Facebook Friends with Benefits: Online Social Support and Slant Perception

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Distinguished Major Thesis

University of Virginia

April 2012

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Acknowledgement

I would like to sincerely thank Professor Dennis Proffitt and cognitive psychology graduate students Jonathan Zadra and Elyssa Twedt for their continuous help and incredible patience with me throughout my project. This process has seen two failed experiments overshadow my first semester, and an entirely new idea in the last five months of this year-long project. That new idea blossomed into an amazing study, thanks in large part to their devotion and patience.

To Jon and Elyssa, I am eternally grateful for their help editing my multiple projects and analyzing the data, and for providing meticulous feedback to improve my writing over many, many, many drafts. To Denny, I owe much of my confidence in, and excitement for, this project. He has been a sounding board for my proposals, continuously offering advice and adding his extensive knowledge of the area to my fledgling ideas. The enthusiasm they have had for my projects has been a boon when I felt that I was failing, and I am forever grateful for their confidence in me.

Beyond help with my thesis, I am so fortunate to have these people as trusted and respected advisors- you have given me a home and a family within the community of psychology research, and my career will be forever shaped by your earnest involvement, insight, and nurturance.
Abstract

The current study examined the effects of online social support on the perception of hill slants. Participants (N = 30) viewed either a supportive or an unsupportive Facebook contact using an iPad while standing at the base of a 5.6°hill. Participants who viewed a supportive contact judged the hill to be on average 7 degrees less steep than participants who viewed an unsupportive contact. This research demonstrates that online social support serves as a psychosocial resource and has a similar effect on visual perception as a physically present friend.
Facebook Friends with Benefits: Online Social Support and Slant Perception

What people experience as “reality” is partly a perceptual construction of the resources currently available to them. Resources are both physiological, such as our physical ability, and social, such as the presence of social support. We draw upon these resources during physical or mental exertion, and the amount we have available determines how we perceive the world around us. For example, the physical presence of social support has been shown to alter individuals’ physiological reactions to pain or stress (Brown, Sheffield, Leary, & Robinson, 2003; Kamarck, Manuck, & Jennings, 1990). Additionally, perception of the environment, such as hill slant, can be altered by the physical, or even imagined, presence of a supportive person (Schnall, Harber, Stefanucci, & Proffitt, 2008). If simply imagining the presence of social support can yield benefits similar to those offered by the physical presence of support, is it possible that online social support would do the same? Does online interaction alter perception of the environment? Thanks to modern technology, people can connect with one another from across the globe, and new social media sites, like Facebook, provide a forum for social connection and support. The present study examines whether social support, via Facebook, can elicit perceptual changes by providing additional resources to individuals as they make judgments about their environment.

Our perception of spatial layout can be scaled based on physical limitations, such as when a person is encumbered with a heavy load (Proffitt, Stefanucci, Banton, & Epstein, 2003). This scaling of slants and distances is altered based on the perceiver’s ability to act in the environment, which can decrease if the perceiver is old, fatigued, or encumbered (Bhalla & Proffitt, 1999; Proffitt et al., 2003). These physical states could affect perception because they alter the difficulty of anticipated action- a hill is harder to climb if one is carrying a heavy load.
and will appear steeper in that situation. Visual perception may operate according to an “economy of action” (Proffitt, 2006) that alters perception based on the energy needed to perform anticipated actions. For an organism to survive, it must not expend more energy than it has available, so perception functions to budget these resources depending on both the tangible aspects of environment and the perceiver’s bioenergetic state (Proffitt, 2006). This inference was corroborated by the study of Schnall, Zadra, & Proffitt (2010), in which they examined the effect of participants’ bioenergetic state on the perception of spatial layouts. They found that depleted levels of blood glucose (which is related to bioenergetic state) were associated with increases in perceived hill slant. When participants were fatigued and depleted of resources, the anticipated action of scaling the hill increased, and the hill appeared steeper to them (Schnall et al., 2010).

Our perception of the environment can be altered based on our ability to act on it, and when that ability is reduced, spatial layouts appear more difficult to traverse.

