Published in final edited form as:
Soc Psychol Personal Sci. 2013 September 1; 4(5): . doi:10.1177/1948550612469233.

Does Posting Facebook Status Updates Increase or Decrease Loneliness? An Online Social Networking Experiment

Fenne große Deters and **Matthias R. Mehl**

Abstract

Online social networking is a pervasive but empirically understudied phenomenon. Strong public opinions on its consequences exist but are backed up by little empirical evidence and almost no causally-conclusive, experimental research. The current study tested the psychological effects of posting status updates on Facebook using an experimental design. For one week, participants in the experimental condition were asked to post more than they usually do, whereas participants in the control condition received no instructions. Participants added a lab "Research Profile" as a Facebook friend allowing for the objective documentation of protocol compliance, participants' status updates, and friends' responses. Results revealed (1) that the experimentally-induced increase in status updating activity reduced loneliness, (2) that the decrease in loneliness was due to participants feeling more connected to their friends on a daily basis and (3) that the effect of posting on loneliness was independent of direct social feedback (i.e. responses) by friends.

Keywords

Facebook; Loneliness; Social Integration; Well-being; Internet Methodologies

> "We live in an accelerating contradiction: the more connected we become, the lonelier we are. We were promised a global village; instead we inhabit the drab cul-de-sacs and endless freeways of a vast suburb of information. (…) The question of the future is this: Is Facebook part of the separating or part of the congregating; is it a huddling-together for warmth or a shuffling-away in pain?" Stephen Marche, Is Facebook Making Us Lonely? The Atlantic, May 2012

About 30% of the world's population uses the internet ("internetworldstats"). And Facebook, the most popular online social networking site, has 800 million active users of whom more than 50% visit the site every day ("Facebook Statistics", 2011). The internet has changed our daily lives, our ways of communication and our ways of interacting with our social networks (Weiser, 2001). But despite its popularity, the public opinion around the internet is rather critical. Prompted largely by Kraut et al's (1998) first and highly influential study claiming that internet use can cause loneliness and depression, the public has been concerned about the detrimental interpersonal and psychological effects of spending time online (McKenna & Bargh, 2000; Shaw & Gant, 2002; Weiser, 2001). Since then, however, the empirical evidence regarding the risks and benefits of internet use has been mixed and Kraut and colleagues' study has been subject to substantial criticism (Gross, Juvonen, & Gable, 2002; LaRose, Eastin, & Gregg, 2001). While some researchers have cautioned against internet use (Nie, 2001; Nie & Erbring, 2000) on the base of it creating "a 'lonely crowd' in cyberspace" (LaRose et al., 2001, The Paradoxical Internet Paradox Section, para. 4), others have identified its beneficial effects on social capital (Ellison, Steinfield, &

Lampe, 2007; Steinfield, Ellison, & Lampe, 2008), social support (LaRose et al., 2001), well-being (Valkenburg & Peter, 2007a) and loneliness (Fokkema & Knipscher, 2007).

These contradicting results might, in part, be due to the fact that early studies defined "internet use" very broadly, subsuming online activities as diverse as reading the news, chatting with friends, buying clothes, and downloading music (LaRose, et al., 2001, McKenna & Seidman, 2006). Although researchers have begun to focus on specific online activities such as chatting (Shaw & Gant, 2000), in the field of online social networking research, most studies still do not differentiate among the various activities members of these sites can engage in (e.g. scrolling through a friend's profile, uploading photos, status updating) (Smock, Ellison, Lampe, & Wohn, 2011). Burke, Marlow, and Lento (2010) recently demonstrated how problematic "aggregating over" these activities can be. Using objective server data to measure participants' online activities, they found that active (e.g. writing private messages, status updating) and passive (e.g. viewing photos, reading friends' conversations) Facebook use showed opposing effects on loneliness and social capital; whereas active use emerged as beneficial, passive use tended to be detrimental.

An Online Social Networking Experiment

Building on this idea, the present study assessed the psychological effects of the specific activity of posting status updates on Facebook. Furthermore, the study capitalized on the unique scientific opportunities online social networking research offers (Back, Stopfer, Vazire, Gaddis, Schmukle, Egloff, & Gosling, 2010; Gosling, Augustine, Vazire, Holtzman, & Gaddis, 2011; Wilson, Gosling, & Graham, 2012). Firstly, online social networking research allows for virtual experimental field research; in other words, it enables researchers to conduct experiments within participants' natural online environments. Thus, while preserving participants' social ecology, the direct, experimental manipulation of real-world behavior allows for strong causal conclusions (e.g. Bond et al., 2012). However, the vast majority of studies in the field have used correlational designs which render findings on the psychological effects of virtual social engagement causally ambiguous (e.g. Ahn, 2011; Burke et al., 2010; LaRose et al., 2001). In the present study, we experimentally manipulated participants' online behavior by instructing them to temporarily post more status updates on Facebook.

Secondly, online social networking sites allow for the efficient collection of direct observational data to supplement the default and often exclusive use of self-reports. Observational data can avoid memory biases and alleviate social desirability effects (Furr & Funder, 2007). As described in detail in the method section, we accessed participants' Facebook profiles during the study to collect relevant observational data.

