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# Loneliness as the Cause and the Effect of Problematic Internet Use: The Relationship between Internet Use and Psychological Well-Being

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## Abstract

The current research started from the assumption that one of the major motives driving individuals' Internet use is to relieve psychosocial problems (e.g., loneliness, depression). This study showed that individuals who were lonely or did not have good social skills could develop strong compulsive Internet use behaviors resulting in negative life outcomes (e.g., harming other significant activities such as work, school, or significant relationships) instead of relieving their original problems. Such augmented negative outcomes were expected to isolate individuals from healthy social activities and lead them into more loneliness. Even though previous research suggests that social use of the Internet (e.g., social networking sites, instant messaging) could be more problematic than entertainment use (e.g., downloading files), the current study showed that the former did not show stronger associations than the latter in the key paths leading to compulsive Internet use.

## Introduction

THE RELATIONSHIP BETWEEN psychological well-being and Internet usage is an enduring question in computer-mediated communication research. The original question, posed as the Internet Paradox—how the Internet could undermine psychological well-being<sup>1</sup>—has been provisionally answered by a preponderance of evidence suggesting that the Internet has an overall positive effect on well-being.<sup>2-4</sup> On the other hand, research on excessive forms of Internet usage has shown that uncontrolled or compulsive Internet use has been known to have negative effects on psychological well-being, such as depression<sup>5</sup> and loneliness.<sup>6,7</sup> Another group of research has turned the relationship around, arguing that psychosocial dysfunctions such as loneliness and depression cause addictive, habitual, or problematic Internet use (PIU).<sup>8,9</sup> Recently, a longitudinal study showed that the relationship between Internet use and psychological well-being might be bidirectional.<sup>10</sup> Based on these findings, the present research examines rival hypotheses about the role of psychological well-being as the cause or the effect of compulsive usage within distinct types of Internet activities: (a) how certain individuals with psychological problems (e.g., loneliness) may develop uncontrolled patterns of Internet use, and (b) how PIU that stems from compulsive use in turn causes negative life outcomes, such as withdrawal from real-life social

activities<sup>11</sup> that could negatively affect users' psychological well-being. Overlapping theoretical accounts have been advanced that should be integrated to understand the mechanisms through which psychological well-being and Internet use impact each other and develop over time. These include the cognitive-behavioral model,<sup>12</sup> social skill account model,<sup>11</sup> and sociocognitive model of unregulated Internet use.<sup>9</sup> The current study also distinguishes different online activities, such as social networking, downloading, and instant messaging, and investigates how these activities exhibit differing patterns of problematic behavior.

### *Psychosocial distress models of the Internet use*

Davis<sup>12</sup> proposed psychosocial problems such as loneliness and depression as one of distal antecedents to PIU. Lonely and depressed individuals turn out to have higher preference for online interaction, since they perceive that online communication might be the "Prozac of social communication,"<sup>13(p25)</sup> relatively less risky and easier than face-to-face communication because of its greater anonymity. This model is refined to become the social skill account of PIU.<sup>11</sup> According to this model, individuals who have deficient self-presentational skills might prefer online communication to face-to-face communication. As they devote more time and attention to their online social interaction, some of them have

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a hard time regulating their Internet use, which is termed compulsive use.<sup>11</sup> Compulsive use in turn leads to negative life outcomes such as lower academic grades, missing class or work, and missing a social engagement.

**H1: (a) Deficient social skills will be positively related to preference for online interaction, (b) preference for online interaction will be positively related to compulsive Internet use, and (c) compulsive Internet use will be positively related to negative life outcomes.**

Even though Caplan<sup>14</sup> acknowledged that psychosocial problems are associated with compulsive Internet use and negative outcomes, he did not include them in the later social skill account model. According to Davis,<sup>12</sup> loneliness plays a role as a distal cause of PIU. This is because when lonely people are not successful with their offline interactions, they attribute their failure to their lack of social skills, which increases PIU in turn. Loneliness should also directly influence preferences for online interaction, since lonely individuals feel that they can interact with others and express themselves better online than they do offline.<sup>15</sup> Previous studies also showed that psychosocial problems such as depression and loneliness had a direct association with PIU<sup>eg.13,16</sup> and caused deficient self-regulation.<sup>9</sup> A possible theoretical explanation for this relationship is found in Bandur<sup>17</sup>: dysphoric individuals have ineffective self-regulation because they tend to slight successful efforts to restore self-control.

