Associations Between Online Friendship and Internet Addiction Among Adolescents and Emerging Adults

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The past decades have witnessed a dramatic increase in the number of youths using the Internet, especially for communicating with peers. Online activity can widen and strengthen the social networks of adolescents and emerging adults (Subrahmanyam & Smahel, 2011), but it also increases the risk of Internet addiction. Using a framework derived from Griffiths (2000a), this study examined associations between online friendship and Internet addiction in a representative sample ($n = 394$) of Czech youths ages 12–26 years ($M = 18.58$). Three different approaches to friendship were identified: exclusively offline, face-to-face oriented, Internet oriented, on the basis of the relative percentages of online and offline associates in participants' friendship networks. The rate of Internet addiction did not differ by age or gender but was associated with communication styles, hours spent online, and friendship approaches. The study revealed that effects between Internet addiction and approaches to friendship may be reciprocal: Being oriented toward having more online friends, preferring online communication, and spending more time online were related to increased risk of Internet addiction; on the other hand, there is an alternative causal explanation that Internet addiction and preference for online communication conditions young people's tendency to seek friendship from people met online.

Keywords: adolescent, emerging adult, Internet addiction, online friendship, online communication

Over the past 15 years there has been a dramatic increase in the number of young people with access to the Internet and a proliferation of Internet programs that young people use for entertainment and social interaction. These changes have raised concerns that some adolescents or emerging adults may be using the Internet so extensively that it interferes with face-to-face interaction or other aspects of daily living. In fact, some scholars have termed such extensive use as *Internet addiction*, which seems to endanger especially adolescents and emerging adults (Griffiths, Davies, & Chappell, 2004; Smahel, Sevcikova, Blinka, & Vesela, 2009; Tsai & Lin, 2003; Wan & Chiou, 2006). To date, however, little is known about the rate of Internet addiction or factors that are associated with it. Much of the concern, however, involves the Internet's role in young people's friendship patterns. Consequently, this article focuses on associations between Internet addiction and approaches to online friendship among adolescents and emerging adults.

Online Friendship

Adolescents and emerging adults are faced with the developmental task of establishing close relationships with their peers and intimate relations with romantic partners (B. B. Brown & Larson, 2009). These relationships reflect young people's need to learn new patterns of communication with peers, seek a position within a group, and share their experiences. Adolescents report that friends are their most important sources of social support, even more than their family (B. B. Brown & Larson, 2009). Because it seems that Internet usage can widen and strengthen the contact of young people with friends and peers (Subrahmanyam & Smahel, 2011), the online communication of youths can have a strong developmental impact.

Young people use the Internet frequently for communication with peers, including strangers as well as friends (Smahel, 2003; Subrahmanyam & Greenfield, 2008). The prominence of communication in young people's use of the Internet does not vary across different countries (Subrahmanyam & Smahel, 2011). As data from the World Internet Project indicate,[1] Czech youths do not differ in this sense from youths from the United States, Canada, Singapore, Hungary, and China (Subrahmanyam & Smahel, 2011). Although there are cross-cultural differences in the usage of dif-

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[1] http://www.worldinternetproject.net

ferent online applications (chat rooms, instant messengers, etc.), the basic patterns of Internet use remain similar. Thus, even though data in this article are based on a sample of Czech youths, findings may have much broader applications.

Young people use the Internet to maintain current friendships but also to create new friendships with individuals they do not know offline (Mesch & Talmud, 2007; Valkenburg & Peter, 2007). A robust quantitative survey across 25 European countries revealed that 30% of European children ages 9–16 years made online contact with someone who they did not know previously offline; nine percent had gone to a face-to-face meeting with someone who they first met on the Internet (Livingstone, Haddon, Gorzig, & Ólafsson, 2011). In the same sample, 40% of European children reported that they were looking for new friends online in the last year. Somewhat lower values were found from an earlier national survey of U.S. Internet users, in which 25% of children and adolescents aged 10–17 years had established occasional online friendships and 14% had a close virtual friendship (Wolak, Mitchell, & Finkelhor, 2002).

