leonard Newman. Makana, thank you for your wise advice. I especially appreciate that you required that I downsize significantly my original dissertation proposal. I would have been lost without that requirement. I also thank you for your unwavering support and encouragement. You were the first to expose me to experimental research, and for that I always will be grateful, as it has shaped and will continue to shape my research agenda. To the rest of my committee, I appreciate your input, your suggestions, technical assistance, confidence in me, and well wishes.

I also must acknowledge Pam Shoemaker, whose influence started me on the academic trajectory back in the late 1990s, while I was earning my master's degree. Your advice and guidance over the years has been invaluable, and I have learned greatly from you. I also appreciate you allowing me to use your physiological equipment for my dissertation.

Finally, I must acknowledge my friends in the Newhouse doctoral program who have been my anchors throughout my time here. John Wolf, thank you for the many nerdy chats about statistics, measures, SEM, and homoscedasticity. Your advice and support has been invaluable. Kristi Gilmore, you have been a rock to turn to when the going gets tough, and you always offered a much-need positive frame on every situation. For this, I thank you. Val Schweisberger and Cory Weaver you have helped me laugh at myself, relax and not take all this too seriously. My mental health thanks you.

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Chapter 1: Introduction

This dissertation focused on an experience many of us have likely encountered in today's world, where making connections on the social-networking site Facebook or chatting on the microblog Twitter are becoming as common as leaning over the backyard fence and gossiping with a neighbor was in decades past. We send a social media *friend*[1] request – an invitation to form a relational connection on a social media site (Ledbetter et al., 2011) -- to a new acquaintance or a work colleague. The person never accepts it or blocks us from seeing his or her *wall*, a public space on a social-networking site than other registered users can view (Walther, Van Der Heide, Kim, Westerman, & Tong, 2008). Or we *friend* an acquaintance from our childhood on Facebook, only to see the person *unfriend* us quickly after we post a comment that was meant to be funny on his or her Facebook wall. The person must have taken our comment "the wrong way," we figure. In all these situations, we may feel a bit miffed or rejected, but we cannot quite figure out why. "It's no big deal, why do I care what they think?" we tell ourselves. But we do care.

Ample research suggests the reason is that social exclusion – a form of rejection – stings because people are evolutionarily hardwired to view any social rejection as a threat to their value as relational partners with others (Leary, 2010; Leary & Baumeister, 2000; Leary & Cox, 2008; Leary & Guadagno, 2011; Leary, Terdal, Tambor, & Downs, 1995). As primitive beings, inclusion in a group was so vital to survival that the need to belong

[1] For the sake of clarity, *friend* was italicized when it means an online social-media connection. This is an attempt to differentiate between the common usage of the word friend and social-media friends.

with others became a powerfully adaptive urge that predisposes us today to seek to affirm our value as relational partners (Baumeister & Leary, 1995; Leary, 2010; Leary & Baumeister, 2000; Leary & Cox, 2008). As a result, social rejection causes what we call "hurt feelings," which operate like a warning system to danger similar to physical pain (Eisenberger, Liberman, & K. Williams, 2003; MacDonald & Leary, 1995; K. Williams, Forgas, & von Hippel, 2005). In essence, emotional pain sounds an alarm to people that their relational value is low.

While much research has focused on social rejection, what has received little attention is whether people react differently to various levels of rejection – such as criticism versus outright rejection – and whether this changes the way their body responds physiologically. While the term rejection is used to mean many types of painful exclusion, I rely on its very literal meaning of being rebuffed after seeking a social connection with other people (Blackhart, Nelson, Knowles, & Baumeister, 2009). In contrast, criticism is a form verbal aggressiveness or rude communication that undermines a person's value (Caza & Cortina, 2007; Rancer & Avtgis, 2006) and may make someone feel rejected but is not rejection. In this sense, criticism may be conceptualized as a rejection of part of the self. This distinction is important because a focus of this project was to examine whether people respond differently to rejection versus criticism both physiologically and in self-reports. It is also crucial to note that rejection from relatives or friends hurts more (eg. Bernstein, Sacco, Young, Hugenberg, & Cook, 2010), but even rejection from strangers causes pain because it foreshadows the threat of being hurt by those one cares about (Leary & Baumeister, 2000; MacDonald &

Leary, 2005). Therefore, it stands to reason that online rejection would hurt even from strangers and that criticism from strangers also would lead to pain.

This dissertation examined responses to online rejection and criticism, using an experiment that manipulated whether people are rejected or merely criticized on a mock social-networking site similar to Facebook that was under my control. This allowed me to examine both rejection and criticism in the computer-mediated environment of a social-networking site, where it has not been studied before. In this sense, it built on the work of Reeves and Nass (1996), who replicated psychological experiments in a computer-mediated environment, finding people responded the same offline as online. The potential effects of rejection and criticism that I examined were: arousal, negative emotions, retaliation against the perpetrator of the rejection or criticism, efforts to foster relationships with others to restore one's relational value, and verbal aggressiveness. College-age people were the target of this study because younger people are more typical users of social media (Lenhart, Purcell, Smith, & Zickur, 2010), such as the mock site used in this study.

I will begin by explaining the relevance of this work. Then I will summarize the theoretical support for my research and how my work will expand the knowledge of how people communicate, particularly through the CMC lens of social media. Finally, I will summarize the main questions that I plan to answer. Chapter 2 will expand on the relevant literature, offering theoretical linkages for specific hypotheses and research questions. Chapter 3 will explain the methodology, including the experimental design and operational definitions of all variables. Chapter 4 explains the results, and Chapter 5 discusses the theoretical implications of this research.

Relevance of this study

Before delving into the overview of the theoretical support and expected theoretical extensions of this research, I will explain the relevance of the questions examined in this study. One aspect of this research examined the extent to which rejection and criticism on social media may lead to verbal aggression, which is using communication to harm others (Bushman & Huesmann, 2010). Scholars are paying increasing attention to uncivil discourse online, which is defined as "name-calling, contempt, and derision of the opposition" (Brooks & Geer, 2007, p. 1), because of concerns it may suppress open discussion (eg. Hwang, Borah, Namkoong, & Veenstra, 2008). Much attention has focused on what is called *flaming*, online messages that intentionally violate polite norms (see O'Sullivan & Flanagin, 2003, for a review). Flaming messages are intended to incite by using profanity, offensive language, or intense emotional outbursts in text or even in video (Moor, Heuvelman, & Verleur, 2010). This type of communication is considered part of the "dark side" (Douglas, 2008, p. 200) of free-wheeling online communication. Other scholars have studied the related concept of "outrage discourse," which is online communication intended to "provoke a visceral response from the audience, usually in the form of anger, fear, or moral righteousness" (Sobeiraj & Berry, 2011, p. 1).

These two forms of aversive communication are proliferating on news websites, which more and more frequently allow readers to comment on blogs and news stories or generate their own reporting (Hermida & Thurman, 2008). As a result, news organizations are forced to use increasingly dwindling resources to moderate readers' comments before they are posted or to take down offensive ones afterward to control

potentially offensive comments or even block repeated violators (Singer et al., 2011). At some sites, news comments have become so vitriolic that journalists must take on the role of curbing these unruly virtual communities to protect the news organization from liability (Braun & Gillespie, 2011) and to ensure the site fosters the type of group loyalty that attracts readers to visit the site again (Chen et al., 2011).

However, most of the communication research regarding online incivility focuses on political discussions on blogs, news sites, or news groups (eg. Mutz & Reeves, 2005; Ng & Detenber, 2005; Papacharissi, 2004; Sobieraj & Berry, 2011; K. Thorson, Vraga, & Ekdale, 2010). Therefore, this current research both builds on this foundation and fills a void in the literature by examining incivility and rejection in regard to a more general online experience of joining and participating in social-networking groups. Highlighting the relevance of this research is the fact that the number of adults using social-networking sites similar to the one examined in this study continues to climb. For example, a recent study found that 65% of adult Internet users participate in some type of social-networking site (Madden & Zickur, 2011). Given this backdrop in the field of communication, understanding how people respond physiologically and through self-reports to harsh CMC, such as rejection and criticism, becomes increasingly important. Scholars generally assume this type of CMC is aversive. However, this study aimed to understand how the aversive nature of this communication affects the body and whether it leads to negative affect, retaliation, verbal aggressiveness, and efforts to restore one's relational value online. These avenues have not been fully examined.

Summary of theoretical basis and proposed extensions

The theoretical basis of this study is rooted in three related lines of research. The first is the belongingness hypothesis (Baumeister & Leary, 1995), which proposes that people have strong evolutionarily adaptive urge to be part of a group. Dovetailing with that approach is sociometer theory (Leary, 2010; Leary & Baumeister, 2000; Leary & Cox, 2008; Leary & Guadagno, 2011; Leary et al., 1995), which proposes that state self-esteem acts as a monitor of people's interpersonal value as relationship partners. When state self-esteem is threatened, people are motivated to adjust their behavior to maintain at least a minimum level of value, the theory holds. In addition, this study offered a test of possible extensions of the related ostracism model (K. Williams, 1997). The model posits that ostracism -- a severe form of social rejection -- threatens four human needs, and that the threat to these needs leads to aversive feelings. The needs identified in the model are: people's state self-esteem, which is evaluative feelings in a particular situation (Leary, 2010); sense of belongingness, or being part of a group (Baumeister & Leary, 1995); sense of being in control; and belief that life is meaningful. In essence, this study examined whether rejection – being prohibited from joining a group one wants to join – or criticism would affect people in the same way as outright ostracism by threatening the four needs and leading to aversive feelings (Smith & K. Williams, 2004; Van Beest, K. Williams, & Van Dijk, 2011; K. Williams, 1997; K. Williams, Cheung, & Choi, 2000; K. Williams et al., 2005; Zadro, K. Williams, & Richardson, 2004; Zadro, K. Williams, & Richardson, 2005).

This study offered new knowledge by examining both sociometer theory and the belongingness hypotheses in a context where they have not before been tested. In

addition, it tested whether the ostracism model, which has been studied in online communication (Smith & K. Williams, 2004; K. Williams et al., 2000; Van Beest et al., 2011; Zadro et al., 2004) but not in social networking sites, applies to rejection and criticism. By examining the inherently different experience of communication in CMC, this study offered new knowledge for communication research that goes beyond merely testing known concepts in a new context. It offered an expansion of our understanding of how online communication may change human interaction.

This study also examined whether online rejection and criticism could be the aversive communication that provokes retaliatory aggression, a form of direction aggression against a specific target (Bushman & Huesmann, 2010), or triggered displaced aggression (Miller, Pedersen, Earleywine & Pollock, 2003). Triggered displaced aggression is when already agitated people encounter a mild annoyance and lash out inordinately at the target of the mild annoyance (Dollard, 1938; Bushman, Bonacci, Pedersen, Vasquez, & Miller, 2005; Miller et al., 2003). In this study, the initial irritation came from either the rejection or criticism online, and both retaliatory aggression and triggered displaced aggression were measured in the CMC world of social media. This offered an opportunity to examine whether rejection from a group on a social-networking site or criticism by that group could lead to retaliation, as prior research has found in other contexts (eg. Twenge, Baumeister, Tice & Stucke, 2001; Van Beest et al., 2011). This study also provided an avenue to investigate triggered displaced aggression, which has received little recent study and has not been examined in CMC.

Additionally, this study extended the understanding of rejection and criticism in communication by examining whether it leads to negative affect and arousal. Affect is

short-lived internal emotional state generated by internal or environment cues that has positive or negative valence (Bartsch, Vorderer, Mangold, & Viehoof, 2008; Brave & Nass, 2003; Keltner & Lerner, 2010; Nabi, 2010; Pfau et al., 2009; Wigley & Pfau, 2010). Arousal is the unvalenced intensity (high/low) of emotion (Bolls, 2010; Bolls, Lang, & Potter, 2001). Theories differ regarding whether affect and arousal are automatic and unconscious (eg. Zajonc, 1980; 1984) or only occur if people have thought about them (eg. Cummins, Keene, & Nutting, 2012; Dasborough, Sinclair, Russell-Bennett, & Tombs, 2008; Frijda, 1986; Lazarus, 1984). Therefore, both self-reports and physiological monitoring are useful to examine these concepts more fully.

A further reason to examine physiological responses and whether they vary in valence or intensity if one is rejected or merely criticized is because the bulk of the extant literature on this topic has used only self-reports. (eg. Smith & K. Williams, 2004; Van Beest et al., 2011; K. Williams, 1997; K. Williams et al., 2000; K. Williams et al., 2005; Zadro et al., 2004; Zadro et al., 2005). Some notable exceptions are two studies that examined social exclusion during an online ball-tossing game. One of those studies used functional magnetic resonance imaging (fMRI) brain scans to find that social pain activates the brain similarly to physical pain (Eisenberger et al., 2003). The other found that exclusion produced a more negative mood in women but had no effect on secretion of salivary cortisol (Zoller, Maroof, Weik, & Deinzer, 2010), a valid biomarker of social psychological stress (Floyd et al., 2007; Hellhammer, Wust, Kudielka, 2009; Kudielka, Hellhammer, Wust, 2009).

In this study, physiological arousal was measured using electrodermal activity, or skin conductance response (SCR), a valid indicator of activation of the sympathetic

nervous system (SNS; Dawson, Schell, & Filion, 2007; Reeves, A. Lang, Kim, & Tatar, 1999; Ravaja, 2004; R. Stern, Ray, & Quigley, 2001). Activation of the SNS has been dubbed the fight or flight response (Cannon, 1927) because it describes the primitive primate response to danger – to run and hide or stay and attack. The physiological valence of affect was measured by examining muscle movement through facial electromyography (EMG; Bolls, A. Lang, & Potter, 2001; Fridlund & Cacioppo, 1986; R. Stern et al, 2001). Facial EMG detects changes in the smile and frown muscles (P. Lang, Greenwald, Bradley, & Hamm, 1983) that may be so fleeting or subtle they are imperceptible to the human eye (Tassinary, Cacioppo, & Vanman, 2007).

Measuring physiological reactivity has benefits over using only self-reports because it is not susceptible to a social desirability bias and can offer evidence of a response before a person is even aware of it (Blascovich & Mendes, 2010; Mendes, 2009; Ravaja, 2004). It is important to note that self-reports and physiological reactivity are measuring different experiences, so results may not coincide (eg. Lim & Reeves, 2009; Zhang & Chock, 2010). As a result, it was advisable to measure arousal and affect both physiologically and through self-reports to explore the full complexity of the effect of rejection and criticism. Both SCR and facial EMG have been found to be valid measures of arousal and emotion, respectively, in media research regarding television and radio news and advertisements (eg. Bolls et al., 2001; Grabe, Zhou, A. Lang, & Bolls, 2000; A. Lang, Chung, Lee, Schwartz, & Shin, 2005a; A. Lang, Chung, Lee, & Zhao, 2005b; A. Lang, Shin, Bradley, Wang, Lee, & Potter, 2005c; A. Lang, Zhou, Schwartz, Bolls, & Potter, 2000; Ravaja, 2006; Reeves et al., 1999; Wang, A. Lang, & Busemeyer, 2011). However, what has received less attention from researchers is an examination of the

physiological reactivity of emotional arousal and valence during social media interaction, as this study examined.

Overview of experimental design

To test these relationships, I created a mock social-networking site that was used for the experiment. Participants were randomly assigned to three conditions, rejection, criticism, or control. In the rejection condition, they attempted to join groups I had previously set up on the site but were thwarted each time. In the criticism condition, participants were accepted into the groups they wanted to join but then were criticized by those groups. In the control condition, subjects were accepted into the groups and then received non-aversive comments from the groups. Skin conductance and facial EMG were monitored during the experiment. After the manipulation, respondents participated in a triggered displaced aggression task and filled out self-reports on arousal, negative affect, retaliatory aggression, attempts to restore relational value, and threats to the four needs in the ostracism model. In addition, this experiment tested boundary conditions of these relationships by examining trait self-esteem, gender, and personality variables, as potential moderators.

In summary, this dissertation answered five over-arching questions:

- Do physiological and self-reported responses to rejection and criticism on social media differ from non-aversive comments?
- Do physiological and self-reported responses to rejection on social media differ from responses to criticism?
- If so, are the responses to rejection or criticism more amplified?
- Does rejection and criticism on social media lead to threats to the ostracism needs and aversive feelings the way ostracism has been found to do?

- What role (if any) do individual differences play in these relationships?

Chapter 2: Literature Review and Theory

Computer-mediated communication

This study focused on criticism and rejection in a particular arena, computer-mediated communication on a social media website. The whole point of social media sites, such as Facebook or the mock site designed for this study, is for people to be able to create profiles about themselves with the aim of forming connections with other people (boyd & Ellison, 2007; Chen, 2011; Cheung, Chiu, & Lee, 2010; Donath & boyd, 2004; Johnson & Yang, 2009; Joinson, 2008; Raacke & Bonds-Raacke, 2008; L. Stern & Taylor, 2007). As such, a social media site was a suitable environment to test the effect of social rejection and criticism on people's emotions, feelings of relational value and tendency to retaliate, restore their relational value, or displace their aggression. In addition, social media offered a useful arena to study responses to rejecting and criticizing messages because of the inherent ambiguity of the intent of computer-mediated messages. The intent of messages in CMC may be more ambiguous than in other forms of communication because of a lack of paralinguistic cues such as smiles, nods, winks, or tone of voice (Bordia, 1997; Hancock & Dunham, 2001; Hancock, Landrigan, & Silver, 2007; Kruger, Epley, Parker, & Ng, 2005; Markey & Wells, 2002; Picard, 1995; Whitty & Gavin, 2001). This ambiguity could heighten the aversive response from a rejecting or criticizing message because people may be unsure if the harm was intentional. However, the ambiguity also could lessen the effect of the message because people may assume the words were meant kindly without facial cues or tone of voice to tell them otherwise. For these reasons, this study specifically examined CMC

communication online in an experimental design in the context of the potentially ambiguous nature of CMC messages.

Politeness rules

Prior research suggests multiple ways of conceptualizing uncivil communication, such as criticism or rejection. The social-norm view suggests that being polite – following rules of etiquette – is ingrained in Western society as a positive value (Fraser, 1990; Papacharissi, 2004), so variations from it are considered socially deviant. Another way to understand incivility is through Grice's maxims of politeness, which suggest people expect communication to be truthful, relevant, clear, and contribute only what the conversation requires (Papacharissi, 2004; Reeves & Nass, 1996). Applied to CMC, this view suggests people expect computer-mediated communication either by humans or even computers to abide by these same rules of politeness as face-to-face (FtF) conversations (Reeves & Nass, 1996). So regardless of whether people *know* the other people on a social-networking site, they would expect their communication with these people to follow these rules. Online rejection and criticism would violate these rules.

A third way to understand uncivil communication is using face theory, which defines *face* as the "image of self delineated in terms of approved social attributes" (Goffman & Best, 2005, p. 5; see also Ting-Toomey, 2005). Under this view, the public *face* is social constructed and exhibited during communication (Metts & Cupach, 2008), including, presumably, online interaction. It is a form of performance of the self that gives others the sense a person is a competent and worthy social actor (Metts & Cupach, 2008). In other words, having *face* means one is valued as a relational partner. Brown and Levinson (1987) developed this idea further through politeness theory. This theory

proposes that *positive face* is threatened if other people see one as undesirable as a relational partner, while *negative face* is threatened if others see one as incompetent (Brown & Levinson, 1987; Metts & Cupach, 2008; Papacharissi, 2004). Under this rationale, it would make sense that rejection and criticism could lead people to *lose face*. *Losing face* has been found to lead people to try to repair their *face* through retaliation (Metts & Cupach, 2008). In addition, criticism and rejection even from strangers can cause emotional pain, according to sociometer theory, the ostracism model, and the belongingness hypothesis. The reason is that any type of rejection would indicate a decrease in a person's relational value, which links to the primal fear of being rejected by one's one group (Leary & Baumeister, 2000; MacDonald & Leary, 2005). In fact, research has found that interpersonal closeness does not necessarily influence the extent of hurt a person experiences (Vangelisti & Hampel, 2010).