These physical limitations can be countered, however, by psychosocial resources like the presence of social support. Recent evidence suggests that the presence or absence of social support can affect perception of the physical world (Schnall, Harber, Stefanucci, & Proffitt, 2008). Schnall et al. (2008) tested this idea by asking participants to judge the slant of a hill either in the presence of a friend or alone. Participants perceived the hill to be less steep with a friend physically present, and the same effect occurred when participants simply imagined a supportive friend (but not an unsupportive individual) before making the slant estimate (Schnall et al., 2008). In addition, the quality of the relationship predicted the degree of perceptual change: participants with higher quality and longer friendships showed greater reductions in perceived slant. Schnall et al. (2008) argued that the presence of a friend (real or imagined) decreases psychological load and changes the evaluation of a challenging situation. They
demonstrated that a dearth of social support is similar to depleted physical states in that it increases the effort required to act, and thus alters the scaling of the environment.

Although we tend to think of social support as occurring only when people are physically with one another, the rise of mail, telephone, and now online social media have created new avenues of interaction that allow for support across time and distance. We can converse with people all around the world with the click of a button, and social media sites, like Facebook, make connecting with people as simple as turning on a computer or smartphone. This broadening of the definition of social support to include the Internet has sparked research examining the strength of online connections. A number of researchers have suggested that online communication not only matches face-to-face interaction, but can extend and supplement it (Kujath, 2011; Valenzuela, Park, & Kee, 2009; Walther, 1996). Users of social media sites engage in prosocial behaviors online much as they do in face-to-face interactions (Wright & Li, 2011), and health associations like Weight Watchers have used Facebook groups to provide support to their members (Ballantine & Stephenson, 2011). Just because users cannot physically touch a friend or relative does not mean that they are incapable of cheering the person up or providing advice during a troubling time; recent evidence suggests that one-on-one online chat services can have positive outcomes for youth with psychosocial problems (Fukkink, 2011).

With the advent of new Facebook applications like Facebook chat and video messages, users can talk to each other in real time and can even see and hear the person providing them with much needed social support. Furthermore, unlike mail or landline telephones, which comprise a time delay or a requirement for the user to be in a location at a given time, respectively, mobile devices and the Internet allow us to get information anywhere, at any time, and in almost any form, which strengthens and enriches the connection between the people interacting.
Past studies have examined online social media and suggest that they offer a setting for support (Ballantine & Stephenson, 2011) and prosocial behavior similar to that seen in real life (Wright & Li, 2011). However, none have yet delved into the effects of online social media on perception. The purpose of the current study is to test whether social support, in the form of the social media site Facebook, can affect perception similarly to when social support is real or imagined, as in the study of visual perception by Schnall et al. (2008). Because Facebook is an online avenue for social support, the finding of Schnall et al., (2008) that simply imagining a close friend was enough to produce a change in environmental scaling, suggests that browsing a friend’s online page via Facebook may do so as well. In fact, viewing a Facebook page should be a richer experience than imagining, so it may have an even larger effect. We chose to use the social networking site Facebook for our study, both for its popularity among the collegiate population and its presence in previous literature. These websites are popular because they offer an easy means to make social connections and enable users to establish and maintain social relationships in a variety of ways.

In the current study, participants viewed either a supportive or an unsupportive Facebook contact before making estimations of hill slant, distance, and the weight of a backpack. We assumed that browsing the Facebook profile of a supportive friend will alter the scaling of the physical world, as in Schnall et al. (2008) when the physical or imagined presence of a friend decreased estimates of hill steepness. We hypothesized that those browsing the Facebook profile page of a supportive person would judge a hill to be less steep, distances to be shorter, and weight to be lighter, than those who browse the Facebook page of an unsupportive person. These results would suggest that social support can be elicited via the online site Facebook, and that this support parallels in-person support in its psychological benefits.
Method

Participants

Thirty-eight students (27 females, 11 males) at the University of Virginia participated in this study for course credit. Eight of these participants were removed from the data analysis because they had prior knowledge of the study procedure. The final sample included 30 students (23 female, 7 male) who were naïve to the purpose of the study and had not previously participated in slant estimation experiments.

