Children's Internet information seeking, life satisfaction, and loneliness: The mediating and moderating role of self-esteem

Ru-De Liu*, Cai-Xia Shen, Le Xu, Qin Gao

School of Psychology, Beijing Normal University, No. 19 XinJieKouWai Street, HaiDian District, Beijing 100875, PR China

Abstract

This study investigated the longitudinal associations between children’s Internet information seeking, life satisfaction, and feelings of loneliness as well as the mediating and moderating role of self-esteem in these associations. A total of 455 Chinese elementary school students participated in two waves of a survey with a 6-month interval, and 19 of these students participated in focus group interviews. The results indicated that seeking school- and life-related information on the Internet predicted more life satisfaction and less loneliness through improved self-esteem. Furthermore, self-esteem moderated the effects of Internet information seeking on loneliness. Internet information seeking predicted less loneliness only for children with low self-esteem. A moderating role of self-esteem in the associations between Internet information seeking and life satisfaction was not found in this study.

Keywords:
Media in education
Elementary education
Pedagogical issues

1. Introduction

With the rapid spread of the Internet among adolescents and children, parents and educators are increasingly concerned about the possible effects of the Internet on adolescents and children’s development, with a primary focus on psychological well-being. A rich body of research has examined the relationship between Internet usage and well-being and has reported mixed results. One theoretical argument is that Internet use robs individuals of social activities and might lead to social withdrawal, thereby undermine individuals’ psychological well-being (e.g., Caplan, 2003; Gross, 2004; Kraut et al., 1998). A contrasting theoretical argument is that Internet use expands, rather than displaces, possibilities for contact with peers and thus enhances psychological well-being (e.g., Amichai-Hamburger & Hayat, 2011; Morgan & Cotten, 2003; Valkenburg & Peter, 2007; Zhao, 2006). This inconsistency may be due to the diversity of available applications and tasks of Internet usage. Studies have investigated the relationship between psychological well-being and different types of Internet use, such as instant messaging (Sellhout, Branje, Delsing, ter Bogt, & Meeus, 2009; Van den Eijnden, Meerkerk, Vermulst, Spijkerman, & Engels, 2008), chat rooms (Blais, Craig, Pepler, & Connolly, 2008; Morgan & Cotten, 2003), online gaming (Blais et al., 2008), and web surfing (Morgan & Cotten, 2003; Sellhout et al., 2009) and have found that these different types of Internet activities affect psychological well-being in different ways. However, information seeking, an important use of the Internet among children and adolescents, has not received appropriate attention. The potential influence of information seeking on children’s well-being has been neglected in previous studies.

Information seeking constitutes an important part of Chinese children’s daily Internet use. A recent report released by the China Internet Network Information Center (CNNIC) revealed that in 2010, more than 14 million Chinese elementary school children used the Internet habitually, and 77.6% of these children used search engines to seek specific information on the Internet (CNNIC, 2011). Information seeking plays an important role in children’s Internet use, but few studies have investigated the effect of Internet information seeking on children’s development. Zhu, Chen, Chen, and Chern (2011) examined the relationship between Internet information seeking and high school students’ academic performance using cross-sectional data, and found that school-related information seeking positively predicted students’ academic efficacy and thus predicted better academic performance. However, to our knowledge, no study has explicitly investigated the effects of Internet information seeking on children’s psychological well-being.

* Corresponding author. Tel.: +86 10 58806324; fax: +86 10 58805302.
E-mail addresses: rdl Liu@bnu.edu.cn, liurude@126.com (R.-D. Liu), shcaixia@126.com (C.-X. Shen), 583783280@qq.com (L. Xu), littlesmellycat@live.cn (Q. Gao).
The purpose of the present study was to bridge these gaps by investigating the relationship between Internet information seeking and children’s well-being. To further determine a causal direction, longitudinal data were collected in this study. Although the Internet provides many kinds of information, in the present study, we focused on children’s school- and life-related information seeking on the Internet. Savolainen (1995) viewed information seeking as an integral component of mastery of life because it facilitates problem solving, and defined everyday life information seeking as “the acquisition of various informational elements with which people employ to orient themselves in daily life or to solve problems not directly connected with the performance of occupational tasks”. Previous studies have found that children can actively seek particular information or advice on the Internet to solve their daily-life problems (e.g., Lu, 2010). For example, when a child has to plan a traffic route to an interesting museum, it may be helpful for him/her to search possible routes online. In the present study, we are concerned about how children use the Internet to seek particular information to solve their schoolwork problems and daily-life problems.