Theoretical framework

Underlying the potential for hurt feelings from criticism and rejection online is the belongingness hypothesis (Baumiester & Leary, 1995). This theoretical approach proposes that the human affinity to gather together or affiliate is a strong, primary, and evolutionarily adaptive need, not simply a motivating force as earlier theorists have suggested (eg. Maslow, 1987; Murray, 1953). For the earliest humans, gathering in groups made tasks, such as hunting large animals, fighting predators, or caring for children not only easier but possible (Baumeister & Leary, 1995; Leary, 2010; Leary & Cox, 2008). In a very real sense, rejection from the group, meant hardship or even death (MacDonald & Leary, 2005; Tesser, 2003). Therefore, natural selection would favor those who were valued as relationship partners (Leary & Cox, 2008), as they would

survive to pass on their genes to offspring. Sociometer theory builds on the need to belong by proposing that state self-esteem, defined as people's self-evaluative feelings in a particular situation, serves as a thermostat of their relational value to others (Leary, 2010; Leary & Baumeister, 2000; Leary & Guadagno, 2011; Leary et al., 1995; Tesser, 2003). State self-esteem differs from trait self-esteem, which is a more constant self-evaluation that is not dependent on a particular situation. Relational value is defined as the degree to which others see a relationship with that person as important (Leary & Guadagno, 2011). High self-esteem, the theory argues, is not a goal in and of itself. Rather, people seek to belong, following evolutionarily adaptive instincts, and state self-esteem becomes a way to measure whether this goal of belonging is likely to be met (Leary, 2010; Leary & Baumeister, 2000; Leary & Guadagno, 2011; Leary et al., 1995). Dovetailing on sociometer theory and the belongingness hypothesis, K. Williams (1997) proposed a model of ostracism to explain how this severe form of social rejection threatens four needs -- sense of belonging, state self-esteem, feeling of being in control, and a belief that life is meaningful --- as well as leads to aversive feelings.

Current study

This study built on this theoretical foundation by examining whether rejection and criticism in the specific context of a social-networking site would threaten people's sense of being strong relational partners, leading them to feel bad, retaliate, feel aroused, or act aggressively. The core question of this research was whether a rather modest rejection from an online group that one wants to join or a mild criticism from strangers could cause effects. Further, this study offered a theoretical extension of our understanding of rejection and criticism by examining whether one is worse than the other. Does rejection

or criticism hurt more or leads to greater negative affect, arousal, retaliation, triggered displaced aggression, or attempts to restore relational value? This study also examined two possible extensions of the ostracism model. First, I tested whether the model applies to online rejection by strangers. It seems logical that the model would apply because social rejection is an umbrella category for ostracism (K. Williams, 1997). Secondly, I tested whether the model applied to online criticism from strangers. Both concepts are explicated below. In addition, this study offered new knowledge by examining through both self-reports and physiological monitoring whether rejection or criticism leads to stronger aversive effects.

Rejection

Researchers have examined rejection in multiple ways including having people experience the threat of rejection, anticipating rejection, imagining being rejected, reliving a past rejection, or the overt rejection of being told they cannot join a group (Blackhart et al., 2009). Overall, findings from a meta-analysis of 192 studies of social exclusion suggest that all these types of rejection cause a significant shift away from positive emotions toward negative emotions, compared to the control or even encountering a different type of negative experience that is not social rejection (Blackhart et al., 2009). Rejection by others in a group setting seemed to intensify the negative effects (Blackhart et al., 2009). For example, Smith and K. Williams (2004) found that people who were initially included in a text message interaction and then excluded reported lowered self-esteem, sense of belonging, feelings of being in control, and belief that life is meaningful compared to those who continued to be included, even though the ostracized people were unaware that others were still interacting. This ample research

supports the main contention of the current study that rejection and criticism are aversive forms of communication that may lead to the same negative emotions that these studies found in social exclusion and ostracism.

However, this study contributed to this literature by focusing on a specific form of rejection in a computer-mediated context. For the purposes of this study, rejection is defined as overt rejection – telling people they cannot join an online group. As such, it was conceptualized as a weaker form of social exclusion or ostracism. It differs from exclusion because rejection implies a person tried to join the group but was thwarted, while one many be excluded from a group one had no desire to join (Blackhart et al., 2009). In addition, this study examined whether people will experience aversive feelings and threats to the ostracism needs if they are rejected from joining an online group that they have not been part of previously. This differs from the experience in many of the ostracism studies (eg. Smith & K. Williams, 2004; Van Beest et al., 2011; K. Williams, 1997; K. Williams et al., 2000; K. Williams et al., 2005; Zadro et al., 2004; Zadro et al., 2005) where people were initially included and then excluded.

Unlike this prior research, this study examined pure rejection, not ostracism. This distinction is subtle but significant. If, as the belongingness hypothesis and sociometer theory proposes, human beings are evolutionarily pre-disposed to maintain their relational value, people should feel threats to this relational value regardless of whether they are rejected from a group they were once part of or they are rejected at the outset from even being part of the group, as this study exaimined. Both acts, if these theories hold, should lead to negative effects. It is important to note that research has found that social rejection hurts more when it comes from a group one cares about (eg. Bernstein et

al., 2010), even if people report no emotional response to the rejection (Twenge, Catanese, & Baumeister, 2003). However, even short-term exposure to ostracism in FtF encounters with strangers has been linked to negative mood, anger, and less feeling of belongingness and control (K. Williams, 1997; K. Williams et al., 1995; Zadro et al., 2005). Ostracism even produces negative effects if a computer does the rejecting (Zadro et al, 2004). That finding has support in presence theory, which suggests people can become so psychologically immersed in virtual experiences that the experiences become more *real* (Biocca & Levy, 1997). As a result, people experience hurt feelings, or social pain (Vangelisti, 1994), when they feel their relational value is threatened (K. Williams et al., 2005; Leary, 2010; Leary & Baumeister, 2000; Leary & Guadagno, 2011; Leary et al., 1995), provoking a threat-defense response similar to that what is wrought by physical injury (MacDonald & Leary, 2005) even if the rejecter is a stranger. The reasoning for this effect is that any type of ostracism or rejection indicates a person lacks relational value and foreshadows the ultimate threat, being left alone by those who matter (Leary & Baumeister, 2000; MacDonald & Leary, 2005). In addition, hurtful communication may be particularly painful when the receivers feel they cannot control the experience (Vangelisti & Hampel, 2010). Following this reasoning, I argued that rejection by a group of strangers would lead to hurt feelings, negative emotions, and threats to the four ostracism needs of state self-esteem, feelings of being in control, belief that life is meaningful, and feelings of belonging compared to non-aversive comments.

Criticism

Criticism is a form of social incivility, which is "low-intensity deviant behavior with ambiguous intent to harm" (Andersson & Pearson, 1999, p. 457). In this sense,

criticism violates social norms because it is communication that fails to show regard for other people (Caza & Cortina, 2007). Criticism also fits within the definition of verbal aggressiveness, which is an attack on another's self-concept to make the person feel badly about the self (Infante & Wigley, 1986; Rancer & Avtgis, 2006). Verbally aggressive messages can attack a person's character or ability to do something and include taunts, teasing, ridicule, and insults (Infante & Wigley, 1986; Rancer & Avtgis, 2006). In this study, criticism was a form of verbal aggressiveness that attacked either the person's competency or self-worth. While criticism (Leary, 2010), does not directly reject someone's relational value, criticism certainly gives a clear sign that the target has some undesirable characteristic.

Sociometer theory and the belongingness hypothesis and the ostracism model do not specifically deal with criticism. However, I am conceptualizing criticism as a weaker form of rejection because when one is criticized, in a sense, a part of the person is rejected. As such, criticism would be expected to lead to negative affects, retaliation, arousal, and triggered displaced aggression, as compared to non-aversive comments. In addition, I examined whether rejection and criticism operate similarly to outright ostracism, threatening the four needs identified in the ostracism model and leading to aversive feelings. However, it remains an open question whether criticism will produce a greater or lesser effect compared to rejection. On the one hand, it stands to reason that criticism may produce less negative effects than rejection because criticism only hints that one's relational value is low, while rejection shows it clearly. However, there is also logic to the argument that criticism may produce a greater negative effect because

criticism is aversive and painful in its own right, unrelated to its potential threat to relational value.

Emotional response to rejection and criticism

Emotions are affective experiences that orient people to respond to stimuli, helping them to pick the correct course of action (Keltner & Lerner, 2010) or encouraging them to regulate their own behavior (Cacioppo & Gardner, 1999). As such, emotions are internal states that may be intense but are relatively short-lived and context-specific, compared to longer-lasting moods that are not tied to a particular situation (Brave & Nass, 2003; Keltner & Lerner, 2010; Nabi, 2010). In reference to communication-based experiences, emotions may be conceptualized as discrete (Nabi, 2010), focusing on categories of emotions, or dimensional, focusing on arousal (high/low) or valence (pleasant/unpleasant) (Bolls, 2010; Bolls et al., 2001). In this study, I focused on the dimensional aspect, grounded in the idea that emotions can motivate behavior through direction and intensity (Bolls, 2010). By direction, I mean that people, like animals, evaluate stimuli and decide whether to approach it or avoid it, depending on whether they see the stimuli as aversive or not, and both approach and avoidance can vary in intensity (Bolls, 2010; Cacioppo & Gardner, 1999). Two primary motivations spur these emotional responses. They are the aversive system, which leads to avoidance or withdrawal, and the appetitive system, which leads to approach (P. Lang, 1995). Intensity is demonstrated through physiological and self-reported affect, while approach and avoidance are indicated by physiological and self-reported arousal. In this sense, affect is a valenced emotional experience that can be positive or negative, offering a directional aspect of emotion (Bolls, 2010; Bolls et al, 2001; Keltner & Lerner, 2010).

Arousal is the intensity aspect of emotion, which links to the primal urge to approach or avoid stimuli (Bolls, 2010; Bolls et al., 2001), and may include a person's subjective sense of being aroused (Cummins et al, 2012). I will discuss affect first and then arousal.

Affect. Affect refers to the directional aspect of emotion (Bolls, 2010; Bolls et al., 2001), offering a valenced emotional experience that can be positive or negative (Keltner & Lerner, 2010). While some scholars see affect as an umbrella term that encompasses emotions, drives, moods, and feelings (Izard, 1993; Wigley & Pfau, 2010), in this study I define affect as good or bad feelings generated by internal or environmental cues that are short-lived states such as anger, disgust, or pride (Pfau et al., 2009; Wigley & Pfau, 2010). Affect does not persist across context and time like emotional traits; nor is it long-lasting or non-context specific like moods (Bartsch et al., 2008; Brave & Nass, 2003; Keltner & Lerner, 2010; Nabi, 2010; Wigley & Pfau, 2010). In essence, emotion and affect are equivalent, rather than affect being an umbrella category for affective experiences (Wigley & Pfau, 2010). Affect is divided into positive and negative, with positive being generated by cues that enhance goal attainment, while negative being the product of cues that interfere with goal attainment (Pfau et al., 2009). Watson, Clark, and Tellegen (1988) explain this idea further, by proposing that positive affect reflects how enthusiastic, active, and alert a person is, compared with negative affect, which measures subjective distress.

Self-reports are often used to measure affect, under the assumption that emotions are the result of mental processes of which people are aware (Dasborough et al., 2008; Frijda, 1986). For example, Lazarus (1984) asserted that affect is "post-cognitive," meaning it is processed only after some thought and represents a constantly changing

response to one's environment. Under this view, people cannot really experience affect unless they have thought about it and comprehend it. However, affect and emotion also can be conceptualized as automatic or involuntary responses to stimuli that people may not be consciously aware of (Dasborough et al., 2008; Zajonc, 1980). For example, Zajonc (1980; 1984) proposed that affect could precede cognition in the sense that people may be afraid of something before they are consciously aware of it. This viewpoint suggests one can experience affect without having thought about it or being able to comprehend it. Therefore, Zajonc (1980; 1984) argued one might have an emotional response without any detectable cognitive process, although he leaves room for the idea that sometimes cognition may precede an emotional experience. My aim was not to settle this debate, which has raged for decades. My goal was to consider both these conceptualizations by looking at affect both as a cognitive process and as a potentially automatic process by using self-reports and physiological monitoring to measure affect.

One way researchers have studied the automatic or unconscious aspect of affect is through facial expressions, which can offer clues to how people feel (Ekman, 1992b). Facial EMG is particularly good at measuring these clues, especially when intensity of emotions may be too weak to trigger reactivity on other physiological measures. However, it offers only positive and negative valence, not indications of specific emotions (Blascovich & Mendes, 2010; Cacioppo, Bush, & Tassinary, 1992; Tassinary & Cacioppo, 1992). Facial EMG measures contractions of somatic muscles (Wang et al., 2011), namely the *zygomaticus major* (smile) muscles and the *currogator supercilii* (frown) muscles (Cacioppo et al., 1992; Cacioppo, Martzke, Petty, & Tassinary, 1988; P. Lang et al., 1993; Tassinary et al., 2007). Greater EMG *currogator* activity, and

decreased *zygomaticus* activity indicate negative affect (Cacioppo et al., 1988; Tassinary et al., 2007; Tassinary & Cacioppo, 1992).

In this study, I predicted rejection and criticism would lead to increases in negative affect when measured both through self-reports and facial EMG. This was based on sociometer theory, which suggests that social rejection such as the type examined in this study would indicate decreased relational value of a person, while criticism would merely threaten that value (Leary & Baumeister, 2000; MacDonald & Leary, 2005). In fact, a meta-analysis of 192 studies on social exclusion found that rejection lead to a negative emotional state with an average weighed effect size of 0.27, which is modest but significantly different from zero (Blackhart et al., 2009). The largest effect sizes were for explicit rejection, compared to implied rejection (Blackhart et al., 2009). As social rejection and criticism are not pleasurable, they would likely lead to negatively valenced affect (Leary, 2010; Vangelisti, 1994) compared to non-aversive comments. It is possible that outright rejection may lead to greater negative affect because it is overt rejection, while criticism is more similar to implied rejection. However, because criticism is an intrinsically aversive type of communication, there is also an argument to be made that criticism may increase negative affect to a greater extent than rejection. Therefore, I hypothesized:

> H1: Social media rejection and criticism will elicit greater physiological and self-reported negative affect than non-aversive comments.

> RQ1: Will social media rejection or criticism produce greater physiological or self-reported negative affect?

Arousal. As stated earlier, emotions have both valence and intensity. Arousal refers to the intensity dimension of emotion (Bolls, 2010; Bolls et al., 2001). Arousal is a psychological state that readies the body to escape or attack when under threat (Berkowitz, 1983; Bushman & Huesmann, 2010) that can be exhibited physiologically. It ranges on a continuum from high (extreme excitement) to low (sleep; Weinberg, 2010), but unlike affect it is not valenced as pleasant or unpleasant (Bolls, 2010). As such, arousal is an indicator of the intensity of the activation of either the aversive (avoid) or appetitive (approach) motivational systems (Wang & A. Lang, 2012). Because people may be aware of their arousal (Cummins et al., 2012), self-reports are often used to measure this construct (Lang, A. & Ewoldsen, 2010; Potter & Choi, 2006; Schneider, Lang, A., Shin, & Bradley, 2004; Wei & Zhou, 2010). Arousal also can be measured physiologically, because, in essence, arousal is the body's way to ready itself to flee (either mentally or physically) the source of its pain in an avoidance response.

Physiological arousal is demonstrated by which of two branches of the autonomic nervous system (ANS) are most activated as they control automatic body functions. When people are at rest or not aroused, the parasympathetic nervous system (PNS) branch predominates, while the sympathetic nervous system (SNS) branch activates in stress or danger (Cacioppo, Tassinary, & Berntson, 2007; Ravaja, 2004; Reeves et al., 1999; R. Stern et al., 2001), although both systems operate simultaneously (Mendes, 2009). SNS activation prompts glands in the hands and feet to fill with particular type of sweat, called eccrine, that rises toward the skin surface (Dawson, et al., 2007; R. Stern et al., 2001). Even if hands and feet are not sweaty, an electrical current passed over the skin can detect a rise of sweat in these glands compared to in an unaroused state (Dawson

et al., 2007; R. Stern et al., 2001). Therefore, physiological arousal is the increase in skin conductance response, compared to the baseline in an unaroused state.

In this study, I hypothesized that social rejection and criticism would lead to both self-reported and physiological arousal because research has found that the brain responds to hurt feelings the same as it would to physical pain (Eisenberger et al, 2003). While pictures provoke greater arousal than words, intense words, such as criticism, have been found to interfere with cognitive processes to a greater extent than more neutral words, highlighting the power of rejection and criticism to hurt people (Carretié et al., 2007). Based on this reasoning, I proposed that both online social rejection and criticism would trigger predominance of the SNS, similar to a physical threat, as demonstrated by increases in skin conductance response from baseline, compared to non-aversive comments. This would be the case even if the rejection or criticism came from a stranger because it shows a decrease in a person's relational value and leads to hurt feelings (Leary & Baumeister, 2000; MacDonald & Leary, 2005). Therefore:

> H2: Social media rejection and criticism will produce greater physiological and self-reported arousal than non-aversive comments.
>
> RQ2: Will social media rejection or criticism produce greater physiological or self-reported arousal?

Retaliation and restoration

When people feel they are not socially accepted, they not only become emotionally agitated, but the rejection may affect their psychological processes in complex ways (Leary, 2010). For example, a meta-analysis of 192 studies on social exclusion found that rejected people feel worse than those who were accepted, although they were not necessarily distressed (Blackhart, 2009). This may be attributed to a

numbing effect following rejection (Twenge et al., 2003). In general, people tend to respond to rejection with three aims: to increase their value as relational partners and gain acceptance, to shield themselves from further pain from rejection, or to retaliate against those who have harmed them (Leary, 2010). Whether criticism would produce the same effect has not been tested. However, I proposed that if criticism, like rejection, can cause emotional pain and a threat to one's relational value, criticism may lead to the same three responses as rejection.

Retaliation. Much research suggests that people act anti-socially when they have been rejected (eg. Twenge, et al., 2001), particularly if they feel a loss of control (Warburton, K. Williams, & Cairns, 2006). In particular, rejection has been found to lead to retaliation (eg. Twenge et al., 2001; Van Beest et al., 2011), which is a specific type of aggressiveness that targets the rejecter (Bushman & Huesmann, 2010). Why this occurs is not really known, as acting out would obviously further damage one's relational value. One theory suggests people lose their ability to self-regulate their behavior amid the emotional numbness of rejection (Twenge et al., 2002). Another view suggests the urge to punish the perpetrator of the rejection outweighs the risk to further damaging one's relational value (Leary, 2010). This view fits face theory, which suggests that people respond when their sense of *face* --- the socially contracted image of the self – is threatened (Brown & Levinson, 1987; Goffman & Best, 2005; Ting-Toomey, 2005). When this happens, a person may become aggressive through retaliation to defend and restore his or her own *face* by harming the *face* of an offender (Metts & Cupach, 2008). In other words, people may lash out against their rejecter after being hurt because it helps them feel as if they have re-established their own value by diminishing the value of the

other person. Under this view, the drive to restore an internal sense of self outweighs any need to appear as a good relational partner. However, little research has examined whether criticism would produce retaliation, although logic would dictate that it would. Criticism may threaten one's relational value, and, as such, lead to a similar behavior as rejection would. Therefore, I hypothesized that both rejection and criticism would lead to greater retaliation against the perpetrator than non-aversive comments.

H3: Social media rejection and criticism will prompt greater retaliation than non-aversive messages.

RQ3: Will social media rejection or criticism produce greater retaliation?

Restoration. One way people seek to restore their relational value is through an attempt to forge connections with other people, but not with those who rejected them (Leary, Twenge, & Quinlivan, 2006; Maner, DeWall, Baumeister, & Schaller, 2007). Presumably, people would prefer to reconnect with real people. Yet, they also have been found satisfy what may be an unconscious need to restore relational value by engaging in para-social relationships, which are ritualized relationships with media actors, such as television newscasters or newspaper columnists (Greenwood & Long, 2011; Perse & Rubin, 1989; Wenner, 1985). On a social-networking site, strangers may become para-social media actors (Chen, 2011). These relationships can provide emotional benefits though they are not real. There is no adaptive reason for human brains to differentiate between *real* and *mediated* life (Leary, 2010) and people have even been found to respond to computers as if they were people (Reeves & Nass, 1996). Based on this logic, I hypothesized that people who are rejected or criticized on the mock social-networking site in this study will be more likely to try to restore their relational value by embracing other people on the site than those who receive non-aversive comments.

H4: Social media rejection and criticism will prompt greater attempts to restore relational value than non-aversive messages.

RQ4: Will social media rejection or criticism produce greater attempts to restore relational value.

Ostracism model

The ostracism model proposes that ostracism will directly threaten four needs – state self-esteem, belongingness, sense of being in control, and belief that life is meaningful – and directly lead to aversive feelings. In addition, the model proposes that ostracism will indirectly lead to aversive feelings, mediated by the four needs (K. Williams et al., 2000; Van Beest & K. Williams, 2006). Part of the aim of this project was to consider whether this model would also apply to rejection, such that rejection would have a direct effect on the four needs and aversive feelings and a mediated effect indirectly through the four needs in the same way as ostracism. The rationale for this argument is that ostracism, as a type of rejection, should operate similarly to rejection. Being rejected from joining a social-networking group that one wants to join seems conceptually similar to being excluded from an in-person or virtual ball-tossing game (Van Beest et al., 2011; K. Williams, 1997; K. Williams et al., 2005; K. Williams et al., 2000; Zadro et al., 2004; Zadro et al., 2005) or from a text-message interaction (Smith & K. Williams, 2004). In these cases, strangers stopped people from participating in an activity that might have been fun but was hardly expected to be significant in their lives. Therefore, it seems reasonable that being rejected from an online group would provoke the same response as being excluded from a ball-tossing game or text-message interaction. While criticism is a different construct than rejection, it violates social norms and is aversive and may reject *part* of the self. So it also could threaten the relational

value of a person in the same was as either rejection or exclusion. Therefore, I examined whether criticism would have a direct effect on the four ostracism needs and aversive feelings and a mediated effect indirectly through the four needs, in the same way as ostracism. Figure 1 shows the ostracism model.