Internet Addiction

The expanding use of the Internet to communicate with peers has prompted concern that it could become an addictive behavior for some youths because they manifest such characteristics as excessive, obsessive, compulsive, or problem-causing use of new digital technologies. Researchers have employed various terms to depict this phenomenon: pathological Internet use (Young, 1995, 1998a, 1998b), problematic Internet use (Shapira, Goldsmith, Keck, Khosla, & McElroy, 2000), Internet addiction disorder, or addictive behavior on the Internet (Widyanto & Griffiths, 2006). To date, however, there is no consensus on the precise definition of Internet addiction or even its standing as a distinct and legitimate disorder; it is not included in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM–IV*; American Psychiatric Association, 1994) but may have a listing in the *DSM–5* (see Block, 2008; Pies, 2009). In this article we use the term *Internet addiction* to describe this phenomenon, which can be operationalized by factors introduced in the next paragraph.

Griffiths (2000a) has identified several components of Internet addiction, based on the general behavioral addiction criteria described by R. I. F. Brown (1993; Griffiths, 2000a, 2000b; Widyanto & Griffiths, 2007). These components have often been used to develop addiction scales for youths (Ko, Yen, Chen, Chen, & Yen, 2005; Lemmens, Valkenburg, & Peter, 2009; Smahel et al., 2009). According to Griffiths (2000a, 2000c) an Internet user can be considered addicted if he or she scores highly on six criteria. The first criterion is *salience*, when the activity becomes the most important thing in an individual's life. This feature can be divided into *cognitive salience*, when an individual often thinks about the activity, and *behavioral salience*, when an individual neglects basic necessities, such as sleep, food, or hygiene, so as to perform the activity. A second criterion is *mood change*: Subjective experiences are affected by the activity. Third is *tolerance*, the process of requiring continually higher doses of the activity to achieve the original sensations. *Withdrawal symptoms*, the fourth criterion, include negative feelings and sensations that accompany not being able to perform the online activity or termination of the online activity. Fifth is *conflict*, involving interpersonal conflict (usually

with one's closest social circle, family, or partner) or intrapersonal conflict caused by the online activity. It is often accompanied by deterioration in school or work results and abandonment of previous hobbies. The final criterion is *relapse and reinstatement*, the tendency to return to addictive behavior even after periods of relative control.

The more that young people engage in friendship seeking or peer communication online, the more time they spend online, and the more opportunity they could have to develop behavior patterns consistent with Internet addiction. But the simple proportion of friends online is not the only factor likely to be correlated with Internet addiction. A second possibility is age. Emerging adults may be more susceptible to Internet addiction than early or middle adolescents, because as young people grow older, adult oversight of their Internet use diminishes (as do the restrictions placed on their Internet activity). With the transition from adolescence to emerging adulthood (typically at the end of secondary school or college), young people's face-to-face interactions with peers diminish and time alone increases, leaving them vulnerable to using the Internet to compensate for lost or weakened relationships with peers. Without supervision, a young person can become excessively involved in online activity (Douglas et al., 2008; Yen, Yen, Chen, Chen, & Ko, 2007). An example of a heavily time consuming social online activity is gaming in persistent virtual worlds such as World of Warcraft or Second Life, which are immensely popular among adolescents and emerging adults. Average intensity of play per week is approximately 25 hr (Griffiths et al., 2004; Smahel, Blinka, & Ledabyl, 2008), which corresponds to average full-time high school attendance.

The proportional share of a young person's social network emanating from online associates may not be as strong a correlate of Internet addiction as the person's preference for online versus offline (face-to-face) relationships. Early studies of youths' Internet use in the late 1990s (e.g., Kraut et al., 1998) indicated that extensive use of online communication can lead to a decline in the size of one's social circle and the amount of communication with family members, as well as increases in depression and loneliness. Changing patterns of Internet use, including the proliferation of social networking sites, have tempered these early concerns, because young people now tend to use the Internet to supplement face-to-face interactions, rather than to communicate with strangers (Boneva, Quinn, Kraut, Kiesler, & Shklovski, 2006; Gross, 2004). In some cases, however, young people prefer to locate friends and pursue relationships via online activities. Their dependence on the Internet for social interactions could make these youths more vulnerable to Internet addiction. Greenfield (1999) concluded that excessive chat-room users (i.e., those who communicate more often with strangers) constitute one group of Internet addicts, since for these users, the Internet is the main source of social and interpersonal rewards, implying potential addiction to virtual relationships and communication.

