Why are children attracted to the Internet? The role of need satisfaction perceived online and perceived in daily real life

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1. Introduction
The rapid rise of the Internet age has made Internet use a popular leisure activity among Chinese adolescents and children. A recent report released by the China Internet Network Information Center (CNNIC) revealed that in 2010 nearly 82.9 million Chinese juveniles used the Internet habitually and that the number was increasing yearly, especially for children younger than 12 years old. According to the report (CNNIC, 2011), more than 14 million Internet users were children aged below 12 years old. As well, the report showed that the time those young Internet users spent online is increasing. Li (2009) investigated how elementary school children from a middle-sized city in northeast China spent their after-school hours. She found that using the Internet had become one of the most dominant leisure activities for these children, surpassing outdoor activities and second only to watching TV and reading.

Growing concern over adolescents and children’s Internet use has spawned research on the possible effects of Internet use on adolescent and child development. Although the Internet expands horizons, facilitates learning, and provides entertainment, heavy use can cause psychological and social problems, such as social isolation, depression, loneliness, and failure at school (Murali & George, 2007). To optimize the benefits of the Internet for children, it is necessary to understand why the Internet is so attractive to children and what protective factors may lead to children’s appropriate Internet use. In this study, we use the framework of self-determination theory (SDT) to elucidate why children are attracted to the Internet.

1.1. Self-determination theory (SDT)
Self-determination theory (SDT) (Deci & Ryan, 1985a, 2000, 2008) is a general theory of motivation that systematically explicates the dynamics of human need, motivation, goal-oriented behaviors, and well-being. Self-determination theory conceptualizes psychological need as innate psychological “nutrients” essential for ongoing psychological growth, integrity, and well-being. Three basic psychological needs are identified: autonomy, competence, and relatedness. The need for autonomy refers to the experience of choice and volition in one’s behavior and to the personal authentic endorsement of one’s activities and actions. The need for competence refers to the propensity to have an effect on the environment as well as to attain valued outcomes within it. Finally, the need for relatedness refers to the desire to feel connected with others— to love and care, and to be loved and cared for (Deci & Ryan, 2000). SDT proposes that activities foster greater intrinsic motivation and yield more positive psychological and behavioral outcomes to the extent to which they satisfy three fundamental human needs (Deci & Ryan, 2000, 2008).

The SDT model has been applied to explain interest and sustained involvement in some intrinsically motivated activities in leisure domains, such as video games (Przybylski, Rigby, & Ryan, 2010; Ryan, Rigby, & Przybylski, 2006; Sheldon & Filak, 2008),...
leisure sports (Hagger, Chatzisarantis, Culverhouse, & Biddle, 2003), and exercise (McDonough & Crocker, 2007; Vlachopoulos & Michailidou, 2006). For example, a study on gaming motivation showed that online games inspired players primarily because these games elicited feelings of autonomy, competence, and relatedness (Ryan et al., 2006).

Aside from need satisfaction specific to activities, background factors, such as personal characteristics, are also related to behavioral outcomes and motivations. According to SDT, individuals who have their basic psychological needs met in day-to-day life tend to integrate activities into their daily lives in a healthy manner (Deci, Eghrari, Patrick, & Leone, 1994; Ryan, 1995). A study on video games (Przybylski, Weinstein, Ryan, & Rigby, 2009) showed that high levels of basic need satisfaction in daily life foster harmonious passion for video games, whereas low levels of basic need satisfaction in daily life promote obsessive engagement in video games.

1.2. SDT and Internet

We propose the application of the SDT framework in evaluating children’s Internet use because the SDT principles, which have been applied to studies on intrinsically motivated behaviors, are also relevant to the psychological functioning and well-being of young Internet users. In contrast to adults who often use the Internet for work- or learning-related tasks, children typically use the Internet for leisure. This is especially true in China, where using the Internet for school assignments is not a prevalent practice. SDT maintains that although intrinsically motivated activities are not necessarily directed at satisfaction of need for autonomy, competence and relatedness per se, active engagement in these interesting activities requires the “nutriments” of need fulfillment. People become more or less interested in activities as the function of the degree to which they experience satisfaction for autonomy, competence and relatedness while engaging in those activities (Deci & Ryan, 2000).

