

Can a Text Message Influence Our Perceptions of the Physical World?

Text Messaging as a Prime for Social Support

Honors Thesis

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Abstract

Previous research has found that a psychosocial resource, social support, affects a person's perception of physical burdens, particularly the steepness of geographical slants. In fact, there is a decrease in the perceived steepness of a geographical slant when a person is in the physical co-presence of another person or after an extended period of visualization of a supportive other. The present study replicated and extended previous findings to test whether the brief activation of a supportive other by sending a text message to them affects subsequent judgments of a geographical slant. Participants who sent a text message to a friend judged a hill to be less steep than did those who were in the physical co-presence of a friend. Even after controlling for relationship duration and strength, a media effect remained. This suggests that a text message serves as a purer prime to activate the idea of a supportive other, which includes the qualities that are most relevant to the task at hand. In comparison, the prime of a physically co-present friend may elicit a broader array of qualities that might or might not be useful to the task at hand, thus diluting the effectiveness of the prime overall.

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The world is a place filled with burdens and uncertainties, both physically and mentally. Understanding how our perceptions of the physical world are formed and how other aspects of our lives affect these perceptions shed light on the dynamic relationship between ourselves, our environment and our relationships. In a society that has become increasingly connected through technology in recent years, our connections with others are often maintained in the absence of physically presence. From text-messaging, to voicemails, to Facebook wall-posts, the way in which we conduct our relationships is rapidly changing. Text-messaging is a prime example of a new technology that has surged in popularity. According to a recent PEW study (Smith, 2011), a typical 18-24 year old cell phone owner sends and receives approximately 50 messages per day. As the current generation continues to rely heavily on text-messaging as a central method of communication, a deeper understanding of the role that technology plays in providing social support is becoming increasingly important.

Social support is a critical aspect of our relationships and is characterized by the benefits that are gained from personal affiliations that provide comfort, assistance and a sense of belonging, which ultimately decrease stress levels and perceptions of physiological burden, while increasing physical and mental well-being (Kaplan, Cassel & Gore, 1977). The presence of social support serves as a buffer to the stresses of life and protects against the negative physiological and psychological effects of high levels of stress (Cohen & Hoberman, 1983; Cohen & Wills, 1985).

Recent evidence has shown that the presence of social support can have a number of physical benefits, particularly in terms of reactivity to stressors. The presence of social support

can protect against stress-related illnesses, such as the common cold, coronary heart disease and cancer (Cohen, Doyle, Turner, Alper & Skoner, 2003; Lett, Blumenthal, Babyak, Strayman, Robins, & Sherwood, 2005; Fawzy et al., 1993), reduce pain ratings in cold-presser tasks (Brown, Sheffield, Leary & Robinson, 2003) and decrease the risk for developing dementia and Alzheimer's disease (Amieva, Stoykova, Matharan, Helmer, Antonucci & Dartigues, 2010).

It is important to note, however, that the physical benefits associated with social support are primarily manifestations of the psychological benefits (i.e. feelings of belonging, connectedness, and competence), rather than sources of instrumental assistance (Schnall, Harber, Steffanucci & Proffitt, 2008). In effect, the presence of a supportive other reduces the burden associated with stress-inducing occurrences. In fact, a study by Master, Eisenberger, Taylor, Naliboff, Shirinyan & Lieberman (2009) found that mere exposure to a photograph of a support figure reduces ratings of induced pain, suggesting that the psychological effects of something as abstract as a photograph can have a significant effect on physical realities.

Social support and physical perceptions

To extend previous findings that visual perceptions of the physical world are influenced by physiological resources, such as fitness and age (Proffitt, Bhalla, Gisswieler & Midgett, 1995), Schnall et al. (2008) examined the effect of psychosocial resources, in the form of social support, on visual perceptions of the physical world. This study focused on the effect of the physical co-presence of a friend on a person's perception of a geographical slant. The researchers used the geographical slant (a hill) to serve as an imposed burden. Participants were recruited as they passed the experimental location either 1) alone (low-support condition) or 2) in a friend pair (high-support condition). Participants were given a backpack weighing 20% of their body weight

and stood at the base of the hill where they were asked to estimate the steepness of the slope. The central finding of the study was that participants in the condition with a friend physically co-present estimated the hill to be significantly less steep than those participants who judged the hill while alone. The researchers concluded that the presence of a friend had a significant effect on how a physical burden was perceived.