Psychological well-being is a relatively comprehensive concept that involves individuals’ positive functioning and psychological health (Ryff & Keyes, 1995). Life satisfaction, viewed as a cognitive component, has been regarded as the key indicator of psychological well-being in many previous studies (e.g., Diener, Emmons, Larsen, & Griffin, 1985), while loneliness has been usually used as an affective indicator of psychological well-being (e.g., Kahn, Hessling, & Russell, 2003; Kraut et al., 1998) because positive relation with others is one of the most important aspects of psychological well-being (Ryff & Singer, 1998). Therefore, the present study focused on children’s life satisfaction as well as feelings of loneliness, and attempted to answer two questions: Does Internet information seeking affect children’s life satisfaction and loneliness over time? If so, through what mechanism does Internet information seeking produce such longitudinal effects?

Information seeking and use involves a goal-oriented problem-solving process, including problem recognition, problem definition, problem resolution, and solution statement (where needed) (Wilson, 2000). Children can utilize the abundant knowledge and information on the Internet to solve problems related to their schoolwork and their daily lives. Such behaviors may relate to children’s psychological well-being. Previous studies (e.g., Parto, 2011) have found that problem solving predicts better mental health.

A study by Zhu et al. (2011) found that using the Internet to search for school-related information helps to improve children’s academic adjustment, including academic self-efficacy and academic performance, and better academic adjustment has been found to be related to higher levels of life satisfaction (Lent, Taveira, Sheu, & Singley, 2009; Vecchio, Gerbino, Pastorrelli, Bove, & Caprara, 2007) and less loneliness (Gorman, Schwartz, Nakamoto, & Meyeux, 2011). Similarly, seeking information on the Internet to solve problems in daily life may promote children’s sense of environmental mastery and increase their psychological well-being. Studies have found that competence experienced in daily life is positively related to life satisfaction (Meyer, Enstrom, Harstveit, Bowles, & Beerens, 2007) and is negatively related to loneliness (Wei, Shaffer, Young, & Zakalik, 2005). Additionally, information retrieved from the Internet can be shared with friends. Shared interests with friends may be associated with high life satisfaction and low loneliness. Based on the above discussion, we propose the following:

**H1.** Internet information seeking positively predicts children’s life satisfaction over time.

**H2.** Internet information seeking negatively predicts children’s loneliness over time.

Another purpose of the present study is to examine a potentially mediating process to explain the effects of Internet information seeking on children’s psychological well-being. A likely candidate to mediate the relationship between Internet information seeking and children’s life satisfaction and loneliness is self-esteem. Self-esteem is a self-schema that expresses an attitude of approval or disapproval (Coopersmith, 1967). Self-esteem is thought to be an actual component of self-esteem (Locke, McClare, & Knight, 1996) and the measures of self-esteem often include self-confidence (Rosenberg, 1965). Self-confidence is a narrower construct, which usually reflects situation-related competence belief, while self-esteem is a more global construct, which reflects general attitudes toward, or affective evaluation of, the self (Blascovich & Tomaka, 1991).

Previous studies have found that academic competence and competence experienced in daily life can strongly predict self-esteem (Crocker, Karpinski, Quinn, & Chase, 2003; Deci et al., 2001; Thøgersen-Ntoumani & Ntoumanis, 2007). For children, seeking information related to schoolwork and daily life may facilitate the solution of problems related to schoolwork and daily life and thus may be associated with self-esteem.