Young people's preferences for online communication may stem from personal characteristics such as self-esteem or self-efficacy. A connection between these factors and extensive Internet use has been reported in many studies (Bessière, Seay, & Kiesler, 2007; Wan & Chiou, 2006). In the research of Morahan-Martin and Schumacher (2003), lonely, depressed, and anxious individuals reported using the Internet more for emotional support, to meet new people, to interact with others, and to behave online

in a less inhibited way. These groups preferred online communication more, and they even found it more intimate and supportive (Valkenburg & Peter, 2007). Compensation for offline social handicaps might be the reason why some individuals tend to turn and return to the Internet more often (Davis, 2001), making them prone to addictive behavior online. These variables should be considered in any evaluation of the association between friendship behaviors and Internet addiction.

Current research revealed that young people use the Internet more frequently than people in older age categories (Lupac & Sladek, 2008) and are in higher need of peer social inclusion and support (B. B. Brown & Larson, 2009). At the same time, since adolescence is crucial for the formation of lifestyles, misuse of the Internet during this stage of life can be more harmful than in later periods (Kaltiala-Heino, Lintonen, & Rimpela, 2004). Unfortunately, to date, no studies have directly examined age differences in rates of Internet addiction among young people and associations between addiction and approaches to friendship (Whitty & Carr, 2006). This exploratory study was meant to address these gaps in the research literature. We focus on associations between Internet addiction and approaches to friendship online among youths, taking into account other variables that could be important in explaining these associations.

Method

Sample

The data were obtained from the World Internet Project: Czech Republic, which surveyed a sample of 1,586 respondents age 12 years and older. The sample was representative of the Czech population in terms of gender, education, age, region, and the size of the respondent's domicile. Data collection took place in September 2007 using face-to-face interviews. The current investigation was based on the 394 respondents between ages 12 and 26 years. In data analyses, the sample is divided into younger adolescents (age 12–15, $n = 99$), older adolescents (16–19, $n = 125$), and emerging adults (20–26, $n = 120$). Approximately 92% of younger and older adolescents and 80% of emerging adults indicated that they were Internet users.

Measures

Online and offline friendship. Participants were asked several questions about their friendships, including, "How many online friends do you have whom you have not met in person? Please mention how many of them you perceive as close friends," and "How many friends do you have in the real world altogether? Please mention how many of them you perceive as close friends, and how many of them you met on the Internet." From their responses we derived the numbers of online friends, offline friends, and close offline friends. In the next sections, we use the term *offline friends* for all friends with whom youths interact offline now, including those they originally met online. The term "online friends" is used to describe friends known exclusively online. Our data were collected in 2007, when Facebook (http://www.facebook.com), MySpace (http://www.myspace.com), and other social networking sites were at the beginning of their popularity in the Czech Republic. It is therefore unlikely that partic-

ipants misconstrued the term *online friends* as equivalent to the term *Facebook friend*, now widely interpreted as encompassing more superficial peer ties.

Internet addiction. To assess level of Internet addiction we compiled a set of 14 items from other studies addressing this construct (Caplan, 2002; Pratarelli & Browne, 2002; Young, 1998b). The items were translated by the authors' team into the Czech language. The items, answered on a 4-point Likert-type scale from *never* to *very often*, assessed the frequency with which participants engaged in behaviors reflecting the six features of Internet addiction specified by Griffiths (2000a). The response scale was used in previous research with satisfactory results (Smahel et al., 2008; Smahel et al., 2009). Sample items include the following: "Have you ever tried to limit the time spent on the Internet but in vain?" (relapse and reinstatement); "Do you feel restless, grumpy or upset when you cannot be online?" (withdrawal symptoms); and "Do you feel that the time spent on the Internet threatens meeting your work responsibilities and obligations?" (conflict). All six components of Internet addiction identified by Griffiths were addressed by at least two items in the questionnaire. Factor analyses indicated that the items formed a single factor; internal consistency of the items was high ($\alpha = .92$). The scale score was derived by summing item scores.

