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UNDERSTANDING MEDIA RICHNESS AND SOCIAL PRESENCE: EXPLORING THE
IMPACTS OF MEDIA CHANNELS ON INDIVIDUALS' LEVELS OF LONELINESS,
WELL-BEING, AND BELONGING

By

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Bachelor of Science, Southern Utah University, Cedar City, Utah, 2020

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Understanding Social Presence

Chairperson: Dr. Stephen Yoshimura

Loneliness is a universal part of being human and is detrimental to well-being. The need-to-belong hypothesis claims that individuals frequently having positive interactions with people close to them mitigates their loneliness. Media richness theory adds that rich media channels allow individuals to perceive higher levels of social presence and maintain those vital, close relationships. Understanding how a given media channel impacts online interactions and, in turn, the interactants is vital. This study used a pretest-posttest equivalent groups experimental design to examine if individuals who interacted with a close relationship partner over a rich media channel would have a decrease in their perceived loneliness levels or an increase in their perceived well-being and sense of belonging (pre-interaction to post-interaction) compared to those who communicated via less rich media channels. The results indicated that the richness of a given channel increased with the number of verbal and nonverbal cues the media channel could communicate; video chat had the highest richness, followed by phone calls and text messages. Although texting had a significantly lower level of social presence, participants did not indicate a difference in social presence felt between video chat and phone calls. Neither media richness nor social presence produced an effect on loneliness, well-being, or belongingness. Overall, the findings suggest that, for a healthy population, no channel of communication examined here is better or worse in terms of its effects on short-term loneliness, sense of belonging, and subjective well-being.

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Loneliness is a worldwide phenomenon anyone may experience, regardless of age, ethnicity, gender, or socioeconomic background. Although short-term loneliness may not be entirely problematic, chronic loneliness is undoubtedly detrimental to well-being, especially when felt at high levels over long durations (Cutler, 2015; Holt-Lunstad et al., 2015; Ingram et al., 2018). On the one hand, one could quickly surmise that both acute and chronic loneliness would be relatively easy to address using the many social technologies that now exist to help people connect with others. On the other hand, a more careful analysis might lead to the proposition that not all technologies are equally effective at mitigating loneliness and affecting human well-being. Indeed, many researchers continue to study whether individuals are able to sustain the types of relationships necessary for well-being through computer-mediated interactions (Burholt et al., 2020; Favotto et al., 2019; Ingram et al., 2018). Given that computer-mediated communication (CMC) has become a fundamental means of human communication and has increasingly replaced face-to-face communication (Drago, 2015), understanding how technology impacts relationship maintenance is vital.

Four basic theoretical assumptions frame the current study. First, all humans have an innate drive to belong. According to the need-to-belong hypothesis, frequent positive interactions with close relationship partners mitigate loneliness (Baumeister & Leary, 1995). Second, not all mediated communication technologies are equally effective at fulfilling one's need to belong. In particular, media richness theory posits that rich media channels allow individuals to perceive higher levels of social presence (Daft & Lengel, 1984) and, thus, maintain those vital relationships. Third, loneliness occurs when individuals perceive a deficiency in their social relations (Perlman & Peplau, 1981), and fourth, loneliness is detrimental to physical and psychological health (Cutler, 2015). Ultimately, the current study is driven by the notion that

individuals who frequently interact online with close friends or family members using rich media channels likely have lower levels of loneliness and higher perceived levels of well-being.

Review of Literature

Defining Loneliness

Loneliness is “the unpleasant experience that occurs when a person's network of social relations is deficient in some important way” (Perlman & Peplau, 1981, p. 31). This definition stems from a discrepancy-attributional approach to loneliness, which assumes that loneliness is a subjective state of a perceived deficit in social connection (Perlman & Peplau, 1981). This approach to defining loneliness has several advantages. First, it paints a complete picture of the factors contributing to loneliness because as the needs of a particular individual shift, the number of social interactions necessary fluctuates. Thus, the discrepancy-attributional approach focuses on the quantity and quality of social interactions different individuals need instead of merely focusing on the specific number of social interactions (Perlman & Peplau, 1981). Second, this approach allows for the possibility that individuals vary in their perception of deficiency and the manner in which it emotionally impacts them (Perlman & Peplau, 1981). For instance, an individual who perceives a deficit between what they need and what they receive may not feel as lonely if they believe they have some control over the number of their social interactions.

Researchers have distinguished between emotional and social loneliness, although both occur due to social deficiency (Weiss, 1973). Individuals feel emotionally lonely when they perceive a deficit, such as a complete lack of or shortage, regarding an intimate, personal relationship (Weiss, 1973). On the other hand, social loneliness occurs when an individual does not have an adequate social network or community with which they belong (Weiss, 1973). This study focuses on emotional loneliness since (a) it is the more acutely painful form (Weiss, 1973)

and (b) it is vital for individuals to establish close, personal relationships to fulfill their belongingness needs (Baumeister & Leary, 1995).

Emotional loneliness is a painful experience because an individual does not have access to the emotional support necessary to deal with the daily stresses of life (Qualter & Munn, 2002; Weiss, 1973). One way to alleviate or lessen emotional loneliness is for an individual to establish a satisfying, close relationship(s) with another person (Baumeister & Leary, 1995; Weiss, 1973). The relationship(s) must supply enough emotional support for the individual, which depends on their specific needs at any given time. The need-to-belong hypothesis claims that loneliness is a direct consequence when individuals have not established or maintained close, personal relationships (Baumeister & Leary, 1995).

The Need-to-Belong Hypothesis and Loneliness

The need-to-belong hypothesis helps explain why human connection and personal relationships are essential to human life (Baumeister & Leary, 1995). This hypothesis (also known as the belongingness hypothesis) proposes “that human beings have a pervasive drive to form and maintain at least a minimum quantity of lasting, positive, and significant interpersonal relationships” (Baumeister & Leary, 1995, p. 497). In other words, humans, almost universally, have an innate drive to create and preserve intimate personal relationships. Loneliness is a direct consequence of the lack of close interpersonal relationships (Perlman & Peplau, 1981), and individuals feel lonely when their “belongingness needs” are not being met (Baumeister & Leary, 1995).

