Introduction

The time people spend involved with electronic media, and their impact on the activities that comprise their daily lives has been of interest to policy makers and researchers since the advent of television (Altheide, 1997). Young children and adolescents are seen as particularly vulnerable to the influence of electronic media. Initially concerns were raised that television viewing was displacing or reducing children’s involvement in developmentally beneficial free time activities such as socializing, physical activity and reading (Van Evra, 1990; Mutz et al., 1993). Not only has television viewing been thought to displace more active and beneficial forms of play and leisure, it has been accused of perpetuating stereotypes and promoting violence and other forms of antisocial behavior. The growth of video gaming has also raised similar concerns (Provenzo, 1991), and more recently the potentially negative influence of internet use and web surfing has been examined (Subrahmanyan et al., 2001). During the past few years, researchers have begun to study internet addiction (Chou, & Ting, 2003; Kaltiala-Heino et al., 2004), and the negative impact of internet use on social functioning (Kraut et al., 1998; Kiesler & Kraut, 1999) and psychological well-being (Engelberg & SjBerg, 2004; Seepersad, 2004). However, the results have been mixed. Much of the research is based on survey and retrospective methods, and even in studies where internet and computer behavior have been electronically monitored and recorded, the actual nature and quality of the experiences people derive from these involvements have not been examined. With the experiential sampling method, Kubey and Csikszentmihalyi (1990) demonstrated the value of examining the actual television watching experience for understanding its meaning and influence on the quality of life, and there has been a call for similar studies of internet and computer use (Subrahmanyam et al., 2001). As well, the relationships between internet/computer use and time spent on other leisure activities and non-leisure activities such as school and homework have not been examined. In this paper, research is described in which adolescents’ internet/computer use during their everyday lives is analyzed. Based on data collected as part of a larger study of the time use and health of adolescents, which included the use of the experiential sampling method, the following research questions are examined: (1) does internet/computer use displace other forms of leisure (physically active, social, reading, involvement with other electronic media) and non-leisure (time at school, homework); (2) to what extent do adolescents experience flow during internet/computer use compared to other forms of leisure; and (3) what is the relationship between internet/computer use and psychological well-being?

Methods

The data used for the analyses were collected during two phases of a larger study of adolescents and their parents that was funded by a SSHRC strategic grant. In three
different sized Southwestern Ontario communities (10,000, 250,000 and 4 million) grade 7 to 12 students participated in a time use survey completed at school during class time. They were enrolled in public, separate and private schools and 55.6% were female. Ages ranged from 12 to 19 and the average age was 14.2 years. Four to six months later a subset of 219 of these students and one of their parents participated in an experiential sampling (ESM) study in which the watches they wore were programmed to randomly signal them eight times a day for one week. On being signaled, the respondents completed a short form in a booklet that they carried providing information about their behavior, moods, psychological states, and social context. The adolescent response rate to the signal was 79.3% and 9731 ESM forms were completed. They also completed a questionnaire at home. The school questionnaires measured time use on a school day or weekend day, and both the school and home questionnaires included items that were used to gather information on adolescents’ school experience, leisure interests, social networks, relationships with parents, and physical and mental health.

For the present analyses, engagement in leisure and non-leisure activities, including the electronic media activities of television/video watching, computer/video gaming, and internet/web surfing, were operationalized as the percent of ESM reports where adolescents indicated involvement in these activities. These estimates were corroborated with data from the school time use survey. To monitor frequency of flow experiences, ratings of the level of skill and challenge associated with each episode of the various activities were used. Flow was operationalized as occurring in those activities where both skills and challenges were greater than each adolescent’s own mean scores across all his or her skill and challenge ratings for the study week (Kubey & Csikszentmihalyi, 1990). Average affect for the study week was assessed with three 7-point semantic differential items (happy-sad, cheerful-irritable and good-bad) and potency, a measure of feelings of mental and physical activation, was also measured with a three-item scale that included alert-drowsy, active-passive and rested-tired. Coefficient alpha for these two composite scales was .83 and .80 respectively. Average levels of depression, loneliness and boredom were assessed with single-item measures. From information gathered on the school and home surveys a multi-item measure was used to assess adolescents psychological well-being (4 items). A 5-point response format was used and the alpha coefficient was .79.