According to cognitive theories, people tend to process information in a way that is congruent with their perspective on the world and on themselves (Beck, 1967). For an individual with positive self-schema, self-relevant information is typically processed in a positive manner. Thus, individuals with high self-esteem typically have a positive attitude toward themselves and others, which implies frankness and respect toward oneself and others. In contrast, individuals with low self-esteem are trapped by negative feelings and thoughts toward themselves and others, leading to self-isolation. A meta-analytical study (Haney & Durlak, 1998) has shown that preventive and treatment programs aimed at improving self-esteem in children and adolescents lead to positive changes in various adjustment areas. In some studies, high self-esteem has been found to positively predict life satisfaction in both adults (e.g., Chen, Cheung, Bond, & Leung, 2006; Hong & Giannakopoulos, 1994) and adolescents (e.g., Neto, 1993, 2001; Zhang & Leung, 2002) and to negatively predict loneliness (Cheng & Furnham, 2002; Zhao, Kong, & Wang, 2012).

Based on the above discussion and previous studies, we propose the following:

**H3.** Self-esteem mediates the effects of Internet information seeking on life satisfaction.

**H4.** Self-esteem mediates the effects of Internet information seeking on loneliness.

Self-esteem may not only serve as a mediator between Internet information and life satisfaction or loneliness but may also have a moderating role. Studies have indicated that individuals with low self-esteem search for more information while they are working on a problem-solving task, and perform the task more effectively when the information search is functional (Weiss & Knight, 1980). Zhu et al. (2011) found that students who felt less capable in their schoolwork benefited more from Internet information seeking in terms of academic performance. Similarly, we reason that children with low self-esteem will benefit more from Internet information seeking in terms of well-being. We propose the following:

**H5.** Self-esteem moderates the relationship between Internet information seeking and life satisfaction such that the relationship is stronger for children with low self-esteem than for those with high self-esteem.
H6. Self-esteem moderates the relationship between Internet information seeking and loneliness such that the relationship is stronger for children with low self-esteem than for those with high self-esteem.

Additionally, due to the lack of existing research on children’s Internet use, the present study used interviews to collect detailed information about children’s perceptions of and feelings about Internet information seeking.

2. Method

2.1. Participants and procedure

To test the longitudinal relationships between children’s Internet information seeking and psychological well-being, the data were collected by administering two waves of surveys with a 6-month interval, from July 2011 (Time 1) to January 2012 (Time 2). The participants were elementary school students between Grade 3 and Grade 6 at two elementary schools in Beijing.

The items on some scales were originally written in English. Thus, a Chinese researcher translated the items into Chinese, and another researcher translated the items back to English. We then compared the two English versions to obtain the first Chinese version of the questionnaires. Before the survey, we consulted a teacher of Chinese in one of the two pre-selected elementary schools about the suitability of the questionnaires for the participants, especially for Grade 3 students. After receiving confirmation that the third-graders possessed sufficient reading skills to complete the surveys, we conducted a pilot test with two classes in an elementary school. The questionnaires were further revised to eliminate ambiguity. In July 2011, the survey was administered in the target schools, and in January 2012, the survey was re-administered.

A total of 637 elementary students participated at Time 1. Of these participants, 487 participated at Time 2, and 455 valid responses were collected, with a valid response rate of 93%. Attrition was 24%, and graduating from the target schools by Time 2 was the most common reason for attrition. Only the 455 participants who completed the study at both times were included in our sample.

Of these 455 participants, 226 were female (49.7%) and 229 were male (50.3%). In July 2011 (Time 1), these participants ranged in age from 8 to 12 years old (M = 10.12, SD = .88) and were in Grades 3–5 (M = 4.04, SD = .82). At Time 2, they were in Grade 4–6.

One month after the second wave of the survey, focus group interviews were conducted to collect detailed information about elementary school students’ perceptions of Internet information seeking. 20 students were selected, and 19 students participated in the interview. Participants were assigned to two groups. The interviews were conducted by one researcher. Each focus group interview lasted one hour.

2.2. Measures

2.2.1. Demographic and control variables

Demographic information was collected at Time 1. Participants indicated their age, sex, and grade level. Previous studies have reported that family income is associated with well-being (Brooks-Gunn, Duncan, & Maritato, 1997; Kraut et al., 1998); therefore, we also controlled for this variable in data analyses. Because school-aged children usually do not know their parents’ income, the Family Affluence Scale (FAS) (Currie, Elton, Todd, & Platt, 1997; Currie et al., 2008), which reflects family expenditure and consumption, was employed to measure children’s family affluence at Time 1 in this study. Four questions were asked, such as, “Does your family own a car, van, or truck?” Participants’ responses were coded (0—“no”, 1—“yes, one” and 2—“yes, two or more”). Higher scores indicate a higher level of family affluence.

