THE IMPACT OF THE INTERNET ON CHILDREN'S DAILY LIVES: PHYSICAL, SOCIAL AND PSYCHOLOGICAL WELL-BEING

by

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(Under the Direction of Joseph. R. Dominick)

ABSTRACT

This study investigated the children's Internet use behavior and how the Internet usage changes children's daily lives. 297 children in 4th through 9th grades participated in survey. Particularly, this study examined how children allocated their time to different media and daily activities and the relationship between children's Internet use and level of physical activities, social involvement and relationship, and loneliness. This study found no displacement effect of the Internet on children's daily activities. Rather, it was found that children who spend more time on the Internet were more likely to spend more time with other media, more time on some kind of physical activities, and were more socially involved. The Internet provided a place for communication and social relationships for children. Net-generation children surrounded by media were not necessarily giving up other activities that were also important for their intellectual, physical, social and psychological development.

INDEX WORDS: Children, Internet, Daily activities, Physical activities, Time, Displacement effect, Social involvement and relationship, Loneliness, Body Mass Index

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To Hyung-Jin and Grace (HyeJoon),
whose tremendous love, support, and patience
make this possible.

To my parents and parents-in-law,
who has always encouraged me to complete
my academic goal.

To Sera, JiWook, ChungWan, and SungHyun,
who has always made me laugh.

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TABLE OF CONTENTS

Page

CHAPTER 1

INTRODUCTION

Justification

Studies about the Internet started from investigating who had Internet access. Researchers then moved to investigate actual Internet use, including how much time people spend on the Internet and what they are doing. This study starts with the assumption that most children now have Internet access either at school, library, or at home. Thus, it examines children's actual Internet usage and how the Internet usage changes children's daily lives in terms of physical, social, and psychological health by investigating the level of physical activities, social interaction and relationship, and loneliness. The study also examines how children allocate their time to different media and daily activities.

The Internet is a new and innovative medium that can completely change the lives of people much as television did in the 1950s and 1960s. The Internet changes people's lives in terms of reaching, disseminating, creating, and evaluating a huge amount of information easily and quickly, communicating with many different kinds of people separated by space and time, and reallocating time for their daily activities. Through various types of Internet uses, such as, e-mail, newsgroups, and chatting, the way people communicate is changed. Since the Internet has changed our lives in a revolutionary way, we cannot help but study and investigate the Internet as to what influence it has on us.

Many scholars in various fields, such as education, psychology and sociology, have studied the impact of the Internet on people and society and reported pros and cons of using the Internet. Children are particularly interesting subjects for studying the Internet for several reasons. First, the Internet is at the heart of a new generation, called the Net generation. According to Don Tapscott, the Net generation consists of babies still in diapers to people who are in their twenties (Tapscott, 1998a). Digital media surrounds the Net generation, who are savvy new technology users. The Internet is an essential part of the Net-generation's lives. Unlike their parents, this generation doesn't have any fear toward the new medium. The Internet is not even a new technology for youngsters. It is natural element of children's lives.

Second, the number of kids and teens who are using the Internet is growing fast every year. According to Nua's Internet survey, 605.60 million people worldwide were online as of September 2002, up from 580.7 million in May 2002 (Nua Internet Survey, 2002). The Pew Internet & American Life Project reported that 45% of all American children who were under 18 years old were on line (Pew Research Center, 2000a). In addition, 95 percent of public schools in the U.S. were connected to the Internet in 1999 (National Center for Education Statistics, 2002). This statistics show that almost all schools in the U.S. now have Internet access regardless of level, region, or poverty concentration. As Internet use among children is dramatically rising and as inappropriate content for children on the Internet poses a huge concern for parents, we need to know what impact the Internet has on children.