Investigating how children use the Internet is important in elucidating the processes by which this medium motivates children’s sustained engagement. According to the CNNIC (2011) reports, Chinese children engage in diverse online activities. The top four reasons children below 12 years use the Internet are online gaming (67.7%), and instant messaging (67.2%), information search (77.6%), online music downloads (86.7%), and exercise (82.7%). For example, a study on gaming motivation showed that online games elicited feelings of autonomy, competence, and relatedness while engaging in those activities (Ryan et al., 2006).

H1a. Need satisfaction perceived online will positively predict children’s time spent online.

H1b. Need satisfaction perceived online will positively predict children’s positive affect experienced online.

The first purpose of the present study is to investigate the impact of satisfaction of needs for autonomy, competence, and relatedness on children’s Internet use outcomes. According to SDT, opportunities to fulfill the three basic needs will yield more involvement and well-being in the immediate context. In this study, frequency of Internet usage per week and time spent online per week were used as indicators of Internet use. We propose that:

H2a. Need satisfaction perceived online will negatively predict children’s negative affect experienced online.

H2b. Need satisfaction perceived online will negatively predict children’s negative affect experienced online.

Individual differences in terms of social background may be associated with Internet use motivation. It is necessary to explore the back ground conditions that make some individuals resilient in Internet engagement and the factors that make others vulnerable to overuse. Although Przybylski et al.’s (2009) study, conducted under a video gaming context, suggested that the satisfaction of autonomy, competence, and relatedness in daily life may help prevent disordered game engagement, no study has examined the effect of need satisfaction in daily life, which may work in a similar manner, under an Internet context.

Furthermore, almost all previous studies were concerned with adults and adolescents, leaving children’s Internet use motivation unexplored. Children differ from adults and adolescents in many psychological, developmental, and behavioral characteristics, so results obtained from adults and adolescents cannot be directly extrapolated to children.

To address these gaps, we investigate the effect of need satisfaction perceived online and in daily real life on the processes that motivate children’s Internet use.

1.3. The present study

The first purpose of the present study is to investigate the impact of satisfaction of needs for autonomy, competence, and relatedness on children’s Internet use outcomes. According to SDT, opportunities to fulfill the three basic needs will yield more involvement and well-being in the immediate context. In this study, frequency of Internet usage per week and time spent online per week were used as indicators of Internet use. We propose that:

H3a. Children’s need satisfaction in their daily real lives will negatively predict their frequency of Internet usage.

H3b. Children’s need satisfaction in their daily real lives will negatively predict their time spent online.

The second purpose of the present study focused on the effect of daily real-life need satisfaction on children’s Internet use outcomes. Based on SDT and previous studies, we suppose that:
Przybylski et al.’s (2009) study under a video game context found that high levels of basic need satisfaction in daily life predict harmonious passion for video games which is related to more positive affect during play. We assume that the mechanism in the Internet context is similar, hence, the following hypotheses:

**H4a**. Children's need satisfaction in their daily real lives will positively predict their positive affect experienced online.

**H4b**. Children’s need satisfaction in their daily real lives will negatively predict their negative affect experienced online.

Additionally, previous studies have found that some demographic variables, such as gender and grade, are associated with children’s Internet use (Subrahmanyam, Greenfield, Kraut, & Gross, 2001; Tabone & Messina, 2010). We used gender and grade as control variables in our analysis. Fig. 1 describes our research model.

### 2. Method

#### 2.1. Participants

Participants were elementary school students between Grade 3 and Grade 6 at two elementary schools in Beijing. A total of 637 elementary school students participated in this study, and 629 valid responses were collected (98.7%). Among these participants, 315 (50.1%) were female and 314 (49.9%) were male. Furthermore, 182 (28.9%) were 3rd grade students, 174 (27.7%) were 4th grade students, 207 (32.9%) were 5th grade students, and 66 (10.5%) were 6th grade students. These participants ranged in age from 8 to 12 years old ($M = 10.32, SD = 1.03$).