Two criteria are necessary for individuals to satisfy their innate drive for connection and personal relationships (Baumeister & Leary, 1995). The first criterion is the need for frequent, positive interactions with at least a few other individuals (Baumeister & Leary, 1995). An

individual only needs to perceive the interactions as positive; one individual could potentially perceive the interactions as positive, while another could perceive the same interactions as neutral or negative. The second criterion is that these interactions must occur with an individual who cares for one's long-term well-being (Baumeister & Leary, 1995). For individuals to feel as if they belong and, thus, not feel lonely, they must have several close relationships with frequent positive interactions and the perception of reciprocal well-being.

Several studies have supported this hypothesis. For instance, Mellor et al. (2008) surveyed 436 participants to examine the associations between the need to belong, satisfaction with personal relationships, loneliness levels, and satisfaction with life. The study found a negative correlation between an individual's satisfaction with their close personal relationships (i.e., met belongingness needs) and loneliness (Mellor et al., 2008). The researchers argued that loneliness explains the connection between one's need for belonging and well-being. In essence, lonely individuals were more likely to have unmet belongingness needs, which negatively influenced their subjective well-being (Mellor et al., 2008).

Similarly, Verhagen et al. (2017) found a direct negative correlation between unmet belongingness needs and well-being. Specifically, they found that when individuals' belongingness needs were not satisfied by their particular relationships, they had higher levels of loneliness, symptoms of depression, and lower self-esteem than those whose relationships did satisfy their need to belong (Verhagen et al., 2017). Although the need to belong is universal, individuals' belongingness needs differ (Verhagen et al., 2017). For instance, an individual with high belongingness needs and low relationship satisfaction would be more negatively impacted than someone with medium belongingness needs and low relationship satisfaction. The importance lies in the level of difference between an individual's belongingness needs and

relationship satisfaction. So, the wider the gap between what a person perceives they need and what they receive from their relationships, the more their well-being will be negatively impacted. Overall, “one should aim at experiencing fulfilled belongingness needs as a means to improve well-being” (Verhagen et al., 2017, p. 506).

Loneliness and the Effects on Well-Being

Loneliness relates to a variety of both physical and psychological health outcomes. Research has found numerous physical health effects, including immunodeficiency, high cholesterol, diabetes, chronic illnesses, arthritis, emphysema, and coronary heart disease. Psychologically, loneliness decreases one’s ability to cope with and adapt to stressful situations and then return to the body’s pre-stress, normal state (Hawkley & Cacioppo, 2007). As a person ages, they naturally lose their ability to cope with stressful situations, and loneliness contributes to and accelerates this natural decline (Hawkley & Cacioppo, 2007).

Physical Health Effects of Loneliness

Loneliness, especially when perceived over long durations, has adverse effects on the physical health of individuals. For example, loneliness negatively impacts the strength of a person’s immune system by affecting their immunocompetence (Kiecolt-Glaser et al., 1984). When a person feels high levels of loneliness for extended durations, their body cannot produce a normal immune response when attacked by foreign substances (Kiecolt-Glaser et al., 1984). People with high levels of perceived loneliness have decreased levels of natural killer cell activity, so they are unable to fight off viral infections in the same manner as individuals who do not suffer from loneliness (Kiecolt-Glaser et al., 1984). Participants with higher levels of loneliness were much more likely to describe themselves as distressed, which is one possible explanation for their weakened immune systems and lower levels of natural killer cells since the

human immune system seems to respond to distress (Kiecolt-Glaser et al., 1984). However, the researchers claim that there are most likely other factors that elucidate how loneliness affects the immune system due to the lack of connection found between loneliness and distress on one of the measures used in the study (Kiecolt-Glaser et al., 1984). Simply put, loneliness is associated with a weaker immune system which, in turn, affects a person's physical well-being.

Even controlling for age, loneliness correlates with several physical health indicators. Researchers analyzed data from a population-based Swiss Health Survey in 2012 (Richard et al., 2017). The individuals who self-reported high levels of loneliness were significantly more likely to report high cholesterol levels and diabetes. They also reported higher levels of chronic illness (i.e., a disease or physical health issue that is expected to or has lasted longer than six months) (Richard et al., 2017). Barlow et al. (2015) conducted an 8-year longitudinal study that also found a positive correlation between loneliness and chronic health conditions, although this was specific to older adults. Higher levels of loneliness are related to arthritis and emphysema (Tomaka et al., 2006). Lastly, individuals who perceive lower levels of social support are more likely to develop coronary heart disease (CHD) (Barth et al., 2010). Once diagnosed, they have higher mortality rates than individuals who do not suffer from loneliness (Barth et al., 2010).

Overall, perceiving high levels of loneliness for extended durations negatively impacts people's physical health. For starters, lonely individuals are more likely to get sick and are less able to fight off illnesses (Kiecolt-Glaser et al., 1984). Additionally, those who perceive high levels of loneliness are much more likely to have a chronic illness (Richard et al., 2017) and develop CHD (Barth et al., 2010) relative to their nonlonely counterparts. In addition to these physical health effects, several psychological health effects are associated with extended durations of loneliness. Nevertheless, frequently interacting with a close relation or friend can

mitigate loneliness, and individuals who do so are less likely to suffer from adverse health effects (Baumeister & Leary, 1995).

Psychological Health Effects of Loneliness

Individuals with higher levels of loneliness are more likely to be diagnosed with anxiety and depression as well as exhibit certain behavioral traits associated with those mental illnesses (Santini et al., 2020). One of the associated behavioral traits is having a negative self-concept (Chung, 2003). The lonelier individuals are, the worse their self-concept tends to be (Chung, 2003). An individual's self-concept consists of their perception of themselves, including the "ideas of who one is, was and will become" (Fazli, 2020, p. 9). Individuals with negative self-concepts tend to feel that others are constantly judging them; they have difficulty dealing with constructive criticism and are overcritical of themselves and others (Brooks & Emmart, 1976). On the other hand, individuals with a positive self-concept are better able to manage problems that arise and handle praise, while they are less likely to compare themselves to others (Brooks & Emmart, 1976). Lonely individuals are more likely to suffer from anxiety and depression, which are correlated with negative self-concepts and poorer life choices.