An important concern, however, is that the effect may have been due simply to social facilitation, in which the mere presence of another improves the performance of non-complex tasks (Zajonc, 1965). That is, the friend standing physically nearby was not activating psychosocial support for the participant, but instead improving their perceived ability to climb the slope. To rule out the effect of social facilitation, Schnall et al. (2008) conducted a second study. This study explored the effect of the imagined presence of a supportive relationship on participants' perception of the perceived burden of the hill.

To address the question, an 'imagined other' procedure was implemented in which the participants underwent a 2-minute relaxation phase prior to the imagining task. During the imagining task, the participants were instructed to imagine one of the following: 1) a positive support (someone of personal great importance, who made them feel good and who would provide help in a difficult situation), 2) a neutral support (someone who they encounter frequently, but do not know personally), or 3) a negative support (someone who was once important to them, but betrayed or disappointed them in a time of need). Then, the participants underwent the hill estimation procedure outlined in Study 1. The results showed that participants who had visualized a positive support person viewed the hill as less steep than did those in the neutral or negative conditions. The researchers concluded that is not merely the presence of another person that affects the perception of a geographical slant. Instead, simply imagining a

positive relationship can activate psychosocial resources that affect perceptions of a challenge in the physical world. Social support, even when not physically present, can have important effects on one's perceptions.

The present study

Overall, the studies by Schnall et al. (2008) illustrate that psychosocial resources (by way of social support) affect perceptions of the physical world and its burdens. The present study directly compares the degree to which being physical co-present or simply imagining a friend provides psychosocial resources sufficient for reducing perceptions of a slope. Through a replication of the slope estimation procedure, we extend the findings of the work of Schnall et al. (2008) in order to explore whether simply text messaging a friend can activate the psycho-social resources required to alter perceptions of a geographical slant.

In a society that is intimately connected to technology, a deeper understanding of the potential psycho-social resources that the virtual world can provide is important. In line with Study 2 of Schnall et al (2008), previous literature on online support groups provides evidence that physical co-presence is not necessary to provide substantial psycho-social resources (Wright & Bell, 2003). A meta-analysis of 28 studies evaluating health outcomes associated with participation in computer-mediated support groups (CMSG) revealed that a CMSG intervention led to decreased depression, increased social support and increased quality of life (Rains & Young, 2009).

The present study explores the link between the physical and virtual nature of social support, particularly through the use of text-messaging. Specifically, can the simple act of selecting a friend and then sending them a text message activate the psycho-social resources that are

responsible for the effect on perceptions of the physical environment? One possibility is that this simple prime is sufficient to activate the psychosocial resources required to affect slant estimates similar to the effect produced by having a friend stand nearby. Another possibility is that the act of texting a friend will have a more powerful effect than a co-present friend. Research on categorical thinking suggests that imagining or recalling other people may activate the social categories to which they belong, a process that serves to streamline mental processing (Macrae & Bodenhausen, 2000). For example, it may be cognitively easier to think of someone as a female, rather than all the individual characteristics that make up the person. In the present study, sending a text message to a friend may prime the social categories the friend represents that are most salient for the given context. In this context of estimating a steep slope with a heavy backpack on, texting a friend should prime descriptors such as helpful, supportive, or caring (Lepore & Brown, 1997).

While both the physically co-present and texted friend should prime social support, the physically present friend may also prime other more individuated aspects of that friend, which may or may not be relevant to the task at hand. That is, a physically co-present friend may activate concepts beyond those related to social support, potentially diluting the pure ‘friend’ prime relative to the activation from texting a friend. Given the brief nature of the text messaging priming event, the descriptors activated are those that are most relevant to the task at hand—facing a physical burden while wearing a heavy backpack. Thus, the simple act of text messaging serves as a purer prime to activate the category of ‘friend’. If this is the case, then the social support activated by text messaging should have a more powerful effect on perceptions of hills in the physical world compared to having a friend physically co-present.