Status Updates

Status updates are short messages that are posted to the personalized welcome page (the so-called newsfeed) of all Facebook friends of the user as well as on the user's own profile page. Status updates are especially interesting as they represent a new and increasingly popular form of communication (Java, Song, Finin, & Tseng, 2007). Most social networking sites, like Facebook, Google+ and MySpace utilize some form of status updates, and in some cases, like on Twitter, they serve as the main function. These posts are restricted in length (e.g. 420 characters on Facebook, 140 characters on Twitter) and recipients can comment on them or indicate that they "like" them. Status updates enable effortless and fast one-to-many communication. They can be directed to a large unknown audience (e.g. everybody on the internet, often on Twitter) or, in the case of Facebook, to a large known audience (all friends on Facebook). On average, Facebook currently counts 60 million status updates per day

(O'Neill, 2010). The popularity and novelty of status updates make it a topic worth being studied empirically.

What Psychological Effects Can Be Expected from Status Updating?

As a form of computer-mediated communication, status updates could be criticized for possibly undermining face-to-face communication, which is considered richer, more natural and thus more beneficial to our social well-being (e.g. Kraut et al., 1998; Moody, 2001; Nie & Erbring, 2000). On the other hand, some studies support the notion that computer-mediated communication can help maintain and solidify existing friendships, especially if regular face-to-face communication is hampered by physical distance (e.g. Ellison et al., 2007; Valkenburg & Peter, 2007b). In a study by Cummings, Lee, and Kraut (2006) on communication types and relationship closeness during the transition to college, computer-mediated communication emerged as more important than phone calls for sustaining friendships. The authors concluded that communication frequency rather than quality is critical for maintaining closeness. Even more so than email, status updates appear ideal for sharing what is happening in one's life because their shortness facilitates frequent posts (Köbler, Riedl, Vetter, Leimeister, & Krcmar, 2010). Is it effective to share the ups and downs of daily life with friends in such short written messages? And does keeping friends up-to-date make one feel more connected to them and thereby protected against feeling lonely? The present study aims to test empirically whether an experimentally induced increase in status updating affects feelings of loneliness. Furthermore, if posting status updates reduces feelings of loneliness, we expect that the effect is, at least in part, due to – or, in statistical terminology, mediated by–how connected and in touch one feels to friends on a daily basis.

Is It Important for Status Updates to Receive Responses?

Status updates can be commented on by friends. What role does this social feedback play for the expected psychological effects of posting status updates? If posting is understood as an attempt to initiate social interaction, a lack of feedback might result in increased feelings of loneliness. Akin to a failed attempt to start a conversation at a party (e.g., with the "target" paying no attention), an unanswered status update could be perceived as social rejection (Williams, Cheung, & Choi, 2000). Thereby, it would prime the discrepancy between desired and actual social interaction, which is at the heart of feelings of loneliness (Mellor, Stokes, Firth, Hayashi, & Cummins, 2008; Perlman & Peplau, 1984). Alternatively, Facebook users might implicitly assume that their status updates reach and are (sooner or later) read by the recipients even if there is no direct response. It is conceivable that the mere feeling of having shared something with friends might promote feelings of closeness and social inclusion. The present study empirically tested the extent to which social feedback affects the hypothesized social effects of status updating.

Methods

Participants and Design

One hundred and two undergraduate students at the University of Arizona with a Facebook profile participated in the study for partial course credit. The study was an internet-based field experiment with a pre-test/post-test control group design. Participants were randomly assigned to the experimental (instructions to post more status updates) or the control (no instructions) condition.[1] Nine students failed to complete the post-assessment questionnaires. Seven students in the experimental condition did not follow the instructions and were excluded from the analyses (four showed no change from baseline in the number of status updates, three posted fewer status updates). Drop-outs did not differ systematically

from the remaining participants in their posting activity or loneliness at baseline. Therefore, the final sample consisted of $N = 86$ participants (experimental condition: $n = 37$, control condition: $n = 49$). Fifty-three (61%) of the participants were female and 77 (90%) were between 18 and 22 years old.

Procedures and Measures

The experiment was conducted entirely online using (a) participants' own Facebook profiles for delivering the intervention and (b) the web-based survey software DatStat Illume for the assessment. First, participants received an email with a link to an online session where they were asked to provide informed consent. Next participants completed a set of questionnaires which included a commonly used 10-item version of the UCLA Loneliness Scale (Russell, Peplau, & Ferguson, 1978) using a scale ranging from 1 (I never feel this way) to 4 (I often feel this way). The UCLA Loneliness Scale measures subjective feelings of loneliness and social isolation (sample items: "How often do you feel completely alone? "How often do you feel shut out and excluded by others?", Cronbach's α = .90, $M = 2.16$, $SD = 0.63$). Participants also filled out the 4-item Subjective Happiness Scale (Lyubomirsky, & Lepper, 1999; Cronbach's α = .87, on a seven-point Likert scale: $M = 5.31$, $SD = 1.10$) and the short version of the Center for Epidemiologic Studies Depression Scale (CES-D-10; Andresen, Malmgren, Carter, & Patrick, 1994; Cronbach's α = .75, on a four-point Likert scale $M = 1.83$, $SD = 0.49$). As the last step in this questionnaire session, participants logged on to Facebook and sent a friend request to our "Research Profile". In doing so, they granted the investigators access to their profile including their wall, which contained a chronological history of their Facebook activity since they joined the social networking site. Next, we counted the status updates participants had posted during the designated "baseline period", the two months prior to study entry. Then, participants in both conditions received email-feedback about their average number of status updates posted per week. Participants in the experimental condition were asked to post more status updates than "they usually post per week" during the following week. Participants in the control condition only received the feedback about their usual status updating activity but no instruction to change their behavior.