Loneliness has been associated with several negative life choices and poorer living conditions that may diminish well-being. Research has found that higher levels of perceived loneliness are correlated with excessive drinking, lower levels of work, and lower household incomes (Tanskanen & Anttila, 2016). Additionally, research has tied higher levels of loneliness to increased recreational drug use (Cacioppo et al., 2002; Ingram et al., 2018). The researchers are unsure whether people use drugs to cope with their loneliness or if drug users tend to have relationships that do not give them the social support they need (Ingram et al., 2018). Loneliness

has been positively correlated with several issues like suicide and alcohol abuse (Perlman & Peplau, 1981) and a lower quality of life (Ingram et al., 2018).

Overall, lonely individuals suffer more mentally and physically when compared to their nonlonely counterparts. Understanding the types of interactions necessary and how computer-mediated communication (CMC) can be used in the most beneficial way for individuals to satisfy their need to belong is vital to mitigate the adverse effects of loneliness. If used appropriately, computer-mediated interactions can play an essential role in maintaining these imperative relationships. A large body of scholarship suggests that the level of social presence felt over various forms of CMC is a crucial factor in predicting the experience of loneliness and, ultimately, one's sense of well-being.

Social Presence Theory

If loneliness affects one's well-being, then one might inquire into the factors of social interactions that play a role in reducing loneliness, especially in an era in which much of our interpersonal interaction takes place over computer-mediated channels (e.g., texting, videoconference, email, social media, etc.). One such factor could be the "social presence" of others. Individuals' perceived levels of social presence impact the relationships they are able to create and maintain over online interactions. Social presence is the "degree of salience of the other person in [an] interaction and the consequent salience of the interpersonal relationships" (Short et al., 1976, p. 65) over various forms of computer-mediated communication (CMC). It is the degree to which an individual perceives another individual as important and, in turn, values their interaction and overall relationship. Higher levels of social presence are necessary for individuals to maintain the close relationships needed to mitigate loneliness. Individuals who interact online over richer media channels (Daft & Lengel, 1984) should be able to perceive

higher levels of social presence since the channels transmit more verbal and nonverbal cues (Gunawardena, 1995).

Despite the prevalence with which the concept of social presence is discussed within research, researchers continue to define social presence in a variety of ways (Alghamdi et al., 2016; Biocca & Harms, 2002; Felnhofer et al., 2014; Lazard et al., 2020; Lowenthal & Snelson, 2017). Lowenthal and Snelson (2017) conducted a literary analysis of 50 of the most cited social presence-focused research articles on Google Scholar. They found seven definitions of social presence used by researchers (Lowenthal & Snelson, 2017). The categories of definitions are being salient, being real, being there, projecting oneself, connection, belonging, and community (Lowenthal & Snelson, 2017). The variety of definitions causes confusion since researchers end up studying subtly different constructs of the same term (Lowenthal & Snelson, 2017).

For this study, social presence is defined as a person feeling as if another person is there (i.e., salience) and real through computer-mediated interactions. This definition was derived from several researchers' interpretations of the original definition of social presence. Short et al. (1976) originally defined social presence as the "degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships" (p. 65). Researchers have explained this as the quality of "being there" (Dunlap & Lowenthal, 2009) and as the perception of a "real person" (Gunawardena & Zittle, 1997). It is evident that researchers of social presence tend to define salience as being "real" or being "there" (Lowenthal & Snelson, 2017). Due to this, it makes sense to define social presence in this manner.

Understanding what the two aspects (i.e., being there and being real) mean is imperative to understanding the concept of social presence. The idea of "being there," or salience, is defined "in terms of whether one senses that the other person(s) they are talking to is present and actively

engaged” (Lowenthal & Snelson, 2017, p. 2) and “in terms of whether another person(s) is present in a supportive and caring sense” (Lowenthal & Snelson, 2017, p. 3). On the other hand, “being real” is defined “in terms of whether one senses that he or she is talking to a human being and not a machine” (Lowenthal & Snelson, 2017, p. 2) and “in terms of understanding what makes a person unique or authentic (e.g., in terms of identity, personality, persona etc...)” (Lowenthal & Snelson, 2017, p. 3). Defining social presence as the degree to which an individual perceives another individual as being there and being real when interacting through a form of CMC creates a complete and exhaustive understanding of how the term should be used. This definition makes it possible to think of social presence as the computer-mediated interaction equivalent to perceiving another individual as present in a face-to-face interaction.

The amount of social presence a given media channel can convey alters the level of intimacy felt between two individuals (Short et al., 1976). For example, when an individual communicates with another via video chat instead of over the phone, they can perceive a higher degree of social presence and, thus, create more intimacy between each other. Immediacy is a measure of the psychological distance an individual puts between themselves and others through communication (Gunawardena, 1995; Wiener & Mehrabian, 1968). An individual can express immediacy or non-immediacy through verbal or nonverbal forms of communication (Gunawardena, 1995). When individuals respond quickly to a text, they express immediacy towards the recipient, which increases social presence. Intimacy and immediacy each play a crucial part in the level of social presence an individual perceives, which impacts their ability to maintain personal relationships over CMC to mitigate loneliness.

Media Richness Theory

The level of social presence perceived by an individual during an online interaction is affected by the richness of a given media channel. Thus, the extent to which social presence affects loneliness and well-being likely depends on the ability of a given channel to convey depth in messages. Media richness is “the potential information carrying capacity of data. If the communication of an item of data, such as a wink, provides substantial new understanding, it would be considered rich. If the datum provides little understanding, it would be low in richness” (Daft & Lengel, 1984, p. 7). The richer the media channel, the more information a channel can communicate at one given time which decreases the possibility of uncertainty or ambiguity between the communicators (Daft & Lengel, 1984). A face-to-face conversation is much richer than a text message due to the amount of verbal and non-verbal cues a person can communicate over the face-to-face channel. Individuals who interact over richer media channels should perceive higher levels of social presence, which may help them maintain their close relationships to mitigate loneliness.

Four characteristics alter a media channel’s richness: “medium's capacity for immediate feedback, the number of cues and channels utilized, personalization, and language variety” (Daft & Lengel, 1984, p. 11). Face-to-face interactions are the richest possible channel due to the immediate availability of feedback and the amount of verbal and non-verbal cues that accompany natural language (Daft & Lengel, 1984). For CMC, video chat has been considered the richest form since it most closely mimics face-to-face interactions (Hornung, 2015). Thus, of all mediated channels, video chatting likely allows for the highest level of social presence to be perceived by individuals to maintain close relationships.