2.2.2. Internet information seeking

Internet information seeking was measured by two items: “I go to the Internet to search for information and materials related to my schoolwork” and “I go to the Internet to search for information and materials related to my daily life”. Respondents answered on a 5-point scale ranging from “never” to “always”. The mean score of the two items was used as the indicator of active Internet information seeking. In this study, the Cronbach’s alpha reliability coefficient of the scale was .73 for Time 1 and .71 for Time 2.

2.2.3. Satisfaction with life scale (SWLS)

The SWLS (Diener et al., 1985; Pavot & Diener, 1993) was employed in this study to measure subjects’ global evaluation of their life. The SWLS consists of five items. Each item is answered on a 7-point scale ranging from “strongly disagree” to “strongly agree”. The SWLS has good psychometric properties (Pavot & Diener, 1993). In this study, the Cronbach’s alpha reliability coefficient of the scale was .76 for Time 1 and .73 for Time 2.

2.2.4. Loneliness and social dissatisfaction scale (LSDS)

The LSDS (Asher, Hymel, & Renshaw, 1984) was employed in this study to measure children’s loneliness. The LSDS consists of 16 items focused on children’s feelings of loneliness rated on a 5-point scale (1 — “not at all” and 5 — “always”) and 8 “filler” items. Higher scores indicate higher levels of loneliness. In this study, the Cronbach’s alpha reliability coefficient of the scale was .92 for Time 1 and .93 for Time 2.

2.2.5. Rosenberg self-esteem scale (RSES)

The Chinese version (Wang, Wang, & Ma, 1999) of the RSES (Rosenberg, 1965) was employed in this study to measure children’s global feelings of self-esteem. The RSES consists of 10 items rated on a 4-point scale, ranging from “strongly disagree” to “strongly agree”. The RSES has good psychometric properties (Corwyn, 2000). In this study, the Cronbach’s alpha reliability coefficient of the scale was .81 for Time 1 and .75 for Time 2.

2.3. Focus group interview

The participants for the focus group interviews were selected according to their scores on Internet information seeking items in the survey at Time 1. Among those who reported “often” or “always” went to the Internet to search for school- and life-related information in the
survey at Time 1 (i.e. those with mean score of Internet information seeking items greater than 4.0), 10 boys and 10 girls were randomly selected, and 19 of them participated in focus group interviews. In terms of grade, 5 students were in Grade 4, 7 in Grade 5, and 7 in Grade 6.

The topic guide included the following questions: (1) What kinds of online activities do you usually engage on the Internet? (2) Do you enjoy using the Internet to seek information? Why? (3) What kinds of information and materials do you usually seek on the Internet? (4) Are you always able to find the information and materials you need on the Internet? (5) How did you feel when you found the information you were seeking on the Internet and when you did not? (6) Do you think the information and materials on the Internet benefit your schoolwork? If so, how? (7) Do you think the information and materials on the Internet benefit your daily life? If so, how? (8) Do you talk with your peers about what you search for on the Internet?

3. Results

3.1. Descriptive statistics

Descriptive statistics and correlations for the key variables in this study are presented in Table 1. On average, participants reported experiencing high levels of life satisfaction (M = 5.48; SD = .78 for Time 1; M = 5.20; SD = .76 for Time 2), high levels of self-esteem (M = 3.18; SD = .51 for Time 1 and M = 3.15; SD = .43 for Time 2), and low levels of loneliness (M = 1.51; SD = .29 for Time 1 and M = 1.42; SD = .25 for Time 2).

3.2. The longitudinal effects of Internet information seeking on life satisfaction and loneliness

We conducted multiple hierarchical regressions to investigate the longitudinal effects of children’s Internet information seeking on their life satisfaction and loneliness 6 months later. In step 1, age, sex, and family affluence were entered as control variables to ensure that we were controlling for the sex, age, and family affluence differences that can be observed in the variables of psychological well-being (e.g., Franzen, 2000; Kraut et al., 1998) and Internet use (e.g., Gross, 2004; Kraut et al., 1998). We also entered the dependent variables at Time 1 into step 1 to ensure that the effects we observed were over time and not an artifact of the correlations at one time. In step 2, self-esteem at Time 1 and Internet information seeking at Time 1 were used to predict life satisfaction and loneliness at Time 2. The results are presented in Table 2 as “Step 1” and “Step 2”.

