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Internet Use and Well-Being in Adolescence

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Previous research suggests that Internet use may be associated with decreases in well-being among adolescents. However, there has been little investigation of the relationship between well-being and social aspects of Internet use. In the present study, 130 7th graders from a middle-class public school in California completed dispositional measures of well-being, and on three subsequent evenings they responded to questions regarding their Internet use (including detailed logs of instant messages) and daily well-being. Time spent on-line was not associated with dispositional or daily well-being. However, as suggested by intimacy theory, the closeness of instant message communication partners was associated with daily social anxiety and loneliness in school, above and beyond the contribution of dispositional measures.

As Internet use among teenagers has grown exponentially in the last 10 years (Becker, 2000), so has concern over its effect on their psychological well-being. Of over 1,000 U.S. parents surveyed in 1999, almost two thirds expressed concern that "going on-line too often may lead children to become isolated from other people," whereas 40% endorsed the belief that "children who spend too much time on the Internet develop antisocial behavior" (Turow, 1999).

Such apprehensions are not simply the fears of overprotective parents; they received initial empirical support from the first major study of the Internet's psychological impact. A longitudinal investigation of first-time Internet users known as the HomeNet study (Kraut et al., 1998) reported that using the Internet for as little as 3 hr weekly led to increased levels of depression and reductions in social

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support over the course of 2 years. Results showed teenagers to be the population most vulnerable to these negative effects. Kraut and colleagues speculated that adolescents' heavy usage of the Internet for on-line communication led them to forsake critical bonds with local friends and family for weak relations with strangers.

In considering the application of Kraut and colleagues' findings to adolescents, two concerns in particular should be noted. First, because the HomeNet sample did not include a non-Internet-using control group, we cannot determine how much of the downward trend in participants' well-being was due to their Internet use or to the unfortunate but steady decline in perceived social support and overall contentment *typically* reported by youth as they proceed through adolescence (Larson, 1999). Second, the Kraut et al. study (like most studies of youth Internet use, e.g., Roberts, Foehr, Rideout, & Brodie, 1999) did not gather detailed accounts of on-line social activity (i.e., with whom and about what Internet users were communicating). Given the importance of supportive peer relationships to healthy adolescent development (for a review, see Hartup, 1996), we argue that an understanding of the relation between youth Internet use and psychological well-being requires a consideration of *with whom* adolescents communicate on-line.

Well-Being and Close Relationships

The need to form and maintain strong interpersonal bonds has been described as a fundamental need (Baumeister & Leary, 1995) and one that is critical to healthy development (e.g., Sullivan, 1953). Research on young adults has found that feeling close and connected to others on a daily basis is associated with higher daily well-being, and in particular, feeling understood and appreciated and sharing pleasant interactions are especially strong predictors of well-being (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000). As outlined by Reis and Shaver (1988), intimacy is developed and sustained through social exchanges with responsive others (e.g., pleasant interactions and feeling understood). Intimacy emerges as an expectation for peer relationships in late childhood or early adolescence (Buhrmester & Furman, 1987; Sullivan, 1953), and the expectations and meanings of friendships remain constant throughout adolescence and adulthood. Thus close and meaningful interactions with peers are likely to be at least as important to adolescent well-being as they are to adult well-being. Indeed, research affirms that close peer relationships contribute positively to adolescent self-esteem and well-being, whereas peer relationship problems such as peer rejection and a lack of close friends are among the strongest predictors of depression and negative self-views (see Hartup, 1996). From the perspective of intimacy theory (Reis & Shaver, 1988), Internet use could undermine *or* foster well-being, depending on whether it supplants (as suggested by Kraut et al., 1998) or expands opportunities for meaningful, daily contact with close peers.

Adolescent Internet Use

Two advances in the use of the Internet are important to our understanding of the nature of on-line relationships and social exchanges. First, new technologies have been developed to further facilitate synchronous on-line interaction with known others. One such feature, instant messages (IMs), allows users to be informed when friends are on-line and to chat with them through text windows that appear on the screens of the two parties involved. Because of its dyadic, real-time, and private format, the IM is structurally and functionally comparable to other important and pervasive forms of social interaction in adolescence: "hanging out" face to face and talking on the phone. Indeed, a recent study by the Pew Internet and American Life Project (2001) indicates that for a fifth of American teenage Internet users, instant messaging (IMing) has become the primary means of contacting friends. Second, with more youth (particularly from middle- and upper-income households) accessing the Internet from home than ever before, teens are increasingly likely to find their close friends on-line. Thus, youth need not necessarily forsake their school-based relationships when they log on; the Internet can now be both a space in which to interact with distant associates and strangers and a supplemental medium for communication with one's established, off-line peer network.