Methods

Participants

One hundred and eighteen students (63 female; mean age: 20 years old) from Cornell University participated in the current study. They were recruited by the researcher as they passed the hill used for this experiment. Those who were walking in pairs were recruited together and all others were recruited individually.

Stimuli

One hill (29.8 degrees) on the campus of Cornell University in Ithaca, New York.

Apparatus

Participants judged the slant of the hill verbally and visually. For the verbal estimates, participants reported the hill slant by writing it down on a piece of paper. As a reference, they were told that 0 degrees represented a flat surface and 90 degrees represented a vertical cliff. For the visual estimates, participants adjusted a protractor (with degree measurements covered) to match their judgment of the slant (Figure 1). The visual and verbal estimates were highly correlated ($r = .54, p < .001$). Only the visual estimates are reported here.

Weighted Backpack

Since overestimation of hill slopes is fairly common even when unburdened (Bhalla & Proffitt, 1999), the use of a weighted backpack increases overestimation. As described by Schnall et al. (2008), if social support serves as a resource against burdens, then the presence of support should counter the additional burden of the weights, making the natural overestimation more apparent. Each participant wore the weighted backpack for the duration of the experiment. The backpack contained hand weights approximating 20% of the participant's body weight. Based on previous research, this amount of additional weight simulates a burden, but does not cause discomfort or back strain (Bhalla & Proffitt, 1999).

Procedure

Participants were informed that they would be participating in a multi-tasking experiment and would receive a candy bar for their participation. Once informed consent was obtained, participants (either alone or in pairs) were escorted to the base of the hill being used in the experiment. Participants recorded their body weight on a piece of paper and the researcher filled the backpack with weights equaling 20% of the participant's indicated body weight. Additionally, there was no mention of whether or not the participant would have to walk up the slope.

Participants walking alone were randomly assigned to one of the 3 other conditions: (1) writing a provided message to themselves in the notepad section of their cell phone (Physically Alone), (2) texting a provided message to 'the person they generally text the most (Texting Friend), (3) texting a provided message to an unknown 'Lab' phone number (Texting Non-Friend). Participants walking in friend pairs were recruited together and were placed in the 'physically present friend' condition. (4) The individuals each wrote a provided message to themselves in the notepad section of their cell phone while the other friend stood several feet away and faced the opposite direction (Physical Friend). See Table 1 for a summary of conditions.

After participants completed the provided message based on the assigned condition, they made their estimates of the slope verbally and visually (as described above). Following the estimates, participants were given a follow-up questionnaire which assessed their mood, physical condition (in general and on that day). In the social support conditions (texting a friend or physical co-presence of a friend), the survey contained additional questions about the participant's relationship to the receiver, the time known the receiver, the gender of the receiver,

the level of friendliness and closeness to the receiver, the frequency of interaction, overall feelings toward the friend and willingness to ask for advice/help. In the text-messaging a friend condition, additional survey questions addressed the participant's frequency of text-messaging and attitudes toward text messaging.

Results

Analytic Approach

The visual estimates of the slope in degrees were analyzed with a General Linear Model (GLM) with three between-subjects factors: social condition (alone vs. partner), media condition (physical vs. texting) and gender (male vs. female). Gender was included in the model because previous research found that women judge hills more steeply than men (Proffitt et al.,1995). In the present data, this was also the case (males: $M = 41.89$, $SE = 1.26$; females: $M = 44.69$, $SE = 1.17$), however the difference did not achieve significance, $F(1, 113) = 2.57$, $p = .11$. Gender did not interact with any of the other factors and is not reported on further.

Social Support

Replicating previous research by Schnall et al. (2008), participants estimated the slope to be less steep in the partner condition ($M = 39.61$ degrees, $SE = 1.24$) than in the alone condition ($M = 46.96$, $SE = 1.24$), $F(1, 113) = 18.16$, $p < .001$, $\eta^2 = .14$. The change in slope perception was evident in both the physical ($t(57) = -2.11$, $p < .05$) and texting conditions ($t(55) = -4.44$, $p < .001$). In fact, the effect of media was not significant, $F(1, 113) = 1.40$, ns , suggesting that social support decreased slope perceptions regardless of medium.