Leaner channels (which have less richness) have fewer cues and restrict the amount and speed of feedback (Daft & Lengel, 1984). These leaner media channels can still be used to communicate successfully, but they tend to work better when conveying more routine and explicit information (Lengel & Daft, 1988). For example, a leaner media channel like email would be appropriate when a manager sends out a routine schedule to their workers. On the other hand, richer media channels are more suitable for non-routine tasks with less clear information, such as face-to-face meetings (Lengel & Daft, 1988). Researchers no longer agree that the richness of the channel necessarily correlates with the clarity and univocal nature of the message sent (Ishii et al., 2019).

Media richness and social presence are interrelated concepts. According to Jung et al. (2017), “media providing richer stimuli elicit a greater perception of presence than media that is less rich in modality, and visuals yield more social presence than text-only formats” (p. 554). In other words, the richer a media channel, the more likely interacting individuals will perceive higher levels of social presence. Individuals should feel psychologically closer to one another when they perceive a higher level of social presence through mediated interactions. So, an individual will be more able to perceive a particular person as both being there for them and real through a richer media channel. This idea connects to the need-to-belong hypothesis, which claims that an individual needs to have frequent interactions they perceive as positive with another individual whom they perceive reciprocally cares for their well-being (Baumeister & Leary, 1995). Individuals should be more able to perceive reciprocal well-being if they perceive another as actually there and real through interactions via CMC. Using richer media channels should allow individuals to perceive higher levels of social presence during online interactions. Thus, interacting with a close friend or family member via richer media channels should satisfy

belongingness needs, mitigate loneliness, and promote higher levels of perceived well-being more than interactions via less rich media channels.

The Current Study

This study is based on the idea that one's need to belong can be satisfied (and loneliness thus reduced) when people interact with others via rich(er) media channels, which allow for more social presence to be established. A study that compared two different instant messaging platforms found a positive correlation between media richness and the quality of relationships (Sheer, 2010). So, computer-mediated communication can help to alleviate loneliness (Burholt et al., 2020; Chen & Schulz, 2016; Cotten et al., 2013; Cutler, 2015), but it is essential to use it to interact frequently and positively with close friends or family members for individuals to satisfy their need to belong. Due to the destructive nature of loneliness on the well-being of individuals, this study seeks to examine the following hypotheses:

H1: Individuals interacting with a close relationship partner over a rich media channel will perceive higher levels of social presence compared to individuals who communicate via less rich media channels.

H2: Individuals interacting with a close relationship partner over a rich media channel will have lower levels of loneliness compared to individuals who communicate via less rich media channels.

H3: Individuals interacting with a close relationship partner over a rich media channel will have higher levels of perceived well-being compared to individuals who communicate via less rich media channels.

H4: Individuals interacting with a close relationship partner over a rich media channel will perceive higher belongingness levels compared to individuals communicating via less rich media channels.

Method

This study used a pretest-posttest equivalent groups experimental design to test the hypotheses. The independent variable was the media channel used to interact (e.g., Zoom, phone call, or text messages/instant messages), and the dependent variables were perceived loneliness, perceived well-being, sense of belonging, the perception of media richness, and perceived social presence. Survey responses were collected from February 2022 through April 2022.

Participants

To recruit participants for this study, the researcher asked their social network contacts to post a paragraph of information with a link to the initial survey on their social media platforms. The study was circulated over several social media platforms (Reddit, Facebook, Instagram). This study was available to individuals 18 years of age and older with at least one close friend or family member. Due to the requirements of this experiment, each participant needed access to a smartphone or computer with a front-facing camera, audio capabilities, and a stable internet connection.

After data collection was complete and the surveys were closed, the data were checked for viable responses. Participants' responses were filtered out and deleted if they (a) failed to give their consent to participate, (b) failed to include a valid email address, (c) claimed not to have a close friend or family member, or (d) did not complete both of the surveys. Although 274 participants began the initial survey, 41 responses were viable after the data-screening process.

One additional participant's data were eliminated after they failed an attention check item in the final survey. Overall, 40 responses were viable for analysis (15% completion rate).

The participants ($N = 40$) primarily identified as female (77.5%) with 22.5% identifying as male. The vast majority of the participants described their ethnicity as White (80%), followed by Hispanic or Latino/Latina (5%), Black or African American (5%), preferred to self-identify (5%), American Indian or Alaskan Native (2.5%), and Asian (2.5%). Regarding age range, most participants were 25-34 years old (30%), followed closely by 65 and older (20%), 35-44 (17.5%), 45-54 (17.5%), 55-64 (10%), and lastly 18-24 (5%). Additionally, 92.5% of the participants described their sexual orientation as straight/heterosexual, followed by bisexual (5%) and pansexual (2.5%).

The majority of the participants had some college-level education, with 37.5% indicating they had a bachelor's degree, followed closely by a master's degree (35%), other (12.5), high school degree or equivalent (10%), and doctorate (5%). Most participants were employed full-time (62.5%), followed by retired (15%), self-employed (10%), employed part-time (5%), student (5%), and unemployed (currently looking for work; 2.5%). Participants described their annual household incomes as between \$75,000 to \$99,999 (28.2%), followed by \$50,000 to \$74,999 (23.1%), \$30,000 to \$49,999 (15.4%), under \$30,000 (15.4%), \$150,000 or more (10.3%), and \$100,000 to \$149,999 (7.7%). One participant did not indicate their household income. The vast majority of participants were married (50%), followed by being single (25%), living with a significant other/partner (15%), divorced (7.5%), and widowed (2.5%). Lastly, participants described their religious affiliation as Christianity (52.5%), followed by none (17.5%), atheist (12.5%), other (10%), Buddhism (5%), and Judaism (2.5%).

Procedure

Individuals were given a Qualtrics link to the initial survey and asked to open it if they were interested in participating in the study. After clicking the link, participants were randomly assigned to one of three conditions (text message, phone call, or videoconference) and prompted to read through more specific information and given an estimated timeline of the pieces of the study. Then, participants were asked to (a) give informed consent, (b) indicate if they were 18 or older, (c) indicate if they had at least one close friend or family member, (d) indicate if they had access to a smartphone or computer with a camera and audio capabilities, and (e) provide their current email address. If participants selected no or did not fill in the above prompts, they were automatically sent to the end of the survey and thanked for their time. If participants gave informed consent, answered yes, and provided their email addresses, they were permitted to begin the initial survey.