Over the next seven days, daily emails were sent out to direct participants to a short online questionnaire which they were asked to complete at the end of the day. In addition to questions about their mood (e.g. "Right now I feel happy"), participants indicated their level of social connection using a five-point Likert scale ranging from "very slightly" to "extremely". ("Right now I feel connected to and in touch with my friends", Cronbach's α for the seven assessments = .89, $M = 3.46$, $SD = 0.90$). For participants in the experimental condition, the daily emails included a reminder to post more. After seven days, participants completed another set of questionnaires which again contained the UCLA Loneliness Scale (Cronbach's α = .94, $M = 2.08$, $SD = 0.69$, $r_{\text{time 1}\times\text{ time 2}} = .69$), the Subjective Happiness Scale (Cronbach's α = .87, $M = 5.36$, $SD = 1.07$, $r_{\text{time 1}\times\text{ time 2}} = .83$.), and the CES-D (Cronbach's α = .81, $M = 1.88$, $SD = 0.52$, $r_{\text{time 1}\times\text{ time 2}} = .53$). In the days thereafter, we accessed participants' Facebook profile from the "Research Profile" and saved the profile pages. Data collected from the saved profile pages included number of friends, number of status updates during the intervention period, and number of responses received per status

[1]A second control group that was instructed to reduce their status updating activity was excluded from the analysis. Surprisingly, about one third of all participants posted no status update during the baseline period and therefore, could not comply with the instructions to post fewer status updates. Instead of excluding participants with no status updating activity from all three groups to assure randomization, we dropped this second control group from the analyses based on the rationale that participants with little status updating experiences can be expected to be particularly impacted by the manipulation (to post more status updates). Dropping this sub-group (to maintain randomization) could thus have critically biased the effect estimation in the experimental (i.e. increase) condition.

update during baseline as well as during the intervention period. Afterwards participants were invited via email to come to the lab for the debriefing upon which their profile was deleted from the friends list of the "Research Profile".

Results

Descriptive Statistics: Participants' Level of Online Connectivity and Activity

Participants had on average $M = 495.3$ Facebook friends ($SD = 355.0$, Range: 13 – 1886). All participants indicated that their "Facebook friends" included real-world friends, 94.2 % were friends with family members, 66.3% with their parents, 44.2% had added co-workers as a friend, and 19.8% their work supervisor or professor.

During the baseline period, participants posted on average $M = 2.2$ status updates per week ($SD = 2.6$, Range: 0.0 - 10.8). During the seven days of the intervention, participants in the experimental condition posted on average $M_{diff} = 8.71$ status updates more than during the baseline ($SD_{diff} = 8.84$, $t[36] = -6.00$, $p < .001$), whereas control participants showed, on average, only a minimal increase in their number of status updates ($M_{diff} = 0.69$, $SD_{diff} = 2.36$, $t[48] = -2.06$, $p = .05$). Participants in the experimental condition increased significantly more than participants in the control condition ($M_{diff} = 8.02$, $t[84] = 6.08$, $p < .001$).

Effect of the Intervention: Did Higher Status Updating Activity Affect Loneliness?

To test the hypothesis that posting more status updates affects loneliness, we predicted time 2 loneliness from time 1 loneliness and condition (contrast coded). Time 1 loneliness ($\beta = 0.66$, $t[83] = 8.46$, $p < .001$) and condition ($\beta = -0.18$, $t[83] = -2.33$, $p = .02$) significantly predicted loneliness at time 2. Participants in the experimental condition reported, on average, a decrease in loneliness ($M_{change} = -0.19$, $t[36] = 2.15$, $p = .04$, $d = -0.31$) after having posted more status updates over the past week. Loneliness did not change among participants in the control condition ($M_{change} = -0.004$, $t[48] = -0.06$, $p = .96$) (see Figure 1). Importantly, the intervention did not affect participants' subjective happiness ($\beta = 0.08$, $t[83] = 1.26$, $p = .21$) or levels of depression ($\beta = -0.05$, $t[83] = -0.57$, $p = .57$) suggesting that the effect is specific to experienced loneliness.