Self-esteem. Rosenberg's self-esteem scale (Rosenberg, 1965) was used in this study. The scale has 10 Likert-type items, answered on a 4-point scale from *strongly disagree* to *strongly agree*. The items were translated by the members of the authors' research institute, and the scale was verified in the previous research. The scale had good internal consistency ($\alpha = .82$). Scale scores represent the sum of item scores.

Preference for online communication. The participants were also asked a set of questions that dealt with their preferences for online versus offline communication (or preference for the online world in general), focusing on aspects of disinhibited communication online. The five questions were as follows: "I am more open on the Internet than in reality"; "On the Internet, I also reveal private details from my life, which I do not share in everyday life"; "I prefer to meet people on the Internet rather than in a real life"; "I find it easier to express myself on the Internet than in a normal conversation"; and "I can better express my emotions (feelings, senses) on the Internet." These questions were answered on a 4-point Likert-type scale (*strongly disagree* to *strongly agree*). The scale's overall Cronbach's alpha was 0.87. Items were summed to create a scale score.

Hours online at home. Respondents also indicated the average number of hours per week they spent online at home and hours spent online in several specific activities. Preliminary analyses indicated virtually no age or gender differences in rates of specific activities, nor any differences by types of activities in level of Internet addiction or approaches to friendship (as described in the next section). We therefore decided to stay with the "hours spent online at home" variable, which is sufficient control for time spent online.

Results

Number of Online and Offline Friends

As indicated in Table 1, all age groups reported having about three times as many offline as online friends (19.3 offline friends

Table 1
Average Numbers of Various Categories of Friends in the Three Age Groups

| | Age group (years) | | | | | | | |
| | 12–15 | | 16–19 | | 20–26 | | Total sample | |
Friend category	M	SD	M	SD	M	SD	M	SD
Online friends	5.6	8.4	7.3	10.5	5.6	9.5	6.2	9.6
Offline friends	18.6	19.1	20.6	17.2	18.6	19.4	19.3	18.5
Close online friends	3.4	4.0	3.8	6.7	4.5	7.1	3.9	6.2
Close offline friends	6.1	7.8	7.0	7.0	7.7	10.7	7.0	8.4
Offline friends met first online	6.0	4.2	5.1	5.1	5.9	9.0	5.6	6.3

vs. 6.2 online friends on average in the whole sample) but only about two times as many offline close friends as online close friends (7.0 close offline friends vs. 3.9 close online friends on average in the whole sample), suggesting that a higher portion of online than offline associates were considered close friends. Note also that, across age groups, between a quarter and a third of offline friends were first met online (5.6 offline friends from 19.3 friends were met online on average in the whole sample). Two-way analyses of variance (ANOVAs) indicated that there were no significant age group or gender differences in these friendship variables.

Approaches to Friendship

Because of the marked variability in the numbers of reported online and offline friends, we decided to divide youths into three groups, reflecting their different approaches to online versus of-fline friendships. The *exclusively offline* group, who reported no online friends, comprised 43.2% of the sample ($n = 140$). *Face-to-face oriented* youths, which included 30.6% of the sample ($n = 99$), reported one third or fewer online friends out of their total number of all friends. For the *Internet-oriented* group (26.2% of the sample, $n = 85$), over one third of their friends were online friends. The cutoff point, one third online friends of all friends, reflected the approximate sample average number of friendships originating online. As displayed in Table 2, the three age groups did not differ significantly in their distribution among the three approaches to friendship; additionally, no age differences were found separately for boys and girls. The genders also did not differ in their approaches to friendship.

To understand more about friendship patterns and social adjustment of youths in each of the three approaches to friendship, we conducted a series of one-way ANOVAs, followed by post hoc tests (using Fisher's least significant difference statistic) when the overall ANOVA F was significant to determine which approaches to friendship displayed significant differences on the criterion variable. Results are reported in Table 3. In prior analyses, we found no significant gender differences in numbers of friends across different approaches to friendship, and therefore, we did not include gender in the analyses.

