Instant Messaging and its Relationship to Depression and Loneliness Among Young Adolescence.¹

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Abstract

There are few empirical studies about instant messaging, and the measurements used are somewhat diverse. The main purpose of this study was to investigate if depression and loneliness differed in relation to instant message habits among young adolescents. Special focus was also on motivation behind, and time spent on instant messaging. The study was conducted using a self report questionnaire, using 3 factors for motivation and 8 items to measure time. The 365 participants were between ages 12 and 16. The study found that depression and loneliness differed in many ways depending on what measurement compared with. The conclusion drawn is that future studies have to use more precise measurements.

Keywords: Internet, Instant Messaging, Loneliness, Depression, Adolescence

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Since the Internet's introduction to the public domain in the early 1990's, Internet use has increased and become part of many peoples' everyday lives. This is especially true in Westernized countries where almost everyone have some kind of Internet access.

Another phenomenon in Westernized countries, at least if you believe the media, is that many people, especially adolescents, feel more depressed and lonely than ever. Even though there is no a priori reason to believe that the increased Internet use is the reason why people feel depressed and lonely, there have been few empirical studies, but much debates about the effects Internet use have on adolescents' social and emotional life.

Early empirical studies were based on the idea that Internet use had a single effect on adolescents' social and emotional lives. Two theoretical models were suggested. The first approach suggested a Displacement Effect: Internet use take away valuable time for social and emotional development outside of Internet (e.g. Kraut et al., 1998; Nie & Ebring, 2000). The other approach suggested a Stimulation Effect: Rather than take away, it increases possibilities for social and emotional development (e.g. Gross, 2004; Valkenburg & Peter, 2007a). A more modest and newer idea, supported by some research, is that the effect Internet use has on adolescents' emotional and social development depends on either whom the users are, how they use the Internet, or both, and that there are no single effect of Internet use (e.g Valkenburg & Peter, 2007b).

One issue that has been the focus in empirical research is Internet communication and its relationship to well-being (e.g Valkenburg & Peter, 2007a; Valkenburg & Peter, 2007b). It's not easy to define well-being conceptually, but the (maybe to) simple definition used here is; what makes our life good (or more mathematically the good minus the bad). I leave out exactly what makes our life good/bad, but I'm going to use the term aspects of well-being to
talk about it. It has been argued (Valkenburg & Peter, 2007b, p. 10) that internet communication is too broad. So it have been suggested that research should distinguish between different kinds of Internet communication (e.g. mail, forums, chat-rooms etc), and more recent research have focused on the activity called *instant messaging*. Instant messaging is a form of real-time communication where people use written messages to communicate directly with one or more people over some kind of network (e.g. Internet or specific program such as MSN). The idea behind most of this research has been that the effects of instant messaging are dependent on how it is used; in particular the difference between instant messaging with strangers (social compensation alleged) versus instant messaging to uphold already existing friendships. In this context social compensation means that a person use instant messaging because he/she feels that it help him/her to overcome experienced lack of social abilities outside of internet. Usually this research also includes quality of friendship as an important factor.

Much of the studies on instant messaging seems to be based on the idea that just as there is no single Internet effect, there are no single Internet communication effect (Valkenburg & Peter, 2007a), and it has been argued (Valkenburg & Peter, 2007b, p.2) that the reason why a lot of early studies have failed to find any effects is because they have been imprecise or exploratory.

Instant messaging has been contrasted with other kinds of chatting (e.g. chatting in public chat room (Valkenburg & Peter, 2007a)). This is a bit strange because this is a form of instant messaging. The conceptual idea behind this distinction is that, depending on what kind of instant messaging being used (e.g. public chat versus private chat), people might instant message with different groups of people (e.g. friends or strangers (Gross 2004)).

I suggest that if one wants to make a distinction, it should be between instant messaging and more indirect kinds of Internet communication (e.g. mailing, networking sites etc),
between communication with people known outside the Internet and people only known from the Internet, and group size (e.g. one on one, small or large group). The reason is simply put; it seems to capture the different aspects well. Strangely enough there seems to be few studies using the contrast between direct and indirect internet communication (although see e.g. Blais, Craig, Pepler, Connolly, 2008; Valkenburg & Peter, 2007a).