The life satisfaction of children from richer families increased more than that of children from poorer families. Controlling for these personal characteristics and dependent variables at Time 1, as predicted by H1, children’s Internet information seeking positively predicted their life satisfaction 6 months later (β = .10, p < .05) and negatively predicted feelings of loneliness 6 months later (β = -.08, p < .05). This finding indicated that Internet information seeking enhanced children’s life satisfaction and reduced their feelings of loneliness over a 6-month period.

Regressions were computed in reverse order: life satisfaction and loneliness at Time 1 were used to predict Internet information seeking 6 months later. Neither of the reversals of these models included life satisfaction or loneliness at Time 1 as significant predictors (p < .05). Therefore, the above results are unidirectional.

3.3. Self-esteem as a mediator

Multiple regression analyses were conducted to examine the mediating role of self-esteem in the longitudinal associations between Internet information seeking, life satisfaction, and loneliness. According to Cole and Maxwell’s (2003) suggestions for testing mediating models with two waves of longitudinal data, we employed a pair of longitudinal tests examining the following issues: (1) the effect of Internet information seeking at Time 1 on self-esteem at Time 2, controlling for initial self-esteem; and (2) the effect of self-esteem at Time 1 on life satisfaction at Time 2 and loneliness at Time 2, controlling for initial life satisfaction and loneliness. Age, sex, and family affluence were entered as control variables. Fig. 1 describes the logic of our analysis. This approach works under the assumption that the longitudinal paths from self-esteem to life satisfaction and loneliness are stationary. Cole and Maxwell (2003) argued that even when the stationarity assumption is violated, this approach is superior to the biased approaches typically applied to the half-longitudinal design, which fails to control for prior levels of dependent variables. The results are presented in Table 3.

Controlling for personal characteristics and initial self-esteem, children’s Internet information seeking at Time 1 positively predicted their self-esteem 6 months later (β = .12, p < .01). Furthermore, children’s self-esteem at Time 1 positively predicted their life satisfaction (β = .18, p < .001) and negatively predicted their loneliness (β = -.18, p < .001) 6 months later. This finding indicated that self-esteem mediated the longitudinal effects of Internet information seeking on life satisfaction and loneliness. Thus, H3 and H4 were supported in this study.

| Table 1 | Descriptive statistics and correlations among key variables. |
|-----------------------------------------------|------------------|--|--|--|--|--|--|--|
| Key variables | M | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Internet information seeking (T1) | 3.42 | .98 | – | – | – | – | – | – | – | – |
| Internet information seeking (T2) | 3.49 | .99 | .49** | – | – | – | – | – | – | – |
| Life satisfaction (T1) | 5.48 | .78 | .14** | .17** | – | – | – | – | – | – |
| Life satisfaction (T2) | 5.20 | .76 | .20** | .24** | .38** | – | – | – | – | – |
| Loneliness (T1) | 1.51 | .29 | .14** | .15** | .27** | .20** | – | – | – | – |
| Loneliness (T2) | 1.42 | .25 | .16** | .23** | .28** | .38** | .59** | – | – | – |
| Self-esteem (T1) | 3.18 | .51 | .18** | .16** | .48** | .33** | .53** | .47** | – | – |
| Self-esteem (T2) | 3.15 | .43 | .21** | .26** | .36** | .40** | .44** | .55** | .50** | – |

*p < .05; **p < .01; T1: Time 1; T2: Time 2.
Longitudinal association between active information seeking and outcome variables at time 2.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Life satisfaction T2</th>
<th>Loneliness T2</th>
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<tr>
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<td>Step 2</td>
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<td>Life satisfaction T1</td>
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<tr>
<td>Information seeking T1</td>
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<td>$0.27$</td>
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<tr>
<td>Self-esteem T1</td>
<td>$0.17^{***}$</td>
<td>$0.25^{*}$</td>
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<td>Information seeking T1 X Self-esteem T1</td>
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<td>$0.00$</td>
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<tr>
<td>$\Delta R^2$</td>
<td>$0.16^{***}$</td>
<td>$0.19^{***}$</td>
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* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; Time 1: T2: Time 2.