Stimuli

One paved hill (5.6°) on the University of Virginia grounds was used for slant estimations. The hill extended far enough such that when participants stood at the base, the crest of the hill was far over the participants’ eye height. Two paved distances over a relatively flat parking lot (51.33 and 72.83 feet, respectively) were used for the distance estimations.

Participants wore a backpack containing free weights that amounted to approximately 20% of the participant’s weight. This weight has been described as a heavy burden by participants, without causing physical pain, and was used to increase the effort that would be required to ascend the hill (Bhalla & Proffitt, 1999; Proffitt et al, 2003). Because all participants made judgments under this increased effort, the difference between conditions could be made more pronounced, such that the social support of the “supportive” condition would counteract the effect of the increased weight, whereas the lack of support in the “unsupportive” condition would add to the increased effort.

Participants answered a set of questionnaires rating their current mood, overall physical condition, current physical condition, exercise patterns, frequency of Facebook usage, and
information about their relationship with the chosen Facebook contact. See Appendix A for full questionnaires and response scales.

**Apparatus**

Participants provided visual matching and verbal estimates of hill slant. For the visual matching task, participants adjusted a movable semi-circle around a circular disc to indicate how they believed the hill would look in cross-section (see Figure 1). There was a protractor on the back of the visual matching disc not visible to participants for the experimenter to read the participants visual slant estimation. For the verbal estimation, participants simply reported the hill slant in degrees.

**Design**

This study examined the effect of social support on perception in a between-participants design. Participants were randomly assigned to one of two conditions: “supportive” or “unsupportive.” The “supportive” condition was described to participants as a Facebook contact who was important to them, made them feel good, and would provide them with help or support in a time of need. The “unsupportive” condition was described to participants as a Facebook contact who was once important to them, but who disappointed or betrayed them in a time of need, or someone who the participant would not go to for support or aid. Perception was assessed by three dependent measures, specifically hill slant, distance, and backpack weight estimations, made in the same order by all participants.

**Procedure**

The researcher explained to participants that the purpose of the experiment was to understand the effects of multitasking on decision making. This cover story was used so participants would remain naïve as to the purpose of the study and would not assume that it had
anything to do with perception. Multitasking was used as the cover because it was believable; participants were using Facebook while they walked and made quick decisions about their environment. First, participants were asked to log into their Facebook accounts on an iPad and select a Facebook contact. In the supportive condition, participants selected either a supportive or an unsupportive Facebook contact, as described in the design section. Participants reported their weight using a range, and then they were told to spend a few minutes browsing the person’s profile page as they usually would and that the experimenter would later ask the participant questions about the Facebook contact. They were given two minutes to browse the contact’s profile page.

Next, participants put on the backpack and walked outside to the hill being used for the slant estimations. During the walk, participants carried the iPad and continued to browse the Facebook contact’s page in order to find pictures satisfying a series of directions given by the experimenter, such as a photo in an outdoor setting or a photo taken at night. At the same time, the experimenter asked questions about the surroundings, such as asking participants to choose a door to enter and to give a route to a nearby stadium. These questions were used to emphasize the cover story about multitasking, and were not used in any analyses. In the final step, participants selected a profile picture of the contact that only contained the designated Facebook contact, with no other people visible. They viewed the profile picture immediately before estimating the steepness of a hill, the distances to a fire hydrant and a lamppost, and the weight of the backpack they were wearing. Participants held the iPad during all of these estimations except for the visual matching task, during which the experimenter held the iPad such that the participant could still see it. After the estimations, participants completed the set of questionnaires and were weighed using a scale.
Results