The Present Study

We present findings from a study on adolescents' daily Internet use and psychological adjustment, with a specific focus on IMing. Participants in this research completed three daily reports of their overall well-being, socially specific adjustment (loneliness and social anxiety in school), and after-school activity, including Internet use. Dispositional measures of these variables were also collected in participants' classrooms prior to the daily reporting. Given the tendency for psychological well-being (Reis et al., 2000) and loneliness (Larson, 1999) to fluctuate within and across days as a function of social contact, we expected that daily indicators of well-being would be especially important to consider.

Analyses will be presented in two parts: descriptive and correlational. First, distinct forms of Internet use will be explored in the context of both overall time on-line and time in non-Internet activities. The second set of results will be devoted to the investigation of associations among on-line activity and well-being. It is proposed that with the increasing ease and speed of on-line communication with friends, adolescents' psychological well-being is not associated with how much time they spend either on the Internet or in specific on-line domains. Rather, we predict that socially specific aspects of psychological adjustment—loneliness and social anxiety with school peers—are related to the closeness of relationships with on-line communication partners. In order to enable the collection of detailed

communication variables, we focus on the characteristics of discrete, dyadic IM exchanges. Specifically, we test the prediction that adolescents who report lower levels of loneliness and social anxiety, relative to their peers, would be more likely to IM with people to whom they felt close. In addition, we expected the daily indicators of loneliness and social anxiety to improve predictions of partner closeness beyond the contributions of trait indicators. Given the centrality of motives for and content of self-relevant disclosure to the process of intimacy (Reis & Shaver, 1988), we also explored the associations among well-being and IM motives and topics. Finally, in light of previously reported gender differences in early adolescents' verbal intimacy with friends (Papini, Farmer, Clark, Micka, & Barnett, 1990) and Internet use (see Becker, 2000), we took gender into account in our analyses.

Method

Demographic data (age, gender, ethnicity), background information on Internet use (e.g., on-line tenure, parental rules regarding Internet use, shared phone access, and speed of Internet connectivity), and dispositional measures of psychological adjustment (depression, social anxiety, and loneliness) were collected from participants in school. For the same night as the data were collected (8–14 hr later) and for two consecutive nights thereafter, participants provided daily reports on three general sets of variables: specific on-line activities, general after-school activity, and psychological adjustment.

Participants

To allow us to examine an adolescent peer context in which Internet use is widespread, we sampled from a relatively homogenous mid- to high-socioeconomic-status community. All seventh-grade students were recruited from one public middle school in Southern California. Parental consent was received for 33% of boys and 47% of girls recruited ($p < .001$), resulting in 49 male and 81 female participants. The participants ranged in age from 11 to 13 years of age, with the majority aged 12 ($M = 12.11$, $SD = .40$). Of the 120 participants who reported their ethnicity, 59.2% identified themselves as European American, 17.5% as Asian American, 10% as being of mixed heritage, 5.8% as Latino/a, 1.7% as African American, and 5.8% as other.

Procedure

To encourage Internet users and nonusers alike to participate in the study and to reduce the likelihood of reactivity, the study was explained during a class and in a letter to parents as research "investigating how adolescents feel about themselves and their peers and how they spend their time after school, including on the

Internet." All participants first completed a confidential self-report questionnaire in class. Participants were then directed to complete the daily report just before going to sleep each night. To encourage timely and complete participation, researchers visited each classroom daily during the course of the study to collect the previous night's and distribute that night's log. Each time participants returned a daily report complete and on time, they were rewarded by the researchers with a piece of candy and a lottery ticket for two movie passes to be raffled in their classroom after the study.

A total of 17 participants did not complete any nightly logs, resulting in 113 participants reporting a total of 275 days, an average of 2.12 of 3 possible days per person. Girls were more compliant, on average completing more logs than boys (Ms = 2.41, 1.63, $p = .001$). There was no significant difference in either psychological measures or levels of typical Internet use between participants who submitted at least one versus no daily reports.