**H2: Loneliness will be directly related to (a) deficient social skills, (b) preference for online interaction, and (c) compulsive Internet use.**

Another perspective is to view loneliness as the effect of Internet use rather than its cause. Negative life consequences should cause loneliness because those consequences (e.g., missing work, class, or social engagements) entail isolating oneself from offline social groups. Also, the potential long-term consequences of withdrawal from offline social contact (e.g., failing a course, losing a job or a relationship) are stressors that cause dysphoria.<sup>18</sup> A preference for online interaction is also likely to have isolating effects offline, since it implies that online social interactions will be more valued and less time will be devoted to real-world interaction. Deficient social skills are a likely contributing cause to loneliness as well.<sup>19</sup>

**H3: (a) Negative life consequences, (b) preference for online social interaction, and (c) deficient social skills will be directly related to loneliness.**

#### *Varieties of Internet experience*

Studies of the relationship between psychological well-being and Internet use have quite naturally centered around social communication on the Internet and were conducted at the time when e-mail was both the dominant form of online social interaction and the dominant online activity.<sup>eg.1</sup> However, social networking sites (SNS) and entertainment (via downloading or streaming) have since become popular online activities, notably among college-aged populations. According to the survey by Youth Trend in which young adults (ages 17–25) were asked to name three favorite sites, the top three favorite Web sites were Facebook (69%), MySpace

(38%), and YouTube (22%).<sup>20</sup> SNS and instant messaging can be categorized as online social activities, while downloading (here including accessing audio or video media files through file sharing or streaming) is less social. In line with explanations that PIU is particularly associated with social uses,<sup>eg.11,13,21</sup> we expect that the proposed models will better, and equally, account for highly social uses (SNS and instant messaging) than will less social applications (downloading).

**H4: (a) Loneliness will be associated more strongly with deficient social skills for highly social activities than for less social ones; (b) deficient social skills will be associated more strongly with preference for online interaction; (c) preference for online interaction will be associated more strongly with compulsive Internet use for highly social online activities than for less social ones; and (d) loneliness will be associated more strongly with compulsive Internet use for highly social online activities than for less social ones.**

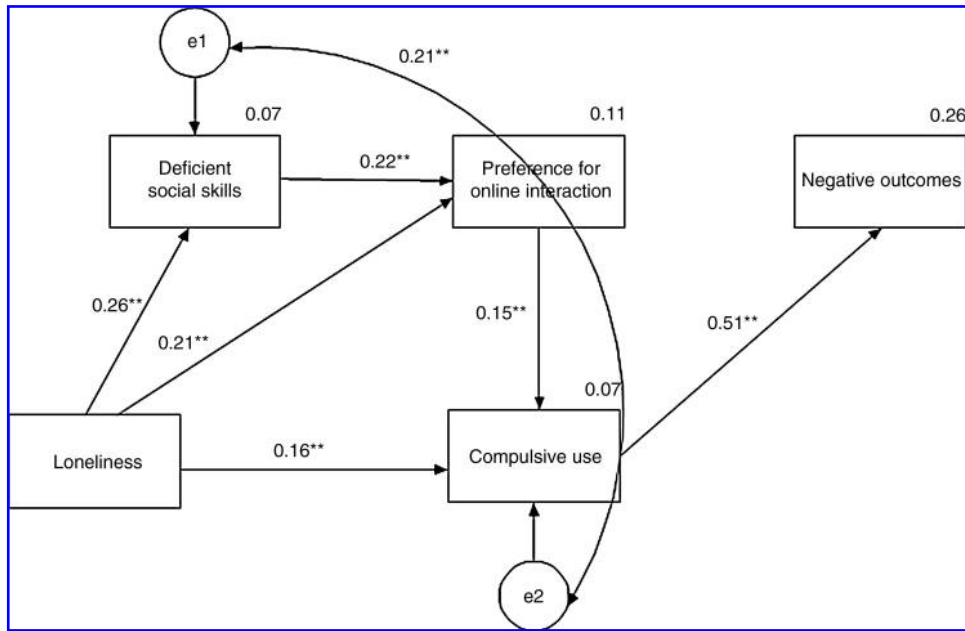
Likewise, if social activities are especially compulsive and likely to produce problematic outcomes, then deficient social skills, preference for online social interaction, and negative life outcomes should contribute more to the increase of loneliness among social activities:

**H5: (a) Deficient social skills (b) preference for online social interaction, and (c) negative life outcomes will be more strongly associated with loneliness for highly social activities than for less social ones.**

#### **Research Methods**

Undergraduate students from two Midwestern universities were invited for an online survey. A total of 635 students participated in the survey, out of which 58% were female and 42% were male. Survey participants were asked to choose their favorite online activity out of 11 activities: social networking sites (SNS), downloading or streaming music, downloading or streaming videos, instant messaging, online gaming (e.g., EverQuest, World of Warcraft), online gambling, online shopping, online pornography, chatrooms, auctions (e.g., eBay), and e-mail. Downloading or streaming music and downloading or streaming videos were merged as “downloading.” After a participant chose one activity as his or her favorite, it was used as the frame of reference for the questions that followed. Two hundred sixty-four participants chose SNS as their favorite online activity, followed by downloading ( $n = 106$ ) and instant messaging ( $n = 105$ ). The total number of participants who selected these top three activities was 475, which comprised 74.8% of all respondents.

Items for compulsive Internet use ( $M = 2.77$ ,  $SD = 1.25$ ,  $\alpha = 0.87$ ) and negative outcomes ( $M = 2.02$ ,  $SD = 1.25$ ,  $\alpha = 0.86$ ) had to be distinguished from each other with an exploratory factor analysis with varimax rotation because of their overlapping operational definitions used in previous research (e.g., PIU<sup>22</sup>). Loneliness was measured by 10 items from Russell’s UCLA Loneliness scale<sup>23</sup> ( $M = 1.78$ ,  $SD = 0.74$ ,  $\alpha = 0.84$ ). Deficient social skills was represented by two items ( $M = 4.71$ ,  $SD = 1.19$ ,  $r = 0.62$ ) from the Self-Monitoring scale.<sup>24</sup> Preference for online social interaction ( $M = 3.38$ ,  $SD = 1.48$ ,  $\alpha = 0.87$ ) was measured by three items from Caplan.<sup>11</sup> All items were measured with a 7-point Likert scale (7, *strongly agree*; 1, *strongly disagree*) and were summed and



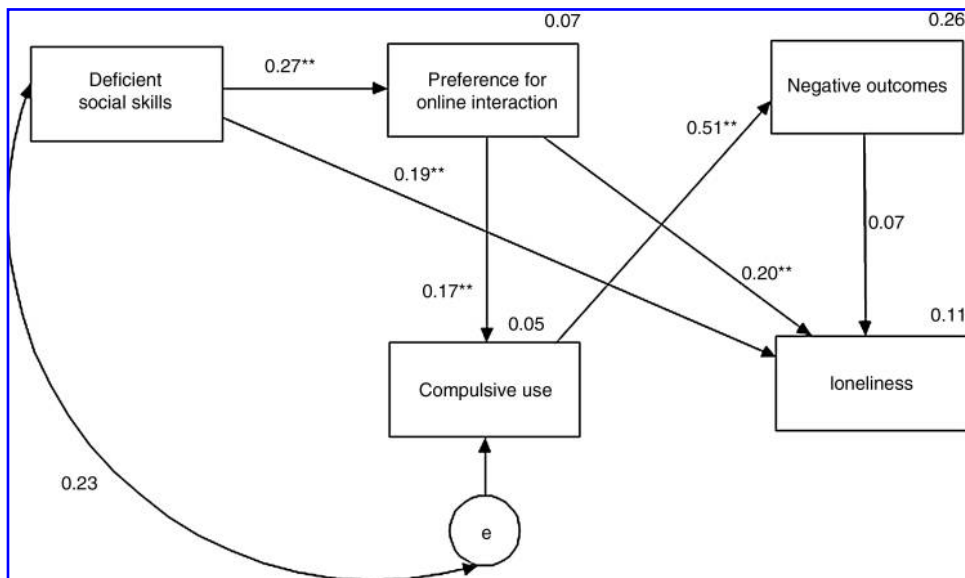
Note:  $\chi^2 = 12.01$ ,  $DF = 3$ ,  $p < 0.01$ ,  $CFI = 0.97$ ,  $NFI = 0.96$ ,  $RMSEA = 0.06$ , e = error. Residuals were omitted from the figure except the one attached to compulsive use, which is related to deficient social skills. \* $p < 0.05$ ; \*\* $p < 0.01$