The main effect of the social condition was qualified, however, by a significant interaction between the media and social factors, $F(1, 113) = 4.17$, $p < .05$, $\eta^2 = .04$. As described in Figure 2, there was no difference between the texting and physical conditions when the participant was physically alone or texted the lab before judging the slope, $t(55) = .63$, ns . In

the social condition, however, participants that texted a friend estimated the slope to be significantly less steep than participants that had a friend physically co-present, $t(155) = 18.16$, $p < .001$, suggesting that the support effect was more powerful in the texting condition.

Relationship Duration

Did relationship strength to the friend in the social condition underlie the effect of support on slope perception? The duration of the relationship (in months) was correlated with the slope estimates for participants in the partner conditions. There was a negative association between friendship duration and the visual estimates, $r(61) = -.25$, $p = .057$. The longer friends knew one another, the less steep the slope appeared.

The duration of the relationships differed, however, across the two media conditions, $F(1, 59) = 9.13$, $p < .01$, $\eta^2 = .13$. Participants in the texting condition ($M = 50.71$, $SE = 8.49$) reached out to friends that they had known for longer than participants in the physical condition ($M = 14.13$, $SE = 8.63$). Could this relationship difference across the two media condition underlie the interaction effect of media and partners on slope perception? To test this question, the duration of the relationship was entered as a covariate in an ANOVA comparing the texting and physical condition. When relationship duration was controlled for, the media effect remained marginally significant, $F(1, 58) = 2.87$, $p = .09$, $\eta^2 = .05$, while the effect of relationship duration was not significant, $F(1, 58) = .83$, *ns*. This pattern of results suggests that the enhanced support effect for participants in the texting condition relative to the physical condition cannot be explained completely by the relationship difference across the two conditions.

Physical Ability

Previous studies suggest that physical fitness can affect slope perceptions. To assess whether physical fitness played a role in the present results, participants' self-reported physical

fitness for the day of testing and their general fitness level were compared across conditions. The descriptive data for physical condition are presented in Table 2. The ANOVA revealed no differences across the media or social conditions were observed (p 's $> .19$). Further, physical condition was not correlated with the slope estimates (p 's $> .74$).

Mood

To test whether the media and social conditions differed in self-reported mood, item ratings (angry, sad, depressed, anxious, stressed, and happy reverse-coded) were averaged into a composite index, $\alpha = .80$. The descriptive data for mood are presented in Table 2. The ANOVA revealed no differences across the media or social conditions emerged for mood (p 's $> .16$), nor did mood correlate with the slope estimates ($r = -.12, ns$). Taken together, these data suggest that mood did not play a role in the slope estimates.

Discussion

The results of the present study are consistent with and extend beyond the findings of Schnall et al. (2008). When participants had a friend physically co-present, they judged the hill as less steep than did those who made the judgments while physically alone. In line with previous findings, the current study confirms that relationship duration and strength do help to explain this effect. It is the presence of a *supportive* relationship, not just the mere presence of another person that accounts for the decrease in estimates of hill slants, which is consistent with the findings of Study 2 of Schnall et al. (2008). Further, when participants text-messaged a friend, they judged the hill as less steep than those who had a friend physically co-present. In other words, the *physical* presence of another person is not solely responsible for the decrease in perceived steepness of the hill. Additionally, this finding provides evidence against the notion that extended visualization of a positive, supportive other is necessary to create this effect. The brief

act of text messaging seems to be a strong enough prime to elicit the mental presence of the supportive relationship, which provides the social support that affects the perception of the physical burden. According to the findings, the partner that participants texted most often tended to be people with whom the strongest and longest relationships existed, as compared to the relationship with the partner that was physically co-present. Interestingly, even after controlling for the effect of relationship duration and strength, the effect of media remains marginally significant. This suggests that the very nature of sending a text-message has a stronger effect beyond just the mental activation of a supportive relationship. This is consistent with the hypothesis that sending a text to a friend primes the most salient aspect of the person (i.e. helping) that is relevant to the task at hand.

According to the Social identification deindividuation (SIDE) model, the absence of a variety of individuating cues in computer-mediated communication allow for a select few cues to become more salient (Spears & Lea, 1994). As a result, this theoretical foundation indicates that social roles can become more robust in a CMC environment, compared to a face-to-face interaction (Boucher, Hancock & Dunham, 2008). In the case of the current study, rather than view the texting partner as a specific person (of a particular relationship duration or strength), the participant views the texting partner as a supportive or helpful friend in general, since it is the most relevant characteristic to the burdensome task at hand.