Third, children are in a developmental stage. The fact that children spend more time in front of a computer using the Internet suggests the possible impact of Internet use

on children's physical, social and mental development. The possible positive influence of the Internet on children is concerned with educational or informational purposes, which suggests that children can acquire lots of information and apply it to their education. However, the claim about the positive impact of the Internet is arguable because children may not get only educational information. Children may use the Internet for various reasons, including getting information, communicating with people, playing games, surfing and visiting different kinds of web sites, etc. The fact that there is no specific regulation about the Internet, nor proper knowledge and guidance of children's Internet use by government, school, or parents, induces more concern.

Also, there have been several claims of a possible negative impact of the Internet on children's daily lives. There have been some concerns about the negative impact of the Internet on children concerning violent and sexual content and a displacement effect in such areas as social relationships, including interaction with family and friends, physical activity and other leisure-time activities, such as reading and playing, and a negative effect on psychological well-being, such as loneliness. However, there have not been many studies regarding this issue. Previous research also has mixed findings. Therefore, we need to know how Internet use will influence children in terms of physical, social and psychological development to confirm or reconsider the results from the previous studies.

Purpose of the Study

Every time a new medium has been introduced, the primary concern by society has been the impact on children in either a positive or negative way. There have been many past studies that looked at the impact of various kinds of media on children.

The Payne fund studies investigated the effects of movies on children in 1920s (Lowery & DeFleur, 1995). Several researchers studied the impact of movies on children in terms of audience, content, attitudes, emotions, health, conduct, and behavior. Even young children were among the moviegoers at that time. A large content analysis of films during the 1920s reported that over three-fourths of the films contained crime, sex, and love. Few films dealt with content that was suitable for children. Also, the use of tobacco and alcohol was frequently portrayed. In addition, it was found that children were more vulnerable agents than adults in emotional arousal from watching films. One study even concluded that certain kinds of films might disturb children's sleep. Moreover, it was found that children might imitate the movie character in the real world.

Wertham conducted a study of the effect of crime comic books under the title of "Seduction of the innocent: The great comic book scare" during the 1950s (Lowery & DeFleur, 1995). Despite all the criticism, this study found that children were seduced by the violent content of the crime comic books.

Television was introduced to our lives during 1950s more quickly than any other medium. A study by Schramm, Lyle and Parker (1961), which was the first major study of children's television watching, investigated the effect of the television in terms of physical, emotional, cognitive and behavioral effect. This study concluded that television might do harmful things for some children. Specifically, watching television made children spend less time with playing (both inside and outside), house chores (e.g., cooking and cleaning), listening to radio, going to movies, and reading books.

The Surgeon General's report on television and social behavior at the end of 1960s was another huge project of the television's effect. A total of twenty-three projects

were conducted to examine television's effect. These studies found that television was saturated with violent content and children were exposed to violence as the time spent with television increased. Also, children observed and learned the behaviors of actors in television programs. Research findings supported that watching violent programs on television increased the likelihood of aggressive behaviors.

This study of the impact of the Internet on children is in line with the previous research of mass media effect on children. As the numbers of children who use the Internet grow, the impact of the Internet on children's daily lives as well as how and why children use the Internet should be examined.

Although we all realize the importance of studying the impact of the Internet on our children's lives, little research has been done regarding the displacement effect of the Internet for children. Particularly, research showing the relationship between Internet use and displacement effect for various daily activities including physical activity and social involvement is still a debatable issue. Also, whether Internet use is related to children's loneliness is still questionable.

This study proposes to investigate the followings:

1) How children use their time. In particular, how children allocate their time to the consumption of different media and various daily activities is examined. Specifically, the amount of time children spend television watching, newspaper reading, radio listening, video game playing, computer and Internet using is investigated. Then, time spent with non-media activities or leisure time activities will be examined. Leisure time activities in this study include reading books, playing organized and

unorganized physical activities, attending community events, church, concerts, and volunteer works. To explore children's time use in detail, the amount of time spent on school, homework, commuting, sleeping, eating etc. will be also examined.