To complement the between-group analyses, we then tested, among participants in the experimental condition, the extent to which increases in status updating during the experiment (i.e. the difference between the number of status updates during experiment and the average number of weekly status updates during baseline) were associated with decreases in loneliness. The existence of such a dose-related effect can help alleviate concerns about expectancy effects as an alternative explanation and provide further evidence for the robustness of the effect. The correlation between increased status updating activity and decrease in loneliness was $r = -.29$ ($p = .09$) indicating a statistical trend that, based on the relative small sample of $n = 37$ experimental participants and a standard two-tailed test, just failed to meet the traditional threshold of statistical significance.[2]

[2]We found a similar descriptive pattern among participants in the control condition ($r = -.11$; $p = .46$). Further, across all participants, changes in status updating were significantly correlated with changes in loneliness ($r = -.27$; $p = .01$). This is important because, conceptually, participants who posted more status updates - without being (experimentally) promoted to do so - should still experience the psychological consequences. Reasons for the lower correlation among control participants likely lie in the smaller effect "input" (i.e. lower spontaneous relative to prompted increase) and the reduced effect "signal" (whereas experimental participants all increased synchronized on day 1, control participants may have increased their status updating activity on any day during the intervention).

Test for Mediation: Does Status Updating Reduce Loneliness Via Increasing Daily Feelings of Social Connectedness?

Next, we tested the degree to which increased feelings of social connectedness – measured daily during the intervention period and averaged over time–served as a statistical mediator for the relationship between the experimental request to post more and changes in loneliness. As recommended by Preacher and Hayes (2004), especially for small samples, we tested for mediation using bootstrapping analyses. Based on 5,000 bootstrap resamples, the indirect effect of experimental condition on residualized changes in loneliness (standardized) via daily feelings of connectedness (standardized) was statistically significant ($b = -0.08$; 95% CI = −0.17, −0.01). Thus, the experimentally induced changes in feelings of loneliness were statistically explained by the degree to which participants felt connected to and in touch with their friends during the intervention period (see Figure 2).

Test for Moderation: Is It Important for the Posted Status Updates to Receive Responses?

Finally, we explored whether the intervention effect, that is the reduction in loneliness after status updating more, was moderated by how many of the status updates received a comment. It is possible that status updates require social feedback or a minimum degree of reciprocity to foster a sense of social inclusion. To test this idea, we added the proportion of commented status updates (standardized) and the condition by proportion-of-commented-status-updates interaction to the regression analysis. The main effect of condition remained significant ($\beta = -0.17$, $t[65] = -2.14$, $p = .04$) but neither the main effect of proportion of commented status updates ($\beta = -0.13$, $t[65] = -1.46$, $p = .15$), nor the interaction term ($\beta = -0.06$, $t[65] = -0.65$, $p = .52$) significantly predicted residualized changes in loneliness. This null-effect replicated for both the proportion of liked status updates and the proportion of status updates that received any kind of social feedback, that is at least one comment or one like. Interestingly, this suggests that posting status updates itself–independent of whether it is "answered"–affected participants' feelings of loneliness.

Discussion

Our online social networking experiment revealed that status updating more over seven days reduced loneliness. As expected, the reduction in loneliness was accounted for by feeling more connected and in touch with friends on a daily basis. Causal priority of status updating and connectedness was established by (1) experimentally manipulating status updating and (2) measuring connectedness temporally before changes in loneliness (Preacher & Hayes, 2004). Additionally, the content of status updates posted during the study is consistent with the idea that posting status updates helps maintain connectedness by sharing daily experiences and by letting friends take part in one's life. Status updates covered a wide range of topics (e.g. school, personal relationships, sports, social events, politics, popular culture) reflecting content also common in daily casual conversations with friends (see Dunbar, Duncan, & Marriott, 1997).

Responses to Status Updates

Interestingly, the results revealed that direct social feedback (i.e. comments and likes) was not a necessary condition for the positive social effects of status updating to emerge. How can "uni-directional" status updating foster a sense of social inclusion? In the following, potential explanations will be discussed.

Studies on expressive writing have consistently found that writing about personally important topics can confer psychological benefits including improvements in social functioning (Pennebaker, & Chung, 2011). However, status updating appears to lack some of expressive writing's identified "active ingredients" (i.e. privacy, repeated elaboration, in-

depth exploration) rendering a "working through" account to our findings unlikely. Nevertheless, the act of writing itself–in the absence of any direct effects status updates may have on one's social network–might create a feeling of connectedness. Gardner, Pickett, and Knowles (2005) identified "social snacking behaviors" (such as looking at photos or re-reading old emails) as symbolic social behaviors that can alleviate loneliness through serving as a reminder of existing social bonds. In a similar way, Facebook users have a target audience–their online social network–in mind when composing status updates. It is through this symbolic process of thinking of a target audience that status updating can have a significant "social snacking" component. Similar to a snack temporarily reducing hunger until the next meal, social snacking may help tolerate the lack of "real" social interaction for a certain amount of time. Such an explanation would be consistent with findings by Sheldon, Abad and Hinsch (2011) that, paradoxically, Facebook use was associated with both increased relatedness satisfaction and increased relatedness dissatisfaction. The authors argue that relatedness dissatisfaction drives Facebook use but remains unchanged because Facebook use does not resolve existing problems within the "real-life" social network which ultimately cause relatedness dissatisfaction. Instead of fostering long-term relatedness satisfaction, Facebook use is –as postulated by Sheldon and colleagues (2011) – a short-term coping mechanism resulting only in transient relatedness satisfaction.