The initial survey began with several demographic questions regarding age, gender identity, sexual orientation, ethnicity, level of education, current employment status, annual household income, marital status, and religious affiliation. Then, participants answered items that measured their perceived loneliness, perceived well-being, and sense of belonging. After completing those items, participants were informed of the media channel they were randomly assigned to for the next piece of the study. Lastly, the end of the survey message informed participants that the researcher would contact them soon with information for the other two parts of the study.

Within 24 hours of participants completing the initial survey, the researcher emailed them information regarding the media channel they were assigned to use, the questions to use for the interaction, a link to the final survey, and a login ID to sign into the final survey (Appendix A).

Additionally, the participants were reminded that they had seven days after completing the initial survey to interact with the person of their choosing and complete the final survey. For example, if a participant completed the initial survey on February 10th, they received an email from the researcher no later than February 11th and then had until February 17th to complete the interaction and final survey. The researcher sent reminder emails to participants 48 hours prior to the completion deadline.

For the interaction piece of the study, participants were given five specific questions to control for consistency. These questions were pulled from a previous research study where researchers had created a series of questions that were found to create closeness between individuals and boost their well-being (Aron et al., 1997). The researcher analyzed the first set of 12 questions and selected the five that seemed to be able to elicit the most positive conversation (Appendix B). Since, according to the need-to-belong hypothesis, positive interactions with close friends or family members are essential to mitigate loneliness (Baumeister & Leary, 1995).

Once participants finished their necessary interactions, participants were asked to immediately open and complete the final survey (the link to the survey was provided in the email from the researcher). Participants were asked to give informed consent and indicate if they had completed the interaction. If participants did not consent to the survey or indicated they had not completed the interaction, they were automatically sent to the end of the survey and thanked for their time. If participants gave informed consent and indicated that they had done the interaction, they were permitted to begin the final survey.

The final survey began with questions regarding how the participant felt about the interaction and the person with whom they interacted. For example, one item was, “Are you able to see this person face-to-face when you would like to?” Then, participants answered the same

items from the initial survey that measured their perceived loneliness, perceived well-being, and sense of belonging. Participants moved on to items that measured their perception of the richness and social presence of the particular media channel they used during the interaction. Lastly, the end of the survey consisted of debriefing information in which the researcher explained the purpose of the study. Participants were also given the following message: “If you have any questions or concerns regarding this study, its purpose or procedures, or if you have a research-related problem, please feel free to contact the researcher, Ashley Arsenault (primary researcher) at ashley.arsenault@umconnect.umt.edu or Stephen Yoshimura (faculty supervisor) at stephen.yoshimura@mso.umt.edu.”

Due to the nature of this study, the surveys were not completed anonymously, and all confidential and identifying information was deleted promptly to protect the participants’ privacy.

Measures

Perceived Loneliness

The revised UCLA Loneliness Scale (Version 3) was used to measure participants’ perceived loneliness (Russell, 1996). The original scale was modified to a 7-point Likert-type scale (1=Never, 7=Always) and consisted of 20 items. Nine of the items were reverse-coded. Participants were asked to indicate how often each statement described how they felt. Example items include, “How often do you feel that you are no longer close to anyone?” and “How often do you feel that there are people who really understand you?”

Version 3 of the UCLA Loneliness Scale has been shown to be a reliable and valid measure of loneliness. According to Russell (1996), this 20-item scale has a Cronbach’s alpha

ranging from .89 to .94. In this study, the initial survey loneliness measure had an alpha of .94, and the final survey had an alpha of .96.

Perceived Well-Being

Perceived well-being was measured using the Perceived Well-Being Scale (PWB) (Reker & Wong, 1984) and the Cantril's Ladder of Life Scale (Cantril, 1965). The PWB scale is a 7-point Likert scale (1=Strongly Disagree, 7=Strongly Agree) that consists of 14 items. Six items measure psychological well-being, while the other eight measure physical well-being for a general well-being index. Six of the items were reverse-coded. Example items include, “No one really cares whether I am dead or alive” and “It is exciting to be alive.”

The PWB scale has been shown to be a reliable and valid measure of well-being. Reker and Wong (1984) reported that “Theta coefficients of .82 and .78 were obtained for the psychological and physical well-being dimensions, respectively. Internal consistency of the overall well-being index reached .91” (Reker & Wong, 1984, p. 25). Martín-María and colleagues (2020), who evaluated 28 different instruments that measure well-being, found that the PWB scale had a positive internal consistency rating, with the Cronbach’s alpha score falling between .70 and .98. In this study, the initial survey measure had a Cronbach’s alpha score of .78, and the final survey measure had a score of .77.

The Cantril's Ladder of Life Scale (Cantril, 1965) consists of one item. Participants were asked to imagine a ladder with nine rungs with the top of the ladder labeled as “best I could expect to have” and the bottom labeled as “worst I could expect to have.” They were then asked to indicate where they felt best represented their current well-being on the ladder.

Sense of Belonging

Participants' sense of belonging was measured using the Sense of Belonging Instrument-Psychological Experiences scale (SOBI-P) (Hagerty & Patusky, 1995). The SOBI-P was modified to a 7-point Likert-type scale (1=Strongly Disagree, 7=Strongly Agree) consisting of 18-items with one item reverse-coded. This instrument was developed to understand the level at which individuals feel like they belong and are involved in their lives. Example items include, "I am not valued by or important to my friends" and "I feel like a piece of a jig-saw puzzle that doesn't fit into the puzzle." It is important to note that higher scores on this measure indicate lower levels of belonging.

In past research, the SOBI-P showed Cronbach's alpha coefficients of .93, .93, and .91 for the three groups studied (Hagerty & Patusky, 1995). This study exhibited a Cronbach's alpha of .95 for the initial survey and a .97 for the final survey measure.

Perception of Media Richness

The Four Constructs of Media Richness scale (Ferry et al., 2001) was used to measure the perception of media richness. This scale was modified to a 7-point Likert-type scale (1=To No Extent, 7=To a High Extent) and condensed to consist of 12 items. Additionally, items were modified slightly to fit the context of the study, and four of the items were reverse-coded. For example, one item was altered from, "To what extent can you know immediately what others in your group think about your ideas?" to "To what extent were you able to know immediately what the person thought about your statements?" (Ferry et al., 2001). For this study, the measure had a Cronbach's alpha of .92.