Additionally, regressions were computed in reverse order, and the results showed that when controlling for information seeking at T1, self-esteem at T1 non-significantly predicted children’s information seeking at T2. Furthermore, controlling for self-esteem at Time 1, life satisfaction at Time 1 and loneliness at Time 1 non-significantly predicted children’s self-esteem at T2. Thus, the above results are unidirectional.

3.4. Self-esteem as a moderator

We tested whether Internet information seeking interacted with self-esteem in predicting life satisfaction and loneliness over time by including the interaction of information seeking at Time 1 with self-esteem at Time 1 in the regression analyses. The results are presented in step 3 of Table 2. The variance explained by the interaction effect increased significantly for loneliness, indicating that self-esteem moderated the longitudinal associations between Internet information seeking and loneliness ($\beta = 0.62$, $p < 0.01$). Thus, H6 was supported. However, interaction effects on life satisfaction at Time 2 were not significant. Thus, H5 was not supported.

To further test the significant interactions on loneliness at Time 2, we trichotomized initial self-esteem. Scores that were one standard deviation below the mean were labeled the low self-esteem group ($n = 80$), and those scoring one standard deviation above the mean were labeled the high self-esteem group ($n = 101$). The remaining children were labeled the medium self-esteem group ($n = 274$). We then used post hoc testing according to Aiken and West (1991) to test for significant interactions on loneliness in groups of children with low, medium, and high initial self-esteem. Fig. 2 describes the interaction effects. As H6 predicted, a higher level of Internet information seeking was associated with less loneliness at Time 2 only for children with low self-esteem at Time 1 (low: $\beta = -0.20$, $p < 0.05$; medium: $\beta = -0.08$, $p > 0.05$; high: $\beta = -0.06$, $p > 0.05$).

3.5. Findings of focus group interviews

During the focus group interviews, the participants responded to questions about their perceptions and feelings about Internet information seeking. A number of findings emerged from the analysis of interviews. First, one of the top reasons most of the participants used the Internet was to search for school- and life-related information to solve their schoolwork problems and daily-life problems. These participants may search for information about the author of an article they are reading in Chinese class, writing samples to improve their writing skills, history stories for their history class, and bus lines before traveling to a strange place. Second, participants thought it was easy to find the information they needed, and they felt satisfied when they found this information and material. Search engines (e.g., www.baidu.com) are their favorite choice when seeking information on the Internet. Third, the participants thought the information and material on the Internet was helpful to their academic performance and daily lives. When they used information and materials from the Internet to improve their schoolwork or to make their lives easier, most of them felt proud and satisfied. Finally, most participants chatted with peers about the information they sought on the Internet.

Following are some examples from the interviews.
An 11-year-old girl reported, “One day we visited the Capital Museum, and our teacher asked us to make a piece of handwritten newspaper introducing the Capital Museum as homework. I did not know how to do it. Then, I went to the Internet and found there were many pictures about the museum. I downloaded some pictures and put them in my work. The next day, our teacher commended my work in the class. I felt very proud...”.

Another 11-year-old girl reported, “On the last winter vacation, I took an extracurricular English class. When I prepared lessons before the next day’s class, I found there were many new words in the passage. I searched the Internet for the pronunciation and meanings of these new words. And when I mastered them, I felt satisfied. My parents were very happy too. The next day, in the class, my classmates made mistakes on these new words when reading the passage, but I read the passage fluently. The teacher commended me. I was very happy...”.

A 12-year-old boy reported, “One day I had to take an extracurricular class in a strange place far from my home. My parents needed to work and could not take me there. I went to the Internet and searched the possible routes. After comparing several traffic routes the Internet provided, I decided to go there by subway. That day, I arrived at the school on time. It was my first time making traffic route plans alone and the first time for me to take the subway alone. My parents praised me when they came home...”.