I will now put forth three arguments to formulate the questions of the paper. The first is about the use of the term (or construct) well-being. Most of the studies mentioned above (and more, see Valkenburg & Peter, 2007b) were interested in the relationship between instant messaging and well-being, but they used different measurements of well-being (e.g. depression, loneliness etc). With different operationalizations of well-being, it is not strange that different studies have found different results. So instead of talking about well-being more globally, I will be more specific and talk about depression and loneliness.

I believe that both depression and loneliness are aspects of well-being and there are probably other aspects of well-being with their own unique relationship with instant messaging. If Internet use has different effect depending on what aspect of well-being examined, then if we want the whole picture of what effect instant messaging has on well-being we have to investigate all the different aspects. People who feel lonely might become depressed (we are social beings, after all), and people who are depressed might feel socially isolated, but unless depression and loneliness are the same thing we should not expect them automatically to be similarly related to instant messaging. So, even though loneliness and depression are related, there might be differences between how they relate to different aspects of instant messaging. But before I make this idea more explicit I have to explain what I mean by different aspects of instant messaging.

There might be many different motivations for using instant messaging. For example, if I would talk to strangers at a bar, most people would not immediately believe that I were
compensating for lack of social abilities. Neither could it be said that I wanted to keep contact with already existing friends. Maybe I just wanted to get to know new people. So, this study will not only look at social compensation and contacting already existing friends, which have been considered the main motivations for instant messaging. I will also look at social entertainment. I might be interested and happy to talk to other people. Now, different motives (contacting friends, social compensation, and social entertainment) for using instant messaging might relate different to different aspects of well-being, and that might be true also for youths who are depressed or lonely.

Different studies have different results concerning the relationship between the amount of time spent on instant messaging and well-being. I have already argued that such differences might depend on what aspect of well-being has been used as measurement, but it might also depend on what measurement of time spent on instant messaging has been used. It seems that the only consensus between different studies is that measurements of amount of time spent on instant messaging should contain both how long (at a given time) and how often people use instant messaging (e.g. Valkenburg & Peter, 2007a; Valkenburg & Peter, 2007b). This raises one question. Is there a difference between how long and how often someone uses instant messaging between lonely and depressed youths?

Adolescents who are depressed are in need of social support. Therefore, the main motive to use instant message should be to contact already existing friends for support. If they need support, they are likely to spend much time online as well as offline with already existing friends. Loneliness, by contrast, has more to do with feeling isolated. Therefore, lonely youths' motivation for using instant messaging should be to break the isolation by contacting new people and spending their time with others (social entertainment). It's also plausible that they will use Internet more in general. There might also be differences between depressed youth and lonely youths with respect to the amount of time they talk with strangers. Here I do
not make any predictions about this. Lonely adolescents might spend a lot of time talking to people on the Internet because it is a way to break the social isolation, and depressed youths may spend at long time talking to others because internet might encourage intimate self-disclosure and allow them to anonymously express their true self (McKenna, Green, & Gleason, 2002). In one aspect, depressed and lonely youths should be similar. Youths high on depression or high on loneliness should both experience instant messaging as a way of hiding their problems or feel more free and comfortable to express themselves. Hence, a strong motive for using instant messaging should be social compensation for both depressed youths and lonely youths.

To summarize, this study has one major hypothesis. Even though loneliness and depression can be expected to be related, there will be differences between how depressed and lonely youths relate to different aspects of instant messaging. To examine this hypothesis, this study focuses on two aspects of instant messaging. The first aspect to be examined is motivation for instant messaging. For depressed youths the main motive should be social support (contacting friends) and social compensation. For lonely youths it should be spending time with others (social entertainment) and social compensation. The motive social compensation, hence, should be salient for both the depressed and the lonely youths.

The second aspect to be examined is the amount of time spent on instant messaging. Adolescents who feel more depression should spend more time instant messaging with strangers and online as well as offline time with friends. Adolescents who feel lonelier should spend more time instant messaging in general and with strangers.

Method

Participants

All off the participants in the study (432 total) where students at Karlsängsskolan, a school for grades 7-9 (Swedish school system) in the town Nora, central Sweden. The participants were
selected because Nora is large enough to have a sufficient population of adolescents, but is
“gated” enough so that most of the participants are interrelated in such way that it’s possible to
look at friendship groups and their activities (not the focus of this paper).