INSERT FIGURE 1 ABOUT HERE

RQ5a: Will social media rejection and criticism threaten the four ostracism needs and lead to aversive feelings to a greater extent than non-aversive comments?

RQb5: If so, will the four needs mediate a positive relationship between rejection and criticism and aversive feelings?

RQ6: Will social media rejection or criticism produce greater threats to the four ostracism needs or lead to greater aversive feelings?

Triggered displaced aggression

Much of the research on ostracism leading to aggression (Van Beest et al., 2011; see Twenge et al., 2001, for a review) has focused on direct aggression against a specific known target or retaliatory aggression, which is also called reactive, impulsive, or hostile (Bushman & Huesmann, 2010) aggression against the rejecter. In all cases, aggression is defined as an anti-social behavior – not a feeling -- that is intended to hurt (Bushman & Huesmann, 2010). What is less understood is how rejection may lead to aggression that is not targeted against the rejecter or an intended target. This type of triggered displaced aggression stems from misplaced agitation that sort of spills out against an unintended target who happened to annoy a person who is already in an agitated state from some previous frustration (Bushman, et al., 2005; Dollard, 1938; Miller et al., 2003). This study aimed to consider whether online rejection and criticism may lead to triggered

displaced aggression, thereby offering more insight into Miller and colleagues' (2003) model of triggered displaced aggression (MTDA).

The MTDA is based on Dollard's (1938) frustration-aggression hypothesis, which proposes that any frustration could lead to aggression. Later findings undermined this broad view, but Berkowitz (1989) reformulated this idea into aversive-stimulation theory. That theory proposes that when people experience something unpleasant, their body automatically responds primitively to reduce this stress by escaping or attacking, much as animals would. Miller and colleagues (2003) built on this work, positing that a provoking event causes a type of frustration and arousal that lead to displaced aggression following a minor trigger. They distinguished this effect from excitation transfer, where people encounter a frustration and then misattribute it to an unrelated event, because effects dissipate more quickly in excitation transfer (Zillmann, 2011) than in displaced aggression. However, excitation transfer may last longer if a person is in a very aroused state. I examined whether online rejection and criticism could be the frustrating provocation that would lead to displaced verbal aggression online if participants are triggered by a mild annoyance, as compared to non-aversive comments. However, because rejection and criticism are perhaps equally frustrating, it is unclear whether rejection or criticism would produce a stronger response.

> H6: Social media rejection and criticism will lead to greater intensity of triggered displaced verbal aggression than non-aversive comments.
>
> RQ6: Will social media rejection or criticism product greater intensity of triggered displaced verbal aggression?

Gender

I considered gender as a potential moderating variable because research suggests gender may be related to feelings of rejection. For example, a meta-analysis of 192 studies of social exclusion found larger effect sizes for rejection manipulations that had a larger proportion of female participants, although it is unclear whether that meant women responded differently to rejection than men or whether the manipulations just affected women to a greater extent (Blackhart et al., 2009). Sensitivity and reactivity to rejection also has been found to vary by gender (eg. Ayduk, Downey, Testa, Yen, & Yuichi, 1999; Downey, Mougios, Ayduk, London, & Shoda, 2004). In addition, research has found clear gender differences in both aggressive behavior and expectations (Anderson & Murphy, 2003; Bartholow & Anderson, 2002; D. Williams, Consalvo, Caplan, & Yee, 2009). These differences are evident as early as preschool (Loeber & Hay, 1997) and continue as women grow up (Anderson & Murphy, 2003; Bartholow & Anderson, 2002). Men have been found to be more likely to aggress physically and directly, while women are more apt to aggress indirectly (Bushman & Huesmann, 2010) through manipulation or withdrawing (Eagly & Steffen, 1986; Wood & Eagly, 2010). In fact this effect can be so pronounced that women have even been found to act more aggressively when they virtually shed their own gender and play video games using male avatars (Chen, Schweisberger, & Gilmore, 2012).

Scholars suggest both biological and psychological mechanisms explain these differences. The biological differences between males and females (such as greater strength for men and child-bearing abilities for women) lead society to ascribe different roles for men and women that reinforce these differences through gender roles (Wood & Eagly, 2010). These stereotypical roles assume men will be assertive or aggressive, while

women will be more communal or nurturing (eg. Plant, Hyde, Keltner, & Devine, 2000; Spence & Buckner, 2000). Social cognitive theory suggests people learn these roles from environmental factors, such as the media and other people beginning in childhood, and these roles are reinforced throughout their lives (Bussey & Bandura, 1999). As a result, it seems reasonable that men and women may exhibit different levels of aggressiveness in response to rejection. However, it remains an open question whether criticism would lead to the same gender difference apparent in response to rejection or aggressive behavior and expectations. There is logic to support the idea that these gender differences would continue in the face of criticism if criticism were truly a subset of rejection, or a rejection of part of the self,

RQ7: Does gender moderate any significant relationships?

Personality

Personality traits are behavior patterns influenced both by hereditary and environmental factors, and they can affect a person's intelligence, character, temperament, and constitution in relatively stable ways, regardless of situation (Eyseneck, 1998). Personality traits are considered relevant to examine in this study because they have been found to be related to propensity for aggressiveness (Grumm & von Collani, 2009; Rancer & Avtgis, 2006; Siebert, Miller, Pryor, Reidy, & Zeichner, 2010), particularly in response to rejection (eg. Baumeister, Bushman, Campbell, 2000; Bushman & Baumeister, 1998; Twenge & Campbell, 2003). For example, a meta-analysis of 62 studies regarding personality and aggression found that narcissists were more likely to aggress than other people, but only if provoked (Bettencourt, Talley, Benjamin, & Valentine, 2006). The theory of threatened egotism posits that narcissists

have an inflated sense of entitlement coupled with a high self-esteem that is unstable and fluctuates in a given situation (Baumeister et al., 2000). As a result, the rejection threatens narcissists' high opinion of themselves, leading them to lash out more aggressively than non-narcissists who have a more stable sense of self that is largely impervious to the ups and downs of daily events. While the relationship between personality traits and criticism is less clear, this study offered an opportunity to assess whether these traits influence responses to criticism as they do to rejection. My rationale was that it is likely personality traits may influence responses to criticism because both rejection and criticism produces frustration and can lead to hurt feelings. Based on this reasoning, it made sense to consider whether personality traits moderate any of the relationships in this study.

RQ8: Do personality traits moderate any significant relationships?

Chapter 3: Methodology

A between-subjects experiment with three conditions (rejection, criticism, and control) was conducted to test the hypotheses and answer the research questions outlined in Chapter 2. For the experiment, I created a social-networking site called "The College Network" using Ning, an online platform that is customizable and has more than 1 million such networks on it (O'Dell, 2010). Figure 2 shows a screen shot of the site. Participants were told the experiment was a chance for them to test a social media site in production that is aimed specifically at college-age students to give their suggestions on how to improve it before it goes to market. The cover story explained that Facebook has become overloaded with older people, so this new site is aimed at reclaiming the audience once held by Facebook before it opened to the general public in 2005, a year after its founding as a Harvard University-only site (boyd & Ellison, 2007). I preloaded the site with 20 potential college-age *friends* for participants to *friend* and 40 groups participants could join.

INSERT FIGURE 2 ABOUT HERE

Focus group and pre-tests

Before the main experiment, I conducted a focus group and four pre-tests to create the groups and fake student profiles on the site and to create the rejecting, criticizing, and neutral messages that were used during the main experiment. The focus group and pre-tests were used to create a site and stimuli for the experiment that was as realistic as possible by using the ideas of college-age students.

Focus group. Seven graduate students at a major Northeastern university who were uninvolved in the main experiment participated in a focus group in November 2010 in exchange for $10 each from a university grant for a one-hour session together. The students were all white, 33.57 years old on average (*SD* = 9.48), and 71.4% were female. After the focus group participants signed a consent form, I explained the premise of the experiment to them, and they brainstormed ideas for groups they believed would likely be found on a social-networking site targeted toward college-age students such as they one in this project. They generated 79 ideas for groups on the site. Of these, I selected 40 groups that did not duplicate other ideas for use on the mock social-networking site in this study. Some examples of groups that were used were: "I hate Uggs," "Leggings Aren't Pants," "How Do They Expect Me to Learn at 8 a.m. When I'm Still Drunk," and "I Can't Live a Day Without Starbucks." I found a publicly available image on the web to represent each group and then created a brief description of each group on the site. In most cases, the description was adapted from an already-existing Facebook group of a similar name. The focus group members also came up with two questions they deemed typical of those that might be featured on a profile for a social-networking site aimed at college-age users. These questions were: "The top 5 songs on my iPod are …" and "On the weekend, you're most likely to find me …"[2]

Then, I initiated the first step of an adaption of a procedure that Graesser (1981) developed that has been used in media research (Shapiro & Chock, 2004) to create the stimuli for this project. The focus group members were asked to imagine they were interacting on a social media site that offered groups for members to join, similar to the

[2] Originally, the focus group participants came up with three open-ended profile questions. However, the third question, "If I become famous, it will be because …" was dropped from the final social-networking site because it did not yield enough responses that seemed interesting enough to put on the site.

groups they proposed. Focus group participants used a think-aloud procedure (Shapiro, 1994) to come up rejecting, criticizing, and neutral comments that would be typical of those they would expect to receive if they were attempting to join groups on a social-networking site. In response to this request, focus group participants came up with neutral comments that were non-aversive and accepted people into the groups for the control condition. This created a control condition that was more comparable to the other conditions, than a control without attempts to join any groups. In the end, the focus group came up with 18 criticizing comments, 15 rejecting comments, and 15 non-aversive comments. I pared these lists to 11 rejecting, 9 non-aversive, and 9 criticizing comments by eliminating duplicates or unclear comments and to ensure a pre-test where students rated these statements would not be so long that few would complete it.

Pre-tests. Pre-test 1 comprised the next step in Graesser's (1981) process. Pre-test 1 was conducted in November 2010 and involved 50 undergraduates at the same university who participated in exchange for $10 each from a university grant and extra course credit. Participants on average were 20.4 years old (*SD* = 2.86), 58.3% were women, and most were white (81.3%). Participants completed a 94-question online questionnaire on Survey Gizmo, where they rated their agreement on a 1 (*not at all*) to 7 (*very much*) scale to the following statements in regard to each of the 29 comments focus group participants had generated: "If I received this message after I tried to join a social media group, I would feel I had been rejected by the group," "If this message were posted on my social-medial site wall, I would feel as if I had been criticized," "If I received this message, it would not bother me at all." The Survey Gizmo software was set up to randomize statements by subject to control for order effects (Krosnick, Judd, &

Wittenbrink, 2005). Messages with a mean above 5 on the 7-point "I feel I had been rejected" scale were considered rejecting messages. Similarly, messages with a mean above 5 on the 7-point "I would feel as if I had been criticized" scale were considered criticizing, and messages with a mean greater than 5 on the 7-point "It would not bother me" scale were considered non-aversive. Using these criteria, 9 statements were considered non-aversive, 19 were considered criticizing, and 20 were considered rejecting. This showed an overlap between rejection and criticism on all but one of the aversive statements.

To further clarify whether a statement was rejecting or criticizing, an additional step was added to Graesser's (1981) procedure. A separate group of students from the same university (N = 59) were recruited for another pre-test in January 2012 in exchange for extra course credit. Pre-test 2 subjects were 19.4 years old on average (SD = 1.44), mainly female (79.7%), and more than half were white (56.7%). After agreeing to an online consent form, these students rated on a dichotomous scale the statements the earlier pre-test participants had determined were either rejecting or criticizing. The subjects were told to imagine they received the messages after attempting to join groups on a social-networking site similar to Facebook. The question read: "We want to know whether you would feel REJECTED or CRITICIZED if you received the following messages in response to your request. We realize you may feel BOTH. But you must pick which BEST describes how you feel." They could choose either "The statement would make me feel MAINLY CRITICIZED" OR "This statement would make me feel MAINLY REJECTED." This step produced four statements for each condition, which serve as the experimental stimuli and are detailed below.

Two additional pre-tests were conducted in November 2011 to screen the potential profile pictures for the fake college-age social-networking group members that study subjects could *friend*. This was done to ensure the fake profiles would appear as realistic as possible to subjects in the main experiment. In both pre-tests, subjects viewed photographs downloaded from Twitter or Facebook and rated on a 1 (*strongly disagree)* to 7 (*strongly agree)* scale whether the person in the picture "looks about my age." Then they were asked to indicate the race of the person on a 1 (*definitely a person of color*) to 7 (*definitely white)* scale. The racial rating was done because the aim was that the membership of the social-networking site used in the study be similar to the racial make-up of the university where the study was conducted.

In addition, pre-test subjects were asked to answer the two open-ended profile questions that the focus group participants devised. While both pre-test groups followed the same procedures, they viewed different potential profile pictures. This was done because if all the 51 photographs were in one pre-test it would have taken participants more than 30 min to finish the questionnaire, which may have lead to excessive partial completion. Participants for both pre-tests were students at the same university who participated in exchange for extra course credit and $10 from a university grant.

Participants in Pre-Test 3 (N = 22) were 21.10 years old on average (SD = 2.34) and 80% were females. Two-thirds of the sample was white, while 13.6% were Asian, 4.5% were Hispanic/Latino/Latina, and the rest checked either other or multi-racial. Participants in Pre-Test 4 (N = 28) had a mean age of 19.64 (SD = 3.13), were 92.9% white and 7.1% Hispanic/Latino/Latina, and more than half were male (53.6%). Statistical tests showed the two groups did not significantly differ in terms of age or

gender,[3] but pre-test 3 subjects were significantly more racially diverse than those in Pre-test 4 ($X^2 = 70$, $p < .0001$). This racial difference was judged not to invalidate results of either pre-test because both groups of subjects should be able to answer profile questions and assess the race and approximate age of potential profile pictures.

After completing online consent forms, respondents in both pre-tests rated photographs that were randomized by subjects. Pre-test 3 participants rated 24 photographs (13 females and 11 males), while those in Pre-test 4 rated 27 photographs (13 males and 14 females.) Based on ratings in both pre-tests, only photographs where participants on average rated them at the midpoint of 4 or greater for being "about their age" were considered to represent college-age students. The other photographs were excluded from the main experiment for not being age appropriate. For the race statements, those photographs that participants on average rated as a 5 or greater were considered white; ratings of less than 4 indicated people of color. Any photograph that received a mean score of 4 was considered racially ambiguous and excluded. Using these criteria, pre-test 3 yielded 13 usable photographs (6 males and 7 females), and pre-test 4 produced 11 usable pictures (9 females and 2 males.) Together, the two pre-tests produced photographs of 7 people of color (6 female and 1 male), and 16 whites (9 females and 7 males).

Of these photographs, only 20 were used in the main experiment. These were 13 of females and 7 of males. All 7 photographs judged to be people of color were used.[4] This was to ensure the gender and racial percentages were roughly similar to the makeup

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[3] For age, results were F (1, 67) = .097, p = .76. For gender, results were, $X^2 = 2.02$, p = .16.

[4] To mirror the university population where the study was conducted, 11 photographs of females should have been used and 9 of males. However, after the pre-tests, it was found that two of the photographs of males were not of sufficient size to upload on the social-networking site, so they were replaced with the extra photographs of females that had met the stimuli criteria through the pre-test process.

of the university where the study was conducted. That university has roughly 20,000 students, of whom about 56% are female and 23% are people of color.[5]

These 20 photographs were uploaded on the mock social-networking site as potential college-age *friends.* Five graduate student volunteers along with the researcher made up a names and dates of birth for someone who would be 18-to 24-years old in 2012 for each of the 20 photographs and created the fake profiles for them on the mock site. All profiles on the site indicated that the student attended the university where the study was conducted. Answers to the profile questions that the pre-test subjects came up with were added to the profiles, and each profile was randomly assigned to join four groups on the site. This was to ensure each group had the same number of members before participants began the experiment, so one group would not appear more popular than others.

Stimuli

The comments rated by participants in pre-test 1 and 2 became the stimuli for the main experiment. Rejecting statements were: "We don't want you in our group," "Not accepted," "Not trying to a be a hater, but you don't belong here," and "People like you don't fit in this group." Criticizing statements were: "It can't be easy being a person like you," "No offense, but when we saw your profile, we laughed," "You're ugly and your momma dresses you funny," and "After reading your profile, that's 30 seconds of our lives we won't get back." Non-aversive statements were: "Welcome to the club," "In case you had any doubt, you rock," "People like you are exactly why this group was formed," and "We've been hoping for someone like you."

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[5] Data retrieved from the Syracuse University website at http://www.syr.edu/about/facts.html.

Sample

Subjects uninvolved in the pre-tests or focus group were recruited from entry-level communication courses at the same university in exchange for $10 from a university grant. A total of 84 students who signed up during in-class recruitment sessions completed both a questionnaire and the experiment. The 17-item questionnaire, created on Survey Gizmo, was emailed to students in late December 2011 and throughout January 2012. It asked demographic questions (gender, age, race, income, year in college) and questions measuring trait self-esteem, rejection sensitivity, and personality variables. These variables were measured before the experiment, so asking about them did not prime subjects to focus on their psychological makeup during the experiment. Subjects were told to include their email address in the questionnaire and enter that email address into the main experiment questionnaire, so results could be linked. Students participated in the main experiment in February and March 2012. One subject provided different email addresses on the survey and the experiment, and efforts to reach this subject to resolve the discrepancy were unsuccessful, so this subject was excluded. Of the 83 remaining subjects, data for 5 were removed from analysis because these subjects failed a manipulation check by being unaware that they had been either rejected or criticized. Results of the manipulation check are detailed below. The remaining sample (N = 78) was 18.86 years old on average (SD = 0.80), mainly female (78.2%), white (79.5%), and mostly freshman (53.6%) or sophomores (38.5%).

For the physiological variables, two additional subjects' data were removed from analysis (N = 76). For one of these subjects, the computer did not record stimulus responses properly for an unknown reason. The other subject was removed because the

subject waited 10 min after receiving the second stimulus message before moving onto the next question. Other subjects moved onto the next question between 13.37 s and 51.43 s after the second stimulus (M = 24.41, SD = 8.73). Therefore, this subject's gap was deemed so large as to indicate that he or she was not paying adequate attention to the experiment, or, perhaps, was doing something else during that period.

Experiment procedures

Subjects participated in the experiment individually, seated in a campus laboratory at a laptop, outfitted with MediaLab experimental software. Participants were randomly assigned to three conditions: rejection (n = 28), criticism (n = 23), or control (n = 27). For the physiological variables, participants in each condition were: rejection (n = 27), criticism (n = 22), control (n = 27). Conditions were counterbalanced by gender. After participants completed a consent form, I explained how to navigate the new social media site to make the cover story for the experiment plausible.

Electrodes were attached to subjects to measure facial muscle movement and skin conductance, following procedures outlined below. Electrodes were attached at this point to provide the 5 to 15 min recommended (Blascovich, Mendes, Vanman, & Dickerson, 2011; Fowles et al., 1981) to allow time for the gel used to improve recording to adhere to the skin, but physiological recording was not started at the point. Subjects were lead to believe recording had begun. A separate laptop from the one that participants used to access the experiment was used for physiological recording. The screen on that laptop used for physiological recording was turned away from subjects, so they could not see whether it was recording.

With the researcher out of the room, subjects were given approximately 5 min to create a profile on the site, adding a first name, date of birth, and answering the two profile questions about music on their iPod and what they do on the weekend. Subjects were told to select profile pictures from 15 cartoon avatars that were available free on the web and uploaded on the desktop of the laptop used in the experiment. The participants were told the avatars were made available to them, so they would have pictures to use for the profile on the new site because photographs of them were not available. Subjects were advised to use only first names on the site to protect their confidentiality.

Then they were asked to navigate the social media site for about 10 minutes and review the existing groups and existing members on the site. Subjects were told the profiles on the site belonged to real students from their university who had already participated in the project. All the students had the name of the university where the study was conducted listed as their school on the profile page of the social network. Subjects were told that they would have to join 4 groups later, so they should get a sense of which ones they really wanted to join and jot down the names on a scrap of paper provided for them. This was done to emphasize the connection they might feel with the groups they sought to join. Subjects were required to join 4 groups because it was judged enough to produce an effect, but not so much that it might lead to subjects' frustration or abandonment of the experiment, confounding results. However, they were told not to join groups, send *friends* request, or interact on the site at this point in the experiment. This was done to alleviate the possibility that a participant might try to engage in a longer conversation with any of their virtual *friends* and attenuate any impact from the

manipulation. After trying out the site, subjects were instructed to kick a bell beneath the desk where they were sitting, and I returned to the room.