One-Time Measures

Typical after-school activity. To enable comparisons of our data with other studies of Internet use (i.e., America Online/Roper Starch, 1999), participants were asked to estimate how much time they spend "on a typical day" using the Internet at home. In addition, in order to situate Internet use in the context of daily after-school activity, five other types of after-school activity were assessed: homework, organized activity (e.g., sports team, club, lesson), hanging out with friends, talking on the phone, and watching television. Next to each activity, participants marked one of five alternatives (*none*, *30 minutes or less*, *1 hour*, *2–3 hours*, *4 hours or more*) to indicate daily engagement.

Loneliness. Nine items from the 30-item UCLA Loneliness Scale, Version 3 (Russell, 1996) were used to assess global feelings of isolation. The words "in school" were added to each item to enable assessment in this specific setting. On 5-point scales (1 = *not at all true for me*, 5 = *all the time true for me*), participants responded to such questions as "How often do you feel left out at school?" Higher scores indicate greater levels of loneliness.

Social anxiety. Global social anxiety was measured using the generalized social anxiety subscale of the Social Anxiety Scale for Adolescents (SAD-G) devised by La Greca and Lopez (1998). This instrument assesses adolescents' subjective experience of generalized social avoidance, inhibition, and distress. Participants rated each of four descriptive self-statements (e.g., "I feel shy even with people I know very well") on a 5-point scale. Higher scores indicate increased levels of social anxiety.

Friendship. A quantitative measure of friendship (number of close friends at school) was included to provide construct validity for the measures of school-based loneliness and social anxiety, as well as to serve as a proxy for the size of social circle assessment used in the HomeNet study (Kraut et al., 1998).

Depressed mood. The 10-item short form of the Child Depression Inventory (CDI; Kovacs, 1992) was administered with eight filler items. For each item, participants selected one of three statements that was "most true" for them *in the past two weeks* (e.g., "(a) Things bother me once in a while, (b) Things often bother me, or (c) Things bother me all the time.") A higher index score indicates greater levels of depressed mood.

Daily Measures

Our primary aim in using a dual-survey approach at this preliminary stage of investigation was to verify participants' in-school global self-reports of peer-related adjustment and after-school behavior with daily reports of their behaviors across three weekdays. Therefore, daily scores across the three days were combined as a mean, despite the potential loss of key information regarding within-person variability (see Reis & Gable, 2000).

Daily after-school activity. Participants were asked to estimate how much time they spent that day on the six after-school activities mentioned above. In addition, eight categories of on-line activity were listed: e-mail, games, multiuser dimensions (MUDs), message boards, list-servs/newsgroups, chat rooms, IMs, and Web or America Online (AOL) sites. Next to each activity, participants rated engagement using the 5-point time scale (*none* to *4 hours or more*) described above.

Characteristics of on-line communication. In order to balance our interest in the details of interaction with our concern for participant attrition and fatigue, the log required participants to provide more extensive information for only their single lengthiest IM interaction that day, as follows: relational identity of IM partner (stranger, acquaintance, friend, best friend, girlfriend/boyfriend, or family member); origin of contact with partner (on-line, off-line in school or off-line outside of school); duration of relationship (six possible categories, from *this is the first time we've met* to *over 2 years*); gender of partner; relative age of partner; their own motives for IMing; and topics discussed. Participants were asked to indicate how much they discussed each of 13 communication topics ranging from less intimate (e.g., politics, schoolwork/college, sports) to more intimate topics (e.g., gossip, boyfriend/girlfriend stuff, friends). Topics were selected based on observations of public teen chat conversations and feedback from pilot participants.

Loneliness. A daily index of loneliness was developed from the UCLA Loneliness Scale. Seven items from the dispositional measure were used. Participants indicated the degree to which each statement was true for them "today at school."

Social anxiety. LaGreca and Lopez's (1988) SAD-G scale was adapted for use as a daily measure, with each of four items assessing how participants felt at school that day.

Subjective well-being. The Student's Life Satisfaction Scale (SLSS; Huebner, 1991) was adapted for use a daily assessment of student's global life satisfaction (cf., depression) beyond such specific domains as peer relations at school. Participants rated their agreement on a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*) for each of seven statements according to how they felt that day (e.g., "My life was just right today"). Higher scores indicate greater daily subjective well-being.