However, in contrast to social snacking behaviors as identified by Gardner and colleagues (2005), status updating is (also) a communicative act. Of the 545 status updates posted during the study, 79% (428) received responses affirming that most status updates do reach the recipients. Increased status updating activity can alleviate loneliness independently of comments by friends, but comments on status updates only represent public social interaction on Facebook. Private messages via Facebook, emails, phone calls, face-to-face interactions etc. were not tracked within the present study. Thus, the positive social effect of status updating might nevertheless result from (unmeasured) influences on one's social interactions. Status updates draw attention to the user, and hence, might motivate friends to initiate social interaction. In support of this argument, 45% of the participants in a survey study on status updating indicated that over the last six months their status updates have resulted at least once in an in-person encounter (Köbler et al., 2010).

Moreover, research suggests that self-disclosure –and status updates disclose at least personal thoughts and feelings–fosters intimacy and affection which is considered important for maintaining relationships (Collins & Miller, 1994; Reis & Shaver, 1988). The content of status updates might allow a conversation to transition more quickly from small talk to more intimate levels (e.g. "I read you got a new job. How is that going?") thereby fostering feelings of social inclusion (Aron, Melinat, Aron, Vallone & Bator, 2007; Mehl, Vazire, Holleran, & Clark, 2010).

Future research needs to disentangle the effect of status updating as a symbolic social behavior (social snacking) and as a catalyzer of actual changes in one's social network, for example by comparing a public status update condition against one in which participants post status updates "privately" so that only the experimenter (and no Facebook friend) can read them.

Limitations and Venues for Future Research

Participants were aware of taking part in an online social networking study and therefore, might have formulated their own hypothesis about the effects of the intervention. Yet, consistent with the skepticism expressed in the opening quote and reviewed in the recent article by Stephen Marche, their own hypotheses were often contrary to the actual results. In the debriefing, many participants expressed critical opinions around Facebook use and, to different degrees, held the notion that Facebook can make people lonely. Ultimately, this is

hardly surprising in consideration of the predominantly negative media coverage on internet use and Facebook (e.g. McKenna & Bargh, 2000). Furthermore, no effect of experimental condition on broader outcome variables such as depression or happiness emerged. Because status updating was manipulated over seven days only, broader effects on well-being would have likely pointed to expectancy effects rather than to a broad, omnibus impact of the intervention. However, if the study duration was longer and if status updating positively affects one's social interactions, downstream broader affective consequences could be expected as well (e.g. Brage & Meredith, 1994; Cacioppo et al., 2008; Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006). Future research needs to replicate our findings and the extent to which increased status updating activity can boost feelings of social inclusion over longer periods of time.

Participants in the present study were college students in the United States. Status updating is pervasive in this population because Facebook was specifically created for this group (Boyd & Ellison, 2007). However, Facebook is rapidly gaining popularity in other age groups (Madden, 2010) and is by now a world-wide phenomenon ("Facebook Statistics", 2011). Future research should broaden the focus and test the impact of status updating in other populations and locations.

In the present study, only the effect of status update quantity (i.e. frequency) but not quality (i.e. content) was assessed. Research recently demonstrated that likeability of Facebook users as judged by strangers decreased with the number of negative status updates; a fact that might hinder the development of new friendships. Moreover, status updates that differed from the users' typical pattern elicited more comments by friends (Forest & Wood, 2012). Will negativity in status updates weaken existing friendships? What is the effect of selectively posting positive status updates? Future research needs to address these and related questions to develop a better understanding of how the content of status updates affects social inclusion.

An Online Social Networking Experiment

The present study successfully applied an experimental procedure to manipulate status updating activity within participants' natural online environment. Participants' compliance was high and recruitment easy because the experiment was conducted completely online which reduced the burden of participation. Many participants provided feedback on the study in the last online questionnaire session expressing that they felt that this research was relevant to their lives, and important for society. No participant refused to add the "Research Profile" as a friend or indicated in the post-experimental survey or during the debriefing unease with the fact that the investigators had access to their profile. This was also true for participants who had to be asked to temporarily alter their privacy settings in order to grant the "Research Profile" full access to the wall of their profile (< 5). Considering that participants had on average about 500 friends on Facebook –suggesting a rather low threshold to add a friend– it is hardly surprising that participants expressed no privacy concerns.

In sum, the procedures used in the present study suggest that research on online social networking sites can be a fruitful methodological approach (for a recent review on Facebook research see: Wilson et al., 2012). For drawing robust scientific conclusions that carry important practical implications, it is equally important to determine causality and to preserve a real-world social ecology. It is our hope that the present study will encourage researchers to directly observe behavior on online social networking sites (Ellison et al., 2007). Many participants were surprised to learn how many or how few status updates they usually post, indicating that the validity of self-reports of online activities might be limited. Moreover, the extent to which biases in these self-reports are linked to personality traits (e.g.

narcissists overestimating their status updating activity) is unclear given that online behavior might be subject to fewer social constraints and therefore more susceptible to impression management than real-world social behavior. Hence, research on the relationship between personality traits and online behavior might particularly benefit from using direct observational data to minimize shared method variance with the self-reported personality traits.