When I returned to the room, I told subjects that I had to check something on the equipment, giving me a ruse to turn on the physiological recording. I warned that they would face a blank screen at one point in the experiment but that they should not be alarmed because that was part of the project. Then I left the room, and subjects faced a computer screen displaying a MediaLab interface designed to resemble the social-networking site. After entering their email addresses, they faced a black screen for 20 s. The black screen was used to create a stimulation-free period during which to derive physiological baseline. Then they were shown a list of all the 40 groups on the site and asked to join the 4 groups they had previously selected. They joined each group one at a time. Immediately after joining each group they received a message (generated by the focus group and screened by pre-test 1 and 2 participants) about whether they were accepted into that group, depending on condition. In the rejection condition, they received a message that read: "You have been rejected from this group" followed by one of the four rejecting messages. For the criticism condition and the control, they received a message that read: "You have been accepted into this group" followed by either one of four criticizing or one of four non-aversive messages, depending on condition. To control for order effects (Krosnick et al., 2005), all statements were randomized by subject.

Participants then completed a manipulation check. They also completed dependent measures detailed below and were permitted to indicate whether they would like to send virtual gifts – either a ticking bomb or a smiley face – to the groups they had sought to join on the site. The gifts served as dependent measures of retaliation and are

detailed below. In addition, they were shown the profile and picture of each site member and asked whether they wanted to send a *friend* request to that person. This was a measure of restoration of relational value explained below. The joining of groups and sending of virtual gifts and *friend* request were set up on the MediaLab site, so that that social-networking site itself would not change from one participant to the next. For example, if all these actions were performed on the site itself, the number of members of a group would grow during the experimental process, which could skew results by making groups with more members appear more popular. However, to the subjects, it appeared as if they were still on the site. Creating the experiment this way also allowed more researcher control over the virtual gifts and the messages sent when attempts to join groups were made. Lastly, subjects were debriefed following a procedure from prior research (Williams et al., 2000) that assured them messages they received during the experiment were randomly assigned and had nothing to do with them personally.

Manipulation Check

In the manipulation check, participants were asked to report which emotional experience "BEST describes how you felt during the experiment" on a 1 to 7 scale with 1 being "*mainly criticized,"* 4 being "*mainly accepted,"* and 7 being "*mainly rejected.*" The scale was designed so a lower score would indicate feeling criticized, a middle score would reveal acceptance, and a higher score would suggest feeling rejected. The aim was to prevent any potential overlap between feeling criticized and rejected, thereby forcing participants to choose between these feelings. Overall, the manipulation worked, F (2,

77) = 13.282, $p < .001$, $\eta^2 = .28$.[6] People in the control condition felt more accepted ($M = 3.93$, $SD = .27$) compared to those in other groups, while those in the rejection condition felt more rejected ($M = 5.14$, $SD = 2.27$), and those in the criticizing condition felt more criticized ($M = 2.57$, $SD = 1.88$). Post-hoc Scheffe corrections showed significant differences between all the groups at $p < .05$.

Dependent measures

Physiological measures. The BIOPAC MP35 system was used for physiological recording. Skin conductance response (SCR) was used as a measure of physiological arousal, or activation of the sympathetic nervous system (Dawson et al., 2007; Reeves et al., 1999; Ravaja, 2004; R. Stern et al., 2001), with higher number responses indicating greater arousal. Facial EMG measures contractions of the somatic muscle (Wang et al., 2001), with negative affect indicated by greater activity in the *currogator supercilii* (frown) muscles and decreased activity in the *zygomaticus major* (smile) muscles (Cacioppo et al., 1992; P. Lang et al., 1993; Cacioppo et al., 1988; Tassinary et al., 2007).

For SCR, 8mm electrodes coated with a gel that improves recording were attached to the fingertips of the index and middle fingers of the participant's non-dominant hand (Blascovich et al., 2011; Dawson et al., 2007; Fowles et al., 1981; R. Stern et al., 2001), so the dominant hand could operate the computer mouse. Skin conductance was recorded using a sample rate of 500 samples per s, using a low-pass filter of 38.5 Hz to 66.5 Hz.

To ensure low impedance for facial EMG, participants were asked to clean makeup or other impurities from their skin at the electrode site, using a cotton ball dipped

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[6] Classic eta squared is reported here and throughout the manuscript, rather than partial eta squared, because classic is considered a more reliable measure of effect size (Levine & Hullett, 2002; E. Thorson, Wicks, & Leshner, 2012). It is hand-calculated using the formula: $\eta^2 = SS_{between}/SS_{total.}$

in tap water, and then to remove dead skin cells using an abrasive pad (Blascovich et al., 2011). Next 4mm shielded electrodes filled with a conducting gel were attached on the face over the *currogator supercilii* and *zygomaticus major* muscles, following standard placement (Blascovich et al., 2011; Fridlund & Cacioppo, 1986; Tassinary et al., 2007). To measure *currogator supercilii* movement, two electrodes were attached to the inner canthus of the eye just above the eyebrow; to measure *zygomaticus major* movement, two electrodes were attached on the cheek along an imaginary line drawn from the preauricular pit (a small depression before the ear) to the corner of the lip (Blascovich et al., 2011; Fridlund & Cacioppo, 1986). Because facial muscle movement tends to occur symmetrically, all facial EMG electrodes were placed on the same side of the face (Blascovich et al., 2011), the left. Both *currogator* and *zygomatic* muscle movement were sampled at 500 Hz per s, using a high-pass filer of 30 Hz and a low-pass filter of 500 Hz (Biopac, 2003). Because the SCR electrodes provided grounding, an additional grounding electrode for the facial EMG was not required.

Both frequency and amplitude were measured for all physiological variables, and means of both were used for analysis. For both measures, two potential baselines were considered. One was the average values for the 20-s black screen uses at the start of the experiment, and the other was the 20 s immediately following the black screen. This was done to ensure a true baseline because of concerns the black screen may have aroused participants. A series of paired t-tests indicated no significant differences between the black screen baseline and the baseline after the black screen, except for SCR frequency, $t(1, 75) = 2.133$, $p = .04$, where the black screen produced a lower baseline. As a result, the black screen baseline was deemed the better choice as a baseline for the remaining

analysis.

After participants joined each group, they received a message (either rejecting, criticizing, or non-aversive depending on condition) for 5 s. Then they took as much time as they wanted to decide on which group to join next. For each message, physiological responses were measures from the start of the stimulus to the start of the next stimulus, so each subject ended up with 4 response periods after the stimuli, which are called phasic periods (R. Stern et al., 2001). This was done to ensure that any response from the stimuli was captured, as physiological responses may not occur immediately after a stimulus. These phasic periods ranged from 12.61 s to 75.66 s (M = 26.97, SD = 9.04). A multiple analysis of variance (MANOVA) showed no significant difference in time by condition, offering evidence that the variability in time would not impact the main analyses. For each of these four periods, the baseline was subtracted from the phasic values to create a reactivity score.

Self-reported arousal. Self-reported arousal was measured using the arousal dimension of the Self-Assessment Manikin (SAM), a non-verbal pictorial assessment (Bradley & P. Lang, 1994; P. Lang, 1995). SAM shows five manikins, which range from a sleepy figure on the left to an excited figure on the right. Participants indicated their arousal level by clicking 1 (*not upset at all)* to 9 (*very upset*) beneath the figures, (M= 3.56, SD = 1.78). This measure was used because it has been found to be an economical yet accurate way to gauge arousal from media content (eg. Cummins et al., 2012; Potter & Choi, 2006; Schneider et al., 2004; Wei & Zhou, 2010). Also, it is the most widely used measure of emotional experience and has been validated in multiple countries (Lang, A. & Ewoldsen, 2010). Figure 3 shows the SAM manikins.

INSERT FIGURE 3 ABOUT HERE

Self-reported affect. This variable was measured using the Positive Affect Negative Affect Schedule (PANAS; Watson et al., 1988). PANAS was utilized because it is the most-widely used self-report of affect (Dasborough et al., 2008) and has been found to have high validity and reliability (Crawford & Henry, 2004) and high convergent and discriminant validity (Watson & Clark, 1994). Participants rated on a 1 (*very slightly or not at all)* to 5 (*extremely*) scale how well the following series of adjectives fit their mood at that very moment. Words indicative of positive affect were *interested, excited, strong, enthusiastic, alert, inspired, determined, joyful,* and *active.* Negative affect was indicated by the words *upset, guilty, ashamed, depressed, jittery, angry, irritable, annoyed, aggravated,* and *frustrated.* They were averaged into separate indices, both with high reliability (negative affect: $M = 5.09$, $SD = 0.83$, Cronbach's $\alpha = .89$; positive affect: $M = 2.56$, $SD = 0.75$, Cronbach's $\alpha = .85$). Higher values on the negative affect scale indicated increased negative affect, while lower number on the positive affect scale served as another measure of negative affect.

Relational response. This concept has two dimensions detailed in the literature (Leary, 2010), retaliatory aggression against those who hurt one and reaching out to other people to restore one's relational value.

Retaliatory aggression: This concept was operationalized in three ways. First, a greater number of virtual ticking bombs participants sent to the groups they had wanted to join on the site were considered a measure of retaliatory aggression. Second, a lower number of virtual smiley faces sent to groups they wanted to join on the site was viewed as a reverse measure of retaliatory aggression, so a lower number would constitute more

aggression. Virtual gifts were used to measure this concept because they are commonly sent to participants on social-networking sites, and virtual gifts can be a means of showing relational closeness (Bakshy, Simmons, Huffaker, Teng, & Adamic, 2010). On average, subjects sent 0.81 ticking bombs (*SD* = 1.31)[7] and 3.54 virtual smiles (*SD* = 10.23) on the site. Logarithmic 10 transformation was used for smiles because of its high positive skewness, 7.98 (Tabachnick & Fidell, 2007). Therefore, all reports regarding the smile variable in the results section pertain to the logged variable.

The third measure examined retaliatory aggression against the site itself, controlling for how well subjects felt the site worked. For this measure, subjects were asked to rate how likely they would be to use the social-networking site again on a 1 (*not at all likely)* to 7 (*very likely)* scale, adapted from prior research (Chen et al., 2011; Kalyanaraman & Sundar, 2006). On average, participants scored 2.88 on the likelihood scale (*SD* = 1.56). Participants also rated their agreement on a 1(*strongly disagree)* to 7 (*strongly agree)* scale on the following statements adapted from the Technology-Acceptance Model (TAM; Venkatesh & Davis, 2000): "Using this social-networking site is clear and understandable," "Using this social-networking site does not require a lot of mental effort," "I find this social-networking site easy to use," "I found it easy to get this social-networking site to do what I wanted it to do." These were averaged into an index, with high reliability (*M* = 5.52, *SD* = 1.06, Cronbach's α = .82). The TAM was used as a control variable in the analysis of likelihood to use the site again. This was done to parse out the retaliation aspect of being likelihood to use the site again by controlling for

[7] One subject entered a nonsensical answer for ticking bombs, 99999999999, so it was removed. The answer was converted to a zero because the answer the subject provided was deemed to be likely an attempt by the subject to advance to the next question without entering a true answer. The Media Lab computer program did not allow subjects to advance to the next question without entering an integer.

whether subjects thought the site worked well.

Restoration of relational value: The concept was operationalized by the number of *friend* requests subjects indicated they wanted to send to the preloaded potential *friends* on the site. They had a chance during the experiment to send *friend* requests to up to 20 people (13 females, 7 males) who comprised the fake students on the social-networking site. Subjects were told the profiles were of fellow students at their university. The subjects reviewed each student's social-networking site profile, which included a picture, before making a decision on whether the send a *friend* request. Immediately afterward, the experiment ended, so subjects did not know if their requests were accepted or not. Overall, subjects opted to send a mean of 8.6 *friend* requests (SD = 5.89) to the students on the site. Overall, men (M = 11.06, SD = 4.60) were significantly more likely to send *friend* requests than women (M = 7.93, SD = 5.96), regardless of condition, F (1, 77) = 4, $p < .05$, $\eta^2 = .05$.

Ostracism model. Five measures make up the ostracism model (Leary, Kelly, Cottrell, & Schreindorfer, 2007; Leary et al., 1995; Williams et al., 2000; Van Beest & Williams, 2006). These were:

- **State self-esteem**. Respondents completed 24 7-point bipolar adjective scales to assess how they felt about themselves at that moment. The scales were adapted from McFarland and Ross' (1982) low- and high-self-esteem feelings scales, as utilized by Leary and colleagues (1995). The following high-esteem adjectives anchored the high end of the scale: *good, competent, proud, adequate, useful, superior, smart, confident, valuable, important, effective,* and *satisfied*. These corresponding low-esteem

adjectives anchored the low end: *bad, incompetent, embarrassed, inadequate, useless, inferior, stupid, insecure, worthless, unimportant, ineffective,* and *dissatisfied*. These were averaged into an index, with high reliability (M = 1.95, SD = 0.66, Cronbach's α = .84).

- **Belongingness.** Participants rated their agreement on a 1 (*strongly disagree*) to 7 (*strongly agree)* scale to 10 statements. Statements were: "I try hard not to do things that will make other people avoid or reject me," "I want other people to accept me," "If other people don't seem to accept me, I don't let it bother me" (reverse scored), "I seldom worry about whether other people care about me" (reverse scored), "I need to feel that there are people I can turn to in times of need," "I do not like being alone," "Being apart from my friends for long periods of time does not bother me" (reverse scored), "I have a strong need to belong," "It bothers me a great deal when I am not included in other people's plans," and "My feelings are easily hurt when I feel that others do not accept me." These were averaged into an index, with acceptable reliability (M = 5.18, SD = 0.61, Cronbach's α = .70)
- **Meaningful existence.** Participants rated their agreement on a 1 *(strongly disagree*) to 7 (*strongly agree)* scale to these statements: "Life has meaning," " Life is meaningless" (reverse scored), "My participation in life is important," and "I contribute a lot to other people's lives." These were averaged into an index, with acceptable reliability (M = 6.14, SD = 0.68, Cronbach's α = .71).

- **Sense of control.** Participants rated their agreement on a 1 (*strongly disagree*) to 7 *(strongly agree)* scale to two statements: "I am in control of my life," and "I can influence the direction of my life" These were averaged into an index, with acceptable reliability (*M* = 6.14, *SD* = 0.68, Cronbach's α = .71).[8]
- **Aversive feelings:** Participants were asked which emotion best described their mood at that very moment on a 1 (*does not describe my mood at all)* to 7 (*describes my mood extremely well)* scale. The negative emotions were, *sad, angry, hurt*, and they were averaged into an index with acceptable reliability (*M* = 2.18, *SD* = 1.11, Cronbach's α = .74). Positive emotions were *happy, elated, and cheerful*, and they were averaged into an index with acceptable reliability (*M* = 3.64, *SD* = 1.23, Cronbach's α = .79).

Following procedures in earlier research (eg. Van Beest & K. Williams, 2006; K. Williams et al., 2000) the four needs – belongingness, sense of control, state-self esteem, and belief that life is meaningful and aversive feelings – were tested as separate dependent variables.

Triggered displaced aggression. This concept was operationalized, using a measure adapted from prior research (Chen et al., 2012). Participants were asked to respond to the following scenario, which was detailed on their computer screen. They were told to imagine a pricey national hotel chain had charged them double for one night's stay and refused to accept responsibility for the mistake or refund any money. The

[8] Two reverse-coded statements from the original measure had to be removed because of low reliability (Cronbach's α = .61).

participants then were asked to rate which of three comments they would be most likely to post on the company's Facebook wall, using a 1 to 7 scale. The 1 was anchored by the mildest comment: "I am very upset with one of my recent stays at this hotel chain. After being charged double for one night, the company refuses to refund my money. If you are planning on staying at one of their locations, I would suggest that you pay very close attention to your bill before leaving the hotel." The midpoint was labeled with a mid-level response: "This hotel chain is terrible. I stayed for one night and they charged me for two. DON'T STAY IN THEIR HOTELS unless you want to be cheated out of your hard earned money." The 7 was anchored with the most aggressive response: "SCREW THIS HOTEL CHAIN! I want my money back now for the freaking night I DIDN'T STAY THERE!!!!! All of their employees are complete jerks. TELL ALL YOUR FRIENDS TO AVOID THIS HOTEL FOREVER!" On average, subjects scored on the low end of this scale (M = 2.49, SD = 1.42).

Potential moderating/control variables

Rejection-sensitivity. This concept was measured using the hurt feelings scale (Leary & Springer, 2001). For each of the following statements, participants rated their agreement on a 1(*not at all characteristic of me*) to 5 (*extremely characteristic of me*) scale. The statements were: "My feelings are easily hurt," "I am a sensitive person," "I am thick-skinned" (reverse scored), "I take criticism well" (reverse scored), "Being teased hurts my feelings," and "I rarely feel hurt by what other people say or do to me" (reverse scored). These were averaged into an index, with high reliability (M = 4.14, SD = 1.32, Cronbach's α = .82).

Big-five personality traits. Personality can be measured in various ways through multiple constructs. For this study I conceptualized it using only one accepted method, the so-called Big Five personality factors: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experiences (Gosling, Rentfrow, & Swann, 2003; Shiota, Keltner, & John, 2006). Extraversion describes people who are outwardly focused, assertive, outgoing, and sociable (Eysenck, 1998; McAdams, 2003). Agreeableness relates to being patient and gentle, conscientiousness is marked by organization and discipline (Ashton et al., 2004). Neuroticism is exhibited by emotional instability and a perception that the world is a threatening place (Amiel & Sargent, 2004; Eysenck, 1998). The personality trait of openness is an ability to accept new experience and people (Wiggins, 1996). While personality traits are often discussed as bipolar constructs, it is important to acknowledge that they really operate on a continuum, and some categories overlap (Eysenck, 1998).

A 5-item personality inventory adapted from Gosling and colleagues' (2003) was used to measure the big five personality traits, extraversion, agreeableness, conscientiousness, emotional stability, and openness to experiences. This measure is useful for research where personality is not the focal variable because it offers a short questionnaire with test-retest reliability, a pattern of external correlates, convergence between observer and self-ratings, and convergence with longer Big-Five measures that are adequate for reliability but not quite as strong as with the longer measures (Gosling et al., 2003). Participants were asked to rate on a 1*(strongly disagree)* to 7 *(strongly agree)* scale how well 5 characteristics that relate to personality traits describe them. The characteristics and the traits they relate to were: 1) extraversion: extraverted, enthusiastic

(*M* = 5.18, *SD* = 1.60); 2) agreeableness: sympathetic, warm (*M* = 5.76, *SD* = 1.23); 3) conscientiousness: dependable, self-disciplined (*M* = 6.18, *SD* = 0.94); 4) neuroticism: anxious, easily upset (*M* = 3.65, *SD* = 1.63); 5) openness to experiences: open to new experiences, complex (*M* = 5.99, *SD* = 0.96).[9]

Trait self-esteem. Ten statements that comprise Rosenberg's (1989) self-esteem scale were used to measure trait self-esteem. Participants rated agreement on a 1 (*strongly disagree)* to 7 (*strongly agree)* scale to the following statements: "I feel that I am a person of worth, at least on an equal plane with others," "I feel that I have a number of good qualities," "All in all, I am inclined to feel that I am a failure" (reverse scored), "I am able to do thing as well as most other people," "I feel I do not have much to be proud of" (reverse scored), "I take a positive attitude toward myself," "On the whole, I am satisfied with myself," "I wish I could have more respect for myself" (reverse scored), "I certainly feel useless at times" (reverse scored), and "At times I think I am no good at all" (reverse scored). These were averaged into an index with high reliability (*M* = 5.77, *SD*

[9] Gosling and colleagues' (2003) scale originally had two items for each personality type, and one was reverse coded for each personality type. However, all the reverse-coded items had to be dropped because of low reliability. They were: 1) extraversion: reserved, quiet (Cronbach's α = .05); 2) agreeableness: critical, quarrelsome (Cronbach's α = .38) 3) conscientiousness: disorganized, careless (Cronbach's α = .25); 4) neuroticism: calm, emotionally stable (Cronbach's α = -.88); 5) openness to experiences: conventional, uncreative (Cronbach's α = .44).

= .71, Cronbach's α = .83).

Narcissism. This was measured using the 16-item Narcissistic Personality Inventory (NPI), which has been found to have internal and discriminant reliability that is similar to Raskin and Terry's (1988) 40-item NPI, so it is useful for situations where a longer questionnaire would be impractical (Ames, Rose & Anderson, 2006). Subjects rated on a 1 (*strongly disagree*) to 7 *(strongly agree)* how well a series of narcissistic and non-narcissistic statements described them.