#### 2.2. Procedure

Data were collected by administering surveys written in Mandarin. The original items of some scales were expressed in English; thus, a Chinese researcher first 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. We consulted a teacher, who teaches Chinese in one of the two pre-selected elementary schools, on whether the questionnaires were suitable for the participants, especially for Grade 3 students. After confirmation that the third graders have possessed sufficient reading skills to complete the surveys, we conducted a pilot test on two classes in an elementary school. The Chinese questionnaires were further revised to eliminate ambiguity.

A month after the pilot study, the surveys were conducted in the participants’ classrooms and trained research assistants were present during all testing. All children received the same instructions and were told their participation was voluntary and that their privacy would be protected. Each participant filled out a self-reported questionnaire, and all the completed questionnaires were collected by research assistants on the spot.

#### 2.3. Measures

##### 2.3.1. Internet use

The participants were asked to estimate the average frequency of Internet use per week and the average time they spent online on weekdays and on Saturday/Sunday. Upon obtaining participants’ time spent online on weekday and Saturday/Sunday, time spent online per week was calculated by $5 \times \text{Average time spent online on weekday} + 2 \times \text{Average time spent online on Saturday/Sunday}$. We assume that the participants in this study can accurately estimate the number of hours they spend online each day. Our sample group comprised 3rd to 6th grade students, aged 8–12. These children began learning the concept of tracking time in the 1st grade. By the 3rd grade, they have acquired sufficient math skills to proficiently calculate length of time. In Beijing, almost all elementary school children have to attend extracurricular classes (such as English, writing, and math for Olympic competitions) arranged by their parents after school, aside from finishing their homework. The time they spend online is therefore limited and easily estimated.

Additionally, some demographic questions were asked as well, including age, gender, and grade.

##### 2.3.2. Positive and negative affect experienced online

Positive and negative affect experienced online were measured by an 8-item scale adapted from Scale of Affect (Emmons, 1992). The scale consisted of 4 positive items (including “joyful”, “satisfied”, “excited”, and “proud”) and 4 negative items (including “angry”, “nervous”, “guilty”, and “frustrated”). Participants rated each item based on how often they felt that way when they used the Internet. All responses were indicated on a 5-point scale (1 = never, 5 = always). The mean score of the four positive items

![Fig. 1. Research model.](image-url)
was used as an indicator of positive affect experienced online, and the mean score of the four negative items was used as an indicator of negative affect experienced online. In this study, internal reliability of the scale was $\alpha = .78$ for positive affect and $\alpha = .72$ for negative affect. In addition, participants were asked to answer an open-ended question, “Why did you experience such moods when you were online?”

2.3.3. Need satisfaction perceived online

A 12-item scale was adapted from previous studies (McAuley, Duncan, & Tammen, 1989; Richer & Vallerand, 1998; Standage et al., 2005) to assess the degree to which the participants perceived the satisfaction of psychological need when they were online. Participants responded on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). The scale consisted of three subscales assessing satisfaction with autonomy, competence, and relatedness. Deci et al. (2001) and many other researchers (Chen & Jang, 2010; Haggar, Chatzisarantis, & Harris, 2006; Standage et al., 2005; Wei, Shaffer, Young, & Zakalik, 2005) successfully used basic need satisfaction for autonomy, competence, and relatedness as three indicators for latent variable of need satisfaction. In the present study, we replicate their method for measuring need satisfaction. The scores from the three subscales were used as indicators for the latent variable need satisfaction perceived online.

Perceived autonomy online was measured using four items adapted from Standage et al. (2005). The original scale includes a stem “In this PE class”. In the present study, the stem was replaced by “when I was online”. A sample item is “I felt a certain freedom of action when I used the Internet”. Perceived competency online was measured using four items from the Perceived Competence Subscale of the Intrinsic Motivation Inventory (IMI; McAuley et al., 1989). The items were slightly modified to fit the study context. A sample item is “I am satisfied with my performance online”.