Results

Time use survey estimates corroborated the ESM estimates of time spent participating in various activities and supported their use in the testing of the displacement hypothesis. For example, when signaled, the 219 adolescents indicated that they were involved in free time activities 42.6% of the time. The estimate from the time use survey was 39.6%. In both sets of data, males reported 3% more free time than females. The ESM and time use survey estimates for time spent engaged in various types of leisure activities as a proportion of total free time activities were also very similar. The ESM estimates were: television/video watching (28.6%), computer/video gaming (6.2%), internet/surfing (5.2%), reading (5.5%), social activities (21.3%) and physically active leisure (15.6%). ESM estimates of time spent at school (16.6%) and doing homework (8.0%) were also similar to those derived from the time use survey.
Regression analyses controlling for age and gender were used to examine the displacement hypothesis. While age and gender differences were found (e.g., males participated in more total leisure and computer/video gaming, girls accessed the internet and web surfed more frequently), these differences did not influence the overall pattern of relationships. All figures reported are beta coefficients and significant at the $p < .05$ level. Higher internet use was associated with decreased television/video watching (-.15) and reading (-.15). Greater time spend engaged in computer and video gaming was associated with less television/video watching (-.14), and social (-.21) and physically active (-.21) leisure. Also, greater time spent television/video watching meant less time reading (-.15) and engaged in social (-.37) and physically active (-.23) leisure. Higher levels of participation in the three electronic media activities did not translate into less time spent at school but more time involved in television/video watching and computer/video games meant less time spent on homework (-.22 and -.14 respectively).

Computer/video gaming (43.7%), physically active leisure (36.1%) and reading (23.1%) produced the highest levels of flow experiences with television/video watching being experienced as flow only 4.6% of the time. Flow was experienced during internet/web surfing and social leisure 10.7% and 12.4% of the time respectively.

Adolescents with lower levels of psychological well-being were found to engage in more internet/web surfing (-.21), though level of participation in other electronic media was unrelated to well-being. Well-being was directly related to amount of physically active leisure reported during the study week (.24). Evidence was found that lower affect and greater depression were experienced during the study week by those engaging in frequent internet and computer/video game use, though feelings of loneliness and boredom were unrelated to level of use.

**Discussion**

Internet/web surfing and computer/video game playing do appear to displace other forms of leisure (physically active, social, reading, and television viewing) and non-leisure (homework). Perhaps, the good news is that they displace television watching more than other leisure activities, and television viewing itself was more of a “displacer” of physically active leisure, social activities and leisure reading than any other activity. While the adolescents experienced flow when engaged in internet and web surfing activities, computer/video gaming followed by physically active leisure clearly generated the most flow. Adolescent leisure activities varied greatly in their ability to generate flow experiences and it seems that the adolescents engaged more in those activities that provided fewer flow opportunities, which seems like a missed opportunity. The one exception to this pattern was the effectiveness of computer/video gaming in generating flow experiences, which is likely due to the built-in feedback provided by video games and the way they adjust the level of challenge to always equal or slightly exceed the skill of the player. However, video game activity was unrelated to general psychological well-being. Of some concern was the finding that those adolescents who engaged in higher
levels of internet/web surfing reported lower levels of psychological well-being. Also, computer/video gaming and internet use were found to be associated with higher levels of depression and lower levels of affect and potency during the study week, though heavier users did not experience more loneliness or boredom. Physically active leisure was found to be most strongly and positively associated with psychological well-being, and those adolescents who were more physically active during the study week also experienced higher levels of affect and potency and were less engaged in internet use. While cause and effect relationships can not be inferred, the results suggest the existence of electronic media lifestyle patterns that put adolescents at-risk.

Applications
This type of research can be used by policy and watch-dog groups to develop guidelines for parents and practitioners for dealing with the electronic media environment to which children are exposed and the competing electronic media activities that contribute to sedentary lifestyles and health risks. One area for concern is the displacement by electronic media of beneficial leisure activities, particularly physically active leisure. More research is needed to determine if it is the media’s “fault” or if the same conditions that foster greater internet/computer use are responsible for lower levels of physically active leisure and other beneficial leisure involvements. The reasons for the negative relationship found between high levels of internet use/web surfing and psychological well-being also need to be further examined.

References