Psychometric Properties of the Adjustment Variables

All standardized psychological scales employed demonstrated acceptable internal consistency and congruence with distributions and correlates of normative adolescent populations, as reported by scale authors (see Table 1 for all internal consistency reliability coefficients). To establish construct validity, we computed correlations between the dispositional and aggregated daily measures of social functioning (see Table 1). These correlations were moderate to strong, ranging

Table 1. Correlations Among Psychological Adjustment Variables and Instant Message Partner Closeness

Variables	Mean	*SD*	α	1	2	3	4	5	6
Dispositional adjustment measures									
1. Number of close friends in school	3.44	1.0							
2. Depression	2.76	3.1	.83						
3. Loneliness	19.54	6.5	.84	−.380***	.523***				
4. Social anxiety	6.87	2.8	.79	−.331***	.493***	.560***			
Daily adjustment measures									
5. Daily subjective well-being	26.38	5.8	.89		−.510***	−.437***	−.361***		
6. Loneliness	13.51	5.1	.83	−.411***	.494***	.609***	.355***	−.560***	
7. Social anxiety	6.17	2.7	.74	−.322**	.474***	.479***	.511***	−.440***	.748***

Note: All nonsignificant ($p > .01$) correlations were omitted. Cronbach's alpha internal reliability statistics are in the column labeled α. Reliabilities for daily adjustment measures represent averages of the daily alphas.
** $p = .001$. *** $p = .0001$.

from $r = .51$ for social anxiety to $r = .61$ for loneliness. Also, it should be noted that the correlations between dispositional and daily measures of psychological well-being were similar across all three days, suggesting a lack of bias stemming from the collection of dispositional and Day 1 measures on the same day. No effects of gender or ethnicity were observed on any psychological measures.

Results

Internet Usage in the Context of Adolescents' After-School Time

Using the traditional response format of how often participants use the Internet, the in-school survey revealed that 90% of participants use the Internet "occasionally" or "regularly" at home. Similarly, 84% of respondents reported that they go on-line on a "typical day." Consistent with these figures, 70% of participants ($n = 110$) reported at least one Internet session during the 3 days of our study. On a given single day, however, between 40% and 57% of participants ($n = 76–99$) reported that they did *not* go on-line. Thus, global questions seemed to bias usage estimates to be somewhat higher (14–21%) than those reported in daily logs. In order to portray an average daily assessment, all activities and psychological measures were averaged across days for all participants.

On average, the Internet consumed less of participants' daily after-school time than any of the other five activities measured. Participants reported over 1 hr in organized activities (e.g., clubs, lessons; $M = 62.35$ min, $SD = 57.4$) and watching television ($M = 62.99$, $SD = 56.6$), and more than 2 hr doing homework ($M = 129.60$, $SD = 60.4$). Average daily time on-line ($M = 46.6$ min, $SD = 59.7$) most closely approximated time spent on the phone ($M = 64.31$, $SD = 115.1$) and with friends ($M = 70.18$, $SD = 70.0$).

As shown in Figure 1, on average, participants devoted the majority of their daily time on-line to three domains: IMing ($M = 28.85$ min, $SD = 42.4$), visiting Web sites and "surfing the Web" ($M = 24.45$, $SD = 33.6$), and e-mail ($M = 20.38$, $SD = 24.3$). No significant gender differences in levels of overall or specific types of Internet usage were revealed by *t*-tests, after excluding the 5 boys (of $n = 113$) who comprised the long tail (95th percentile) of high daily game activity (i.e., 75 min or more of on-line game play per day). It should be noted that the average sum of time spent in specific domains far surpassed average daily overall time participants reported spending on the Internet, suggesting that participants commonly engaged in simultaneous activity, or "multitasking."

Characteristics of IMs

Participants reported exchanging IMs with an average of 2.68 ($SD = 1.83$) different people per day. Additional data were collected about participants' longest