Relatedness perceived online was measured by four items adapted from the Acceptance Subscale of the Need for Relatedness Scale (Richer & Vallerand, 1998). To fit the present study context, the stem was modified to “When I was online”. A sample item is “When I was online, I felt I was supported by others online”.

A reliability test based on the data of this study revealed a satisfactory internal consistency ($\alpha = .92$ for overall online need satisfaction, $\alpha = .82$ for autonomy, $\alpha = .85$ for competence, and $\alpha = .86$ for relatedness).

2.3.4. Basic need satisfaction in daily life

15 items from Basic Need Satisfaction in General Scale (BNSG-S) (Gagné, 2003; Johnston & Finney, 2010) were used to assess participants’ basic need satisfaction in their real lives, three items for basic satisfaction with autonomy, 5 for competence, and 7 for relatedness. BNSG-S has been used in previous studies to assess general need satisfaction (Conroy & Coatsworth, 2007; Kashdan, Julian, Merritt, & Uswatte, 2006; Kashdan, Mishra, Breen, & Froh, 2009; Meyer, Enstrom, Harstveit, Bowles, & Beever, 2007; Niemiec, Ryan, & Deci, 2009; Vansteenkiste, Lens, Soenens, & Luycx, 2006; Wei et al., 2005). The original scale consists of 21 items and contains the following instruction: “Please read each of the following items carefully, thinking about how it relates to your life”. To fit the present study, the instruction was slightly modified: “Please read each of the following items carefully, thinking about how it relates to your real life when you are offline...”. Participants responded on a 7-point scale ranging from 1 (not at all true) to 7 (very true). The scores from these three subscales were used as indicators for the latent variable need satisfaction in daily real life.

A reliability test based on the data of this study revealed an acceptable internal consistency ($\alpha = .83$ for overall real-life need satisfaction, $\alpha = .61$ for autonomy, $\alpha = .60$ for competence, and $\alpha = .75$ for relatedness).

2.4. Statistical analysis

Structural equation modeling (SEM) was performed to examine the effects of psychological need satisfaction perceived online and perceived in daily real life on children’s Internet use outcomes, including frequency of Internet usage per week, time spent online per week, positive affect experienced online, and negative affect experienced online. Gender (0 = male, 1 = female) and grade (3–6) were controlled. Four parallel models were evaluated.

Before the formal analyses, outliers and normality were screened by examining standardized scores for each variable. This study applied the criterion that any case with a $|z|$ score greater than 3.0 was deemed an outlier. Eleven cases were identified as outliers. A preliminary data analysis indicated that the results did not change significantly after deleting outliers; therefore, these outliers were removed from the dataset to avoid possible interference with the results.

Normality was screened by examining the skewness and the kurtosis of each variable. According to the cutoff suggested by Kline (2005), variables with absolute values of skewness greater than 3.0, or with absolute values of kurtosis greater than 8.0 are deemed severely non-normal. The results of a descriptive analysis showed that no variable in this study was severely non-normal. Maximum likelihood (ML) estimation was adopted, as it is robust to moderate deviations from normality (Chen & Jang, 2010; Hau & Marsh, 2004; Hu, Bentler, & Kano, 1992; Olsson, Foss, Troye, & Howell, 2000).

3. Results

3.1. Descriptive statistics

Descriptive statistics for all measures are presented in Table 1. Most participants reported using the Internet less than three times per week ($M = 2.43; SD = 1.85$), and using the Internet for less than 1 h on weekdays ($M = 80; SD = 86$) and for an average of 1.5 h on Saturday/Sunday ($M = 1.57; SD = 1.42$). On average, participants reported experiencing high levels of positive affect ($M = 3.61; SD = .95$) and low levels of negative affect ($M = 1.65; SD = .68$) when they were online. Most participants reported medium levels of need satisfaction perceived online ($M = 4.38; SD = 1.53$), and some participants reported high levels of need satisfaction perceived in daily real life ($M = 5.25; SD = .93$).