2) How children use the Internet. Children's general Internet use will be examined. Various types of the Internet use by children and the amount of Internet use are addressed in detail. This study also proposes to examine how this Internet use is different in terms of demographic variables, including gender and age. The level of Internet experience influence on children's amount of Internet will also be investigated.

3) Children's perceptions of the Internet in terms of the effect on their time use and credibility will be examined.

4) This study also proposes to investigate the relationship between Internet use by child and the level of physical activities, social relations, and psychological well-being.

In sum, the purpose of this study is to examine children's Internet use behavior and how Internet usage changes children's daily lives. It will seek to determine if there is a possible displacement effect for daily activities and an impact on children's physical, social, and psychological well-being.

Chapter Organization

The dissertation consists of five chapters.

Chapter one introduces the justification and purpose of the study.

Chapter two presents the literature review about Internet as a new medium, Internet use by children, children's developmental issues regarding physical activity, social relations, and psychological well-being, and displacement effect. Also, research questions and hypotheses are presented.

Chapter three reports the method used in the study.

Chapter four presents the findings and results of the study.

Chapter five discusses the implication of the study and suggestion for the following studies.

CHAPTER 2

LITERATURE REVIEW

Internet as a New Medium

New Telecommunications Technologies…

Drive us apart	bring us together
Privatize our lives	help build community
Isolate us politically	promote activism
Injure children psychologically	help children psychologically
Provide superficial knowledge	increase in-depth knowledge
Leave people with no sense of local community	increase our sense of geographic place

(by Kubey, 2000)

According to DiMaggio, Hargittain, Neuman, and Robinson (2001), the Internet is defined as the "electronic network of networks that links people and information through computers and other digital devices allowing person-to-person communication and information retrieval." The advent of the computer and the Internet has brought a whole new world in terms of gathering, disseminating, creating, and criticizing information and communicating with people. Since the Internet became popular in the early 1990s, many people log on the web and search for information instead of going to the newspaper or television to get information. As the number of people who use the Internet is growing, most people now accept that Internet is a revolutionary new medium that has changed our life style completely. However, nobody can exactly tell how the Internet changes our lives. As Kubey (2000) argued, the Internet as new media technology may enhance and help our lives or do harmful things to people.

The Internet now is becoming an important research topic in various fields, including communication, sociology, psychology, public health, political science, education, computer science and so on. Then, what are the distinctive characteristics of the Internet as a new medium and how is it different from the old media, such as television, radio, and newspaper?

The Internet has several distinctive features. First, the Internet is an active and interactive medium. In other words, the Internet is a two way medium. We call a person who uses the Internet "user," not a viewer or listener. "User" suggests activeness and controllability. Internet users can create information by themselves or actively search and reach the information on the web. Further, people evaluate the given information and set forth their view so that other people can see them. Interaction with other users is another feature of interactivity of the Internet. Opinions and views flow freely on the web. Even though television viewers can watch television actively by means of choosing a channel, television watching is still a passive activity compared to Internet use.

Second, the Internet transcends time and space. Internet provides an easy way to connect to people who live far away. In fact, many children keep in touch with foreign friends, or friends they made in camp, every day and even know what they're up to (Wolcott, 1999). The Internet is a globalized place in that people can easily meet new people from all over the world, which was not possible before the introduction of the Internet. Also, the Internet changes our sense of time. We neither have to wait for the morning or evening newspaper nor wait for the program on television. We simply go to the Internet and get what we need whenever we want.

Third, the Internet is a revolutionary communication tool. We mainly have used mail or phone as a communication tool until e-mail spread. Now, we have a new communication tool- the Internet -- that provides an easy way to keep in touch with people. The Stanford Institute for the Quantitative Study of Society conducted a large Internet survey in December 1999, with a national sample of 4,113 individuals from 2,689 households. According to a preliminary report by Nie and Erbring of this project (2000), sending and receiving e-mails is the most common online activity for each demographic group. Thus, Internet offers a new channel for communication between people in addition to the mail and phone.