Conclusion

The present study contributes to the growing body of research assessing psychological effects of internet use. It used an experimental online social networking design to focus on one specific online activity and found that status updating can reduce loneliness. Hence, in line with recent studies, the present investigation points to merits rather than perils of (social) internet use. Technological change often creates ungrounded fears but also over-inflated hopes (see Boase and Wellman, 2006). In order to minimize risks and to seize chances, systematic, empirical and ideally experimental research is crucial to isolate the conditions under which online social engagement can serve as a psychological asset versus a psychological liability.

References

Ahn J. The effect of social network sites on adolescents' social and academic development: Current theories and controversies. Journal of the American Society for Information Science and Technology. 2011; 62(8):1435–1445.

Andresen EM, Malmgren JA, Carter WB, Patrick DL. Screening for depression in well older adults: evaluation of a short form of the CES-D (Center for Epidemiologic Studies Depression Scale). American Journal of Preventive Medicine. 1994; 10:77–84. [PubMed: 8037935]

Aron A, Melinat E, Aron EN, Vallone R, Bator R. A procedure and some preliminary findings. Personality and Social Psychology Bulletin. 1997; 23:363–377.

Back MD, Stopfer JM, Vazire S, Gaddis S, Schmukle SC, Egloff B, Gosling SD. Facebook profiles reflect actual personality, not self-idealization. Psychological Science. 2010; 21:372–374. [PubMed: 20424071]

Boase, J.; Wellman, B. Personal relationships: On and off the Internet. In: Vangelisti, AL.; Perlman, D., editors. The Cambridge handbook of personal relationships. Cambridge University Press; New York, NY: 2006.

Bond RM, Fariss CJ, Jones JJ, Kramer ADI, Marlow C, Settle JE, Fowler JH. A 61-million-person experiment in social influence and political mobilization. Nature. 2012; 489:295–298. [PubMed: 22972300]

Boyd DM, Ellison NB. Social network sites: Definition, history, and scholarship. Journal of Computer-Mediated Communication. 2007; 13:210–230.

Brage D, Meredith W. A causal model of adolescent depression. Journal of Psychology. 1994; 128(4): 455–468. [PubMed: 7932297]

Burke, M.; Marlow, C.; Lento, T. Social network activity and social well-being; Paper presented at the Proceedings of the 28th International Conference on Human Factors in Computing Systems; 2010; New York: ACM Press; p. 1901-1912.

Cacioppo, JT.; Hawkley, LC.; Kalil, A.; Hughes, ME.; Waite, LJ.; Thisted, RA. Happiness and the invisible thread of social connection: The Chicago Health, Aging, and Social Relations Study. In: Eid, M.; Larsen, RJ., editors. The science of subjective well-being. The Guilford Press; New York, NY: 2008. p. 195-219.

Cacioppo JT, Hughes ME, Waite LJ, Hawkley LC, Thisted RA. Loneliness as a specific risk factor for depressive symptoms: Cross-sectional and longitudinal analyses. Psychology and Aging. 2006; 21(1):140–151. [PubMed: 16594799]

Collins NL, Miller LC. Self-disclosure and liking: A meta-analytic review. Psychological Bulletin. 1994; 116(3):457–475. [PubMed: 7809308]

Cummings, J.; Lee, J.; Kraut, R. Communication technology and friendship during the transition from high school to college. In: Kraut, R.; Brynin, M.; Kiesler, S., editors. Computers, phones, and the internet; Domesticating information technology. Oxford University Press; New York: 2006. p. 265-278.

Dunbar RIM, Duncan NDC, Marriott A. Human conversational behavior. Human Nature. 1997; 8(3): 231–246.

Ellison NB, Steinfield C, Lampe C. The benefits of Facebook "friends:" Social capital and college students' use of online social network sites. Journal of Computer-Mediated Communication. 2007; 12:1143–1168.

Facebook Statistics. n.d.Retrieved December 21, 2011, http://www.facebook.com/press/info.php?statistics

Fokkema T, Knipscheer K. Escape loneliness by going digital: A quantitative and qualitative evaluation of a Dutch experiment in using ECT to overcome loneliness among older adults. Aging & Mental Health. 2007; 11:496–504. [PubMed: 17882587]

Forest AL, Wood JV. When social networking is not working: Individuals with low self-esteem recognize but do not reap the benefits of self-disclosure on Facebook. Psychological Science. 2012 Retrieved February 28, 2011, from http://pss.sagepub.com/content/early/2012/02/07/0956797611429709.

Furr, RM.; Funder, DC. Behavioral observation. In: Robins, R.; Fraley, C.; Krueger, R., editors. Handbook of Research Methods in Personality Psychology. Guilford Press; New York: 2007. p. 273-291.

Gardner, W.; Pickett, C.; Knowles, M. Social snacking and shielding: Using social symbols, selves, and surrogates in the service of belonging needs. In: Williams, KD.; Forgas, JP.; von Hippel, W., editors. The social outcast: Ostracism, social exclusion, rejection, and bullying. Psychology Press; New York: 2005. p. 227-242.