As would be expected, the Internet-oriented group had a significantly higher number of friends and close friends they had met online than did the face-to-face oriented youths, whose scores, in turn, were significantly higher than among the exclusively offline group. However, the face-to-face oriented participants had substantially more offline friends, on average, than either other group. Participants who drew friends exclusively from offline associates had only about half the number of friends, all told, than the other two groups, whose total number of friends did not significantly differ. A similar pattern of group differences was observed regarding number of hours spent online at home and preference for online communication. The groups did not differ in levels of self-esteem, but, consistent with our expectations, the Internet addiction score was significantly higher among Internet-oriented than face-to-face oriented participants, who had higher scores than the exclusively offline group members.

Thus, all three groups had different profiles on these variables, but youths who relied exclusively on offline associates for friendships were especially distinctive from either their face-to-face oriented or Internet-oriented peers. There were substantial associations (Kendall's tau) between the approach to friendship and the preference for online communication ($r = .40$, $p < .001$, $n = 323$) as well as the addiction score ($r = .31$, $p < .001$, $n = 313$).

Table 2
Age Group Differences in Participants' Distribution (Percentage) by Approach to Friendship

| | Age group (years) | | | | | | | |
| | 12–15 | | 16–19 | | 20–26 | | Total | |
Approach to friendship	%	n	%	n	%	n	%	n
Exclusively offline	43.7	41	35.4	41	50.8	58	43.2	140
Face-to-face oriented	30.8	29	37.0	43	23.7	27	30.6	99
Internet oriented	25.5	24	27.6	32	25.5	29	26.2	85
Total	100.0	94	100.0	116	100.0	114	100.0	324

Table 3
Difference by Approach to Friendship in Friendship and Adjustment Variables

| | Approach to friendship | | | | | | | |
| | Exclusively offline | | Face-to-face oriented | | Internet oriented | | | |
Variable	M	SD	M	SD	M	SD	F	η^2
Number of friends online	0^a	0	6.7^b	5.6	16.5^c	12.4	146.23	0.47^{***}
Number of offline friends	16.0^a	15.3	26.2^b	17.7	17.1^a	17.7	11.97	0.07^{***}
Close friends online	0^a	0	2.1^b	2.9	4.9^c	5.5	18.97	0.09^{***}
All friends (online and offline)	16.0^a	15.3	33.0^b	12.5	33.7^b	28.2	26.16	0.14^{***}
Hours online at home	7.5^a	9.9	13.3^b	13.7	12.2^b	11.8	8.28	0.05^{***}
Self-esteem	30.4^a	4.2	29.3^a	4.7	30.2^a	4.4	1.61	0.01
Preference for online communication	3.2^a	3.1	6.8^b	3.3	7.4^b	3.4	58.60	0.27^{***}
Addiction score	21.2^a	7.3	25.6^b	7.3	27.9^c	7.9	22.55	0.13^{***}

Note. Comparison groups with different superscripts in the same row have significantly different scores (based on post-hoc Fisher's least significant difference statistic) on the friendship or adjustment variable reported in that row.
$^{***} p < .001$.

Associations Between Internet Addiction and Approaches to Friendship

To determine whether the association between Internet addiction and approaches to friendship was accounted for by our other friendship and adjustment variables, we used a hierarchical two-step linear regression where we regressed the addiction score on approaches to friendship (dummy coded), after controlling for the other variables (see Table 4). Results for Step 1 (control variables) are reported in Model 1; results when approaches to friendship variables are added are reported in Model 2. The Internet-oriented participants served as the criterion group in dummy variables for approaches to friendship. The multicollinearity of independent variables was tested by variance inflation factor (VIF) coefficients and was found to be not problematic (all VIFs ≤ 1.40). We also determined that there were no significant interactions between independent variables in the univariate analyses.

Among variables entered in the first step of the regression, preference of online communication and hours spent on the Internet at home had positive associations with Internet addiction, whereas self-esteem was negatively associated with this outcome. That is, young people with lower self-esteem and youths who prefer communicating online to communicating offline may be more prone to become addicted to the Internet. Contrary to our expectation, age was not associated with the addiction score, nor was gender.

In the second step (Model 2) we added approach-to-friendship variables. Even after controlling for self-esteem, preference for online communication, hours online, and the demographic variables, the approaches to friendship variables still had a significant association with Internet addiction, adding 4.3% to the variance explained in the addiction score.