The narcissistic statements were: "I know that I am good because everybody keeps telling me so," "I like to be the center of attention," I think I am a special person," "I like having authority over people," "I find it easy to manipulate other people," "I insist upon getting the respect that is due me," "I am apt to show off if I get the chance," "I always know what I am doing," "Everybody likes to hear my stories," "I expect a great deal from other people," "I really like to be at the center of attention," "People always seem to recognize my authority," "I am going to be a great person," "I can make anybody believe anything I want them to," "I am more capable than other people," and "I am an extraordinary person."

The non-narcissistic statements were: "When people compliment me I sometimes get embarrassed," "I prefer to blend in with the crowd," "I am no better or nor worse than most people," "I don't mind following orders," "I don't like it when I find myself manipulating people," "I usually get the respect that I deserve," "I try not to be a show off," "Sometimes I am not sure of what I am doing," "Sometimes I tell good stories," "I like to do things for other people," "It makes me uncomfortable to be the center of attention," "Being an authority doesn't mean that much to me," "I hope I am going to be

successful," "People sometimes believe what I tell them," "There is a lot that I can learn from other people," "I am an extraordinary person," and "I am much like everybody else."

Responses to the narcissistic statements were averaged into an index, and answers to the non-narcissistic statements were averaged into a separate index. However, only the index of the narcissistic statements (M = 4.63, SD = 0.72, Cronbach's α = .82) were used in analyses because the index of non-narcissistic statements had low reliability that could not be improved even if items were removed form the index (M = 5, SD = 0.56, Cronbach's α = .68).

Data analysis strategy

Data reduction. All physiological analysis was conducted using AcqKnoweldge 4.1 software. Data were inspected visually, and then the software was used to construct a phasic response from the data, using a 0.05 Hz high-pass noise filter. The estimated baseline was set at 0.25 s. The skin conductance response threshold was set at 0.02 μmho (microhos, a unit of measurement used for conductivity). SCRs below 10% of the maximum were rejected. The program generated two scores for skin conductance, the *frequency* of SCRs in μS (micro siemens) and the *amplitude* in μmhos for the baseline period and each of the four phasic periods.

For facial EMG data, the software rectified the waveform with an interval of 0.03 s. Rectifying essentially flips negative waveforms, so all waveforms are positive (Blascovich et al., 2011). Then the software integrated the EMG signal at an interval of 0.03 s. This process is similar to "smoothing," which averages the signal to remove noise from electrical devices and other sources, but it differs because integrating actually

accumulates the signal (Fridlund & Cacioppo, 1986), producing a "moment-by-moment estimate" (Blascovich et al., 2011, p. 61) of the EMG signal energy. The software produced a mean amplitude measured in μV/s (micro volts per second) and mean frequency measured in μV that was used in analyses.

Baseline differences. Following standard procedures for physiological research (Blascovich et al., 2011), a series of ANOVAs were run before hypothesis testing to examine whether the people randomly assigned to each of the three conditions had baseline physiological values that were significantly different. This was done because the baseline physiological values were to be used to calculate reactivity scores for dependent variables in the hypothesis tests. If subjects' baseline physiological values varied by condition before the experiment manipulation, this could invalidate any results found in the study because the differences might be due to the baseline physiological differences, not the manipulation. However, no significant differences were found, which indicated the baselines could be used to calculate reactivity scores used as dependent variables in later analyses (Blascovich et al., 2011).

Analysis strategy. For all hypotheses, statistically significant differences were measured at the $p < .05$ levels, and when post hoc corrections were needed, Scheffe was used. For H1 and H2, physiological variables were analyzed using multivariate analysis of variance (MANOVA) because it allowed 4 dependent variables for each of the 4 phasic periods to be analyzed collectively. Analysis of covariance (ANCOVA) was used for all the self-reported measures. For all the self-report dependent variables, personality variables, trait self-esteem, rejection sensitivity, and narcissism were uses as covariates. This was done because research has found that retaliation after rejection may be greater

for hyper-sensitive people (Ozlem, Downey, Testa, Yen, & Shoda, 1999; Downey et al., 2004; Leary & Guadagno, 2011), and personality variables and trait self-esteem may effect how people respond to aversive communication and their propensity for aggression (Baumeister et al., 2000; Bettencourt et al., 2006; Blackhart et al. 2009; Bushman & Baumeister, 1998; Grumm & von Collani, 2009; Rancer & Avtgis, 2006; Siebert et al., 2010). None of the covarites showed a statistically significant effect, so the analyses were re-run using ANOVAs without the covariates, and those results are reported later. Gender was added as an additional factor in the MANOVAs and ANOVAs to test for gender effects because men and women have been found to respond differently to rejection (Ayduk, et al., 1999; Blackhart et al, 2009) and in regard to aggressive behavior and expections (Anderson & Murphy, 2003; Bartholow & Anderson, 2002; D. Williams et al., 2009; Eagly & Steffen, 1986). However, gender was dropped from the analyses if it showed now effect. Significant gender effects are explained in Chapter 4.

Chapter 4: Results

H1 predicted that rejection and criticism would lead to greater self-reported and physiological negative affect than in the control condition. Partial support was found for this hypothesis with a modest but statistically significant effect, F (2, 77) = 7.37, p = .001, η^2 = 0.16. People in the rejection condition (M = 2.11, SD = 0.70, p =.005) and criticism condition (M = 2.17, SD = 0.61, p = .008) felt significantly more self-reported negative affect than those in the control condition (M = 1.58, SD = 0.50). See Figure 4 for a visual illustration of these results. No significant differences were found between conditions for self-reported positive affect, where lower values would indicate increased negative affect, F (2,77) = 0.21, p = .81, η^2 = 0.01.

INSERT FIGURE 4 ABOUT HERE

For physiological measures, no significant difference was found in *currogator supercilii* muscle movement, which had been hypothesized to increase in rejection and criticism conditions as a physiological measure of negative affect. For *zygomaticus major* muscle movement, a small but significant difference was found by condition following the fourth stimulus only, but it was not in the hypothesized direction, F (2, 76) = 3.26, p = .04, $\eta^{2=}$ .08. A decrease in *zygomatic* muscle movement indicates negative affect, so this decrease was hypothesized for the rejection and criticism conditions. However, results showed that *zygomatic* muscle movement was actually the greatest in the rejection condition. When Scheffe post-hoc corrections were used, the difference between the rejection and criticism conditions fell short of statistical significance (p = .06) and no difference was found between rejection and the control (p = .17). No differences were

found for *zygomaticus* muscle movement following stimuli 1, 2, or 3. Figure 5 shows *zygomaticus* muscle movement results for stimulus 4.

INSERT FIGURE 5 ABOUT HERE

These findings show partial support for H1 by offering evidence of an increase in self-reported negative affect in rejection and criticism conditions, compared to the control. However, in answer to RQ1, no significant differences were found between rejection and criticism for self-reports or for *corrugator* muscle movement. Results for *zygomaticus* muscle movement are addressed above.

H2 predicted that both self-reported and physiological arousal would increase in the rejection and criticism conditions, compared to the control. No significant differences were found, so this hypothesis was not supported. These results also answer RQ2, which asked whether rejection or criticism would produce greater arousal.

H3 proposed that retaliation against the site and against the groups on the site would be greater in the rejection and criticism conditions, compared to the control condition. Support was found for this hypothesis, using all three operational definitions of this concept. As hypothesized, subjects in the rejection condition were significantly more likely to say they would not use the site again, even when controlling for how well they thought the site worked. The effect was small but statistically significant, F (2, 77) = 3.93, p = .02, η^2 = 0.10. Those in the rejection condition on average scored 2.29 (SD = 1.3) on the 7-point scale, compared to those in the control condition (M = 3.44, SD = 1.64, p = .007). However, no significant difference was found between the criticism condition (M = 2.96, SD = 1.67) and the control (p = .54) or between the criticism and rejection (p = .31) conditions, partially answering R3 (Figure 6).

INSERT FIGURE 6 ABOUT HERE

Also, people in the rejection and criticism conditions were significantly more likely to send virtual ticking bombs to the groups they had attempted to join on the site, showing a small effect, F (2, 77) = 5.17, p = .008, η^2 = 0.12. Subjects in the rejection (M = 1.14, SD = 1.48, p = .02) and criticism (M = 1.13, SD = 1.55, p = .03) conditions were significantly more likely to send virtual ticking bombs than those in the control (M = 0.19, SD = 0.40) condition. However, no significant difference was found between rejection and criticism, partially answering RQ3 (Figure 7).

INSERT FIGURE 7 ABOUT HERE

In addition, people in the control condition sent a significantly greater number of virtual smiley faces to the groups they had sought to join, compared to those in the rejection condition. The effect was modest but significantly different from zero, F (2, 77) = 5.35, p = .007, η^2 = 0.13. This also showed support for this hypothesis, as people in the control condition were expected to retaliate less, as demonstrated by sending more smiley faces. Using the log10 transformed variable, those in the control condition sent a mean of 0.59 virtual smiles (SD = 0.42), compared those in the rejection condition (M = 0.27, SD = 0.33, p = .007). No significant differences were found between the control and the criticism conditions (M = 0.43, SD = 0.30, p = .27) or between the criticism and rejection (p = .33) conditions, partially answering RQ3 (Figure 8).

INSERT FIGURE 8 ABOUT HERE

In sum, the answer to RQ3, which asked whether rejection and criticism lead to greater retaliatory aggression, depends on the measure used. For both the sending of ticking bombs and the sending virtual smiley faces, both rejection and criticism appeared

equally aversive, leading to the same response. However, rejection and criticism operated differently in regard to retaliation toward the site itself, with rejection appearing to be more aversive.

No significant difference was found between conditions for attempts to restore relational value, leaving H4 unsupported and answering RQ4. Neither rejection nor criticism threatened the four ostracism needs or lead to an increase in aversive feelings, compared to control, answering RQ5a and RQ6. RQ5b asked whether the four needs would mediate a main affect between rejection and criticism and aversive feelings, but this could not be answered because no main effect was found. Also, no significant differences were found between conditions for triggered displaced aggression, leaving H5 unsupported and answering RQ7. In addition, no significant effects were found for any personality variables or for narcissism, trait self-esteem, or rejection sensitivity, answering RQ9.

In answer to RQ8, gender showed a small significant effect on the sending of ticking bombs, F (2, 77) = 7.73, p = .007, η^2 = .08. While both men and women followed the same trend of sending more ticking bombs in the rejection or criticism conditions, compared to the control, this effect was more pronounced for men. Overall men (M = 1.59, SD = 1.46) were more likely than women (M = 0.59, SD = 1.19) to send ticking bombs. In addition, men far exceeded women in the number of bombs sent in rejection (M_{Male} = 2.14; M_{Female} = 0.81) and criticism (M_{male} = 2.20, M_{Female} = 0.83) conditions, compared to the control (M_{male} = 0.20, M_{Female} = 0.18). See Figure 9.

INSERT FIGURE 9 ABOUT HERE

Also, a significant interaction for gender with a small effect was found for the number of virtual smiley faces sent, F (2, 77) = 4.12, p = .02, η^2 = 0.09, and the main effect lost statistical significance when gender was entered into the equation. Using logged variables, the interaction showed that men sent more smiley faces overall (M = 0.47, SD = 0.30) compared to women (M = 0.42, SD = 0.40). But women (M = 0.65, SD = 0.43) in the control condition sent more smiley faces than men (M = 0.32, SD = 0.25), while men (M = 0.44, SD = 0.38) sent more smiley faces in the rejection condition than women (M = 0.22, SD = 0.31). Men also sent more smiley faces in the criticism condition (M = 0.66, SD = 0.05) than women (M = 0.36, SD = 0.31). Figure 10 shows a graphic presentation of the interaction. No other significant gender effects were found.

INSERT FIGURE 10 ABOUT HERE

Chapter 5: Discussion

This study had five main objectives. The first was to explain whether physiological and self-reported responses to rejection and criticism on social media differ from non-aversive comments. The second was to examine whether physiological and self-reported responses to rejection on social media differ from responses to criticism. The third was to assess whether responses to rejection or criticism were more amplified. My fourth aim was to test whether rejection and criticism on social media lead to threats to the ostracism needs and aversive feelings the way ostracism has been found to do. Finally, the fifth was to examine what role (if any) individual differences such as personality and gender played in these relationships. I will address the theoretical implications of my findings in response to these questions in the order to which I have posed the questions. Then I will explain the practical relevance of my findings to the larger field of communication and the specific subfield of computer-mediated communication and online interaction, including the application to engagement on news websites and social media sites. Then I will offer limitations of this study and propose avenues for future research that my findings suggest.

Online rejection and criticism

A core theoretical question that this dissertation sought to answer is whether rejection and criticism from strangers on a social-networking site lead to aversive effects, compared to non-aversive comments. Underlying this viewpoint was the belongingness hypothesis (Baumeister & Leary, 1995), which posits that people have a strong evolutionarily adaptive urge to affiliate. In essence, I was testing this theoretical viewpoint in the computer-mediated world of social media. I did this by examining

whether prohibiting people from joining an online group on a social-networking site would lead to emotional pain because, as the belonging hypothesis asserts, even rejection by strangers may foreshadow the threat of being rejected by those one cares about (Leary & Baumeinster, 2000; McDonald & Leary, 2005). The idea was that if the belongingness hypothesis is true, people should feel some emotional response – however slight – from even mild rejection because people are so hardwired to view any social rejection as a threat to their value as relational partners with others (Leary, 2010; Leary & Baumeister, 2000; Leary & Cox, 2008; Leary & Guadagno, 2011; Leary et al., 1995). In addition, this dissertation sought to extend this theoretical premise to criticism, where it has not before been tested. My argument was that criticism may operate as a rejection of part of the self, and, therefore, it would also tap into this primitive need to belong to others.

Self-reported negative affect and retaliatory aggression. A key finding from this research is that rejection and criticism do both lead to emotional pain compared to non-aversive comments. In this study, subjects in both the rejection and criticism conditions felt increased self-reported negative affect and exhibited increased retaliatory aggression against those who had hurt them, compared to the control group. This is a significant finding because the rejection and criticism in this study were very mild. People were rejected from joining a group or criticized by a group that they wanted to join on a social-networking site but that they only became aware about 10 min before the rejection and criticism occurred. They had little time to become emotionally invested in that group. While the effects were modest, this is unsurprising given the mildness of the manipulation. The fact that being rejected from or criticized by an online group of strangers in a laboratory setting could even cause an effect suggests rather strong support

for the belongingness hypothesis. In a real-life setting, people join groups on social-networking sites frequently and are likely much more invested in those groups than subjects in this study. Perhaps, effects would be greater in a real-world setting, where people may join groups made up of real-life friends. In any case, my findings clearly show that rejection from or criticism by an online group on a social-networking site can tap into the evolutionarily adaptive need to belong. This supports the contention in the belongingness hypothesis that the inclusion in groups that was so vital to the survival for our primitive ancestors remains a strong adaptive urge today, even in a virtual environment. This offers a significant contribution to the literature by finding support for the belongingness hypothesis, which has been tested in the FtF world, in a new arena: the disembodied world of online media. For communication research, this suggests further evidence that people respond the same online as they do off, adding to the work of Reeves and Nash (1996) who replicated psychological experiments in the CMC environment.

This study also offers support for my contention that people experience criticism as some level as a rejection of part of the self. Prior research on the belongingness hypothesis has not dealt with criticism directly, as this study does. Therefore, my findings offer a significant extension of this theoretical viewpoint by showing that criticism, like rejection, taps into the evolutionarily adaptive need to belong that the belongingness hypothesis proposes. It is notable that the subjects in the criticism condition in this study had been accepted into the group and then criticized. Therefore, it appears the negative affect and exhibition of retaliatory aggression that they exhibited was not due to rejection. They were responding solely to criticism because they had been accepted into the group.

These findings suggest that criticism does not just violate politeness rules or social norms as prior literature has proposed (Caza & Cortina, 2007). It offers substantial support that criticism fits the definition of verbal aggressiveness by being an assault on one's self-concept that attacks either a person's character or ability to do something (Infante & Wigley, 1986; Rancer & Avtgis, 2006).

It is notable that rejection and criticism produced significantly greater retaliatory aggression in all three ways it was measured, compared to the control. These findings suggest support for both face theory and the related politeness theory. When people where criticized and rejected on the online social-networking site, their sense of their socially constructed public *face*, (Brown & Levinson, 1987; Fraser, 1990; Goffman & Best, 2005; Papacharissi, 2004) may have been threatened, leading them to attempt to restore their *face* by damaging the *face* of their offender through retaliatory aggression (Metts & Cupach, 2008). This finding fits results of prior research, which has found that people act anti-socially when they have been rejected (eg. Twenge et al., 2001; Van Beest et al., 2011; Warburton et al., 2006). It extends this literature by finding that criticism also can lead to a form of anti-social behavior, such as retaliation against the aggressor. This occurred despite the viewpoint that aggression of any type decreases a person's relational value, suggesting that the urge to punish the perpetrator may outweigh the further risk to one's relational value (Leary, 2010).

In addition, my findings offer support for my contention that criticism gives a clear sign that the target has some undesirable characteristic, and, therefore, criticism is a weaker form of rejection that rejects part of the self. This offers a meaningful addition to the belongingness hypothesis literature by offering early support that criticism operates

similar to rejection and leads to similar effects. Stated simply, my study counters the popular childhood's mantra: Sticks and stones may break my bones but words will never hurt me. Not only do word hurt, but also criticizing words hurt even when they are paired with acceptance into a group one wants to join. With the proliferation of uncivil discourse online, this is an important finding for controlling or curbing the effects of this communication.

Positive affect. However, it is important to point out that rejection and criticism did not lead to all the aversive effects that were hypothesized. While self-reported negative affect increased in rejection and criticism conditions, compared to the control, self-reported positive affect showed no significant difference. This may be due to the mildness of the manipulation. Rejection and criticism made people feel negative emotions but not to such as great extent that their positive emotions decreased. This viewpoint is bolstered by the fact that while negative affect increased in both rejection and criticism conditions, the increase was small. On the 7-point negative affect scale where a higher number indicated greater negative affect, rejected subjects score 2.11 and criticized subjects scored 2.18, compared to 1.58 in the control. This suggests the manipulation made them feel bad, but not truly distressed.

This is unsurprising for two reasons. First, while the research aim was to induce negative emotion from the manipulation, concern was taken not to truly hurt the subjects. Secondly, while no experiment can duplicate perfectly real-life experience, a goal of this research was to mimic the brief interactions with strangers that occur on social-networking sites. Certainly, rejection or criticism from a group of friends would cause greater effects than this study found, as supported by prior research (eg. Bernstein et al.,

2010), although other scholars have found interpersonal closeness does not necessarily influence the extent of hurt a person feels (Vangelisti & Hampel, 2010). Similarly, stronger rejecting or criticizing messages may have produced greater effects. But the aim of this research was to examine effects of brief encounters among strangers to mild rejection and criticism. In that sense, my results dovetail nicely with the existing literature, which suggests rejection hurts but does not make people feel really bad. For example, a meta-analysis of 192 social exclusion studies found that rejection caused a significant shift toward a negative emotion state but did not make people feel distressed (Blackhart et al., 2009). My results coincide with that view. Self-reported negative affect increased in rejection and criticism conditions, but the increase in means could hardly be considered a demonstration of true distress. In addition, the lack of a statistically significant effect in positive affect in this study suggests people felt momentarily bad after the manipulation but not enough to decrease their positive affect. One would expect a truly distressed person not only to exhibit a larger increase in self-reported negative affect but also a significant decrease in self-reported positive affect.

Physiological affect. Furthermore, it is notable that no significant difference was found between conditions in regard to *currogator supercilii* (frown) muscle movement, which is considered a valid measure of physiological negative affect (Bolls et al., 2001; Fridlund & Cacioppo, 1986; P. Lang et al., 1983; R. Stern et al., 2001). One possible explanation is that the noise generated by computer equipment and other sources in the laboratory was too great to fully detect an effect. Facial EMG in particular requires subjects to remain relatively still (Blascovich et al., 2011). While subjects were warned both orally and on the computer screen to stay still, it is possible they were unable to do

so as the moved their heads to read the questions and used a computer mouse to type their answers. It is also plausible that because the rejecting and criticizing messages were mild and came from strangers that they did not produce a large enough effect in *currogator supercilii* muscle movement to be detected. An advantage of facial EMG is it can detect changes in frown and smile muscles so brief the human eye could not spot them (P. Lang et al., 1983; Tassinary et al., 2007). However, it is also true that small effects, such as those found by self-reports measuring negative affect in this study, may have been too subtle to be picked up by physiological recording. By convention, a reactivity score for facial muscle movement is the difference between the phasic response (after the stimuli) and the baseline. A true facial EMG baseline should be zero (Blascovich et al., 2011), but this is nearly impossible to achieve in an experiment where people may feel uncertain or uncomfortable with electrodes on their faces. Therefore, a heightened baseline could make only a more severe response detectable.