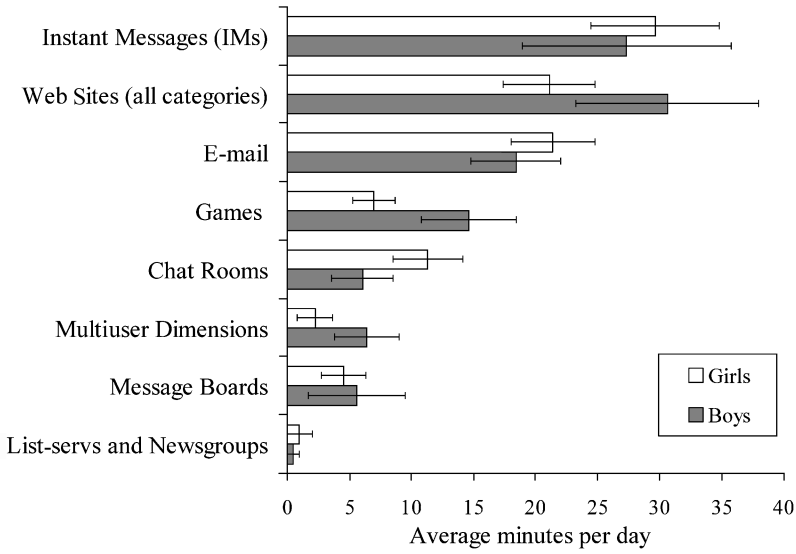

Fig. 1. Average daily time (+*SE*) spent on-line by domain.

IM interaction each day. The median interaction duration was 30 min, and 54% of participants who reported IMing ($n = 43$) indicated that they communicated with the person "every day" or "almost every day." An additional 14% reported weekly contact with the IM partner. In contrast, only 7% of instant messengers stated that the reported interaction was the first IM they had ever exchanged with that particular person.

IM motives and topics. Participants' motives for and topics of IM communication convey the social and personal nature of participants' interactions. The topics most commonly reported by both boys and girls were friends (58%), gossip (51%), and "boyfriend/girlfriend stuff" (50%). The most widely reported motive for IMing was "to hang out with a friend," endorsed by 92% of instant messagers ($n = 43$), and nearly three fourths of instant messagers reported IMing because they were bored (74%).

IM partners. Consistent with our expectations, participants' relationships with IM partners ($n = 86$) were described, on average, as relatively long-standing friendships with peers first met in school. Most IM partners (86%) were reported to be "about the same age" (i.e., less than 2 years older or younger) as the participant, whereas the remaining 14% were described as 2 or more years older. Just over half (54%) of reported IM interactions occurred in same-sex dyads. Of the partners, 88% were first met off-line, predominantly at school (67%). Only 12% of

partners were first encountered on-line. Sixty-five percent of participants reported knowing their IM partner for more than a year, and 35% had known their partner for more than 2 years. No participants reported knowing their partner for less than a week.

To be able to describe the closeness of participants' relationships with IM partners, partner type was ordered on the dimension of closeness. First, we excluded three low-frequency categories (boyfriend/girlfriend, family member, other) because the closeness of these relationships varies considerably among young adolescents (cf. Brown, 1999). Second, we represented the remaining categories as a 4-point closeness scale (1 = *stranger*, 2 = *acquaintance*, 3 = *friend*, and 4 = *best friend*). Third, we averaged closeness of the communication partner across days. Reported closeness of the relationship with primary IM partners was fairly consistent across the three days (Cronbach's $\alpha = 68$) and reflected participants' tendency to communicate with friends ($M = 3.10$, $SD = 0.8$). Examination of cross-tabulations of IM partner closeness and origin of the relationship (i.e., off-line vs. on-line) showed that the vast majority of friends and all best friends were initially met *off-line*. The few strangers with whom participants communicated were largely met on-line (five out of six). Closeness differed neither by gender nor by tenure on-line.

Internet Usage and Psychological Adjustment

Overall usage levels. Consistent with our predictions, time on-line—overall or in specific domains (e.g., chat, games)—was not correlated with psychological adjustment. In addition, analysis of variance comparisons among groups of Internet users of varying levels of tenure (e.g., 0–6 months vs. 2 years or more using the Internet) yielded no significant differences on any psychological measures.

Predicting closeness of relationship with IM partner from daily adjustment. Pearson correlations between IM partner closeness and all psychological measures (controlling for effects of gender, average daily time on-line and average daily time on IMs) yielded significant associations with daily levels of loneliness, $r(38) = -.43$, $p = .01$, and social anxiety, $r(38) = -.40$, $p = .01$, suggesting that participants who felt relatively socially anxious and/or lonely in school *on a daily basis* were more likely to communicate in IMs with people with whom they did not have a close affiliation.

Hierarchical multiple regressions were performed to test the multivariate model: the contribution of average daily social anxiety to the average closeness of IM partners. It should be noted that because the data reported here are correlational, inferences cannot be made regarding the direction of causality; that is, our data cannot distinguish whether problematic peer relations cause individuals to seek out unfamiliar communication partners on-line, or, conversely, if on-line

communication with a close friend from school is responsible for improved comfort and connectedness in school. In spite of this limitation, the temporal sequencing of the data collection (i.e., daytime feelings in school precede nighttime Internet use) requires that we frame the association between school adjustment and on-line communication in terms of the former predicting the latter.