The Internet not only offers a new way to communicate with people but also enables them to connect with a virtual community where people have shared interests. Oravec (2000) argued that the notion of 'neighbor' has been changed from only the individuals who live nearby to include those whom people meet and maintain relationship on line. In fact, people can make real friendship and get support through various websites, support groups (Parks & Roberts, 1998), or online counseling (Powell, 1998).

Today's home is called a "wired home," where family members perform all kinds of activities through a computer network (Oravec, 2000). New technology also changes the home as place where family members get together. In other words, the Internet affects not only family members but also the function of the home environment. Gumpert and Drucker (1998) analyzed the media technology and the changing communication landscape affecting home environment. They argued that the home as space could be influenced by communication activities that are changed by new media technology.

Many families now have more than one television set. The number of television sets and VCRs is high in families with children (Rice, 1996). The television set is no more the centerpiece of the home or a tool for gathering family members together. Gumpert and Drucker (1998) argued that even generations were defined by media technology not by chronological age.

Communication devices, such as, radio, television, telephone, and especially the computer/Internet seem to not only make life be more convenient and provide time for leisure (for example, people can do daily activities like shopping, banking, or finding information, or even getting prescription online) but also take up time from other activities. On the other hand, new technological developments such as electricity, washer, dryer, toaster, etc. seemed to help people to live conveniently and save time.

Internet and Children

> "Children are not viewers; they are users and they are active. They do not just observe; they participate. They inquire, discuss, argue, play, shop, critique, investigate, ridicule, fantasize, seek, and inform." By Tapscott (1998b).

Almost all new media, including radio, television, computer and the Internet, have been considered a potential positive and negative influence on children. Children have been treated as the most vulnerable agents of media influence. Moreover, the concern about media effects on children has grown as media occupy a large portion of children's free time and become available in almost every home or school.

The Internet is a primary educational and developmental tool for many parents and teachers (Demner, 2001). A study of children's use of the Internet by National School Boards Foundation (n.d.), which surveyed 1,735 households for both parents and

children, showed that most parents and children considered the Internet as a positive tool in children's lives.

"The majority of American parents with computers at home juggle the dream and the nightmare of the Internet at the same time (Turow, 1999)."As children spend more time on the Internet, many parents have been worried about the impact of the Internet on their children. Turow's Internet study in 1999, which surveyed 1,102 parents, found three parent types: 'Online Worriers,' 'Disenchanted,' and 'Gung Ho Parents.' 'Online Worriers' had conflicting opinions about the impact of the Internet on children. While about 88% of parents expressed their concern that heavy Internet use might isolate children, about 66% of those were also concerned that Internet might contribute to children's antisocial behavior. In addition, over 75% of parents expressed their concerns that children might provide private information to strangers and view sexually explicit materials online. At the same time, these parents still believe that the Internet helps children in some way. More than 90% of parents said that children could get help from the Internet for their homework and 87% agreed that children could learn useful things online. Also, nearly 79% of parents answered that children without Internet access were disadvantaged. 'Disenchanted' parents expressed uncertainty about the Internet as a necessity for children's future success. 'Gung Ho parents' were the ones who had highly positive opinions toward the Internet. In general, even though many parents think that the Internet has a positive impact on children, at the same time they are concerned about the possible negative influence of the Internet including violent and sexual content, strangers, and advertisements (Turow, 1999).

Content on the Internet is one of the potential problems for children. Children are able to get any information through the Internet without adults' mediation in various settings including home, school, and library. For example, parents whose child built a bomb by retrieving information through the Internet had to let the child use the Internet again after some restrictions because they worried their son might be computer illiterate (My son built a bomb, 1997). Content pertaining to violent information, such as how to make a bomb, pornographic materials, hate information are among those that can influence children negatively.