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Descriptive statistics for all measures.</th>
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<tbody>
<tr>
<td><strong>Internet use</strong></td>
<td>Mean</td>
</tr>
<tr>
<td>Frequency of Internet usage per week</td>
<td>2.43</td>
</tr>
<tr>
<td>Time online per week</td>
<td>7.08</td>
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<tr>
<td>Time spent online on weekday</td>
<td>.80</td>
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<tr>
<td>Time spent online on Saturday/Sunday</td>
<td>1.57</td>
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<tr>
<td><strong>Positive affect experienced online</strong></td>
<td>3.61</td>
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<tr>
<td>Negative affect experienced online</td>
<td>1.65</td>
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<tr>
<td><strong>Need satisfaction perceived online</strong></td>
<td>4.38</td>
</tr>
<tr>
<td>Total need satisfaction perceived online</td>
<td>5.03</td>
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<tr>
<td>Competence perceived online</td>
<td>4.18</td>
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<tr>
<td>Relatedness perceived online</td>
<td>3.96</td>
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<tr>
<td><strong>Need satisfaction perceived in daily real life</strong></td>
<td>5.25</td>
</tr>
<tr>
<td>Total daily-real life need satisfaction</td>
<td>5.19</td>
</tr>
<tr>
<td>Competence perceived in daily real life</td>
<td>4.95</td>
</tr>
<tr>
<td>Relatedness perceived in daily real life</td>
<td>5.54</td>
</tr>
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3.2. Model 1: Frequency of Internet usage per week

Fig. 2 illustrates the standardized path coefficients of the Frequency of Internet Usage per Week model. The fit indices suggested a good fit of data, $\chi^2/df=2.29$, RMSEA=.03, CFI = .98, NFI = .97, GFI = .98. Regarding the structural paths, boys used the Internet more often than girls ($\beta = -.12, p < .01$), consistent with previous studies found (e.g., Subrahmanyam et al., 2001). Need satisfaction perceived online significantly positively predicted children's frequency of Internet usage per week ($\beta = .19, p < .001$). Children who perceived high levels of autonomy, competence, and relatedness online tended to use the Internet more often; thus H1a was supported. However, need satisfaction perceived in daily real life predicted the frequency of Internet usage per week non-significantly, thus H3a was not supported in this study.

3.3. Model 2: Time spent online per week

Fig. 3 illustrates the standardized path coefficients of the Time Spent Online per Week model. The fit indices suggested a good fit of data, $\chi^2/df=1.97$, RMSEA = .04, CFI = .98, NFI = .96, GFI = .99. Regarding the structural paths, need satisfaction perceived online significantly positively predicted children's time spent online per week ($\beta = .28, p < .001$). Children who perceived high levels of autonomy, competence, and relatedness online spent more time online; thus H1b was supported. In contrast, need satisfaction perceived in daily real life significantly negatively predicted time spent online per week ($\beta = -.13, p < .01$). Children who perceived low levels of autonomy, competence, and relatedness in daily real life spent more time online; thus, H3b was supported in this study.

3.4. Model 3: Positive affect experienced online

Fig. 4 illustrates the standardized path coefficients of the Positive Affect model. The fit indices suggested a good fit of data, $\chi^2/df=3.87$, RMSEA = .07, CFI = .98, NFI = .97, GFI = .97. Regarding the structural paths, boys experienced more positive affect than girls ($\beta = -.07, p < .05$). Need satisfaction perceived online significantly positively predicted positive affect experienced online ($\beta = .54, p < .001$); thus, H2a was supported in this study. Need satisfaction perceived in daily real life also significantly positively predicted positive affect experienced online ($\beta = .12, p < .01$); thus, H4a was supported in this study.

3.5. Model 4: Negative affect experienced online

Fig. 5 illustrates the standardized path coefficients of the Negative Affect model. The fit indices suggested a good fit of data, $\chi^2/df=2.06$, RMSEA = .04, CFI = .98, NFI = .96, GFI = .98. Need satisfaction perceived in daily real life significantly negatively predicted negative affect experienced online ($\beta = -.23, p < .001$). Children who perceived low level of autonomy, competence, and relatedness in their daily lives experienced more negative affect when using the Internet; thus, H4b was supported in this study. However, need satisfaction perceived online predicted children's experiences of negative affect online non-significantly, inconsistent with H2b.