The current study only addresses the use of text-messaging as a prime for social support. It is possible that there may be other ways to elicit this effect. We question whether text-messaging is the bare-minimum prime needed. In connection to the previous work by Schnall et al. (2008), we see that extended visualization of a supportive other is not necessary, but could a brief e-mail or a short Facebook wall-post provide the same, or stronger, effect? Further research is needed in

order to examine the lowest possible boundary to activate such a result. Consistent with previous work within psychology of media field, it is possible that interactions formed in other CMC settings are intensified given the nature of interpersonal relationships in a virtual setting (Hancock & Dunham, 2001).

With further research examining the possible lower boundary of activation and the effects beyond influence on perceptions of the physical environment, this study can have many practical implications. Given that the current findings suggest that text-messaging serves as a pure prime to activate the image of a supportive relationship, the method of sending a text to a friend prior to a stressful event could potentially be developed into an intervention tool to help ease the intensity of emotional and physical burdens that people face on a daily basis.

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Figure 1. Image of Protractor used to make visual estimate

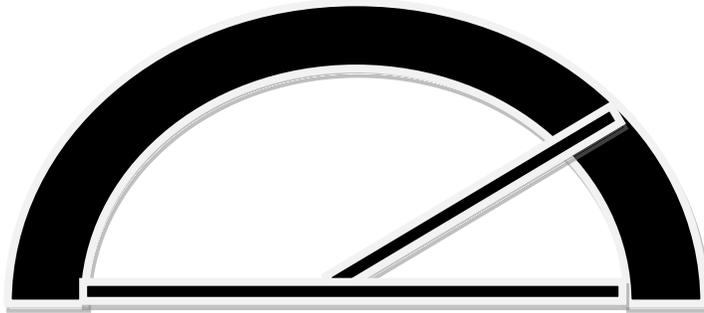


Figure 2. Mean Slope as a Function of Partner and Media Condition

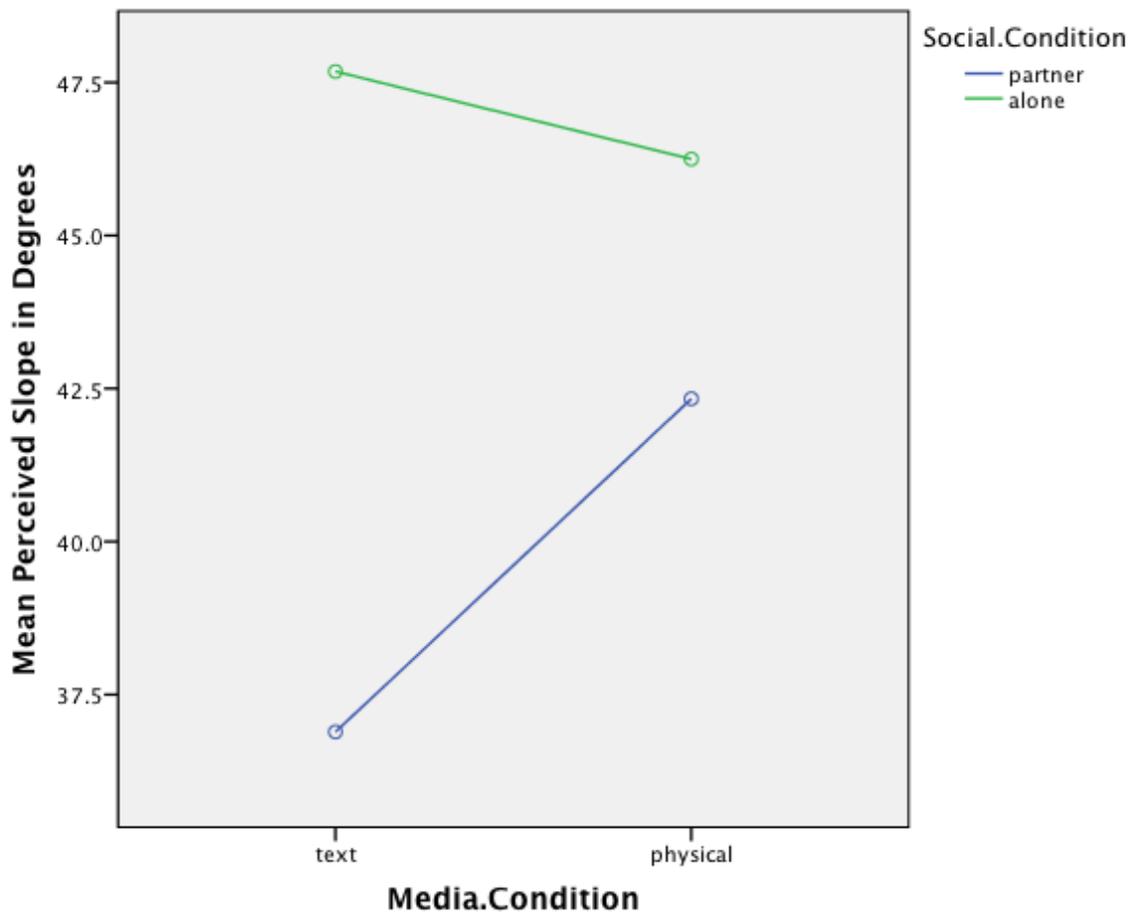


Table 1. Summary of the 4 treatment conditions

	<i>Media (Present)</i>	<i>Media (Absent)</i>
<i>Social Support (Present)</i>	Send message to “person texted most often” (Text Friend)	Write message in notepad section of phone while other stands nearby (Physical- Friend)
<i>Social Support (Absent)</i>	Send message to unknown ‘Lab’ number (Text Non-friend)	Write message in notepad section of phone (Physical- Alone)

Table 2. Descriptive Statistics of Current and General Physical Condition and Mood across Media and Social Conditions

	Alone		Partner	
	Text	Physical	Text	Physical
	<u>Mean (SE)</u>	<u>Mean (SE)</u>	<u>Mean (SE)</u>	<u>Mean (SE)</u>
Current Physical Condition	2.821 (0.213)	2.759 (0.209)	2.690 (0.209)	2.900 (0.206)
General Physical Condition	3.071 (0.212)	2.621 (0.209)	3.000 (0.209)	2.900 (0.205)