Slant Estimates

A linear mixed-effects model was used to investigate the effect of online social support on slant estimates. The effects of arousal level and general fatigue on slant perception were also included in the model. Thus, slant estimates were predicted from the additive effects of Facebook condition (supportive vs. unsupportive), measurement type (verbal vs. visual matching), general fatigue, arousal level, the participant’s gender, and an interaction term between arousal and Facebook condition, with a subject-level random intercept. The analysis revealed statistically significant coefficients for the Facebook condition, fatigue, arousal, gender, and the interaction term (see Table 1). As shown in Figure 2, participants in the supportive condition provided lower estimations of hill slant than participants in the unsupportive condition ($\beta = -7.21, p = 0.03$). Higher levels of arousal predicted higher slant estimates in the unsupportive condition ($\beta = 7.61, p = 0.02$), and there was an interaction between condition and arousal that predicted a significant difference in the effect of arousal on slant estimates for the supportive relative to the unsupportive condition ($\beta = -9.25, p = 0.02$; see Figure 3). There was a significant coefficient for gender such that men’s slant estimates were lower than women’s ($\beta = -8.69, p = 0.03$), and the coefficient for fatigue was also significant, predicting larger slant estimates for participants with larger fatigue scores ($\beta = 0.97, p = 0.03$; see Figure 4).

Additional Measures

Linear mixed-effects models were also used to investigate the possible predictors of distance and weight estimates. In each case, the models predicted the estimate from the additive effects of Facebook condition, general fatigue, arousal level, gender, and an interaction term.
between arousal level and Facebook condition. There were no statistically significant coefficients in any of the models.

**Discussion**

In this study, participants viewed either a supportive or an unsupportive Facebook contact while standing at the base of a hill. Participants who viewed a supportive contact’s Facebook page saw the hill as less steep than participants who viewed an unsupportive contact’s page. Arousal intensified this effect, creating a larger difference between the two conditions at higher arousal levels. In addition, higher levels of fatigue were associated with increased estimates of slant, as expected from previous research (Bhalla & Proffitt, 1999; Schnall et al., 2010). Finally, women tended to overestimate the hill slant more than men did, and this effect is also consistent with previous research (Proffitt, Bhalla, Gossweiler, & Midgett, 1995).

The estimations of distance and backpack weight, however, were not statistically significant. Despite these null results, we believe that the main findings of slant estimations are not in question. The distances most commonly used in previous literature (i.e., Proffitt, Stefanucci, Banton, & Epstein, 2003), ranged from one to seventeen meters, whereas the distances used for our estimations were approximately sixteen and twenty-two meters. It may be that because we used longer distances, as well as verbal reports rather than visual matching or blindwalking as in previous studies (i.e., Proffitt, Stefanucci, Banton, & Epstein, 2003), participants were unable to estimate the distances accurately. Additionally, the weight estimations were not statistically significant. Recent evidence has suggested that the presence of another person leads people to estimate a box as less heavy, presumably because they assume the other person could help them lift it (Doerrfeld, Sebanz, & Shiffar, 2011). In our study, participants wore the weight in a backpack and were not allowed to lift it by hand. It may be that
people cannot estimate weight on their backs accurately, which could account for the lack of significant results for this measure.

The significant results of this study demonstrate that online social support acts as a resource and affects visual perception, much like the physical presence of social support. This extends the findings of Schnall et al. (2008) that the physical presence of a friend causes hills to be perceived as shallower. One possible explanation for this finding is that viewing a supportive friend online made that friend’s potential support salient and reduced the overall burden the participant felt. This alteration of perception has been shown to occur in face-to-face interactions. For example, the physical presence of a friend can lead individuals to perceive physical pain as less intense and experience lower levels of cardiac stress during a challenging mental arithmetic task compared to when they are alone (Brown, Sheffield, Leary, & Robinson, 2003; Kamarck et al., 1990). However, physical presence is not always necessary for the provision of social support. Schnall et al. (2008) found that simply imagining a supportive person decreased estimates of hill slant. In the present study, participants did not have the physical or imagined presence of another person, but rather viewed the profile page of a Facebook contact. Online social support altered the way participants scaled their environment in the same way that the physical presence of another person has been shown to do.