4. Discussion

The present study investigated why the Internet is attractive to children and what social conditions impact children's motivation under the SDT framework. As expected, results showed that children who perceived more psychological need satisfaction when they used the Internet tended to use the Internet more often, spent more time online, and experienced more positive affect (e.g., joyful, satisfied). The association between need satisfaction and positive behavioral and psychological outcomes found in previous studies (Baard et al., 2004; Milyavsky & Koestner, 2011; Standage et al., 2005; Zhao et al., 2011) was confirmed in the present study for Internet use.

These results suggest that the inherent properties of the experiences provided by the Internet motivate children's sustained Internet engagement. Internet applications that can better satisfy children's basic psychological needs may appear more attractive to children. For example, well-designed online games satisfy children's need for autonomy by offering a wide range of in-game options related to goals and strategies and varied opportunities for action. Online games also have the potential to satisfy the need for competence by balancing players' skill with game challenges, matching players against one another on the basis of their history of in-game performance, and providing continuous performance feedback. Similarly, children's need for relatedness can be satisfied because online games allow interaction between players, provide players with opportunities to form short-term bonds with other players in group missions, and allow players to develop long-term social bonds with other players through web forums related to...
Fig. 3. Results of the time spent online per week model.

Fig. 4. Results of the positive affect model.

Fig. 5. Results of the negative affect model.
specific games (Przybylski et al., 2010). These elements may explain why online gaming is the top reason children use the Internet.

The association between need satisfaction perceived online and negative affect experienced online as predicted by H2b, however, was not found in the present study, inconsistent with that observed in previous studies in the education (Standage et al., 2005) and work domains (Baard et al., 2004). The results suggest that the relationship between need satisfaction and negative affect in intrinsically motivated activities may be different from that in activities that are not always inherently interesting but so important that people have to engage (such as learning, and working). In intrinsically motivated leisure activities, participation is voluntary. Low levels of online experienced need satisfaction may diminish a child's desire for Internet use, thereby leading to low levels of Internet exposure. These low levels, in turn, generate limited overall negative affect. Nevertheless, more research is required to reinforce our findings.

The non-significant association between need satisfaction and negative affect does not mean that children use the Internet without experiencing negative affect. Although children whose basic needs are satisfied online experience positive affect, some may simultaneously experience negative affect. In the present study, in addition to positive/negative affect children experience online, we investigated the reasons children felt the affect rated. Some children reported that although they were happy and excited when they used the Internet, they also felt anxious about being scolded by parents or guilty because they believed that the time-consuming experience of using the Internet would undermine their academic performance. And some children reported they felt angry and anxious when the Internet connection was too slow or when the computer worked slowly.

In addition to the inherent properties of the Internet, children's social backgrounds contribute to Internet use outcomes. In this study we found that children's need satisfaction perceived in daily real life positively predicted positive affect experienced online, and negatively predicted their time spent online and negative affect experienced online.

These results suggest that individual differences in basic need satisfaction in daily real life are associated with the way in which children engage in the Internet. Children who experience high levels of daily need satisfaction tend to use the Internet in a healthy manner: appropriate amount of engagement and more positive affect. In contrast, children who experience low levels of daily need satisfaction are vulnerable to disordered Internet engagement: less enjoyment, more negative affect experience, and yet a higher overall amount of engagement.

Children who perceive less satisfaction in daily real life tend to spend more time online might because, for these children, the needs for autonomy, competence and relatedness are more pressing. Lower daily basic need satisfaction indicates that these children have fewer opportunities to fulfill their basic needs in daily life. When the Internet fulfills these children's needs, it becomes more important to them, leading to greater Internet use.

According to SDT, low daily basic need satisfaction results in internalizing problems, such as depression, social anxiety (Baard et al., 2004; Deci & Ryan, 1985b), and low self-esteem (Niemic, Ryan, & Deci, 2009). Thus the findings of the present study may explain associations found in previous studies between low self-esteem (Caplan, 2002), loneliness (Hamburger & Artzi, 2003; Morahan-Martin & Schumacher, 2003; Stepanikova, Nie, & He, 2010), social anxiety (Shepherd & Edelmann, 2005), and depression (Shepherd & Edelmann, 2005) and greater use of the Internet.