Another possibility is that the period of time for which the physiological response was measured was too great, diffusing any potential effect. For each condition, the rejecting, criticizing, and control messages remained on a computer screen in front of the subject for 5 s. However, the four phasic periods were measured from the start of each stimulus (when the rejection, criticizing, or control message) was received to the start of the next stimulus, producing 4 periods coinciding with each of the 4 messages per condition. Reactivity scores were created this way because a visual inspection of the physiological data showed what appeared to be responses after the initial 5 s the message was on the screen, so this method was devised so all responses from stimuli were detected even if they did not occur within the 5 s. This meant the 4 phasic time periods

were of a different length for each subject, depending on how quickly subject moved on to the next question, ranging from 12.6 s to 75.66 s (M = 26.97 s, SD = 9.04). Therefore, it is possible that non-effects during these periods diluted a very small effect.

An alternate explanation for the disconnect between self-reported and physiological negative affect is the fact that physiological and self-report measures are examining different experiences, so results have been found not to mirror each other (eg. Lim & Reeves, 2009; Zhang & Chock, 2010). Some scholars argue that affect occurs only after some thought or cognition (Dasborough et al., 2008; Frijda, 1986; Lazarus, 1984, so people must be aware of how they feel. Under this view, one can only feel what one has thought about, so negative affect cannot exist if one cannot detect it or think about it. Therefore, in this study a person would only feel rejected or criticized if he or she realized the pain and thought about its effect. Using this rationale, the thinking about the pain is what leads to the affect. Other scholars suggest that affect may be an automatic or involuntary response to stimuli that does not require conscious awareness, although sometime cognition may precede an emotional experience (Zajonc, 1980; 1984). This viewpoint suggests one can experience a response to stimuli but not be aware of that response or be able to think about it. Under this view, a response to rejection or criticism would be involuntary and automatic and not require a subject to be consciously aware that he or she had been rejected or criticized. In essence, the person feels pain but does not know why or from what.

Given these theoretical viewpoints, it is possible that the subjects in my study felt a mild form of negative affect that they were aware of in the rejection and criticism condition, compared to the control, but an automatic or unconscious response to the

stimuli was not apparent. That would explain why self-reported negative affect increased in the rejection and criticism conditions compared to control, but physiologically measured negative affect did not. In other words, the subjects read the rejecting and criticizing words and at some level thought about their negative meaning, producing a relatively slight increase in negative affect. However, it was only the cognition about the words that lead to that response not an automatic process. Put another way, my findings suggest that people only felt pain from the rejection and criticism because they knew intellectually that the comments were painful. So it is the knowing that the words are hurtful that causes the pain.

The results from this study regarding *zygomatic major* muscle movement also did not confirm my hypothesis. Although a significant difference was found following stimulus 4, it was counter to predictions. As *zygomaticus major* muscles are dubbed the smile muscles, a decrease is considered a physiological measure of negative affect (Cacioppo et al, 1988; Tassinary et al., 2007; Tassinary & Cacioppo, 1992. In this study, *zygomatic* muscle movement was greatest in the rejection condition following stimulus 4, and the overall equation showed a statistically significant main effect. When Scheffe post hoc corrections were employed, the differences between conditions fell short of statistical significance. Rejection was trending toward significance compared to criticism ($p = .06$), but not significantly different compared to the control. No significant differences were found in response to stimuli 1, 2, or 3.

Several possible explanations exist for this result. First, *zygomaticus* muscle movement can indicate a grimace or "sardonic smile" of scorn or disdain (Darwin, 1873, p. 251), rather than a true "Duchenne" (Blascovich et al., 2011, p. 43) smile of happiness

named after the French neuroanatomist Duchenne de Bolonge (Ekman, 1992a). In the current study, the sardonic smile/grimace hypothesis would offer some logic, as rejecting subjects activated *zygomaticus major* muscles more than criticizing subjects, suggesting responses to rejection and criticism differ. However, because movement of this muscle was not greater in the rejection condition compared to the control, and because differences between rejection and criticism were only trending toward significance, caution should be taken. If the data were truly capturing a grimace effect it seems more likely rejection should differ from the control than from criticism. One way researchers attempt to parse out a smile versus grimace or sardonic smile effect is by also measuring movement of the *orbicularis oculi,* a muscle beneath the eye, that activates along with the *zygomaticus major* in a smile of true happiness (Blascovich et al, 2011; Darwin, 1873; Ekman, 1992a; Schmidt, Ambadar, Cohn, & Reed, 2006). However, *orbicularis* was not measured in this study because most physiological facial EMG research focuses on just the *zygomaticus major* and *currogator supercilii, zygomaticus* and *orbicularis* do not always activate together, and sometimes both *orbicularis* and *zygomaticus* activate together during "deliberate" or forced smiles (Schmidt et al., 2006). Because it was unclear whether measuring *orbicularis* would be helpful, I decided the additional cost to purchases electrodes and adhesive electrodes collars to collect a third muscle site was not warranted.

In general, measurement of *currogator* and *zygomatic* muscle movement is used in conjunction to assess negative affect whether *orbicularis oculi* is measured or not (Cacioppo et al., 1992; P. Lang et al., 1993; Cacioppo et al., 1988; Tassinary et al., 2007). However, given that *currogator supercilii* muscle movement showed no effect by

condition, it is also plausible that subjects in the rejection condition were merely smiling or even snickering at the rejecting comments in stimulus 4. It may have taken time to build up to this effect, so no effect was found from the earlier stimuli. However, this reasoning does not explain why criticizing comments would not produce a more similar effect. Also, coupled with the self-reported negative affect effects it seems unlikely that the rejected and criticized subjects felt no negative emotion from the messages. Another possible hypothesis is that the *zygomaticus major* muscle movement found in this study was actually the result of "cross-talk" (Blascovich et al., 2011, p. 48) from another nearby muscle. Hess (2009), for example, found that *zygomaticus major* activity could be found during anger, rather than happiness, if people clench their teeth, activating the nearby *masseter* muscle, which is a much stronger muscle than the *zygomaticus.* Given the results of this current study, there is some limited logic to this hypothesis, but it is limited by the lack of significant differences between rejection and control or any effect for criticism.

A final alternate explanation for these results is that rejected subjects engaged in some type of face-saving mechanism, but that criticized subjects did not. According to face theory and the related politeness theory, conflict threatens one's *face* (Ting-Toomey, 2005), which is the socially constructed public self-image people have for themselves (Brown & Levinson, 1987; Goffman & Best, 2004; Papacharissi, 2004). When threats to *face* are relatively minor, people may use humor as a face-saving technique (Metts & Cupach, 2008; Saunders, 1988) to diffuse the threat, but whatever technique people use, the techniques become habitual, such that they may not be fully aware they are using the technique (Goffman & Best, 2005). Given that framework, it is plausible that people

activated the *zygomaticus major* muscles more after being rejected because they were smiling or even laughing a bit to save *face*, but criticism at some level threatened *face* less, leading to less *zygomaticus major* activation. However, considering rejection and control did not differ, more research is needed to understand this phenomenon. It is interesting that the only effect was found after stimulus 4. Perhaps – whatever the reason for the effect – it took time for it to build up, so no effects were found for the earlier stimuli. This suggests a potential additive effect of the stimuli that should be examined further in future research.

Arousal. The lack of significant differences by condition in either self-reported or physiological arousal requires some examination. It may be that with such a mild rejecting or criticizing manipulation, only a limited negative emotional response was triggered, not a larger threat that both self-reported and physiological arousal measure. Prior research has found that rejection makes people feel bad, but not really distressed (Blackhart et al., 2009). Arousal is the intensity dimension of emotion (Bolls, 2010; Bolls et al., 2001) and a physiological state that prepares a person to flee or fight (Berkowitz, 1983; Bushman & Huesmann, 2010). It shows predominance of the sympathetic nervous system (SNS), which activates in stress or danger (Cacioppo, et al., 2007; Reeves et al., 1999; Ravaja, 2004; R. Stern et al., 2001). My findings suggest that mere rejection from an online group one wants to join or criticism from that group after acceptance is not a significantly stressful event to provoke true arousal. One cannot argue that failure to find an effect means no effect was present because many factors, such as experimental design, lack of statistical power due to a small sample, or measurement error could be the true culprits (O'Keefe, 2007). However, given the mildness of the manipulation in this

experiment, it is reasonable to consider that rejecting or criticizing statements from strangers on an online group may not be significantly arousing to produce detectable arousal. More research is needed to resolve this question.

Triggered displaced aggression. Because no significant difference in either self-reported or physiological arousal by condition were found, it would have been unlikely to see statistically significant variation in attempted to displace aggression. The model of triggered displaced aggression (MTDA; Miller et al., 2003), proposes that a provoking act causes a type of frustration and arousal that leads to the displaced aggression after the trigger. So if arousal does not occur, triggered displaced aggression is unlikely to follow. In this sense, my findings of no effect for triggered displaced aggression support the MTDA because neither arousal nor triggered displaced aggression increased in the rejection or criticizing conditions, compared to control. My findings also suggest that excitation transfer (Zillmann, 2011), where people encounter a provocation and then misattribute it to an unrelated situation, did not occur. In general excitation transfer happens very quickly except at high levels of arousal, which were not found in this study. Excitation transfer also assumes people misattribute the arousal and transfer to another situation (Wang & A. Lang, 2012), which clearly did not occur because no arousal increase was found.

However, because triggered displaced aggression has received relatively little recent study in the communication literature, the full relationship between arousal and triggered displaced aggression is not known. A recent pilot study found an increase in triggered displaced aggression following an angry mood manipulation and violent video game play compared to the control without a significant increase in arousal by condition

(Chen et al., 2012). Yet, that study is inconclusive because it had only 27 participants in two conditions, and trending support ($p = 0.08$) for significant differences in arousal were found. If the sample were larger, it is possible that both arousal and triggered displaced aggression would have been found to be significantly different by condition in that study.

Restoration of relational value. Prior research has found that one way people attempt to restore their relational value after rejection is by trying to form connections with other people, not those who rejected them (Leary et al., 2006; Maner et al., 2007). However, no support was found in this current study for this effect. Study subjects were consistent across conditions in likelihood to send *friend* requests to other participants on the social-networking site. Two rationales offer explanation of these results. First, it is possible or even likely that the relatively minor rejection and criticism in this study was not enough to truly threaten subjects' feeling of their own relational value, so they felt no need to restore it. Or their relational value may have been slightly threatened, but not enough to provoke an effect. It is also plausible that the subjects felt a threat to their relational value, but they did not view the other students on the site as true para-social actors with whom they could restore their relational value. They may have seen sending *friend* requests as simply part of the normal routine of social media interaction and not as a means to fulfill an emotional need for reinforcement of their relational value. The data in this study cannot conclusively answer these questions. However, the fact that sending *friend* requests was common among all the participants suggests that this is an area worthy of more exploration. Subjects could send up to 20 *friend* requests, but on average sent 8.6 with men ($M = 11.06$) sending significantly more than women ($M = 7.93$). That

finding may have more to do with how men view *friending* strangers on social media compared with women than the core questions of this research.

Do rejection and criticism differ?

A second over-arching question this dissertation sought to answer is whether rejection or criticism is more aversive. A related question was if one is more aversive, which one? The answer to these two questions was: It depends. For self-reported negative affect no significant difference was found between rejection and criticism conditions, although both were more aversive than the control. This suggests that at least in leading to minor negative emotions, rejection and criticism operate similarly. In physiologically measured affect, no significant differences of any kind were found for *currogator supercilii* muscle movement, the so-called frown muscle that indicates negative affect. *Zygomaticus major* (smile) muscle movement showed a significant difference by condition after the final stimulus. When post hoc Scheffe corrections were employed, the difference between rejection and criticism fell short of statistical significance ($p = .06$) and was not different compared to the control. As discussed earlier, these findings do not fit current theory on *zygomaticus major* muscle movement, which is generally considered a reverse measure of negative affect, such that a decrease in movement of this muscle indicate negative affect (Cacioppo et al., 1988; Tassinary et al., 2007; Tassinary & Cacioppo, 1992). As explained earlier, my incongruent finding may have been due an attempt by subjects to *save face* by smiling in the face of their slight emotional pain. Or it may have been the result of electrical noise in the recording or cross-talk from another nearby facial muscle. It is also plausible it was due to failure to also measure movement of the *orbicularis oculi*, a muscle beneath the eye, that activates along with the

zygomaticus major in a smile of true happiness (Blascovich et al., 2011; Darwin, 1873; Ekman, 1992a). However, why the increase in *zygomatic* activity would occur for rejection but not criticism is unclear and requires further study to unravel.

In regard to the finding on retaliatory aggression, my findings suggest that whether rejection and criticism differ in terms of aversiveness depends on how retaliation is measured. Rejected and criticized subjects were equally likely to send virtual ticking bombs to those who they thought had hurt them, and both were significantly different from the control. This finding confirms earlier research that has found rejected people response by retailing against those who have harmed them (Leary, 2010), and it expands the literature by explaining that this effect also may apply to those who are merely criticized yet accepted. However, for the other two operational definitions of retaliatory aggression, the results are less straightforward because results for rejection and criticism did not always mirror each other. This offers evidence that rejection and criticism differ in some fundamental way that cannot be parsed out in this study. It is plausible that criticism may hurt people only because it is a form of verbal aggressiveness that is intrinsically aversive, but rejection causes pain through a different mechanism by being both aversive and threatening one's relational value, leading to greater effect in more nuanced measures. This question awaits further research.

This study offers no insight into whether rejection and criticism differ in regard to self-reported or physiological arousal, restoration of relational value, or triggered displaced aggression, as no significant differences of any kind were found for those variables.

Ostracism model

The fourth aim of this dissertation was to examine whether rejection and criticism on social media lead to threats to the ostracism needs of need to belong, state self-esteem, belief that life is meaningful, and sense of being in control as well as increase aversive feelings the way ostracism has been found to do. The rationale for this argument was that social rejection is seen as an umbrella category for ostracism (K. Williams, 1997), such that ostracism is a more severe form of rejection. So my question was whether ostracism and rejection would produce similar effects that might vary in degree. Criticism in this study was conceptualized as a form of partial rejection of the self, so it was argued that criticism also might operate similar to ostracism. Sociometer theory builds on this idea buy asserting that state self-esteem acts as a thermostat of people's sense of their relational value to others (Leary, 2010; Leary & Baumeister, 2000; Leary & Guadagno, 2011; Leary et al., 1995; Tesser, 2003), such that high self-esteem is not a goal in itself. Rather, these theories suggest that people are evolutionarily wired to seek to affiliate with others, and depressions in state self-esteem become a warning sign of whether their goal of belonging is likely to be met. As no significant differences were found by condition on any of the threats to the four needs or to level of aversive feelings, at first glance my results suggest that rejection and criticism do not operate similarly to ostracism. It is highly plausible that ostracism is intrinsically different from rejection and criticism because it involving joining a group or interaction and then being shunned from it or essentially kicked out. In contrast, social rejection is when people are told they cannot affiliate, but unlike ostracism this occurs before they

have become part of the group. Criticism is a verbal aggressiveness that both violates social norms and may attack one's self-concept (Caza & Cortina, 2007; Rancer & Avtgis, 2006; Infante & Wigley, 1986).

My findings could be interpreted to mean that one must be part of a group first and then excluded to threaten the ostracism needs. Mere rejection and criticism may not be enough. The very act of joining a group even for a short period may change how people see the group and their experience of being left out of it. It is also plausible that even if there were effects from rejection and criticism they would be much weaker than from ostracism, as ostracism is a more severe aversive act. So it may be that to detect such a small effect a much greater number of subjects would be required. In the ostracism literature, sample sizes vary, but particularly the online ostracism effects were found with very large samples. For example, K. Williams and colleagues (2000) had 1,486 subjects in a study of cyberostracism using a virtual flying disc game that found reduced sense of control and belonging along with elevated aversive feelings as ostracism increased. It is notable to point out that even with that large sample threats to state self-esteem and a belief that life is meaningful were not found. What this means for the relevance of applying the ostracism model to rejection and criticism is inconclusive. It may be that rejection and criticism produce threats that coincide with the model but they were too minuscule to detect with this sample. It is notable that even when effects were detected (in negative affect and retaliatory aggression) in this current study, they would fit Cohen's (1992) typology of small effects, so even smaller effects could be hard to detect without more subjects.

Individual differences

Personality. A final goal of this dissertation was to examine whether individual differences, namely personality and gender played any role in the significant relationships. The short answer is that personality had no effect. All significant analyses were run with the so-called Big Five personality factors – extraversion, agreeableness, conscientiousness, neuroticism, and openness to experiences – as covariates and no significant effects were found. It is worth nothing that because personality was not the focus of this study, I measured personality using a short-form personality inventory adapted from Gosling and colleagues (2003) because of concerns subjects would fail to complete a longer measure. While this measure has been found to have test-retest reliability and convergence between observer and self-ratings that are adequate, its reliability is not as strong as with the longer measures (Gosling et al., 2003). In fact, in this study, I ended up having to use single-item measures for each personality type rather than two measures formed into indices because of low reliability when the items were averaged. So one cannot rule out that measurement error lead to my finding of no significant effects from personality variables. I also used narcissism, rejection sensitivity, and trait self-esteem as covariates in all significant relationships, and no effects were found.

Gender. However, for retaliatory aggression gender produced some interesting effects, suggesting that the way rejection and criticism lead to retaliation may differ between men and women. While men and women were both more likely to send virtual ticking bombs to the group that rejected or criticized them compared to the control, this

effect was heightened for men. This finding fits nicely in the aggression literature, which has consistently found gender differences in both aggressive behavior and expectations (Anderson & Murphy, 2003; Bartholow & Anderson, 2002; Chen et al., 2012; D. Williams et al., 2009) that are exhibited as early as preschool (Loeber & Hay, 1997). In general, men have been found to be more likely to aggress overtly (Bushman & Huesmann, 2010), while women are more likely to manipulate or withdraw (Eagley & Steffen, 1986; Wood & Eagly, 2010).

Gender roles, which stem from both biological and psychological mechanisms, can explain these differences. Gender is the meaning society and individuals give to men and women, based on both their biological differences and the social norms that grow out of those differences (Wood & Eagly, 2010). Biological differences include the fact that males in general secrete more testosterone than women at all times and particularly when threatened, while women produce higher oxytocin levels when they nurture or commune with others (Wood & Eagly, 2010). Based in part on these biological differences, society has ascribed different roles to males and females. These roles dictate that males as a group are thought to have greater agency or self-assertion, while society values females for communion, or connecting with others, to a greater extent (eg. Plant et al., 2000; Spence & Buckner, 2000). Obviously these descriptors do not hold true for every man or woman. Over time, these differences became engrained stereotypes that society reinforced by rewarding people for fitting these gender roles and punishing those who deviate (Wood & Eagly, 2010). The media have been found to reinforce these gender roles by repeating them to such an extent that they are reified. Social-cognitive theory (Bussey & Bandura, 1999; Bandura, 2001), for example, argues that people have an

advanced capacity for learning from what they observe – including from the media – and they act on what they see through a process called modeling. As such, children learn gender stereotypes through observation how men and women perform these roles, and these roles are reinforced through a person's lifespan (Bussey & Bandura, 1999).

When applied to aggression behavior, traditional gender roles suggest that males are more assertive and task-oriented, while females are valued for being nurturing and supportive (eg. Plant et al., 2000; Spence & Buckner, 2000). Script theory argues that children learn scripts particularly for aggressive behavior through their experiences, including watching media content, and that these scripts guide their social behavior as adults (Huesmann, 1986; Kunkel et al., 2007). As media portrayals often exaggerate gender role differences, this process can reinforce stereotypical gender roles (Lauzen, Dozier, & Horan, 2008; Wood & Eagly, 2010) or influence how people view these roles (eg. Behm-Morawitz & Mastro, 2008). Taken together, this explains why men would retaliate more when rejected or criticized than women in this study.

In this study, this finding regarding a gender effect for retaliatory aggression both confirms the existing literature and also offers an interesting addition to the literature by showing that this effect is virtually the same whether people are criticized or rejected on a social-networking site. While it has long been known that rejection leads to retaliation, whether criticism leads to retaliation has received little study. Therefore, this finding offers an extension of how we understand retaliatory aggression.

In addition, the significant gender interaction for the sending of virtual smiley faces offer some evidence of differences in the way men and women may respond to affronts to their sense of *face*, in accordance with both face theory and politeness theory.

Sending virtual smiley faces was considered evidence of the absence of retaliation, as sending a smile is a positive act. Fitting my hypothesis, women in the control condition sent more virtual smiley faces compared to the other conditions. However, contrary to predictions, men were more likely to send virtual smiley faces if criticized, followed by rejection. These findings elude a clear-cut explanation. However, it seems plausible that men felt a greater threat to their socially constructed *face* than women by either rejection or criticism, so perhaps they had a greater need to *save face* by sending smiley faces and acting like they did not care about the affront. Social norms about the stoic man may have shaped this need, following the ideas of script theory and social cognitive theory.