Why might online social support provide benefits similar to those received from in-person social support? Online communication through support groups and one-on-one chat services have been shown to yield benefits similar to face-to-face interactions (Ballantine & Stephenson, 2011; Fukkink, 2011), and users interact via social networking sites as they do in the physical world (Wright & Li, 2011). Moreover, people use the web to strengthen their current social connections, such as using Facebook as a supplement to face-to-face interactions (Kujath,
Connecting with others via online media allows people to share ideas and experiences more often than might be possible to do in person, and this serves to strengthen existing relationships. In the present study, viewing a supportive friend on Facebook could have provided social support similar to that provided by the physical presence of a friend, and thus yielded shallower estimates of hill steepness.

The online presence of social support had the overall effect of making the hill look less steep, but under certain conditions, this effect was exaggerated. Higher levels of arousal predicted higher slant estimates in the unsupportive condition, and we found an interesting interaction between arousal and Facebook contact condition, such that the difference between conditions was larger at higher levels of reported arousal. Arousal often serves as information about a current situation, and it can increase the importance or saliency of certain aspects of that situation (Storbeck & Clore, 2008). In the interaction effect, arousal may have acted as information about the importance of the social support, making the presence, or absence, of social support more salient. This highlighting of psychosocial resources could have affected how they estimated their own abilities, and this difference in assessment of personal ability could have yielded the even larger discrepancy between conditions. However, the slant-increasing effect of high arousal when viewing an unsupportive contact was significantly stronger than the slant-decreasing effect of high arousal when viewing a supportive contact, such that the overall effect of high arousal functions to increase slant estimates, even though we found the interaction of high arousal and condition.

Beyond acting as a psychosocial resource that can alter people’s perceptions of their own capabilities, social support has been also linked to levels of metabolic resources, such as glucose in the bloodstream. The depletion of these metabolic resources has been implicated in the
findings of increased perception of hill slant. Individuals who are fatigued or low on glucose perceive hills to be steeper than those who are physically refreshed (Proffitt et al., 1999, Schnall et al., 2010). Social support can affect the regulation of glucose levels, which can be measured by determining the level of glycosolated hemoglobin (HbA$_{1c}$) in the blood (Feldman & Steptoe, 2003). HbA$_{1c}$ is a form of hemoglobin whose concentration can serve as a measure of the average concentration of glucose in the bloodstream over a period of time and can be used to indicate disrupted glucose homeostasis in non-diabetics. Low levels of emotional and practical social support have been associated with higher levels of HbA$_{1c}$ (Feldman & Steptoe, 2003). Those who enjoy less social support can have more disregulated levels of blood glucose and may be unable to efficiently allocate their resources, which is critical to health and survival. It is possible that those viewing an unsupportive Facebook contact experienced this dis regulation of glucose levels, and thus judged the hill to be steeper from their apparent lack of metabolic resources. Additionally, this may explain the increased effect that we found at higher levels of arousal, when the presence or absence of social support was more salient. Glucose levels were not measured in this experiment, but future research could observe the effects of online social support on glucose levels to test this potential explanation.

**Conclusion**

Our results indicate that online social support, via the social networking site Facebook, has similar effects on perception as does the physical or imagined presence of social support. Social support, it seems, acts as a psychosocial resource, and the benefits of this resource can be realized through online social interaction. Our results demonstrated that viewing a supportive friend’s Facebook page can provide similar benefits to the physical presence of a friend. We also found that high levels of reported arousal increased hill slant estimations and intensified the
effect of condition, possibly because arousal highlighted the presence or absence of social support. When the presence or absence of that support was made more salient to participants, estimates of hill steepness changed, possibly because they felt the quality of the psychosocial resource was especially important. When that person was a loyal, caring friend, participants enjoyed the benefits of support that made the hill look less steep. Beyond estimations of the world around us, this study has shown that modern technology allows us to supplement our existing relationships and glean meaningful support from an online source. Berscheid (2003) argued that social relationships are one of the most important contributors to the survival of our species, and our results suggest that social media can provide a method for people to create and maintain those meaningful relationships that can benefit them far into the future.
References