Perceived Social Presence

Perceived social presence was measured using the Social Presence Scale (Seiter & Curran, 2021). This scale was modified to a 7-point Likert-type scale (1 = Strongly Disagree, 7=Strongly Agree) consisting of 7 items. Items were modified slightly to fit the context of the study. One of the items was altered from, “When chatting online I strongly feel the presence of my fellow conversationalist” to “When chatting over this media channel, I strongly felt the presence of my fellow conversationalist.” In this study, the measure had a Cronbach’s alpha of .93.

Results

Descriptive Statistics and Manipulation Check

All descriptive statistics can be found in Table 1, followed by a correlation matrix (Table 2). As a manipulation check, the researcher ran a one-way ANOVA and several Bonferroni post hoc tests to analyze the effects of the three different media channels on the perception of media richness.

A one-way ANOVA was performed to compare the effect of the three media channels (Zoom/video chat, phone call, and text/instant messages) on the perception of media richness. The one-way ANOVA revealed that there was a statistically significant difference in the perception of media richness between all three media channel groups ($F(2, 35) = 59.02, p = 0.00$). A Bonferroni post-hoc test for multiple comparisons found that the mean value of the perception of media richness was significantly different between the Zoom/video chat ($M = 6.29, SD = .51$) and phone call groups ($M = 5.06, SD = .51$) ($p < .01, 95\% C.I. = .47, 1.99$). A Bonferroni post-hoc test for multiple comparisons found that the mean value of the perception of media richness was significantly different between the Zoom/video chat and the text/instant

message groups ($M = 3.14$, $SD = 1.01$) ($p < .01$, 95% $C.I. = 2.41, 3.89$), and that the mean value of the perception of media richness was significantly different between the phone call and the text/instant message groups ($p < .01$, 95% $C.I. = 1.21, 2.63$).

Hypothesis Tests

The first hypothesis predicted that the individuals who interacted over the richer media channels would perceive higher social presence levels than individuals who communicated via less rich media channels. The results indicated partial support for this hypothesis. A one-way ANOVA was performed to compare the effect of the three different media channels (Zoom/video chat, phone call, and text/instant messages) on perceived social presence. The results revealed a statistically significant difference in the perceived social presence between all three media channel groups ($F(2, 35) = 8.96$, $p = 0.001$). A Bonferroni post-hoc test for multiple comparisons showed that the mean value of the perceived social presence was significantly different between the Zoom/video chat ($M = 5.36$, $SD = .99$) and the text/instant message groups ($M = 3.53$, $SD = 1.31$) ($p < .01$, 95% $C.I. = .60, 3.07$). In addition, the mean value of the perceived social presence was significantly different between the phone call ($M = 5.18$, $SD = 1.30$) and the text/instant message groups ($M = 3.53$, $SD = 1.31$) ($p < .01$, 95% $C.I. = .46, 2.83$). However, no statistically significant differences emerged between the perceived social presence among the Zoom/video chat and phone call groups ($p = 1.00$, 95% $C.I. = -1.07, 1.45$). Thus, H1 received partial support.

The second hypothesis predicted that individuals who interacted with a close relationship partner over a rich media channel would have more of a decrease in their perceived loneliness levels (pre-interaction to post-interaction) compared to those who communicated via less rich media channels. A repeated measures ANOVA was performed to compare the effect of the media channel (Zoom/video chat, phone chat, and text/instant message) on loneliness levels. No

statistically significant difference in loneliness levels emerged between any of the three groups ($F(2, 36) = .92, p = .41$). Thus, H2 was not supported.

The third hypothesis predicted that the individuals who interacted with a close relationship partner over a rich media channel would have more of an increase in their perceived well-being (pre-interaction versus post-interaction) compared to those who communicated via less rich media channels. Two repeated measures ANOVAs were performed to compare the effect of the media channel (Zoom/video chat, phone chat, and text/instant message) on well-being levels. For the PWB scale, there was no statistically significant difference in well-being levels between any of the three groups ($F(2, 36) = .26, p = .77$). For the ladder of life item, there was no statistically significant difference in well-being levels between any of the three groups ($F(2, 36) = .08, p = .92$). The results found that when analyzing well-being based on the ladder of life item, well-being decreased from the pre-interaction to the post-interaction. Thus, H3 was not supported.

The fourth hypothesis predicted that the individuals who interacted with a close relationship partner over a rich media channel would have more of an increase in their sense of belonging (pre-interaction versus post-interaction) compared to the those who communicated via less rich media channels. A repeated measures ANOVA was performed to compare the effect of the media channel (Zoom/video chat, phone chat, and text/instant message) on sense of belonging. There was no statistically significant difference in the sense of belonging levels between any of the three groups ($F(2, 36) = 1.30, p = .29$). H4 was not supported.

Discussion

This study aimed to understand how different richness levels of a media channel (video chat, phone call, and text messages) would impact individuals' loneliness, well-being, and

belongingness levels after interacting with a close relation. Contrary to the initial predictions, neither media richness nor social presence affected these variables. Even though statistically nonsignificant findings may seem inconsequential, these findings reveal two substantial conclusions: (1) all three media channels elicited different richness levels but not consistently different social presence levels, and (2) a single computer-mediated interaction is not enough to affect individuals' levels of loneliness, well-being, or sense of belonging.

All three media channels elicited different richness but not consistently different social presence levels. This finding suggests that media richness has a ceiling effect on social presence, whereby increasing richness to media channels results in increasingly diminishing returns to the amount of social presence that can be conveyed through video. That is, there seems to be a point where increasing richness no longer affects the levels of social presence perceived. Interacting over the phone or video chat appears to convey more social presence than texting alone. However, there was no increase in the level of social presence perceived with the addition of a video component since the phone and video chat groups perceived no statistically significant difference.

Previous studies have shown mixed results regarding the impacts of a visual component on social presence. For example, a systematic review of 152 studies on the factors that predict social presence showed that “the addition of video does not consistently increase one’s sense of social presence, [which] suggest[s] that once a threshold is met, increasing the immersive quality of a modality does not automatically lead to increased social presence” (Oh et al., 2018, p. 20). The researchers explained that the nature of a task and the exact sensory components required by a task seem to moderate perceived social presence (Oh et al., 2018). Specifically, tasks that

require visual elements affect perceived social presence more than tasks that require audio components alone (de Greef, 2014).