Limitations

The main limitation of this study is that the rejection and criticism used as stimuli had to be mild enough not to cause serious pain to participants for ethical reasons, but this, of course, limits the ability to detect an effect. It is quite plausible that the rejection and criticism were too slight to produce effects that would occur with a stronger manipulation. The aim was to mimic the slights that are encountered in the real world of social media interaction. Of course, no experiment can truly duplicate a real-world situation. Additionally, the control in this project was acceptance, so that it would more closely mirror typical social media interactions. However, it is plausible, results would have differed if a control were used where subjects joined groups but did not receive any type of comment from the group.

Another limitation is that the design of this study left participants only a short time to interact on the site before they got rejected, criticized, or accepted. Perhaps spending a longer time would have made them more invested in the site and in the

groups, bolstering effects. In addition, the sample size (N = 77) must be acknowledged as a possible limitation. While this sample sites fits established criteria for a three-condition experiment to detect large effects (Cohen, 1992), it may have been too small to detect small or medium effects. Finally, it is important to note that the questions in this study were tested only on college-age American men and women, not a random sample of the general population. It is plausible that people of different racial or ethnic groups, cultures, or other demographic groups may respond differently to online rejection, criticism, or acceptance than those who were in this study.

Future research

Findings from this study offer several avenues for fruitful future research. First, it would be advisable to examine different levels of online rejection and criticism, rather than one level, as this study examined. While this study found that rejection and criticism were basically equally aversive, differences between these constructs may be found at higher or lower levels of both rejection and criticism. Varying the levels of rejection and criticism might lead to effects on arousal, physiologically measured negative affect, triggered displaced aggression, and restoration of relational value that were not found in this study. In addition, feelings of ostracism that were not found in this study might be triggered at higher levels of manipulation. It would also be advisable to compare the social networking group rejection and criticism employed in this study with a true ostracism condition, where people join an online group and then are thrust from it. While cyberostracism in an online game has been found to produce similar effects as FtF ostracism (K. Williams et al., 2000), ostracism from a social-networking group has not been studied. Another area worthy study would be varying the timing of the rejection and

criticism. In this study, participants were rejected, accepted and criticized, or accepted and offered non-aversive comments immediately after attempting to join a group. While this mirrors the experience on social media, there are times when people may ask to join a group and not find out the answer for a while. This delay might impact effects.

How online rejection and criticism lead to aggression also deserves further study. This study found increases in a particular type of aggression, retaliatory aggression, but not in triggered displaced aggression. It would be worthwhile to consider how online rejection and criticism may impact other types of aggression, such as aggressive intentions, and whether arousal must be present for triggered displaced aggression to occur. Perhaps at increased levels of rejection and criticism, arousal would be significant enough to trigger more aggression.

Furthermore, how rejection and criticism may lead to efforts to restore relational value should be examined. No effect was found in this study, but it may be that people do not view the act of *friending* strangers on a social media sites as a way to compensate for being rejected or criticized. Because social media interaction is a relatively new phenomenon, further study is needed to understand what the act of *friending* strangers really means to people and why they do it.

Based on these study's findings, it seems clear that how people respond to online criticism deserves more attention. Does the type of criticism matter? In this study, people were accepted into an online group and then criticized. Perhaps, that made them feel criticized by one of their own. Would criticism be more painful if it came from outside the group or if it came after a longer-term relationship with the online group, mirroring the effect found in other forms of social exclusion (Bernstein et al., 2010). These are

questions worth exploring. In addition, it would be worthwhile to examine whether the increase in *zygomaticus major* activity in the rejection condition could be replicated in other study. Also examining *orbicularis oculi* muscle movement in conjunction with *zygomaticus* could help illuminate whether the rejection leads to a face-saving *true* smile or a grimace or sardonic smile.

Finally, this study suggests that more research is needed on gender effects of responses to social media rejection or criticism. Significant differences by gender were found for retaliatory aggression, but further exploration is needed for other types of aggression, as well as arousal, and efforts to restore relational value. It also would be useful to assess the extent of social norms in producing this effect and whether women or men would act differently if they took on the attributes of the opposite gender in a gendered Proteus Effect as found by Chen and colleagues (2012). In other words, would women retaliate more from rejection and criticism if they were using the virtual avatar of a male? Testing testosterone levels before and after social media rejection and criticism also might help explain whether retaliatory aggression on an online site would lead to spikes in this hormone, which have been found in situations that challenge dominance (Mazur & Booth, 1998; Wood & Eagly, 2010). This research could help parse out the biological and psychological dimensions of the gender effect.

Conclusion

Clearly, the results show that online rejection and criticism caused a similar pain as more heightened forms of social exclusion, such as ostracism. People who were rejected or criticized not only felt bad as demonstrated by an increase in negative affect, but they also acted on those feelings. They acted on those feeling by sending virtual

ticking bombs to those who had hurt them, saying they were less likely to use the social-networking site again even if they thought it worked well and by being less likely to send virtual smiley faces. However, the rejected and criticized subjects were not so hurt that their sense of belonging, control, state self-esteem, or belief that life is meaningful were threatened or aversive feelings were increased. This suggests that while rejection may hurt, ostracism hurts more. Being part of a group – even briefly – and then being ousted from it causes greater pain than being prohibited from joining a group one seeks to join. These findings dovetail nicely with the ample literature on FtF rejection and ostracism that has found that while social exclusion makes people feel bad, they are not overly distressed by it (Blackhart et al., 2009). However, the results of this study show support for both sociometer theory and the belonginess hypothesis. It demonstrates the significant power of online rejection that any effect could be found from being prohibited from joining an online group of strangers that one only knew about for a few minutes before being denied entry to the group. The effect may be small, but powerful, suggesting that the adaptive urge to gather in groups is so strongly ingrained that even a small slight like the manipulation in this study can trigger a sense of loss to one's relational value. In addition, these findings bolster earlier research that has found that whether human interact online or off they respond to each other in a similar fashion (Reeves & Nass, 1996). In other words, just because the rejection came from a virtual online group of strangers, it still stings as it might if it were from *real* people one met in the FtF world.

The study also offers early insight into the question of whether online rejection and online criticism are equally painful. Certainly, the findings offer evidence that both experiences cause an increase in negative affect that does not differ. This suggests that

both cause equivalent pain. However, other findings from this study suggest a more complicated process is involved. Criticism did not make people less likely to use the social-networking site the way rejection did. Nor did criticism encourage people to send fewer virtual smiley faces. In fact, smiley faces were highest in the criticism condition among men. In addition, while both rejection and criticism lead to retaliatory aggression, this effect was heightened in men.

Taken together, these findings suggest that the seemingly minor instances of incivility that people encounter online (eg. Mutz & Reeves, 2005; Ng & Detenber, 2005; Papacharissi, 2004; Sobieraj & Berry, 2011; K. Thorson et al. 2010) are far from benign. These slights cause real pain as they would in the offline world. The pain may be cumulative and can lead to retaliation in a cycle of potentially escalating verbal aggression. For communication theorists, these findings suggest many areas for fruitful research not only to fully understand the effects of rejection and criticism online but also to figure out how to lessen uncivil speech online or at least decrease the deleterious effects of this communication. For communication practitioners, this study sounds an early warning bell of the need to educate and train future professional communicators such as journalists and public relations practitioners on how to deal with and buffer the effects of uncivil speech online. This is a necessary step because in the future more and more communication will occur through a computer-mediated lens, and much interaction related to news and information will take place in the virtual community of social-networking sites. The web may no longer be the virtual frontier that Rheingold (2000) described, but the Internet retains some of its "Wild West" attributes, to extend his metaphor. As a result, I believe it is communication scholars' and practitioners'

obligation to understand how to tame rejection and criticism on social media without curbing the zest that should be part of the free-wheeling experience of computer-mediated communication.

APPENDICES

QUESTIONNAIRE

The following questions were asked on an online survey distributed to participants through a link in email.

Demographic Questions

How old did you turn on your last birthday? ___

What is your biological sex?

[ ] Female

[ ] Male

What year in school are you in?

[ ] Freshman
[ ] Sophomore
[ ] Junior
[ ]Senior
[ ] Graduate students
[ ] Other

What is your race?

[ ] African-American or Black

[ ] Asian

[ ] Caucasian or White

[ ] Latino or Hispanic

[ ] Middle Eastern

[ ] Native American

[ ] Pacific Islander

[ ] Biracial

[ ] Other (please specify):

[ ] Prefer not to answer

Please select the category that best describes your family's annual household income.

1=under $25,000
2= $25,00 to $34,999
3=$35,000 to $49,999
4=$50,000 to $74,999
5=$75,000 to $99,999
6=$100,000 to $124,999
7=$125,000 to $149,999
8= $150,000 or more
9=Prefer not to respond

Potential moderating variables

Rejection-sensitivity scale (Leary & Springer, 2001). For each of the following statements, participants rated their agreement on a 1(*not at all characteristic of me*) to 5 (*extremely characteristic of me*) scale. The statements were:

"My feelings are easily hurt."

"I am a sensitive person."

"I am thick-skinned." (reverse scored)

"I take criticism well." (reverse score)

"Being teased hurts my feelings."

"I rarely feel hurt by what other people say or do to me." (reverse scored)

Big-five personality traits, short-form scale. (Gosling et al., 2003; Shiota et al., 2006).

Participants rated on a 1*(strongly disagree)* to 7 *(strongly agree)* scale how well 10 sets of characteristics that relate to personality traits.

The categories and the traits they relate to were: extraversion: 1) extraverted,

enthusiastic; reserved, quiet (reverse scored); 2) agreeableness: critical, quarrelsome (reverse scored); sympathetic, warm; 3) conscientiousness: dependable, self-disciplined; disorganized, careless (reverse scored); 4) neuroticism: anxious, easily upset; calm, emotionally stable (reverse scored); 5) openness to experiences: open to new experiences, complex; conventional, uncreative (reverse scored).

Trait self-esteem. (Rosenberg, 1989). Participants rated their agreement on a 1 (*strongly disagree)* to 7 (*strongly agree)* scale. Statements were:

"I feel that I am a person of worth, at least on an equal plane with others."

"I feel that I have a number of good qualities."

"All in all, I am inclined to feel that I am a failure." (reverse scored)

"I am able to do thing as well as most other people."

"I feel I do not have much to be proud of." (reverse scored)

"I take a positive attitude toward myself."

"On the whole, I am satisfied with myself."

"I wish I could have more respect for myself." (reverse scored)

"I certainly feel useless at times." (reverse scored)

"At times I think I am no good at all." (reverse scored)

Narcissism. (Ames, Rose & Anderson, 2006). Subjects rated on a 1(*strongly disagree*) to 7 *(strongly agree)* how well the following narcissistic and non-narcissistic statements described them. Responses to the narcissistic statements were averaged into an index, and answers to the non-narcissistic statements were averaged into a separate index. A higher

number on the narcissism index indicated higher narcissism, and a lower number on the non-narcissism index indicated an alternate measure of narcissism.

The narcissistic statements were:

"I know that I am good because everybody keeps telling me so."

"I like to be the center of attention."

I think I am a special person."

"I like having authority over people."

"I find it easy to manipulate other people."

"I insist upon getting the respect that is due me."

"I am apt to show off I get the chance."

"I always know what I am doing."

"Everybody likes to hear my stories."

"I expect a great deal from other people."

"I really like to be at the center of attention."

"People always seem to recognize my authority."

"I am going to be a great person."

"I can make anybody believe anything I want them to."

"I am more capable than other people."

"I am an extraordinary person."

The non-narcissistic statements were:

"When people compliment me I sometimes get embarrassed."

"I prefer to blend in with the crowd."

"I am no better or nor worse than most people."

"I don't mind following orders."

"I don't like it when I find myself manipulating people."

"I usually get the respect that I deserve."

"I try not to be a show off."

"Sometimes I am not sure of what I am doing."

"Sometimes I tell good stories."

"I like to do things for other people."

"It makes me uncomfortable to be the center of attention."

"Being an authority doesn't mean that much to me."

"I hope I am going to be successful."

"People sometimes believe what I tell them."

"There is a lot that I can learn from other people."

"I am much like everybody else."

Self-reported arousal. Self-reported arousal was measured using the arousal dimension of the Self-Assessment Manikin (SAM), a non-verbal pictorial assessment (Bradley & P. Lang, 1994; P. Lang, 1995). SAM shows five manikins, which range from a sleepy figure on the left to an excited figure on the right. Participants indicated their arousal level by clicking 1 (*not upset at all)* to 9 (*very upset*) beneath the figures.

Self-reported affect. (Watson et al., 1988). Participants rated on a 1 (*very slightly or not at all)* to 5 (*extremely*) scale how well the following series of adjectives fit their mood at that very moment. Words indicative of positive affect were *interested, excited, strong,*

enthusiastic, alert, inspired, determined, joyful, and *active*, and these were averaged into an index. Negative affect was indicated by the words *upset, guilty, ashamed, depressed, jittery, angry, irritable, annoyed, aggravated,* and *frustrated*, and these were averaged into an index. A higher value on the negative affect index indicated increased negative affect, and a lower number on the positive affect index provided an alternative measure of negative affect.

State self-esteem. Respondents completed 24 7-point bipolar adjective scales to assess how they felt about themselves at that moment. These high-esteem adjectives anchored the high end of the scale: *good, competent, proud, adequate, useful, superior, smart, confident, valuable, important, effective,* and *satisfied*. These corresponding low-esteem adjectives anchored the low end: *bad, incompetent, embarrassed, inadequate, useless, inferior, stupid, insecure, worthless, unimportant, ineffective,* and *dissatisfied*. The results were averaged into an index.

Belongingness. (Leary et al., 2007). Participants rated their agreement with on a 1 (*strongly disagree*) to 7 (*strongly agree)* scale. All statements were averaged into an index. Statements were:

"I try hard not to do thing that will make other people avoid or reject me."

"I want other people to accept me."

"If other people don't seem to accept me, I don't let it bother me." (reverse scored)

"I seldom worry about whether other people care about me." (reverse scored)

"I need to feel that there are people I can turn to in times of need."

"I do not like being alone."

"Being apart from my friends for long periods of time does not bother me." (reverse

scored)

"I have a strong need to belong."

"It bothers me a great deal when I am not included in other people's plans."

"My feelings are easily hurt when I feel that others do not accept me."

Meaningful existence. (K. Williams et al., 2000). Participants rated their agreement on a 1 *(strongly disagree*) to 7 (*strongly agree)* scale. Results were averaged into an index. The statements were:

"Life is meaningless."

"Life has meaning." (reverse scored)

"My participation in life is important."

"I contribute a lot to other people's lives."

Sense of control. (K. Williams et al., 2000). Participants rated their agreement on a 1 (*strongly disagree*) to 7 *(strongly agree)* scale. Results were averaged into an index. The statements were:

"I am in control of my life."

"I feel out of control." (reverse scored)

"I can influence the direction of my life."

"I have the feeling that other people decide everything" (reverse score).

Triggered displaced aggression. This concept was operationalized, using a measure adapted from prior research (Chen et al., 2012). Participants responded to the following

scenario, which was detailed on their computer screen. They were told to imagine a pricey national hotel chain charged them double for one night's stay and refused to accept responsibility for the mistake or refund any money. The participants then rated which of three comments they would be most likely to post on the company's Facebook wall, using a 1 to 7 scale. The 1 was anchored by the mildest comment: "I am very upset with one of my recent stays at this hotel chain. After being charged double for one night, the company refuses to refund my money. If you are planning on staying at one of their locations, I would suggest that you pay very close attention to your bill before leaving the hotel." The midpoint was labeled with a mid-level response: "This hotel chain is terrible. I stayed for one night and they charged me for two. DON'T STAY IN THEIR HOTELS unless you want to be cheated out of your hard earned money." The 7 was anchored with the most aggressive response: "SCREW THIS HOTEL CHAIN! I want my money back now for the freaking night I DIDN'T STAY THERE!!!!! All of their employees are complete jerks. TELL ALL YOUR FRIENDS TO AVOID THIS HOTEL FOREVER!"

Aversive feelings. (Van Beest & K. Williams, 2006). Participants rated which emotion best described their mood at that very moment on a 1 (*does not describe my mood at all)* to 7 (*describes my mood extremely well)* scale. The negative emotions were, *sad, angry, hurt*, and the positive emotions were *happy, elated, cheerful*. Results were averaged into two indices with a higher score on the negative emotions index indicating greater aversion, and a lower number on the positive emotions index providing an alternate measure of aversion.

Rate the social-networking site. (Chen et al., 2011; Kalyanaraman & Sundar, 2006) Participants rated how likely they would be to use the social-networking site again on a 1

(*not at all likely)* to 7 (*very likely)* scale. They rated their agreement on a 1(*strongly disagree)* to 7 (*strongly agree)* scale on the following statements adapted from technology-acceptance research (Venkatesh & Davis, 2000) that were averaged into an index:

"Using this social-networking site is clear and understandable."

"Using this social-networking site does not require a lot of mental effort."

"I find this social-networking site easy to use."

"I found it easy to get this social-networking site to do what I wanted it to do."

RECAPITULATION OF HYPOTHESES AND RESEARCH QUESTIONS

H1: Social media rejection and criticism will elicit greater physiological and self-reported negative affect than non-aversive comments.

RQ1: Will social media rejection or criticism produce greater physiological or self-reported negative affect?

H2: Social media rejection and criticism will produce greater physiological and self-reported arousal than non-aversive comments.

RQ2: Will social media rejection or criticism produce greater physiological or self-reported arousal?

H3: Social media rejection and criticism will prompt greater retaliation than non-aversive messages.

RQ3: Will social media rejection or criticism produce greater retaliation?

H4: Social media rejection and criticism will prompt greater attempts to restore relational value than non-aversive messages.

RQ4: Will social media rejection or criticism produce greater attempts to restore relational value.

RQ5a: Will social media rejection and criticism threaten the four ostracism needs and lead to aversive feelings to a greater extent than non-aversive comments?

RQ5b: If so, will the four needs mediate a positive relationship between rejection and criticism and aversive feelings?

RQ6: Will social media rejection or criticism produce greater threats to the four ostracism needs or lead to greater aversive feelings?

H5: Social media rejection and criticism will lead to greater intensity of triggered displaced verbal aggression than non-aversive comments.

RQ7: Will social media rejection or criticism product greater intensity of triggered displaced verbal aggression?

RQ8: Does gender moderate any significant relationships?

RQ9: Do personality traits moderate any significant relationships?