Mood	1.980 (0.125)	1.917 (0.123)	2.207 (0.123)	1.922 (0.121)

Appendix A. Informed Consent

You are being asked to take part in a research study of how people multitask. We are asking you to take part because you were a passerby near our research site. Please read this form carefully and ask any questions you may have before agreeing to take part in the study. Please call Professor Jeffrey T. Hancock at (607) 255- 4452 if you have any questions.

What the study is about: The purpose of this study is to learn how multi-tasking affects perceptions of challenges.

What we will ask you to do: If you agree to be in this study, we will ask you to complete two tasks: a technology task and a perceptual task.

Risks and benefits: We do not anticipate any risks to you participating in this study other than those encountered in day-to-day life. There are no direct benefits for participants.

Compensation: You will receive a candy bar for participating in this study. Participation will last approximately 7 minutes.

Taking part is voluntary: Taking part in this study is completely voluntary. You may skip any questions that you do not want to answer. If you decide to take part or to skip some of the questions, it will not affect your current or future relationship with Cornell University. If you decide to take part, you are free to withdraw at any time.

Statement of Confidentiality: Your participation in this research is confidential. Your name will not be connected to any of your responses. The data will be stored and secured in Kennedy Hall in a locked file. In the event of a publication or presentation resulting from the research, no personally identifiable information will be shared.

If you have questions: The researcher conducting this study is Prof. Jeff Hancock. Please ask any questions you have now. If you have questions later, you may contact Prof. Hancock at jth34@cornell.edu or (607) 255-4452. If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Institutional Review Board (IRB) at (607) 255-5138 or access their website at <http://www.irb.cornell.edu>. You may also report your concerns or complaints anonymously through the Ethicspoint website: <http://www.ethicspoint.com/> or by calling toll free at 1-866-293-3077. Ethicspoint is an independent organization that serves as a liaison between the University and the person bringing the complaint so that anonymity can be ensured.