Because the task given to the participants in this study did not require constant visual attention (even when communicating over video chat), the visual components may not have affected perceived social presence very much. Notably, social presence theory does not appear to provide a complete explanation for these results. The theory argues that the level of social presence perceived during an interaction is mainly affected by the number of verbal and nonverbal cues a media channel can transmit at a given time because these factors affect perceived immediacy and intimacy (Short et al., 1976). While the theory mainly implicates the channel of communication as the primary source of fluctuation in perceived social presence, the current findings show that the channel of communication may not be as relevant as it was in the late 1970s. Rather, the current findings suggest that modern technological channels of communication are far more sophisticated at helping people convey social presence than they were when the theory was created. Thus, the theory may be in need of some revision and updating to better reflect the affordances of current social technologies.

Considering the technologically saturated nature of modern interpersonal interaction, close relationship partners might not focus on their partners' behaviors as much when they interact via video chat, because they are already familiar with each other's nonverbal behaviors and may not need to attend to their meanings as closely as they would if they had less familiarity with each other. In fact, one recent study found that within close friendships, "video chat and phone calls serve similar purposes—to engage in synchronous, cue-rich (relative to text messaging) conversations" (Ruppel et al., 2018, p. 1575). Since video chat and phone calls tend to serve the same function, close relationship partners may use those media channels not only as

consistent replacements for face-to-face interaction but also as equal substitutes for each other. If true, this could explain why no difference would be found in perceived social presence levels between those channels. Either way, more research is needed to better understand the contexts in which including visual components can affect the social presence felt and to test the continued applicability of social presence theory to modern, technologically-laden social environments.

The other conclusion of the current study is that a single computer-mediated interaction is not enough to affect individuals' levels of loneliness, well-being, or sense of belonging. Notably, the participants who volunteered for this research began the study with relatively low loneliness levels and high levels of well-being and belonging. For such individuals, one single interaction with a close relationship partner is probably of not much benefit, regardless of whether they communicate with that partner via rich or lean media channels. Metaphorically speaking, if an individual is already well-hydrated, drinking one glass of water or Gatorade will not benefit them much, if at all. However, if an individual is dehydrated, then one glass of water will make a substantial difference to their body, and the Gatorade would be even more beneficial than the water due to the number of electrolytes. So, for individuals with high levels of loneliness, low well-being levels, and a lower sense of belonging, one interaction with a close relation is going to benefit them significantly more, and the richness of the media channel might make a difference. If an individual is depleted and needs that social interaction, a video chat or phone call should elicit the social presence levels (like the electrolytes) necessary to benefit them the most. More research is needed to better understand the contexts in which online interactions over various media channels can benefit individuals.

Demographically, the majority of the participants were married or living with a significant other (75%). Additional examination of the data indicated that the majority of the

participants interacted with a close friend (47.5%), followed closely by a family member (42.5%) and a spouse or significant other (10%). The combination of that information indicates that a remarkably large number of the participants have several relationships with people they consider close to them. Although assumptions cannot be made about the quality of all their relationships, 60% of participants described their relationship with the person they interacted with as very close (7 out of 7 on a closeness scale), followed by one scale below very close (30%; 6 out of 7), and two scales below close (10%; 5 out of 7). So, most of the participants were married or living with a significant other and had at least one relationship they would describe as very close. For these participants, the one computer-mediated interaction would be just like a hydrated person drinking one glass of water or Gatorade.

Future research should thus focus on more physically isolated populations, such as people in nursing homes or prisons. The media channel might make more of an impact if individuals are more isolated from daily contact or removed from all of the interpersonal relationships they once valued. People who are not just physically isolated but also socially isolated, such as neurodivergent individuals, might also be important to study with the research questions addressed here because these individuals tend to have fewer close ties and may benefit from maintaining relationships over less rich media channels. Another area for future research is to look into the creation of new relationships over computer-mediated technology. Using richer media channels and perceiving higher social presence may be even more vital for budding relationships, whether platonic or romantic. Finally, focusing on the types of tasks or conversations that impact whether or not the addition of a video component increases social presence seems particularly relevant today.

Limitations

Although the findings of this study offer a number of heuristics for future research, several limitations exist within this study and give reason for caution when interpreting the results. First, the participants do not reflect a particularly diverse demographic. The majority of the participants described themselves as straight white Christian females with a bachelor's or master's degree whose annual household income exceeded \$50,000. Thus, these findings cannot extend beyond that group, even though the results and experience of this specific group of individuals can guide and inform future research.

Second, the study had a low completion rate, which indicates that the findings may be based on a group of people who had a certain degree of motivation to participate that is different from those who did not complete the study. For example, the participants were required to finish three separate parts of this study (initial survey, interaction, final survey) drawn out over a week. Out of the 274 participants who began the initial survey, only 87 (31.8%) completed it, and of those, only 41 (47.1%) completed the interaction and final survey. Overall, 40 responses were viable for analysis. The laboriousness of the media conditions (participants seemed to have found it easier and/or quicker to complete the study when assigned to the texting condition) may have contributed to this challenge. Thus, future studies should not only pursue more isolated or lonely populations but also find ways to increase the probability of completion by participants, whether through greater incentive for participation, ease of participation, or both.

Conclusion

Overall, this study illustrates that media channels (i.e., Zoom/video chat, phone call, and text/instant messages) have different levels of media richness. However, richness does not directly correlate with social presence, and certain channels seem to be better at conveying social

presence than others. Notably, the specific parameters of an interaction seem to determine if the visual component of the given channel will influence an interactant's perceived level of social presence. The findings suggest that when individuals who feel close to each other interact via video chat, they might not focus on their partners' behaviors as much because they are already familiar with each other's nonverbal behaviors.

Although the results did not work out entirely as predicted, one might find the implications somewhat comforting. Even though people may have strong preferences for one channel over another, the findings suggest that, at least for a healthy, nonlonely population, any channel of communication examined here is neither better nor worse than any other in terms of its effects on short-term loneliness, sense of belonging, and subjective well-being. The current findings may be beneficial for future researchers who might conduct similar studies on people who are experiencing more significant deficits in their social lives (i.e., greater isolation and/or loneliness).