Additionally, the results revealed that children's perceived need satisfaction in their real daily lives positively predicted the positive affect they experienced online and negatively predicted negative affect. According to SDT, individuals who experience high levels of basic need satisfaction in daily life are more likely to internalize activities. Researchers (Przybylski et al., 2009) discovered that low levels of basic need satisfaction predicted an obsessive passion toward video games that conflicted with other facets of one's life. Thus similarly, despite experiencing need satisfaction online, children with low basic need satisfaction in daily life are prone to experiencing less positive affect and more negative affect (e.g., anxiety over potential blame from parents).

In the present study we found no evidence supporting the link between daily need real-life satisfaction and frequency of Internet usage as predicted by H3a. The probable explanation for this might be that children spent different amounts of time online in every Internet use session. Compared with the frequency of Internet usage per week, the time spent online per week was the more important indicator of Internet use.

In sum, the present study extends the understanding of why children are attracted to the Internet. From the perspective of SDT, two factors were revealed, one concerned with children's psychological experience online, and the other concerned with their psychological conditions in real life. The Internet is attractive because it satisfies children's basic needs. Moreover, the Internet is most attractive to children who perceive high need satisfaction online but low basic need satisfaction in their daily real lives.

This study has implications for parents, teachers, and the general public. Our findings suggest that although the attractive properties of the Internet motivate children's sustained Internet engagement, basic need satisfaction in daily life helps to prevent disordered Internet use. Therefore, concrete measures should be taken to encourage appropriate Internet use among young children. Enhancing children's daily psychological need satisfaction can be an effective way of accomplishing this goal. According to SDT, social support for autonomy, competence, and relatedness provides conditions to enhance need satisfaction (Deci & Ryan, 2000; Deci & Ryan, 2008). For parents and teachers, providing such support can be beneficial in preventing children's excessive or disordered Internet engagement. Specifically, understanding children's perspectives, acknowledging children's feelings, offering opportunities for choices, and encouraging self-initiation can support children's need for autonomy (Baard et al., 2004). Providing optimal challenges and positive feedback on effectiveness can satisfy children's need for competence. Greater involvement with children and encouraging children's peer interactions can enhance children's feelings of belonging in families and schools, thus meeting their need for relatedness. All of these measures may help children to develop healthy Internet use patterns. Future research is needed to further clarify how need support might facilitate appropriate Internet use and prevent unhealthy engagement.

5. Limitations

Several limitations of the present study should be noted. First, all data were collected with self-report measures that may, to some extent, limit the strength of our findings. The biggest potential deficiency may be children self-reporting their average time spent online per week. A child's concept of time may be different from adults'. For instance, an hour car ride to a child could seem forever. Future studies should examine and reinforce our findings by using multiple data collection methods. For example, consulting parents about the time their children spend online or using observation techniques may extend our understanding of children's Internet use habits.

Second, the design is cross-sectional and thus causal relationships cannot be determined, especially for the association between children's Internet use and their daily real-life need satisfaction. In previous studies, two opposing hypotheses were proposed to
explain the relationship between social involvement and Internet use: greater use of the Internet decreases social involvement and psychological well-being (Kraut et al., 1998) vs. lonely and depressive individuals are more likely to use the Internet (Ceyhan & Ceyhan, 2008; Hamburger & Artzi, 2003). Future studies may examine the longitudinal associations between daily real-life need satisfaction and Internet use to determine the causal path.

Third, this study regarded Internet use as a whole without distinguishing different types of Internet use. Will the associations of need satisfaction perceived online and in daily real life with Internet use as revealed in the present study be supported across various types of Internet use? This is an interesting topic for future work.

Finally, the population sample was not selected on the basis of the criteria for pathological Internet use. Surveying children identified as pathological Internet users would increase the generalizability of our findings.

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