To take into account the potential influence of gender and the possibility that time spent on-line might increase the likelihood of friends also being on-line, we entered gender and the average daily total time on-line as first and second steps in the regression, respectively.[1] To control for the influence of dispositional social anxiety, the initial global assessments obtained at school on the first day were then entered into the equation. We were thus able to examine whether daily average social anxiety would add substantially to an explanation of partner closeness beyond that provided by the global measure. The daily measure of social anxiety significantly predicted closeness of IM partner, $\beta = .45$, $p < .02$, adding 13% to the total variance explained by the model, $\Delta R^2 = .13$, $p < .02$.

Similarly, daily and dispositional loneliness were entered as successive third and fourth steps in a hierarchical regression predicting average closeness of IM partner. As predicted, daily loneliness predicted an additional 8% of the total variance, $\Delta R^2 = .08$, $p < .06$, $\beta = -.41$, $p < .06$ (i.e., above and beyond the contribution of dispositional anxiety). In predicting the closeness of IM partners, then, daily loneliness and daily anxiety are important. Teens who, on average, reported feeling more daily loneliness and/or social anxiety in school were more likely to communicate with a stranger than with a friend or close friend after school. To provide discriminant evidence for our claim that IM partner characteristics were associated with socially specific rather than overall well-being, correlations were computed between closeness and both dispositional (CDI) and daily (SLSS) global well-being. Associations were nonsignificant, indicating that general feelings of life contentment or dissatisfaction could not predict the closeness of participants' IM partners.

Exploratory analyses: IM motives and topics. Consistent with the pattern of our main findings, exploratory analyses revealed that time spent discussing certain social topics was associated with interpersonal adjustment. Specifically, participants who reported feeling lonely in school both in general and on a daily basis were less likely to talk about friends when IMing, $r(23) = -.47$, $p = .01$, and $r(23) = -.43$, $p = .01$, respectively. Similarly, participants with higher dispositional social anxiety were less likely than their more comfortable peers to discuss romantic topics, $r(36) = -.44$, $p = .01$.

[1] On-line tenure and constraints on phone and Internet usage (i.e., parental rules, shared phone access, speed of Internet connectivity) were not significantly associated with any of the predictor or outcome variables and were therefore excluded from subsequent regression analyses.

Examination of participants' motives for IMing also supports the hypothesis that on-line communication serves distinct functions for adolescents experiencing peer-related distress. Although the most commonly reported motive for IMing was to "hang out with a friend," the motive "to avoid being alone" was unique in demonstrating significant associations with psychological adjustment. Daily average social anxiety was significantly and positively correlated with solitude avoidance, $r(35) = .55$, $p = .0001$. In addition, youth reporting fewer close friends in school were significantly more likely to report IMing to avoid being alone, $r(35) = -.53$, $p = .001$.

Discussion

The aim of the present study was twofold: first, to examine more closely what adolescents were doing on-line, and second, to examine whether distinctions among on-line activities and communication partners allow us to better understand the relation between Internet use and well-being.

In spite of the growing role of on-line communication in the lives of young people, even regular Internet users in our sample continued to spend most of their after-school time on traditional activities, many of which involved peer interaction (e.g., participating in clubs or sports, hanging out with friends, talking on the phone). Moreover, on-line communication appears to be similar in several ways to traditional means of youth social interaction (Brown, 1999): it occurred largely in private settings (i.e., e-mail and IMs) with friends who were also part of participants' daily, off-line (e.g., school) lives. In addition, on-line communication was reported to be mainly devoted to ordinary yet intimate topics (e.g., friends, gossip) and motivated by a desire for companionship.

Given that participants reported spending much of their on-line time engaged in interactions with close others, the null association between time spent on-line and psychological well-being is not surprising. According to intimacy theory (Reis & Shaver, 1988), such interactions should be *positively* related to well-being. Likewise, on-line usage by specific domain (e.g., downloading music, chatting) were not associated with well-being. Indeed, the very meaning of time spent in individual on-line domains may be complicated by the prevalence of on-line multitasking among participants. In future research, event-contingent reports, in which participants keep a log of on-line activities when they occur, may be more sensitive to such distinctive and potentially important context of use (Reis & Gable, 2000).