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APPENDICES

Appendix A

Email from Researcher

Hello *name*,

My name is Ashley Arsenault, and I'm a researcher from the University of Montana. Within the last 24 hours, you completed an initial survey and consented to participate in my research study. I really appreciate you being willing to take the time to help with my project. You will be asked to complete two more parts for this study. You will have 7 days from when you completed the initial survey to complete the interaction and submit the final survey. You have until this date to complete the final survey.

Part 2 consists of an interaction with a close friend or family member of your choosing. Please communicate with this person over this media channel. For this interaction, please discuss the five questions below.

1. Given the choice of anyone in the world, whom would you want as a dinner guest?
2. What would constitute a perfect "day" for you?
3. When did you last sing to yourself? To someone else?
4. For what in your life do you feel most grateful?
5. If you could wake up tomorrow having gained any one quality or ability, what would it be?

Please interact with your close friend or family member as naturally as possible given the media channel you were given. Feel free to discuss as much or as little as you want and do not push the person you are interacting with to be more detailed than they normally would be. Try the best you can to communicate naturally with this person. If they ask, you may mention that this is part of a research study, but please do not give them any more details.

Part 3 consists of a survey. Once you have completed the interaction (discussed the 5 questions above with a close friend or family member over the given media channel), complete this final survey. [https://umt.co1.qualtrics.com/jfe/form/SV_6AyzZzwYOvayxuu?Login%20ID=\\${e://Field/Login%20ID}](https://umt.co1.qualtrics.com/jfe/form/SV_6AyzZzwYOvayxuu?Login%20ID=${e://Field/Login%20ID})

Your Login ID for the survey is: 7-digit number given by Qualtrics at end of initial survey.

I appreciate your time and effort in trying to better understand how interacting over different media channels may impact people and their relationships. If you have any questions or concerns about what you are being asked to do, feel free to email me.

Thank you!

Ashley

Appendix B

Creating Closeness Interaction

Set I - 5 of the 12 questions that would elicit the most positive interaction

1. Given the choice of anyone in the world, whom would you want as a dinner guest?
2. What would constitute a perfect “day” for you?
3. When did you last sing to yourself? To someone else?
4. For what in your life do you feel most grateful?
5. If you could wake up tomorrow having gained any one quality or ability, what would it be?

TABLES

Table 1
Descriptive Statistics for Variables

	Frequency	Percent	Mean (SD)	α
Loneliness (UCLA Loneliness Scale)			2.98 (.87)	.94
Well-Being (PWB Scale)			5.12 (.79)	.78
Well-Being (Ladder of Life Item)			7.93 (1.31)	-
Sense of Belonging (SOBI-P)			2.73 (1.17)	.95
Post Loneliness (UCLA Loneliness Scale)			2.91 (.91)	.96
Post Well-Being (PWB Scale)			5.21 (.73)	.77
Post Well-Being (Ladder of Life Item)			5.03 (.74)	-
Post Sense of Belonging (SOBI-P)			2.60 (1.25)	.97
Media Richness (Media Richness Scale)			4.71 (1.49)	.92
Social Presence (Social Presence Scale)			4.62 (1.46)	.93
Zoom/Video Chat	11	28.2%		
Phone Call	14	35.9%		
Text/Instant Messages	14	35.9%		

Table 2
Correlation Matrix for Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Loneliness (UCLA Loneliness Scale)	-	-.45**	-.44**	.81**	.93**	-.54**	.12	.82**	-.09	.04
2. Well-Being (PWB Scale)		-	.45**	-.46**	-.38*	.91**	.10	-.44**	-.03	-.05
3. Well-Being (Ladder of Life Item)			-	-.51**	-.41**	.49**	-.13	-.44**	.04	-.11
4. Sense of Belonging (SOBI-P)				-	.85**	-.56**	.09	.94**	-.21	-.02
5. Post Loneliness (UCLA Loneliness Scale)					-	-.50**	.14	.88**	-.15	.04
6. Post Well-Being (PWB Scale)						-	.08	-.56**	.02	-.14
7. Post Well-Being (Ladder of Life Item)							-	.10	-.06	-.08
8. Post Sense of Belonging (SOBI-P)								-	-.18	-.03
9. Media Richness (Media Richness Scale)									-	.78**
10. Social Presence (Social Presence Scale)										-

*p < .05. **p < .01.

Table 3

Means, Standard Deviations, and Summary of One-Way Analyses of Variance and Repeated Measures Analyses for Variables (H1, H2, H3, H4)

Measure	Pre-Interaction		Post-Interaction		<i>F</i> (2, 36)	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Loneliness (UCLA Loneliness Scale)	2.99	.88	2.91	.91	.92	.41
Zoom/Video Chat Group	2.92	.86	2.75	.84		
Phone Call Group	2.84	.79	3.73	.83		
Text/Instant Message Group	3.20	1.00	3.21	1.03		
Well-Being (PWB Scale)	5.21	.80	5.21	.73	.26	.77
Zoom/Video Chat Group	5.06	.97	5.29	.71		
Phone Call Group	5.24	.75	5.30	.73		
Text/Instant Message Group	5.06	.74	5.07	.78		
Well-Being (Ladder of Life Item)	7.95	1.32	5.03	.74	.08	.92
Zoom/Video Chat Group	8.00	1.48	5.09	.30		
Phone Call Group	8.07	1.33	4.93	1.21		
Text/Instant Message Group	7.79	1.25	5.07	.27		
Sense of Belonging (SOBI-P Scale)	2.70	1.16	2.60	1.25	1.30	.29
Zoom/Video Chat Group	2.43	1.24	2.35	1.25		
Phone Call Group	2.51	.84	2.39	.98		
Text/Instant Message Group	3.10	1.34	3.02	1.46		
Measure	Pre-Interaction		Post-Interaction		<i>F</i> (2, 35)	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Perceived Media Richness (Media Richness Scale)			4.71	1.49	59.02	.00
Zoom/Video Chat Group			6.29	.51		
Phone Call Group			5.06	.51		
Text/Instant Message Group			3.14	1.01		
Perceived Social Presence (Social Presence Scale)			4.62	1.46	8.96	.00
Zoom/Video Chat Group			5.36	.99		
Phone Call Group			5.18	1.30		
Text/Instant Message Group			3.53	1.31		