You will be given a copy of this form to keep for your records.

Statement of Consent: I have read the above information, and have received answers to any questions I asked. I consent to take part in the study.

Your Signature _____ Date _____

Your Name (printed) _____

Signature of person obtaining consent _____ Date _____

Printed name of person obtaining consent _____ Date _____

Appendix B. Survey for Text Alone and Physical Alone Conditions

1. Age : _____(in years)
2. Gender: Male or Female
3. Have you ever taken a human perception course? Yes or No
4. Mood: Rate your mood on a scale from 1 to 5 (1 being not at all and 5 being a great degree) for the following moods:

	not at all				a great degree
Happy	1	2	3	4	5
Anxious	1	2	3	4	5
Stressed	1	2	3	4	5
Depressed	1	2	3	4	5
Angry	1	2	3	4	5
Sad	1	2	3	4	5

5. Please rate your general physical condition on a scale of 1 to 6 (1 being excellent and 6 being poor)

	excellent					poor
General Physical Condition:	1	2	3	4	5	6

6. Please rate your physical condition today on a scale of 1 to 5 (1 being excellent and 5 being very unwell)

	excellent				very unwell	
Physical condition today:	1	2	3	4	5	6

7. How long ago was your last conversation? _____

8. What medium was it in?

Phone

Text

Face to Face

Facebook

I would be sorry if the
texting feature on mobile phones shuts down. 1 2 3 4 5

I am more likely to text than
call when using my mobile phone. 1 2 3 4 5

I feel out of touch when I
haven't texted anyone in a while. 1 2 3 4 5

My use of texting has caused
me problems. 1 2 3 4 5

8. Age : _____(in years)

9. Gender: Male or Female

10. Have you ever taken a human perception course? Yes or No

11. Mood: Rate your mood on a scale from 1 to 5 (1 being not at all and 5 being a great degree) for the following moods:

	not at all				a great degree
Happy	1	2	3	4	5
Anxious	1	2	3	4	5
Stressed	1	2	3	4	5
Depressed	1	2	3	4	5
Angry	1	2	3	4	5
Sad	1	2	3	4	5

12. Please rate your general physical condition on a scale of 1 to 6 (1 being excellent and 6 being poor)

	excellent				poor	
General Physical Condition:	1	2	3	4	5	6

13. Please rate your physical condition today on a scale of 1 to 5 (1 being excellent and 5 being very unwell)

	excellent				very unwell	
Physical condition today:	1	2	3	4	5	6

14. How long ago was your last conversation? _____

15. What medium was it in?

Phone

Text

Face to Face

Facebook

8. Age : _____(in years)

9. Gender: Male or Female

10. Have you ever taken a human perception course? Yes or No

11. Mood: Rate your mood on a scale from 1 to 5 (1 being not at all and 5 being a great degree) for the following moods:

	not at all				a great degree
Happy	1	2	3	4	5
Anxious	1	2	3	4	5
Stressed	1	2	3	4	5
Depressed	1	2	3	4	5
Angry	1	2	3	4	5
Sad	1	2	3	4	5

12. Please rate your general physical condition on a scale of 1 to 6 (1 being excellent and 6 being poor)

	excellent					poor
General physical condition:	1	2	3	4	5	6

13. Please rate your physical condition today on a scale of 1 to 5 (1 being excellent and 5 being very unwell)

	excellent				very unwell
Physical condition today:	1	2	3	4	5

14. How long ago was your last conversation? _____

15. What medium was it in?

Phone

Text

Face to Face

Facebook

Appendix E. Debriefing Form

Debriefing Form

The purpose of this study was to understand how virtually connected social ties affect social support. The questionnaire that you completed at the end of the study will help us determine these effects.

We will ensure that your phone number is deleted from the lab's cell phone immediately, and it will not be recorded, distributed, or associated with your name or any personal information.

We request that you do not discuss this study with your friends, classmates or colleagues at Cornell University, or any other individuals who may be walking along the street, so that we may be able to include them in this study.

If you have any questions about this study, please ask them now and we will be happy to clarify anything. If you have questions about this study in the future, please contact Prof. Jeff Hancock at jth34@cornell.edu.

We greatly appreciate your participation and hope you enjoy the treat!