Results of these regressions support the contention that approaches to friendship affect Internet addiction, but it is possible

Table 4
Linear Regression: Factors Associated With Internet Addiction

| | Model 1 | | Model 2 | | |
Variable	B	β	B	β	95% CI
(Constant)	33.423		37.566		
Self-esteem	-0.301^{**}	−.167	-0.326^{**}	−.181	[−0.512, −0.139]
Preference for online communication	0.584^{**}	.276	0.338^{**}	.160	[0.079, 0.598]
Hours online at home	0.081^*	.121	0.073^*	.109	[0.001, 0.144]
Age	0.111	−.058	−0.090	−.047	[−0.285, 0.106]
Gender	1.430	−.089	−1.219	−.076	[−2.899, 0.462]
Approach to friendship					
Exclusively offline			-4.649^{**}	−.290	[−6.913, −2.385]
Face-to-face oriented			-2.341^*	−.135	[−4.500, −0.182]
R^2	0.165		0.209		
F	11.893^{**}		11.234^{**}		
ΔR^2			0.043		
ΔF			−0.659		

Note. CI = confidence interval.
$^* p < .05$. $^{**} p < .01$.

that the reverse causal sequence is true. To test this alternative, we also conducted a hierarchical two-step linear regression with Internet addiction as the predictor and approaches to friendship as the criterion variable (see Table 5). The multicollinearity of independent variables was again tested by VIF coefficients and was found to be not problematic (all VIFs ≤ 1.20).

Among control variables in the first step of the regression (Model 1 in Table 5), only the preference of online communication had a positive association with approaches to online friendship: Higher preference for online communication led to higher preference for online friendship. Age, gender, and hours spent online were not associated with approach to friendship. In the next step (Model 2 in Table 5), we added the Internet addiction score and found that, controlling for other variables, it was significantly associated with approach to friendship, accounting for 3.9% additional variance in approach-to-friendship variables.

Discussion

Internet programs and activities provide young people with new dimensions of social activities. Not only can youths initiate and maintain relationships with individuals they encounter only online but they also can use Internet features such as social networking sites or instant messaging to arrange or supplement face-to-face interactions with offline associates. Concerns that the Internet might be an inherently unhealthy venue for social interactions have subsided, but investigators have noted that some adolescents and emerging adults are so preoccupied with Internet activities that they show signs of addiction to these activities (Griffiths et al., 2004; Smahel et al., 2009; Tsai & Lin, 2003). Findings from the current investigation suggest that youths who are most prone to Internet addiction do display distinctive patterns of Internet activity related to their source and pursuit of friendships.

In partitioning the sample according to tendency to seek friendships online or offline, we found that the group that had a balanced proportion of offline and online friends seemed to be well adapted in both environments. They had the largest number of friends in general as well as the greatest number of close friends. An interesting fact is that this (face-to-face) group had the highest number of offline friends who originally had been met online. Such results

seem to confirm the stimulation hypothesis (Valkenburg & Peter, 2007): Youths tend to use the Internet mostly for maintaining and enriching their social circles. This corresponds to the developmental need of youths to establish relations with peers, and it seems that the Internet is just a tool for addressing this need. Furthermore, the concept that Internet usage leads youngsters to social isolation (Kraut et al., 1998) was not confirmed, as the fewest number of friends was recorded by those who did not report having any online friends. These results are congruent with other research (Valkenburg & Peter, 2007).

Concerning the associations between Internet addiction and the approaches to online friendships, analyses revealed that effects between these variables may be reciprocal. On the one hand, we found that one's approach to online friendship was significantly associated with Internet addiction: A higher tendency toward addictive behavior corresponded to higher rates of initiating friendships online. Greenfield (1999) concluded that excessive chat room usage rendered individuals prone to Internet addiction, but chat rooms tend to involve interactions with strangers. Our findings suggest that extensive Internet-based interactions with friends also may be a factor in Internet addiction. The data, however, also lend themselves to an alternative causal explanation, namely, that Internet addiction and preference for online communication with friends conditions young people's tendency to seek friendship from people met online. The idea of reciprocal effects between Internet addiction and the increasing tendency to pursue online friendships may best mirror reality: Youths who prefer online friendships probably have more conflicts between their online and offline worlds. They may neglect their offline friends, which could feed their tendency to overuse the Internet. On the other hand, youths already prone for some reason to Internet addiction spend a lot of time online. They may be searching for friends online to gain the social support they do not have offline. Longitudinal studies are needed to sort out the real causal directions of these associations. Yet even longitudinal findings are limited because rapid changes in Internet use patterns create cohort effects that limit generalizability of findings from one cohort of adolescents to the next.