Chat rooms may be another Internet hazard. Nie and Erbring (2000) reported that those under the age of 25 were the biggest group who used the chat room often. Surprisingly, a huge portion of this chatting interaction was with people whose identity was not known. Contacting strangers and making friendship with unknown people make parents nervous about their children's Internet use. In addition, since children may encounter so many different kinds of pop-up windows for commercial advertisements, the influence of those advertisements on children's buying and consuming behavior could be another concern. As information overloads on the Internet, children sometimes are overwhelmed by the amount of information. Those who have little experience with the Internet seem to suffer more (Oravec, 2000).

Also, the credibility of the Internet as a medium is questionable. Given that information on the Internet is unchecked and that anyone can be an author on the Internet, the Internet might provide inaccurate, biased, and misleading information (Flanagin, & Metzger, 2000). However, lots of people seem to believe what the Internet offers to them. For example, a UCLA study (2001) found that about 58 % of users answered that they

believed most of the information provided by the Internet was accurate and reliable. Children as Internet users could be the easiest victims of misinformation on the Internet since children are still in a developmental stage in terms of reasoning and judgment. Also the fact that information seeking is one of the most common Internet activities provides a question about how people perceive the credibility of the information on the Internet.

As children depend on the Internet more than before, they seem to trust all the information from the Internet. Thus, whether a high level of Internet usage is related to the level of credibility of the Internet is an interesting question to investigate. Flanagin and Metzger (2000) assessed people's perception of the credibility of the information from the Internet and compared it to the information from other media sources. In this study, they found that information from the Internet was perceived as credible as the other media including, radio and television although the newspaper was perceived the most credible medium.

The Internet provides an opportunity for children to establish a sense of belonging. According to interviews with teens by Wolcott (1999), the Internet equals freedom for some teens and gives a sense of independence. Parents frequently limit the time on the telephone but infrequently with computer use. Teens use lots of slang and shorthand[1] online to express individuality and speed up the conversation. This Internet slang sometimes provides a sense of belonging to an Internet user. When it comes to the Internet, children seem to know more than their parents do. Whereas adults control television, children control the Internet (Tapscott, 1998b).

[1] Examples of Internet slang or shorthand are following: wazup? (What's up?), ready 4 2nite? (Ready for tonight?), luv (love), g2g (got to go), and wut? (what?) (Wolcott, 1999)

Since various forms of media, such as, television, radio, and Internet are taking much of children's time, the relationships between media, children's time use and their development should be examined carefully. Huston, Wright, Marquis and Green (1999) claimed that young children's use of time would be particularly important to their development because of several reasons, including, "social and intellectual development is probably more malleable than it is in later childhood and adolescence; and young children probably have less control over their options for time use than do older children."

Children's Time Use

Bianchi and Robinson (1997) noted that most children's time use studies had focused on the time spent with parents (especially for preschool children) rather than examining more broadly how children spend their time. Also, few of these studies have encompassed various kinds of activities. This study focuses on children's media activities, particularly Internet use, as well as other daily activities.

1) Media activities

Since television was introduced to our lives during the 1950s, the amount of time spent on the television watching has grown dramatically. Likewise, as the Internet has begun to take time from children's daily schedule, it is interesting to see how much time children spend on each media activity. Also, various types of Internet use and how it is different across gender, age, the level of experience and home media environment should be examined.

The UCLA Internet study (2001) reported that users spent about 9.8 hours a week on the Internet. The primary reason for going online was to obtain information quickly, for work, and access to e-mail.

Sending and receiving e-mail is the most common Internet activity among children. Also, instant messages are one of the Internet activities that many users do online (Nie, & Erbring, 2000; UCLA Center For Communication Policy, 2001). Internet research by Pew Research Center (2001) showed that about 20% teens used instant message as a way of contacting friends. Through e-mail and instant messages, teens extend their relationship with friends outside of school. Gross, Juvonen, and Gable (2002) reported that instant messaging, visiting and surfing web sites, and e-mailing were the most common Internet activities among children aged 10 to 13 years old. They argued that the Internet became a supplemental communication medium.