Gosling SD, Augustine AA, Vazire S, Holtzman NS, Gaddis S. Manifestations of personality in online social networks: Self-reported Facebook-related behaviors and observable profile information. Cyberpsychology, Behavior, and Social Networking. 2011; 14

Gross EF, Juvonen J, Gable SL. Internet use and well-being in adolescence. Journal of Social Issues. 2002; 58:75–90.

Java, A.; Song, X.; Finin, T.; Tseng, B. Why we twitter: Understanding microblogging usage and communities; Proceedings of the 9th WebKDD and 1st SNA-KDD 2007 Workshop on Web Mining and Social Network Analysis; San Jose, CA. 2007; New York: ACM Press; Aug 12. 2007 p. 56-65.

Köbler, F.; Riedl, C.; Vetter, C.; Leimeister, JM.; Krcmar, H. Social connectedness on Facebook–An explorative study on status message usage; Paper presented at the 16th Americas Conference on Information Systems; Lima, Peru. 2010; 2010. p. 247

Kraut R, Patterson M, Lundmark V, Kiesler S, Mukophadhyay T, Scherlis W. Internet paradox: A social technology that reduces social involvement and psychological well-being? American Psychologist. 1998; 53:1017–1031. [PubMed: 9841579]

LaRose R, Eastin MS, Gregg J. Reformulating the Internet Paradox: Social Cognitive Explanations of Internet Use and Depression. Journal of Online Behavior. 2001; 1(2) Retrieved from http://www.behavior.net/JOB/v1n1/paradox.html.

Lyubomirsky S, Lepper H. A measure of subjective happiness: Preliminary reliability and construct validation. Social Indicators Research. 1999; 46:137–155.

Madden, M. Social networking use among those ages 50 and older nearly doubled over the past year. 2010. Older adults and social media. Retrieved January 13, 2012, from http://www.pewinternet.org/Reports/2010/Older-Adults-and-Social-Media.aspx

McKenna KYA, Bargh JA. Plan 9 from cyberspace: The implications of the internet for personality and social psychology. Personality and Social Psychology Review. 2000; 4(1):57–75.

McKenna, KYA.; Seidman, J. Considering the interactions The effects of the internet on self and society. In: Kraut, E.; Brynin, M.; Kiesler, S., editors. Computers Phones, and the Internet: Domesticating Information Technology. Oxford University Press; New York: 2006. p. 279-295.

Mehl MR, Vazire S, Holleran SE, Clark CS. Eavesdropping on happiness: Well-being is related to having less small talk and more substantive conversations. Psychological Science. 2010; 21:539–541. [PubMed: 20424097]

Mellor D, Stokes M, Firth L, Hayashi Y, Cummins R. Need for belonging, relationship satisfaction, loneliness, and life satisfaction. Personality and Individual Differences. 2008; 45(3):213–218.

Moody EJ. Internet use and its relationship to loneliness. CyberPsychology & Behavior. 2001; 4:393–401. [PubMed: 11710265]

Nie NH. Sociability, interpersonal relations, and the internet: Reconciling conflicting findings. American Behavioral Scientist. 2001; 45(3):420–435.

Nie, NH.; Erbring, L. Internet and society: A preliminary report. Stanford Institute for the Quantitative Study of Society; Stanford, CA: 2000.

O'Neill N. Twitter nears Facebook's daily status update volume. 2010 Retrieved December 21, 2011, from http://www.allfacebook.com/twitter-facebook-status-2010-02.

Nie, NH.; Erbring, L. Internet and society: A preliminary report. Stanford Institute for the Quantitative Study of Society; Stanford, CA: 2000.

Pennebaker, JW.; Chung, CK. Expressive writing and its links to mental and physical health. In: Friedman, HS., editor. Oxford handbook of health psychology. Oxford University Press; New York, NY: 2011. p. 417-437.

Perlman, D.; Peplau, LA. Loneliness research: A survey of empirical findings. In: Peplau, LA.; Goldston, SE., editors. Preventing the harmful consequences of severe and persistent loneliness. National Institute of Mental Health; Rockville, MD: 1984. p. 13-46.

Preacher KJ, Hayes AF. SPSS and SAS procedures for estimating indirect effects in simple mediation models. Behavior Research Methods, Instruments, & Computers. 2004; 36(4):717, 731.

Reis, HT.; Shaver, P. Intimacy as an interpersonal process. In: Duck, S., editor. Handbook of personal relationships. John Wiley and Sons; Chichester, England: 1988. p. 367-389.

Russell D, Peplau LA, Ferguson ML. Developing a measure of loneliness. Journal of Personality Assessment. 1978; 42:290–294. [PubMed: 660402]

Shaw LH, Gant LM. In defense of the internet: The relationship between internet communication and depression, loneliness, self-esteem, and perceived social support. CyberPsychology & Behavior. 2002; 5:157–171. [PubMed: 12025883]

Sheldon KM, Abad N, Hinsch C. A two-process view of Facebook use and relatedness need-satisfaction: Disconnection drives use, and connection rewards it. Journal of Personality and Social Psychology. 2011; 100:766–775. [PubMed: 21280967]

Smock AD, Ellison NB, Lampe C, Wohn DY. Facebook as a toolkit: A uses and gratification approach to unbundling feature use. Computers in Human Behavior. 2011; 27:2322–2329.