Table 5
Linear Regression: Factors Associated With Approaches to Friendship

Variable	Model 1		Model 2		
	B	β	B	β	95% CI
(Constant)	1.220		0.473		
Self-esteem	0.010	.056	0.017	.092	[−0.001, 0.036]
Preference for online communication	0.106	.485**	0.093	.425**	[0.070, 0.116]
Hours online at home	0.003	.050	0.002	.024	[−0.005, 0.009]
Age	−0.009	−.047	−0.007	−.035	[−0.026, 0.012]
Gender	0.091	−.055	0.059	.035	[−0.224, 0.106]
Internet addiction			0.022	.217**	[0.011, 0.033]
R^2	0.246		0.285		
F	19.575**		19.880**		
ΔR^2			0.039		
ΔF			0.305		

Note. CI = confidence interval.
** $p < .01$.

The connection between Internet addiction and approaches to friendship cannot be attributed simply to youths' preferences for communicating with friends online versus offline because the association remained significant even after controlling for participants' communication preferences. Those who preferred to seek and communicate with friends online reported higher levels of Internet addiction, possibly because their communication patterns led to a style or level of Internet activity commensurate with addictive behavior. Low levels of self-esteem also were associated with higher levels of Internet addiction. Collectively, these three characteristics—relying on the Internet as a source of friendships, preferring online venues for communicating with friends, and manifesting low self-esteem—may begin to build a profile of young people especially susceptible to Internet addiction. Again, however, causal associations among these variables are purely speculative at this point.

Our expectation that emerging adults would display more evidence of Internet addiction than adolescents was not confirmed by the data. In fact, neither age nor gender differences were pronounced on variables included in our study. The absence of gender differences in addictive behavior among youths seems to be in line with other research on European samples (Johansson & Gotestam, 2004; Milani, Osualdella, & Di Blasio, 2009), but the absence of age differences is more challenging to interpret. Even though emerging adults are less supervised on the Internet than adolescents and may indeed spend more time on the Internet, it is possible that they use the Internet for different activities than adolescents (such as shopping or work-related communication), and these different activities are less linked with addictive behavior. It is also possible that the broader use of the Internet that may occur with age is offset by cohort differences in which successive cohorts of adolescents spend increasing amounts of time online. Cohort sequential studies (longitudinal assessments of a succession of age cohorts) with tight spacing between cohorts are needed to assess these possibilities. Such studies should be attentive to changes across age groups and cohorts in the types of activities that dominate young people's Internet use.

Interestingly, no significant gender and age differences were found in the numbers of online friends, close online friends, and approaches to online friendship. Adolescents and emerging adults have similar numbers of online friends. This finding is in line with the study of Valkenburg and Peter (2007) on a Dutch sample, which revealed that, for the 88% of youths who interacted online with friends they knew offline, online communication was positively related to closeness of their friendship; furthermore, this effect was stable across all developmental stages and across genders. It seems that the developmental need of communication with peers, online and offline, as well as with exclusively online friends, is also stable across age and gender within this developmental period. As Boneva et al. (2006) noted, two major needs of youths are satisfied in online communication (messengers in their study): maintaining their individual friendships and belonging to a peer group.

Our results should be interpreted with caution because of some limitations to the study. The interview format may have prompted some participants to be less candid than they might have been in more confidential, self-report questionnaires, possibly resulting in an underreporting of Internet activity or addictive behaviors. There is not yet sufficient research to establish clinical levels of Internet addiction, so we cannot discern how serious the levels reported by our participants really were. Most important, longitudinal research is needed to differentiate friendship patterns that promote Internet addiction from those that result from such an addiction. Nevertheless, our findings underscore the possibility that young people's overreliance on the Internet in negotiating friendships may contribute to addictive levels of Internet usage that can interfere with healthy social development across adolescence and emerging adulthood.

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