FIG. 1. Path analysis results of the psychosocial distress model of Internet use when loneliness is a cause.

averaged into single indicators so that they could be used for path analyses. Two path models were analyzed separately, one with loneliness as an exogenous variable and the other with loneliness as an endogenous variable, in order not to make the path model nonrecursive. AMOS 6.0<sup>25</sup> software was used to test the hypothesized path models.

**Results**

The first hypothesized model with loneliness as an exogenous variable did not show a good fit with the data encompassing SNS, downloading, and instant messaging:  $\chi^2 = 30.43$ ,  $df = 4$ ,  $p < 0.001$ , comparative fit index ( $CFI$ ) = 0.92,



Note:  $\chi^2 = 15.03$ ,  $DF = 3$ ,  $p < 0.01$ ,  $CFI = 0.96$ ,  $NFI = 0.95$ ,  $RMSEA = 0.06$ , e = error. Residuals were omitted from the figure except the one attached to compulsive use, which is related to deficient social skills. \*\* $p < 0.01$

FIG. 2. Path analysis results of the psychosocial distress model of the Internet use when loneliness is an outcome.

TABLE 1. MULTIGROUP ANALYSIS RESULTS OF THREE FAVORITE ONLINE ACTIVITIES WHEN LONELINESS IS A CAUSE

Path	Favorite online activity		
	Social networking	Downloading	Instant messaging
Loneliness → Deficient social skill	0.26**	0.36**	0.11
Loneliness → Preference for online interaction	<b>0.15*</b>	<b>0.16*</b>	<b>0.40**</b>
Loneliness → Compulsive use	<b>0.15*</b>	<b>0.30**</b>	-0.02
Deficient social skill → Preference for online interaction	<b>0.29**</b>	<b>0.26**</b>	<b>0.03</b>
Preference for online interaction → Compulsive use	0.22**	0.10	0.22*
Compulsive use → Negative outcomes	0.49**	0.59**	0.45**

Note.  $N=475$ . Bold, italic numbers denote significantly different path coefficients among three different favorite online activity groups. \* $p < 0.05$ ; \*\* $p < 0.01$ .

normed fit index ( $NFI$ )=0.91, root-mean-squared error of approximation ( $RMSEA$ )=0.11. As a way to improve the model fit, one of the suggestions made by the modification indices was adopted, connecting the error terms of deficient social skills and compulsive use. This change could be supported from the sociocognitive model in that both deficient social skills and compulsive Internet use reflect a common inability to perform effective self-monitoring, a form of self-regulation.<sup>26</sup> The corrected model showed a better fit with the data ( $\chi^2=12.01$ ,  $df=3$ ,  $p < 0.01$ ,  $CFI=0.97$ ,  $NFI=0.96$ ,  $RMSEA=0.06$ ) supporting H1 and H2 (Figure 1).