Steinfield C, Ellison NB, Lampe C. Social capital, self-esteem, and use of online social network sites: A longitudinal analysis. Journal of Applied Developmental Psychology. 2008; 29(6):434–445.

Valkenburg PM, Peter J. Internet communication and its relation to well-being: Identifying some underlying mechanisms. Media Psychology. 2007a; 9:43–58.

Valkenburg PM, Peter J. Online communication and adolescent well-being: Testing the stimulation versus the displacement hypothesis. Journal of Computer-Mediated Communication. 2007b; 12:1169–1182.

Weiser EB. The functions of internet use and their social and psychological consequences. CyberPsychology & Behavior. 2001; 4:723–743. [PubMed: 11800180]

Williams KD, Cheung CKT, Choi W. Cyberostracism: Effects of being ignored over the internet. Journal of Personality and Social Psychology. 2000; 79(5):748–762. [PubMed: 11079239]

Wilson RE, Gosling SD, Graham LT. A review of facebook research in the social sciences. Perspectives on Psychological Science. 2012; 7:203–220. doi:10.1177/1745691612442904.

World internet usage statistics news and world population stats. n.d.Retrieved December 6, 2011, http://www.internetworldstats.com/stats.htm

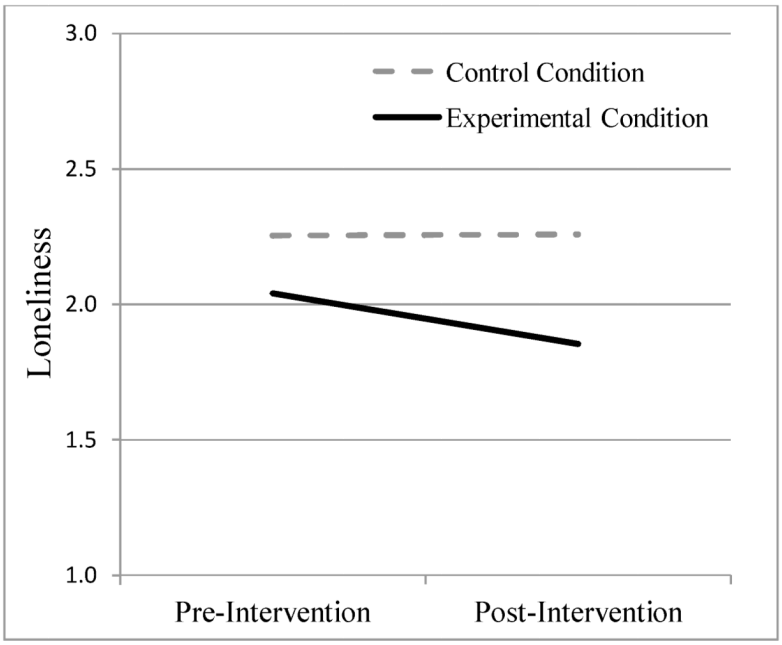

Figure 1.
Mean change in loneliness in the control and experimental condition. The difference in loneliness at time 1 between control (n = 37) and experimental condition (n = 49) was not significant (M_{diff}= 0.21, p = .67)

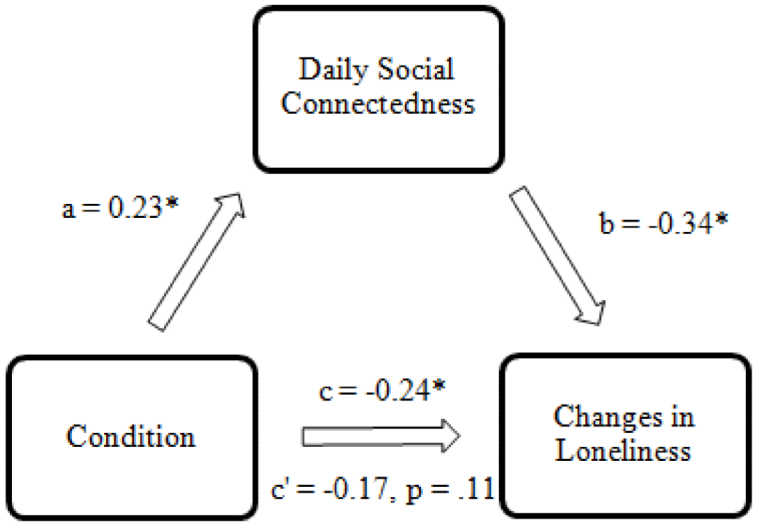

Figure 2.
Daily social connectedness as a mediator of the relationship between experimentally induced increases in micro-blogging activity and changes in loneliness. a= Effect of Condition on Daily Social Connectedness, b = Effect of Daily Social Connectedness on Residualized Change in Loneliness controlled for Condition. c =Effect of Condition on Residualized Change in Loneliness, c'= Direct effect of Condition on Residualized Change in Loneliness controlled for Daily Social Connectedness.