All participants’ parents were contacted by mail and were asked if their children were
allowed to participate. 19 rejections were returned. Above that, 48 students were absent from
class when the study were made or because they didn’t want to participate. That leaves 365
participants which is the study sample of the present study. Of these 365 participants, 189
were boys and 176 were girls. They were between the ages 12-16 ($M = 13.956$).

The participants received a minor reward (as refreshment halfway through the study), a
piece chocolate and a soft drink.

**Measures**

**Loneliness.** The items about loneliness were from the UCLA loneliness scale (Russel,
1996). An earlier study (Valkenburg & Peter, 2007a) analyzed that scale for the eight items
with highest item-total correlation. In that study they only used five of the items, since
negative or positive wording of the questions could be divided into different factors. This
study used all eight items. Examples of items are: I often feel lonely, I often feel close to
people etc. The response scale was 1 (Never), 2 (Seldom), 3 (Sometimes), 4 (Always). In the
present sample the alpha reliability for this scale was .77.

**Depression.** The 20 items about depression were taken from the Child Depression scale
from the Center of Epidemiological Studies (Schoenbach, Kaplan, Grimson, & Wagner,
1982). The participants were asked about their mood during the last week (e.g. During last
week I have; felt sad, thought that I'm not as good as everyone else, etc). In the present sample
the alpha reliability for this scale was .85.

**Motivation for instant messaging.** The participants were asked why they used instant
messaging. All motivation items were measured on a scale from 1 (*does not describe me* at
The items were divided into three factors (using Principal Component Analysis with Oblimin with Kaiser Normalization as rotation method):

**Contacting friends** consisted of three items and were supposed to measure instant messaging to get into contact with friends. The items were, I use instant messaging because; I can talk more with my friends online, I can spend more time with my friends online, and I can have more contact with my friends online. In the present sample, the alpha reliability for this scale was .76.

**Social compensation** consisted of four items: I use instant messaging because; I feel less shy online, I feel more comfortable to express myself online, I'm less ashamed of myself when I am online, and it's easier for me to talk online. In the present sample the alpha reliability for this scale was .87.

**Social entertainment** consisted of four items: I use instant messaging because; it's something to do, it's a way to get more friends, it's a way to spend time, and it's a way to meet new people. In the present sample the alpha reliability for this scale was .78.

**Time spent instant messaging.** In Sweden, chatting is generally used instead of instant messaging, but it also used for other kind of (direct online) communication. So, while the items (in the Swedish questionnaire) used the term chatting, the instructions given stressed that chatting meant real-time communication, where the participant used written messages to communicate directly with one or more people (over some kind of network, namely the Internet). So, I will use the term instant messaging instead of chatting.

All items about time spent instant messaging were measured with two kinds of scales. The first asked about *how often* youths spent time instant messaging, measured in amount of days spent on the activity within the last week. The alternative answers were 1 (None of the days), 2 (1 to 2 days), 3 (3 to 4 days), 4 (5 to 6 days) and, 5 (every day). The second asked about *how long* they spent time on instant messaging, measuring the amount of time spent on
the activity the last time spent online. The alternative answers were 1 (I did not use instant messaging (specific way) last time I was online), 2 (Up to half an hour), 3 (Between half an hour and one hour) 4 (between one and one and a half hour) 5 (Between one and a half and two hours), 6 (Between two and two and a half hour), 7 (Between two and a half and three hours) and, 8 (more than three hours).

Procedure

The participants were in twenty different classes, so to perform the study there were twenty research assistances, one per class. The participants had one hour and twenty minutes to complete the questionnaire. That was the time offered by the school and was not a free choice. The questionnaire was divided into two parts. The first was about their offline friendships and most personal questions and the second one was about their Internet habits and remaining personal questions. When a participant had finished the first part he/she returned it and received the second part and the refreshment from the research assistant. When the time was over, or the class was done, the second part was returned. Participants who failed to finish were offered an opportunity continue later on, and two participants did. A teacher let everyone in to each classroom but left during the actual collection of the data to ensure privacy, with the exception of some students who needed special assistance. The research assistance stayed with their class the whole time to answer questions and control for possible problems during the collection of the data. No major disturbances were reported by the research assistances.

Analyses

In this study I use normal Person correlation for calculating associations among the variables examined. In order to examine if the correlation between loneliness and other variables differ from the correlation between depression and these other variables, I make use of a formula
that tests differences between two dependent correlations (Glass & Hopkins, 1996, p. 362-363).