In general, there is no difference between genders in terms of Internet involvement (Demner, 2001). Girls use the Internet as much as boys. However, girls and boys used the Internet in different ways (National School Boards Foundation, n.d.). Girls reported that they used the Internet for education, schoolwork, e-mail and chat rooms whereas boys were likely to use the Internet for entertainment and games. Thus, when it comes to the Internet, the stereotype of girls' having technology phobia might disappear.

Huston et al. (1999) indicated that television viewing is negatively associated with age. As children go to school and have lots of things to do, they may not have enough time for television viewing, so time spent with television may decline with age. However, when it comes to the Internet, several studies reported that older children use the Internet more than younger children. According to Pew Research Center Internet project (2001),

older teens were likely to use the Internet more than younger teens. The study by National School Boards Foundation (n.d.) reported that teenagers were more likely to go online at school whereas younger children log on at home rather than at school. Wästlund, Norlander, and Archer (2001) also reported that younger people have more experience with the Internet and go online more often.

According to Pew Research Center project (2000a), 'Internet veterans,' or those who have used the Internet for more than three years are more likely younger and more educated. Also, Internet veterans do more things, use the Internet more frequently and longer. This study also reported that Internet use patterns seemed to change over time from fun, to information seeking, to more important things like job searching, to more difficult things like online banking and shopping. The UCLA Internet study (2001) also confirmed that very experienced Internet users (five or more years on the Internet) used the Internet for e-mail, professional work, reading news or trading stocks, whereas people who had experience with the Internet less than one year reported that they spent a large portion of time online surfing the web, playing games, or chatting. Another study by Pew research center (2001) indicated that teens with years of online experience were more likely use the Internet more. A Stanford study (2000) also reported that the amount of experience with the Internet was positively related to the amount of hours on the Internet and the number of online activities that people engaged in.

The percentage of Internet connectivity of public schools in the United States has reached about 99% in fall 2001 (National Center for Education Statistics, 2002). This is a huge increase compared to about 34 % of public schools that had Internet access in 1994. Although most schools provide computers to students and try to narrow the digital gap

between the Internet haves and have-nots, Internet access at home may be a variable that predicts the amount of time spent on the Internet, the effect on the participation in other daily activities, and further physical, social, and psychological well-being.

Indeed, the National School Boards Foundation (n.d.) reported that parents said that home outpaced school for children's Internet access, while children said that they used the Internet more at school. Given that the main reason for families to buy computers and connect to the Internet was for children's education, and education was one of main reasons for children's increased Internet use (National School Boards Foundation, n.d.), Internet access at home would be an important factor in predicting children's Internet use. Also, the Pew Internet & American Life project (2001) reported that about 83% of teenagers aged 12 to 17 logged online from home, even though most teens said they access the Internet from multiple locations, such as, school, library, Internet café and friend's home.

Gumpert and Drucker (1998) claimed that home environment after the introduction of a new technology or a new media development was very important because this space could be influenced by the changes in societal and communication ways. They argued that the new domestic technologies could affect social interaction in the home environment in two ways: facilitate the interaction or substitute for the interaction between people. Especially for children, the home media environment may be a crucial factor in predicting children's media use. Since children under 18 years old are still in the developmental stage in general, their media use may need guidance and mediation from adults. Whether children use the Internet in a separate place where mediation by adults is not easy should not be overlooked when studying children's

general Internet use. Thus, the ownership of a personal computer or Internet access would be an important factor in predicting children's Internet use.

Irving defined "digital divide" as a concept that represents the inequality of Internet access regarding social, economic and geographic level. DiMaggio redefined the digital divide as "digital inequality."(University of Maryland, 2001). Also, DiMaggio et al. (2001) defined the "digital divide" as "inequalities in access to the Internet, extent of use, knowledge of search strategies, quality of technological connections and social support, ability to evaluate the quality of information, and diversity of uses." When we suppose that the Internet might play an important role in children's development and future success generally, Internet connectivity would be an essential factor.