As expected, *whom adolescents communicated with on-line* was found to predict peer-related psychological well-being. Although most social interaction through IMs occurred between friends known from off-line, the closeness of participants' relationships with IM partners was predicted by daily social functioning. Specifically, participants who reported feeling lonely or socially anxious in school

on a daily basis were more likely to communicate through IMs with people they did not know well (i.e., strangers vs. friends).

These findings suggest that when they feel connected and comfortable with school-based peers, early adolescents use the Internet to seek out additional opportunities to interact with them. In the case of chronic or even temporary feelings of social discomfort or detachment, however, adolescents may use the Internet to avoid being alone, and, in doing so, turn to people disconnected from their daily life.

But do Internet-based relations provide anxious and lonely youth with the intimacy and companionship that are missing in their off-line lives? Alternatively, because these youth are more likely to communicate with strangers, are they more vulnerable to on-line predators? These questions await future research. In our sample, the closeness of participants' relationships with their IM partners was significantly associated with the relationship's origin, meaning that there were few cases of close friendships developed on-line. Given the growing evidence that close relationships can and do originate on the Internet, especially for individuals experiencing difficulty in their off-line social life (see McKenna & Bargh, 2000), we suspect that their absence in the present sample may be at least in part the result of our sample's limited size and frequency of lonely individuals. Future investigations of larger school-based samples and including older adolescents and greater numbers of marginalized youth will provide additional insight on this phenomenon among youth.

In contrast to previously reported gender differences in both levels and types of on-line communication (America Online/Roper Starch, 1999; Kraut et al., 1998), boys and girls in the present study reported equivalent levels and characteristics of interpersonal communication not only on the Internet, but also on the telephone. The present findings indicate a need for further research on early adolescent girls' and boys' communication with friends, on and off the Internet.

In addition, future studies should compare younger and older youth. We would expect changes in social Internet use to mirror developmental changes in intimacy and friendship patterns. For example, with age, teenagers report spending more time in person with an opposite-sex peer (e.g., Brown, 1999; Furman, Brown, & Feiring, 1999); they may also be increasing their *on-line* cross-sex communication. Alternatively, early adolescents may communicate with members of the opposite sex sooner, if the Internet provides a safe space for this otherwise daunting social contact. Interestingly, in the current sample, 46% of IM interactions occurred in cross-sex dyads.

Finally, although in the present sample parental rules regarding Internet usage were not found to be influential, further research is needed on the family context of use, particularly in light of the differing depictions of parental on-line monitoring offered by youth and their parents (Pew Internet and American Life Project, 2001).

Two limitations to the present research should be noted. First, the majority of participants were European American, middle to upper-middle class, and, according to even the most recent data (e.g., Becker, 2000), considerably more

experienced and engaged with the Internet than the average American seventh grader. Although our findings on the distribution of psychological adjustment variables and general Internet usage patterns are consistent with various community and national probability samples, future studies will benefit from drawing upon diverse youth populations. We may find different patterns of on-line behavior or different relations between on-line behavior and well-being in contexts in which the majority of Internet users' peers do not (yet) have on-line access at home. Perhaps this can account for discrepant findings of studies conducted at different stages of the exponential growth of home Internet access.

A second limitation stems from the number of daily logs on which participants reported Internet use. We attempted to address compliance issues by limiting the complexity of the nightly logs, administering a raffle for participants, and visiting classrooms daily. Nevertheless, there were still incidents of noncompliance and a number of logs completed on days that participants simply did not use the Internet. Future research can expand the duration of sample days to overcome this limitation to maximize the many benefits of obtaining daily reports of Internet use and well-being.

Conclusions

The findings presented here suggest that McKenna and Bargh's (2000) claim that "there is no simple main effect of the Internet on the average person" (p. 59) applies to the case of early adolescents. Our results are not inconsistent with their and others' evidence that the Internet may serve distinct functions for socially anxious and lonely individuals. At the same time, we find that normatively adjusted adolescents use the Internet as yet another tool in their communications repertoire. This finding conveys a very different picture from that provided by early studies and media reports on adolescent Internet use. We have argued that advances in communications technology and the continuing growth in youth Internet access may help to explain the discrepancy across studies (e.g., early and more recent investigations) and samples (e.g., of adults vs. teenagers). This said, continuing research is needed to further examine the functions and potential long-term effects of the many distinct and rapidly evolving uses of the Internet. In conducting such research, researchers are urged to take into account the social and developmental context of adolescents' daily lives.

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