Results

Descriptive

Of the 365 participants only 3 explicitly reported that they didn't use instant message. But there were also 29 participants who didn't answer any of the instant messaging questions. So, of the participants who answered ($N = 336$), instant messaging was used by 99%. Table 1 (below) contains mean, standard deviation and sample population for the different measurements used.

Table 1

<table>
<thead>
<tr>
<th></th>
<th>$M$</th>
<th>$SD$</th>
<th>$N$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>2.13</td>
<td>0.50</td>
<td>310</td>
</tr>
<tr>
<td>Loneliness</td>
<td>1.85</td>
<td>0.54</td>
<td>348</td>
</tr>
<tr>
<td><strong>Motivational measurements:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contacting friends</td>
<td>4.36</td>
<td>1.78</td>
<td>325</td>
</tr>
<tr>
<td>Social Compensation</td>
<td>3.29</td>
<td>1.82</td>
<td>326</td>
</tr>
<tr>
<td>Social Entertainment</td>
<td>4.65</td>
<td>1.48</td>
<td>322</td>
</tr>
<tr>
<td><strong>Time measurements:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How often</td>
<td>3.28</td>
<td>1.40</td>
<td>331</td>
</tr>
<tr>
<td>How long</td>
<td>3.91</td>
<td>2.18</td>
<td>333</td>
</tr>
<tr>
<td><strong>People only known from internet:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How often</td>
<td>2.17</td>
<td>1.27</td>
<td>320</td>
</tr>
<tr>
<td>How long</td>
<td>2.69</td>
<td>2.11</td>
<td>325</td>
</tr>
</tbody>
</table>
Online with instant message friend:

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often</td>
<td>2.58</td>
<td>1.24</td>
<td>245</td>
</tr>
<tr>
<td>How long</td>
<td>2.51</td>
<td>1.76</td>
<td>240</td>
</tr>
</tbody>
</table>

Offline with instant message friend:

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>How long</td>
<td>2.11</td>
<td>1.37</td>
<td>244</td>
</tr>
<tr>
<td>How often</td>
<td>4.26</td>
<td>2.59</td>
<td>179</td>
</tr>
</tbody>
</table>

First, it should be noted that depression was significantly related to loneliness, \((r = .42 \ p < .001 \ N = 305)\). This was in accordance with the expectations. But the main hypothesis of this paper is that even though loneliness and depression are related, there will be difference between how they relate to different aspects of instant messaging.

Motivation behind instant messaging

The first aspect to be examined is motivation for instant messaging. The hypothesis was that the instant messaging motivation for youths with high depression should be contacting friends. The motivation behind loneliness should be social entertainment. Both youths high on depression and loneliness should score higher than other youths on social compensation. The result is summarized in table 2 (below).

**Instant messaging to contact friends.** Only depression had a significant relationship with instant messaging to contact friends. Adolescents who felt more depressed used instant messaging more to contact friends than less depressed, \((r = .19 \ p < .01 \ N = 292)\). Adolescents who felt more lonely, neither used instant messaging more nor less to contact friends than less lonely adolescents, \((r = .10 \ p > .05 \ N = 321)\).
When the correlation between depression and instant messaging to contact friends was compared with the correlation between loneliness and contacting friends, no significant difference were found.

### Table 2

<table>
<thead>
<tr>
<th></th>
<th>Depression</th>
<th>Loneliness</th>
<th>Depression/Loneliness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contacting friends</td>
<td>.19**</td>
<td>.10</td>
<td>- 1.69</td>
</tr>
<tr>
<td></td>
<td>(292)</td>
<td>(321)</td>
<td></td>
</tr>
<tr>
<td>Social compensation</td>
<td>.23***</td>
<td>.25***</td>
<td>.33</td>
</tr>
<tr>
<td></td>
<td>(292)</td>
<td>(322)</td>
<td></td>
</tr>
<tr>
<td>Social entertainment</td>
<td>.28***</td>
<td>.11</td>
<td>- 3.10*</td>
</tr>
<tr>
<td></td>
<td>(291)</td>
<td>(321)</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Values in parenthesis represent number of participants included in each correlation.

* p < .05; ** p < .01; *** p < .001 all two-tailed test.