The second hypothesized model with loneliness as an endogenous variable did not show a good fit with the data ( $\chi^2=38.18$ ,  $df=4$ ,  $p < 0.001$ ,  $CFI=0.90$ ,  $NFI=0.89$ ,  $RMSEA=0.12$ ). Following the same change made for the first hypothesized model to improve its fit, the error term of compulsive use was made to be correlated with deficient social skill. The model fit with the data improved ( $\chi^2=15.03$ ,  $df=3$ ,  $p < 0.01$ ,  $CFI=0.96$ ,  $NFI=0.95$ ,  $RMSEA=0.06$ ) (Figure 2).

A multigroup analysis was performed to test H4. The multigroup analysis can be used for checking whether the same path model can be applied across different sets of data. In other words, if there is any significantly different causal path among three favorite online activity groups (i.e., SNS, downloading, and instant messaging), it means that certain causal relationships in the hypothesized model might be stronger (or weaker) for certain activity than those of the remaining activities. The main focus of the comparison across the three online activities was whether any causal path in the hypothesized model might be significantly stronger for online social activities (e.g., SNS and instant messaging) than downloading. Thus, each of the six causal paths was con-

strained to an equal value across the three online activity groups one at a time and contrasted against the model without any constraint. The  $\chi^2$  of each model with one path constrained to equality was contrasted against that of the unconstrained model. If any of the  $\chi^2$  of the model with one constrained path became significantly worse than that of the unconstrained model, it can be concluded that the constrained path coefficient is significantly stronger or weaker for certain online activity compared to the others. (For more detailed information on multigroup analysis, please refer to Kline.)<sup>27</sup> In the first multigroup analysis, three out of six paths were significantly different across the three favorite online activity groups. Another multigroup analysis was performed to test H5. Two paths turned out to be significantly different across three favorite activities. Tables 1 and 2 summarize the results of both multigroup analyses.

## Conclusion

Depending on the types of outcomes caused by the social use of the Internet, the social compensation model indicates that individuals who lack offline social skills benefit from online interaction, while the rich-get-richer model suggests that they might suffer from more negative outcomes. The first hypothesized model can be categorized as the latter, since it presumes that individuals who are lonely and use the Internet to compensate their deficient social skills might experience negative life outcomes (e.g., harming other significant activities such as work, school, or significant relationships) instead of relieving their existing problems. It suggests that individuals who are not psychosocially healthy (e.g., are lonely) have difficulty not only maintaining healthy social

TABLE 2. MULTIGROUP ANALYSIS RESULTS OF THREE FAVORITE ONLINE ACTIVITIES WHEN LONELINESS IS AN OUTCOME

Path	Favorite online activity		
	Social networking	Downloading	Instant messaging
Deficient social skill → Loneliness	0.21**	0.27**	0.06
Preference for online interaction → Loneliness	<b>0.14*</b>	<b>0.16*</b>	<b>0.37**</b>
Negative outcomes → Loneliness	0.04	0.19*	0.12
Deficient social skill → Preference for online interaction	<b>0.33**</b>	<b>0.32**</b>	<b>0.08</b>
Preference for online interaction → Compulsive use	0.23**	0.14	0.20*
Compulsive use → Negative outcomes	0.49**	0.59**	0.45**

Note.  $N=475$ . Bold, italic numbers denote significantly different path coefficients among three different favorite online activity groups. \* $p < 0.05$ ; \*\* $p < 0.01$ .

interaction in their real lives but also regulating their Internet use. Moreover, these individuals end up adding additional problems to their lives besides their loneliness. The increased problems might drive them to rely more on their favorite online activity as a means to diminish or escape from their augmented troubles, which could isolate them and increase loneliness more. This proposition was tested with the second hypothesized model that had loneliness as an endogenous variable following negative outcomes and was supported. This pattern suggests a potential malicious cycle of unregulated Internet use if not moderated. From the multigroup analysis comparing three favorite online activities in the hypothesized model with loneliness as an outcome, downloading turned out to be the most problematic in that only its outcomes were significantly related to loneliness. It is the entertainment applications of the Internet rather than social ones that perhaps pose the greatest threat to the well-being of its users. So, some social uses of the Internet may be quite harmless even if they interfere somewhat with real-world activities.

### Disclosure Statement

No competing financial interests exist.

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