Figure 1. Ostracism model

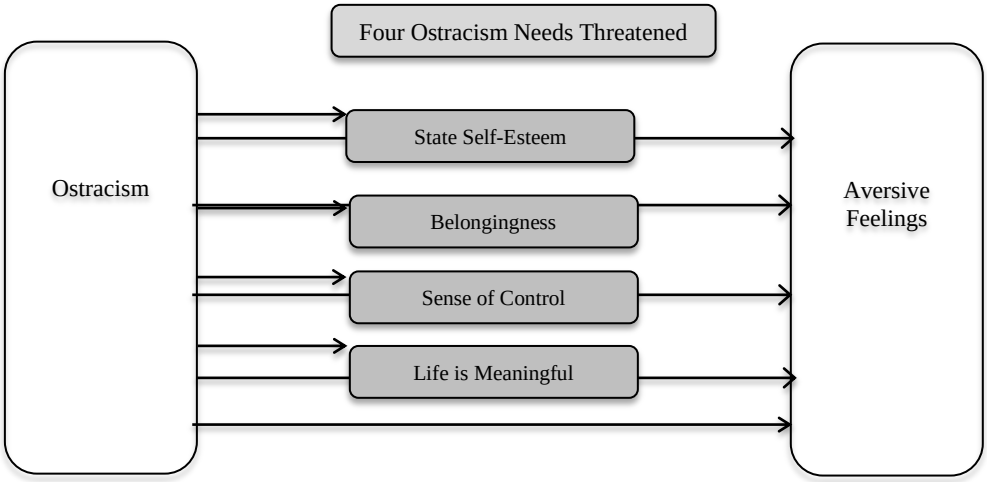


Figure 2: Screen Shot of the College Network, social-networking site

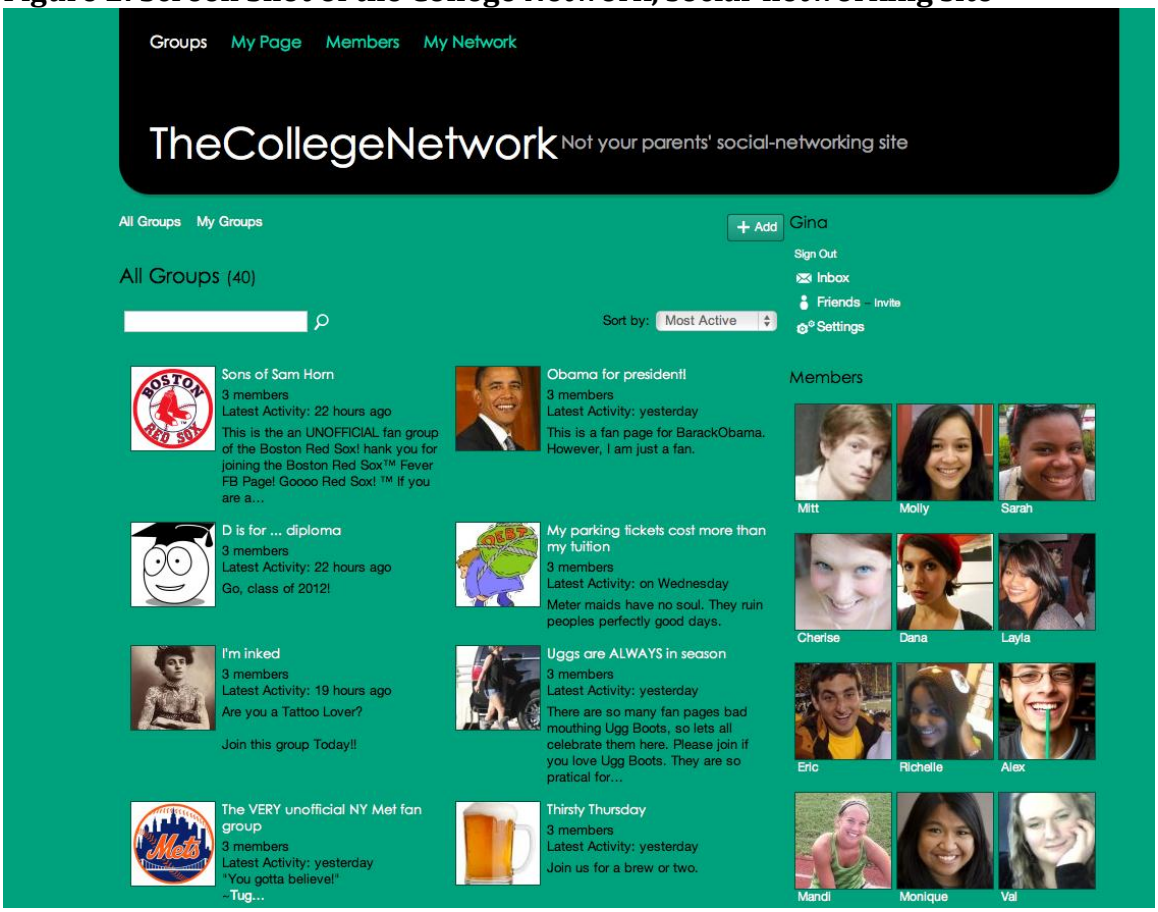
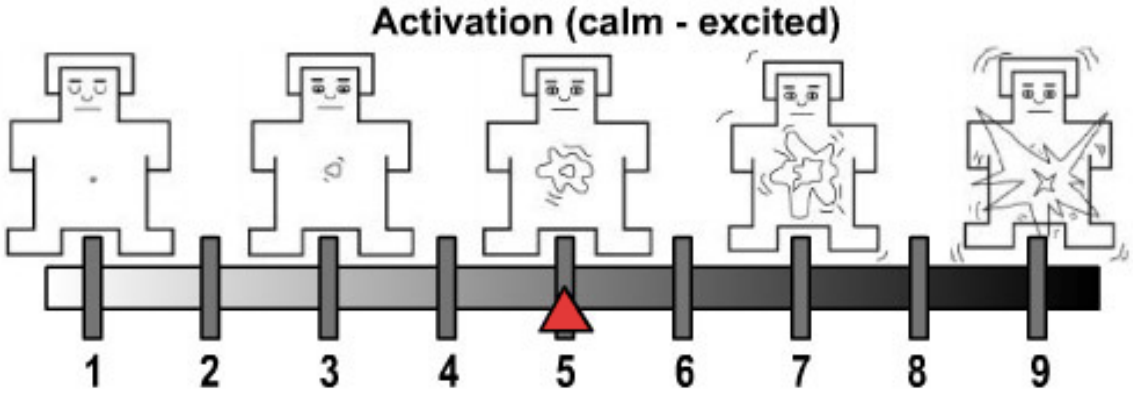
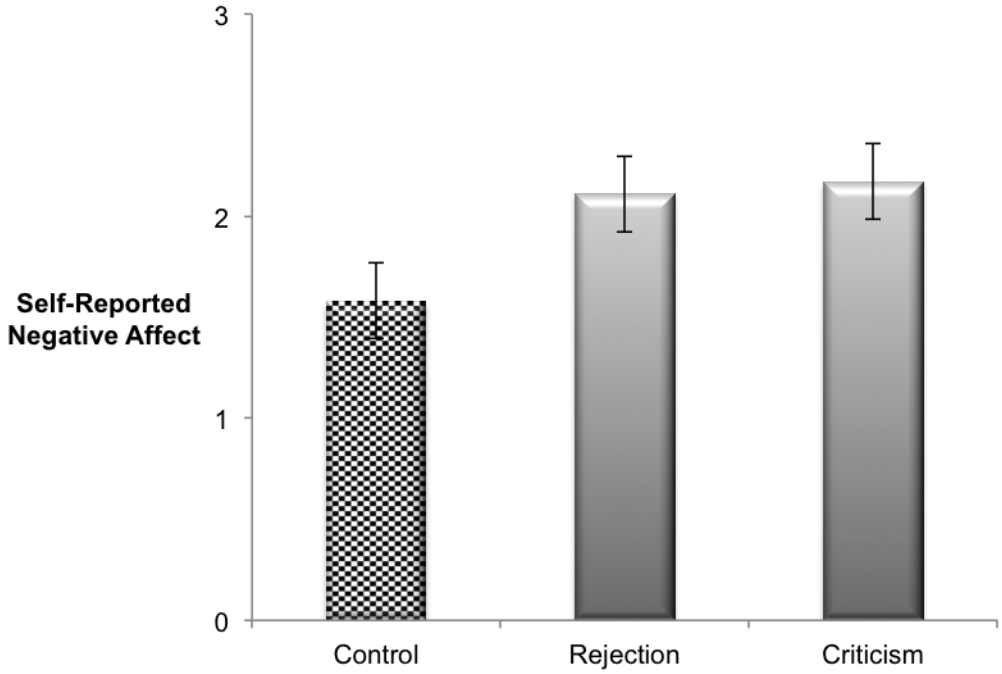


Figure 3: Self-Assessment Manikins for Arousal



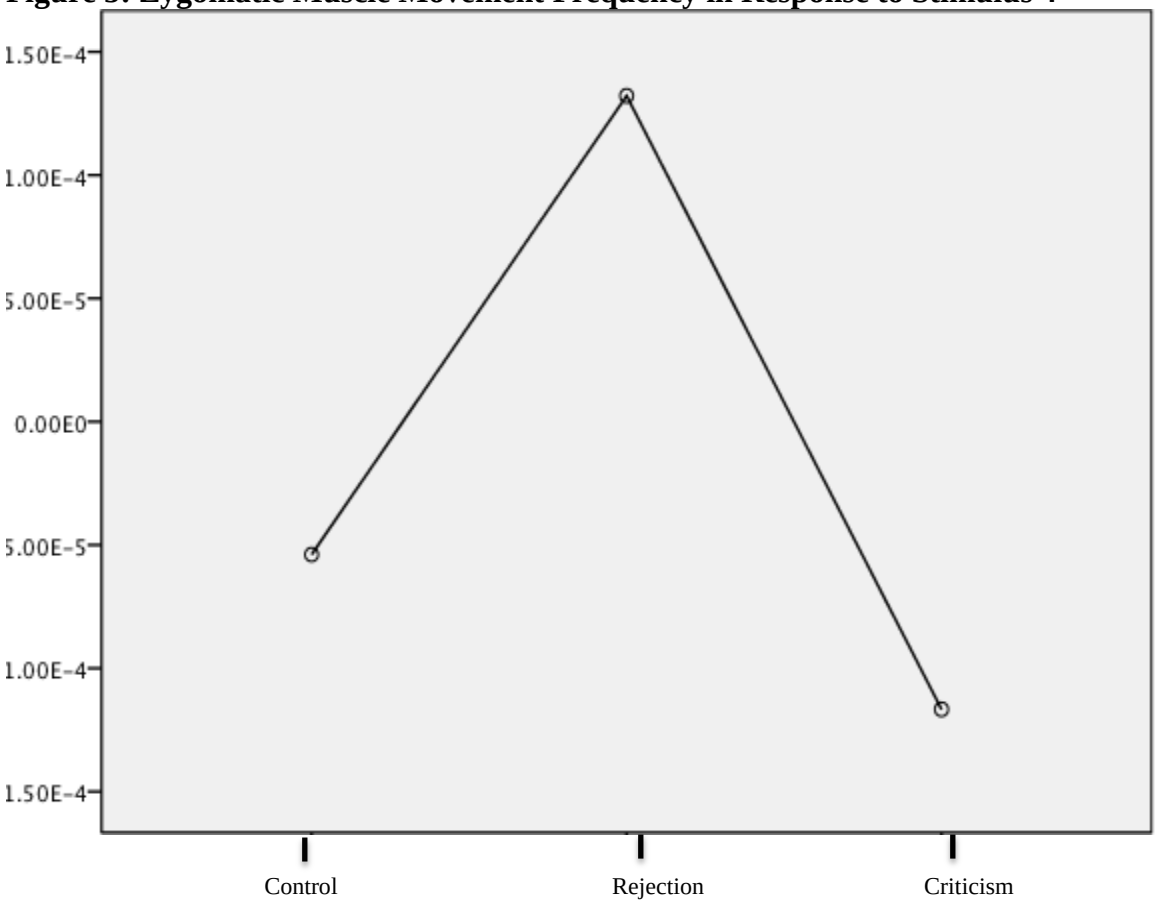
Adapted from Bradley & P. Lang (1994) and P. Lang (1995).

Figure 4: Self-Reported Negative Affect



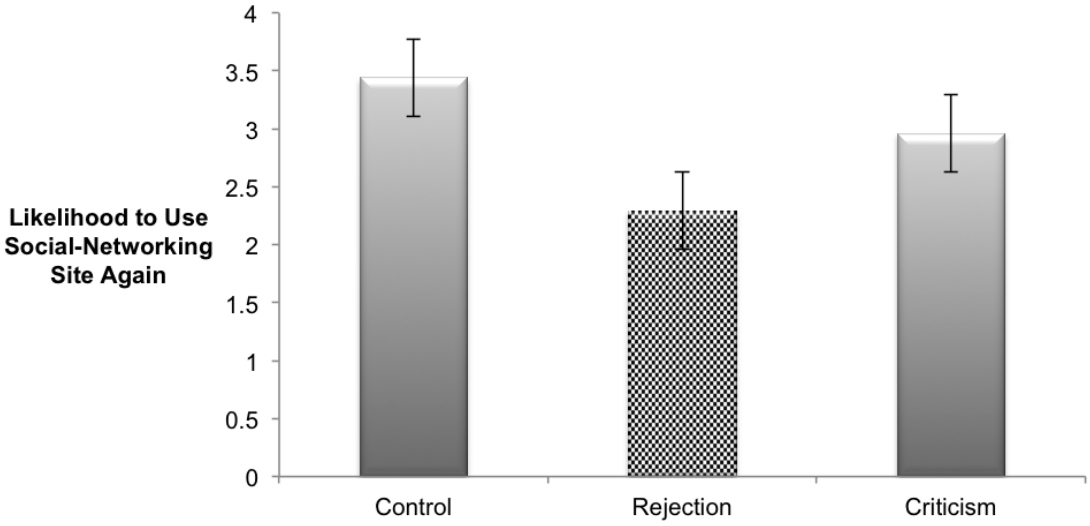
Control differs from rejection and criticism at $p < .05$.
Negative affect measured on a 7-point scale.
Bars represent standard error terms.

Figure 5: Zygomatic Muscle Movement Frequency in Response to Stimulus 4



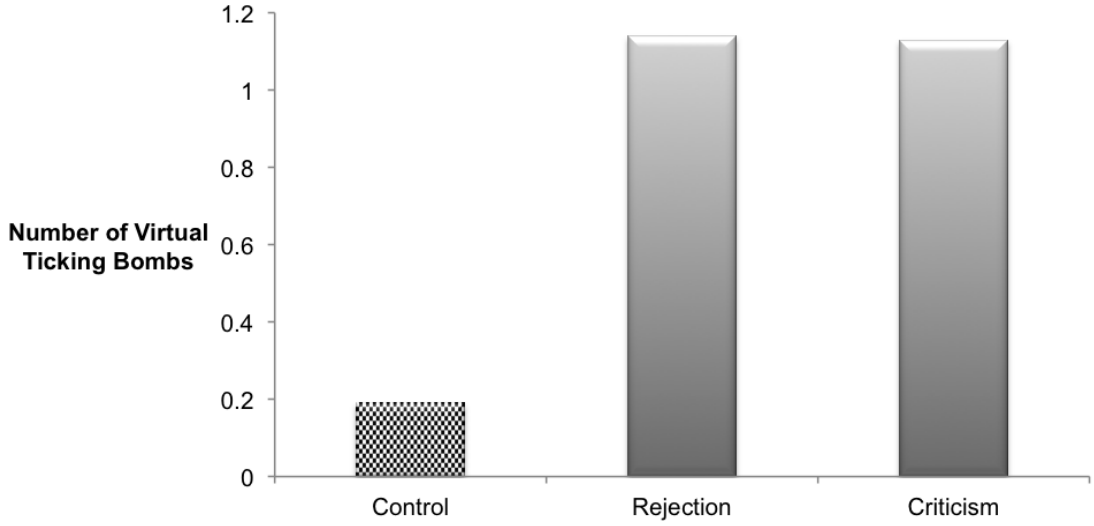
Rejection is trending toward a significant difference with criticism at $p = .06$

Figure 6: Likelihood to Use Social-Networking Site Again



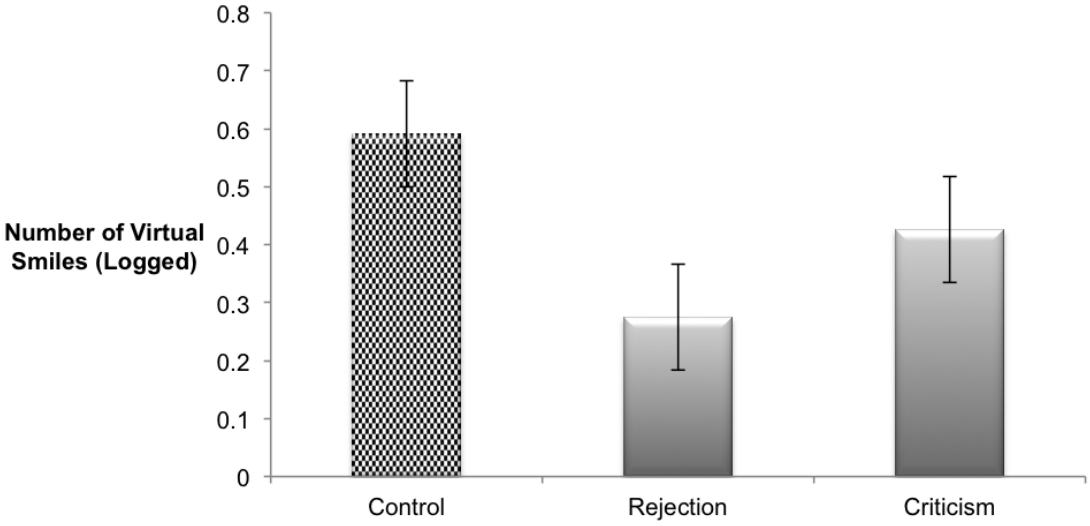
Rejection is significantly different from control at $p = .007$.
Likelihood to use social-networking site again is measured on a 7-point scale with a higher number indicating greater likelihood. Analyses controlled for how much subjects liked the site, using the Technology Acceptance Model.

Figure 7: Number of Virtual Ticking Bombs Sent



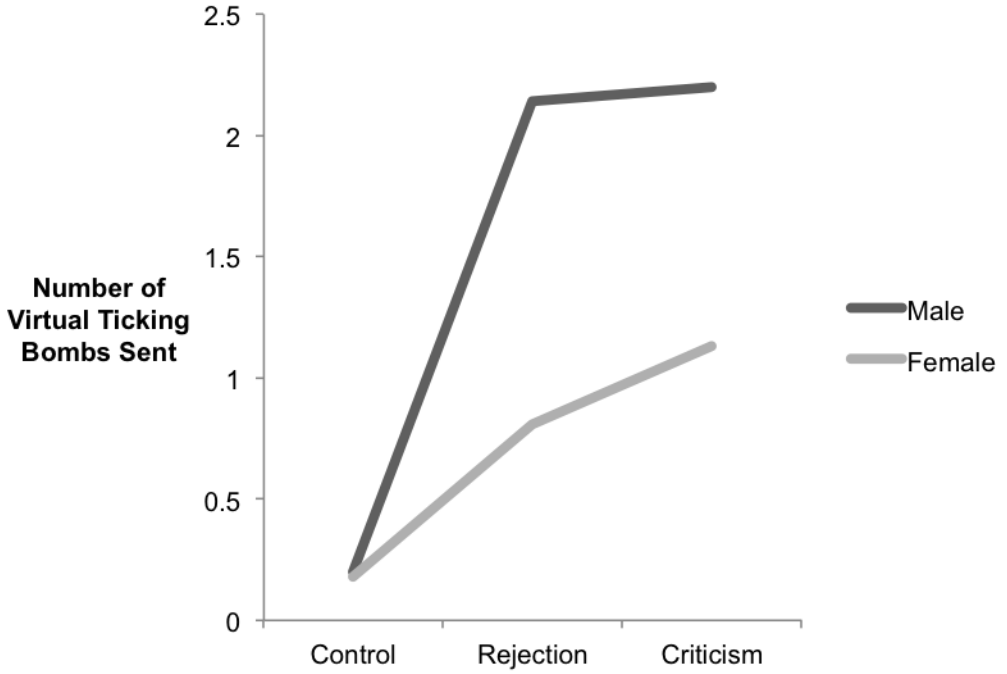
Rejection and criticism are significantly different from control at $p < .05$.

Figure 8: Number of Virtual Smiles Sent



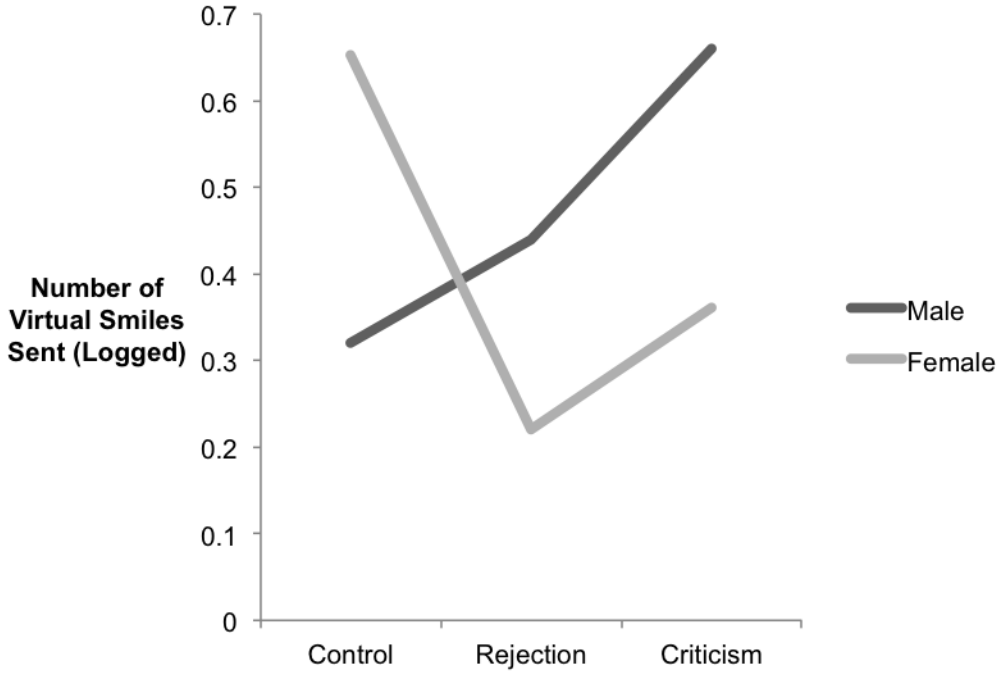
Rejection is significantly different from control at $p = .007$.
Bars represent standard error terms.

Figure 9: Gender Effect for Sending of Virtual Ticking Bombs



Main effect is significantly different between control and rejection at $p = .01$ and between control and criticism at $p = .02$; gender effect was significant at $p = .007$

Figure 10: Gender Interaction for Sending Virtual Smiley Faces



Gender interaction is significant at $p = .02$

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