*Instant messaging for social entertainment.* Only depression had a significant relationship with instant messaging for social entertainment. Adolescents who felt more depressed, used instant messaging more for social entertainment than less depressed, \( r = .28 \ p < .001 \ N = 291 \). Adolescents who felt more lonely, neither used instant messaging more nor less to contact friends than less lonely adolescents, \( r = .11 \ p > .05 \ N = 321 \).

When the correlation between depression and instant messaging for social entertainment were compared with the correlation between loneliness and social entertainment, significant difference were found. Adolescents, who felt more depressed, used instant messaging for social entertainment more than adolescents who felt lonely \( t = -3.10, \ p < .05 \).

*Instant messaging for social compensation.* Both depression and loneliness had significant relationship to instant messaging for social compensation. Adolescents who felt
more depressed, used instant messaging more to compensate socially than less depressed, \((r = .23 \ p < .001 \ N = 292)\). Adolescents who felt more lonely, used instant messaging more to compensate socially than less lonely, \((r = .25 \ p < .001 \ N = 322)\).

When the correlation between depression and instant messaging to compensate socially was compared with the correlation between loneliness and social compensation, no significant difference were found.

To summarize, depression seems to be related to all three motivational factors while loneliness only seems to be related to social compensation. But when the correlation between depression and loneliness (motivational factors considered) were compared, only instant messaging for social entertainment was significantly different. This supports the idea that different motivations for instant messaging have different relations to well-being depending on what aspects of well-being is being tested (at least for loneliness and depression). But it does not fully support the hypothesis put forward in this study.

**Time spent instant messaging**

The second aspect to be examined was the amount of time spent on instant messaging. The hypothesis was that adolescents who feel more depression should spend more time instant messaging with strangers and online as well as offline time with friends. Adolescents who feel lonelier should spend more time instant messaging in general and with strangers. The result is summarized in table 3 (below).

*Instant messaging in general.* Only depression had a significant relationship with instant messaging in general. Adolescents who felt more depressed used instant messaging both more often \((r = .20 \ p < .01 \ N = 296)\), and longer \((r = .19 \ p < .01 \ N = 297)\), than adolescents who were less depressed. Adolescents who felt more lonely, neither used instant messaging more nor less often \((r = -.06 \ p > .05 \ N = 328)\), or longer \((r = -.04 \ p > .05 \ N = 330)\), than adolescents who did feel less lonely.
Table 3

Pearson correlation between measurements of time spent instant messaging and depression or loneliness and test for significant differences between those correlations.

<table>
<thead>
<tr>
<th></th>
<th>Depression</th>
<th>Loneliness</th>
<th>Depression/Loneliness</th>
</tr>
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<tbody>
<tr>
<td><strong>General:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How often</td>
<td>.20**</td>
<td>- .16</td>
<td>- 4.64*</td>
</tr>
<tr>
<td></td>
<td>(296)</td>
<td>(328)</td>
<td></td>
</tr>
<tr>
<td>How long</td>
<td>.19**</td>
<td>- .04</td>
<td>- 4.04*</td>
</tr>
<tr>
<td></td>
<td>(297)</td>
<td>(330)</td>
<td></td>
</tr>
<tr>
<td><strong>People only known from internet:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How often</td>
<td>.16**</td>
<td>- .04</td>
<td>- 2.14*</td>
</tr>
<tr>
<td></td>
<td>(289)</td>
<td>(316)</td>
<td></td>
</tr>
<tr>
<td>How long</td>
<td>.18**</td>
<td>- .04</td>
<td>- 2.46*</td>
</tr>
<tr>
<td></td>
<td>(292)</td>
<td>(321)</td>
<td></td>
</tr>
<tr>
<td><strong>Online with instant message friend:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How often</td>
<td>- .09</td>
<td>- .15*</td>
<td>- 3.73*</td>
</tr>
<tr>
<td></td>
<td>(224)</td>
<td>(244)</td>
<td></td>
</tr>
<tr>
<td>How long</td>
<td>- .05</td>
<td>- .09</td>
<td>- 2.10*</td>
</tr>
<tr>
<td></td>
<td>(219)</td>
<td>(239)</td>
<td></td>
</tr>
<tr>
<td><strong>Offline with instant message friend:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How long</td>
<td>- .14*</td>
<td>- .20**</td>
<td>- .83</td>
</tr>
<tr>
<td></td>
<td>(223)</td>
<td>(243)</td>
<td></td>
</tr>
<tr>
<td>How often</td>
<td>- .03</td>
<td>- .10</td>
<td>- .79</td>
</tr>
<tr>
<td></td>
<td>(163)</td>
<td>(178)</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Values in parenthesis represent number of participants included in each correlation.