Table 1

| Effects of Facebook Contact Condition, Arousal, Fatigue, Gender, and the Interaction of Condition and Arousal on Slant Perception |
|---|---|---|---|---|---|
| Condition (Supportive) | -7.21 | 3.06 | 24 | -2.36 | 0.03 |
| Arousal | 7.61 | 2.89 | 24 | 2.63 | 0.02 |
| Fatigue | 0.97 | 0.41 | 24 | 2.35 | 0.03 |
| Gender (Male) | -8.69 | 3.71 | 24 | -2.34 | 0.03 |
| Condition (Supportive) x Arousal | -9.25 | 3.56 | 24 | -2.60 | 0.02 |
Figure 1. The visual matching disc for the slant estimation. Participants rotated the dark green semicircle to make the angle of the green segment appear to match the angle of the cross section of the hill. The disc was approximately 8 inches in diameter.
Figure 2. Participants’ hill slant estimations by condition.
Figure 3. Interaction of arousal and Facebook contact condition. Relative arousal scores are in standard deviations, so the scores are relative to the mean.
Figure 4. Effect of fatigue on slant estimates. Fatigue score is the sum of a 5-point Likert scale questionnaire.
Appendix A

Physical Fitness Questions
Rate your general physical condition:
  1- Very poor to 6 - excellent
    1= very poor
    2= poor
    3= fair
    4= good
    5= very good
    6= excellent

Rate your physical condition today:
  1- Very unwell to 6 - excellent
    1= very unwell
    2= unwell
    3= fair
    4= good
    5= very good
    6= excellent

How often on average do you exercise per week?
  0- never to 7 - every day
    0= never
    1= 1 day a week
    2= 2 days a week
    3= 3 days a week
    4= 4 days a week
    5= 5 days a week
    6= 6 days a week
    7= every day

Facebook Contact Questions
How long have you known this person?

How often do you interact with this person?
  1- never to 5 - every day (never, rarely, sometimes, often, every day)
    1= never
    2= rarely
    3= sometimes
    4= often
    5= every day

Does this person currently attend UVA:
  Yes
  No
How far are you from this person (physical distance of your residences)
1 = no distance (this person is your roommate)
2 = live in same building (dorm, house, apartment) but does not live in your room
3 = < 1 mile
4 = 1-5 miles
5 = 5-10 miles
6 = 10+ miles

Rate your feelings towards this person:
1 - not at all friendly to 5 - extremely friendly
1 = extremely unfriendly
2 = somewhat unfriendly
3 = neutral
4 = very friendly
5 = extremely friendly

Would you turn to this person for help with a problem?
1 = absolutely not to 5 = absolutely yes
1 = absolutely no
2 = probably not
3 = maybe
4 = probably yes
5 = absolutely yes

**Facebook Usage Questions**
How many friends do you have?
How long have you been using Facebook?
How often during the week do you use Facebook?
0 = never (don’t use)
1 = once a week
2 = a couple times a week
3 = almost every day
4 = every day
5 = more than once a day

On days when you use Facebook, approximately how much time do you spend browsing (total amount, not individual visits)?
0 = never (don’t use)
1 = less than 1 hour
2 = 1-2 hours
3 = 3-4 hours
4 = 5-6 hours
5 = more than 6 hours

What is/are the primary reason(s) you use Facebook? (mark all that apply)
- Advertising (events, publications)
- Dating/Romantic Relationships
- Keeping in touch with friends
- Keeping in touch with family
- Networking (career/educational)
- Photo-sharing

Which function(s) of Facebook do you use most? (mark all the apply)
- Live chat (instant messaging)
- Playing games
- Posting/sharing photographs
- Send gifts
- Sending “wall posts”
- Sending private messages
- Status updates
- Writing notes

What was the gender of the Facebook contact you selected?
- Female
- Male

How long have you been Facebook friends with this person?

Demographics:
What is your ethnicity?
- African American
- Asian
- Bi-racial/Multi-ethnic
- Caucasian
- Hispanic (Latino)
- Native American
- Native Hawaiian or Pacific Islander

What is your age in years?

What is your gender?
- Female
- Male