4. Discussion and limitations

The present study investigated the longitudinal associations between children’s Internet information seeking, life satisfaction, and loneliness and examined the mediating and moderating role of self-esteem in these associations. As expected, we found that Internet information seeking enhanced participants’ life satisfaction and reduced their loneliness over a 6-month period. Although some researchers believe that Internet use for non-communication purposes cannot provide long-term rewards usable in real-life (Selfhout et al., 2009) and may lead to internal problems (Morgan & Cotten, 2003), this study suggested that seeking school- and life-related information on the Internet may be beneficial to children’s psychological well-being. This finding indicates that different types of non-communication Internet activities may affect psychological well-being in different ways.

Seeking school- and life-related information on the Internet is a goal-directed behavior that is unlike undirected Internet surfing, in which individuals are exposed to information with no specific informational need. Some previous studies have found that Internet surfing seemed to be strongly associated with Internet addiction disorder (Yang & Tung, 2006) and depression (Morgan & Cotten, 2003). This study indicated that directed school- and life-related information seeking may contribute to children’s lives in a different way. The interviews in this study suggested that participants can search for and choose useful information on the Internet and can utilize this information to make schoolwork and daily life easier. This information-seeking behavior can provide long-term rewards that are useful for children’s real lives and that may enhance their psychological well-being.

The mediating effects of self-esteem were examined, and the results of multiple regression analyses revealed that self-esteem mediated the longitudinal associations between Internet information seeking and children’s life satisfaction and loneliness. The benefits of Internet information seeking stem from improved self-esteem. Evidence from the interviews in this study showed that participants feel proud and satisfied when they find the information they seek and when they successfully solve problems in either schoolwork or daily life with the help of information and material on the Internet. Competence in Internet information seeking and information utilization can enhance children’s self-esteem. Previous studies have found that self-esteem plays a crucial role in mental health and happiness (Diener & Diener,

<table>
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<th>Loneliness T2</th>
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*p < 0.05; **p < 0.01; ***p < 0.001; Time 1: T2: Time 2.

Fig. 2. Self-esteem and Internet information seeking interaction for loneliness.
Acknowledgments

The results of this study confirmed these associations using longitudinal data. Improved self-esteem predicted greater life satisfaction and less loneliness over a 6-month period.

The results of this study further revealed that self-esteem served not only as a mediator but also as a moderator in the associations between children’s Internet information seeking and loneliness. As H6 predicted, children with low self-esteem benefited more from Internet information seeking in reducing loneliness, compared with children with high self-esteem. This result provides evidence for what could be called ‘compensation’ effects: Internet information seeking reduces feelings of loneliness only for children with low self-esteem. For children with high self-esteem, Internet information seeking predicts loneliness non-significantly. The moderating effects of self-esteem on Internet information seeking and life satisfaction, as H5 predicted, were not found in this study. This may indicate that children’s Internet information seeking is generally associated with greater life satisfaction, regardless of their initial self-esteem level.

Some limitations of the present study should be noted. In this study, the data were collected in two waves; therefore, we can test whether self-esteem is a partial mediator, but we cannot test whether self-esteem completely mediates the longitudinal effect of Internet information seeking on children’s life satisfaction and loneliness. Future work is needed to collect at least three waves of data to test whether self-esteem completely mediates the longitudinal associations between Internet information seeking and children’s life satisfaction and loneliness. Furthermore, we collected data from two elementary schools in Beijing, one of the most developed cities in China, which may limit the generalizability of this study. Future studies may extend the research by surveying schools in other cities and rural areas.

5. Implications

The present study extended the understanding of the effects of Internet use on children’s psychological well-being. School- and life-related Internet information seeking can enhance children’s life satisfaction and reduce their loneliness over a 6-month period through improved self-esteem. This is encouraging news for parents and educators who worry about the adverse effects of the Internet on children’s development, and it is especially encouraging for children with low self-esteem. Whatever the reason for their low self-esteem, increasing school- and life-related Internet information seeking is likely to reduce their feelings of loneliness. This study has implications for parents and educators. Encouraging children to use the Internet to search for school- and life-related information and to utilize this information to solve problems in schoolwork and daily life may be an easy and effective way to improve children’s self-esteem, enhance their life satisfaction and reduce their feelings of loneliness. Furthermore, taking measures to prevent possible information overload and to filter useful information from undesirable information on the Internet is necessary to maximize the benefits of Internet information seeking.

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References