* *p < .05; ** *p < .01; *** *p < .001 all two-tailed test.
When the correlation between depression and instant messaging were compared with the correlation between loneliness and instant messaging, significant differences were found. Adolescents who felt more depressed used instant messaging both more often \((t = -4.64, p < .05)\) and longer \((t = -4.04, p < .05)\) than adolescents that felt more lonely.

**Instant messaging with people only known from the Internet.** Only depression correlated significantly with instant messaging with people only known from the Internet. Adolescents who felt more depressed used instant messaging both *more often* \((r = .16 p < .01 N = 289)\), and *longer* \((r = .18 p < .01 N = 292)\), with people they only know from the Internet than adolescents who felt less depressed. Adolescents who felt more lonely, neither used instant messaging more nor less *often* \((r = -.04 p > .05 N = 316)\), or *longer* \((r = -.04 p > .05 N = 321)\), with people only known from the Internet than adolescents who felt less lonely.

When the correlation between depression and instant messaging with people only known from the Internet were compared with the correlation between loneliness and instant messaging with people only known from the Internet, significant difference were found. Adolescents who felt more depressed used instant messaging with people only known from the Internet both more often \((t = -2.14, p < .05)\) and longer \((t = -2.46, p < .05)\) than adolescents who felt more lonely.

**Instant messaging with instant messaging friend.** Only loneliness had significant correlation with instant messaging with instant messaging friend, but only if measured as *how often* and not *how long*. Adolescents who felt more lonely, used instant messaging *less often* than less lonely adolescent \((r = -.15 p < .05 N = 244)\), but neither more nor less *longer* \((r = -.09 p > .05 N = 239)\), to communicate with their instant messaging friend. Adolescents who felt more depressed, neither used instant messaging more nor less *often* \((r = -.09 p > .05 N = 224)\), or *longer* \((r = -.05 p > .05 N = 219)\), to communicate with their instant messaging friend than adolescents who felt less depressed.
When the correlation between depression and instant messaging with instant messaging friend were compared with the correlation between loneliness and the same measurement, significant difference were found. Adolescents who felt more lonely used instant messaging with people only known from the Internet less often than adolescents who felt more depressed ($t = -3.73, p < .05$). There was also a significant difference between how long they interacted ($t = -2.10, p < .05$), but because the correlation in themselves were insignificant it’s hard to interpret the result.

**Time spent offline with instant messaging friend.** Both depression and loneliness had significant relationship to offline time spent with instant messaging friend but only if measured as *how often* and not *how long*. Adolescents who felt more depressed spend less often time offline with their instant messaging friend than less depressed adolescents ($r = -.14 p < .05 \ N = 223$), but neither more nor less long time ($r = -.03 p > .05 \ N = 163$). Adolescents who felt more lonely spent less often time offline with their instant messaging friend than less lonely adolescents ($r = -.20 p < .01 \ N = 243$), but neither more nor less long time ($r = -.10 p > .05 \ N = 178$).

When the correlation between depression and time spent offline with instant message friend were compared with the correlation between loneliness and social to time spent offline with instant message no significant difference were found.

To summarize, depression seem to be more related (than loneliness) to the amount of time spent instant messaging in general and instant messaging with people one only knows from the Internet. Loneliness seems to be more related (than depression) to the amount of time spent with one's instant messaging friend online. Only time spent with one's instant messaging friend offline was significantly related to both depression and loneliness. It also seems like depression is both related to how often and how long (with one exception) one
spent time on instant messaging, while loneliness seems to be affected more by how often but not how long one spent time on instant messaging.

Finally it might be worth noting that most correlation coefficients in this study were low and therefore the variance in one variable explained for by the other are low as well.

Discussion

The major findings in this study could be summarized as; the hypothesis of this study was mainly wrong, only social compensation were correctly predicted to be related to both depression and loneliness. But the main idea that depending on what measurement of well-being being used, there will be different results in relationship with instant messaging (this might be true for other Internet studies as well) were supported in other ways. Some people seem to use instant messaging for social entertainment (at least more depressed people) and not only for social compensation or to contact already existing friends. Finally, when it comes to time spent on instant messaging there might be a difference between how long and how often someone use instant message (dependent on aspect of well-being).

Because I used correlation to analyze I can not infer cause and effect. Therefore I can not say if the results support a displacement or a stipulation effect. Both are possible. But one can have a priori arguments for what explanations of the findings that are more (or less) plausible. Before I look closer at some of those I will explain what I mean by instant messaging being cause of something (or having an effect or similar). I do not believe that instant messaging (or the Internet) per se can be a cause on its own but rather a mediator between people's choice of lifestyle and the consequences of that lifestyle.

When it comes to loneliness I found two major findings. The first was that the only motivational factor that was related to loneliness was social compensation. There are (at least) three possibilities why this is the case. The most plausible would be that there is some third factor (e.g shyness or low self-esteem) that either is the cause of both or the mediator between
loneliness and instant messaging for social compensation. I base this idea simply on two assumptions. First, the construct used to measure social compensation seems more directly related to something like shyness than to loneliness. Second, even though it's possible that people who use instant messaging for social compensation feels lonelier, it seems a bit farfetched. So even though other explanations are not excluded I suggest that next line of research test this notion.

The other finding were that adolescent who feel lonely report that they spend less time both online and offline, (measured as how often one spend time) with their instant messaging friend. This might seems like an obvious result, but I'm not sure it is. The measurement of loneliness is a measurement of feeling lonely, that does not necessary imply being lonely. Before seeing this result I would have argued that there was an obvious difference between those two states of being. One could spend time with a lot of people and still feel lonely, or spend time alone without feeling lonely at all (other combinations are possible). I could not find any previous research along that line though, so maybe it might be worth researching in the future.

Depression was more complex than loneliness and I'm not sure how to best explain those findings. When it came to motivational factors all had a role to play, so the next step (probably) is to research if any of them are more important. One plausible explanation could be that when someone feels depressed it's easier to go online and use instant messaging to fulfill ones social needs than it is to seek friends or other social activities outside ones home (this could also explain why people who feel more depressed seems to instant messaging more in general). To test this one could look at how depressed people use the Internet (e.g do they use a computer at home or do they use it somewhere else?) A problem with such research could be that most people today have Internet access at home and it might be hard to make a distinction.
When it comes to social compensation the same argument I gave for loneliness and social compensation is plausible. In other words, there is a third variable (e.g. shyness or low self-esteem) that is either the cause of both or a mediator between depression and instant messaging for social compensation.

Depression were also related more to general instant messaging and instant messaging with people one only knew from online but not so much with instant messaging with one’s instant messaging friend. This is consistent with the explanation given above (but there might be other explanations as well).

Finally, the most interesting finding was that social entertainment played a major role in depression (but not in loneliness). This is interesting because it both shows that depression and loneliness differ (well-being in all honors), and shows that there is more to instant messaging than social compensation and maintaining friendships. People (at least depressed adolescents) use instant message because it’s a way to spend time and meet new people.

A major mistake was that the participants were not asked about ethnicity. Swedish society today consists of many different cultures and different generations of immigrants. So there might be some problem with population validity.

Another problem is the measurement used to test time spent on the net. First, there were some misses in the formulation (see measurements for details). Secondly, because its only measure ‘last week’ and ‘last time’ it’s hard to draw any real conclusions (the participants’ last time instant messaging could have been significantly different from their normal patterns of instant message). Hopefully this study show that how long and how often someone uses instant messaging might be different things but it’s still not a perfect (or even good) measure. The only way to overcome the real problem is to make longitudinal studies where the participants keep daily logbook for their instant messaging habits.
Arguable one of the strengths of this study (contrary to Valkenburgs argument) is that it is exploratory. Because (consistence with Valkenburgs argument) this study used more precise definition than many of the existing studies. To be explicit about what I mean by this; earlier studies might be precise on their own but not if seen as a group of studies on the same subject. This is what I argued at the introduction about being clear about what constructs to use. Well-being is too broad. Aspects of well-being probably capture the relationships with instant messaging (and Internet use in general) better. Amount of time might also be too broad or imprecise, but it is less clear.

Sadly, I still do not have an answer to the question raised at the beginning of this paper; is increased Internet use the reason that people are feeling depressed and lonely? But hopefully this paper shows that to answer that question we have to answer some more specific questions first. And by doing that we might one day find an answer to my question.
References