Based on the literature review, the following research questions and hypotheses are posited regarding of children's general media use.

RQ 1-1: What are the general characteristics of children's media use, such as watching television, reading newspaper, listening to radio, playing video game, reading books and using the Internet? What is the relationship between the home media environment and the amount of time spent on each media activities?

RQ 1-2: What are the general characteristics of children's Internet use? How much time do children spend on using the Internet? What are the general perceptions of children about the credibility of the Internet and the effect of the Internet on their time use? How is the perception of the Internet effect on time use different in terms of age, gender, and Internet experience?

RQ 1-3: How are the Internet uses by children different in terms of home media environment, Internet access, Internet experience and age?

H 1-1: Children who own their Internet accessible computer will spend more time on the Internet than children who don't.

H 1-2: Children who have more experience with the Internet will spend more time on the Internet than children with little experience.

H 1-3: Older children will use more Internet than younger children.

RQ 1-4: How are the Internet uses different between genders?

2) Non-media activities

According to several studies of children's time use (e.g., Timmer, Eccles, &O'Brien, 1985; Carpenter, Huston, & Spera, 1989), young children spend their time with several activities, such as education (e.g., attending school), sleeping, eating, personal care (e.g., grooming, bathing), house chores, attending community events (e.g., church, social events), socializing with people, participating in organized club/recreational activities, inside/outside unorganized playing, and leisure activities (e.g., reading for pleasure, watching television).

Given that the number of children who use the Internet and the amount of time spent on the Internet are growing, many have worried that children might jeopardize their routine daily activities to spend more of their time online. A recent study of children's daily activities including Internet use by Gross, Juvonen, and Gable (2002) reported that children spent most of their after school time on daily activities, such as, participating in organized sports activities, hanging out with friends, and talking on the phone. That is, Internet use did not occupy much after school time.

Research question two examines the time spent with non-media activities by children.

RQ 2: How much time do children spend on non-media activities, including school, eating, sleeping, commuting, physical activities, and social involvement?

Displacement Effect

1) Theoretical background

Social capital is the notion that is the foundation for trust in a civic society (Putnam, 1993). It embraces the concept of social interaction that includes social trust, civic engagement, and social connectedness. In his book 'Bowling alone,' Putnam argued that television was the prime suspect in declining American social ties as he worried about the decreasing number of bowling leagues. Moy, Scheufele, and Holbert (1999) defined 'social capital' as the relationships of citizens within a community that also can be termed 'civic engagement.' Wellman, Haase, Witte, and Hampton (2001) classified social capital into three forms: Network capital, Participatory capital, and Community commitment. Network capital represents the relations with family, friends, and neighbors who can provide companionship and a sense of belonging.

Participatory capital includes participation in politics and organization involvements. Community commitment can be explained by the level of commitment toward community. Whether the Internet increases or decreases social capital is a controversial issue in previous research. The Internet might increase social capital in that people can express and exchange their opinions through bulletin boards, communicate with people who are far away through e-mail and instant messaging, and easily make an online relationship and get support, and often connect to off line meetings.

In contrast, the Internet could also decrease social capital in that the Internet might prevent people from having face-to-face contact in real world settings and further

alienate them from real contact and interactions. Also, the Internet can take so much time that people don't have enough time for participation in various other activities including community events, physical activities, and volunteer work. Putnam (1995a) argued that television was the only driving force in the decline of social capital in America. He claimed that television viewing led us to reduce our leisure time activities and participation in outside activities. Putnam (1995b) argued that people who grew up without television tended to engage in more civic events than people with television. Further, he found that television viewing was negatively associated with social capital whereas newspaper use was positively associated. Throughout his argument, he blamed television viewing as the main reason for declining social activity outside the home. However, Putnam's claim has been criticized in that he was concerned only with the total amount of television viewing while neglecting the content of television programs.

One way to study the impact of new media in our daily lives is to examine the change in time spent on the new media and time spent on the existing media. 'Time' is a particularly useful variable in exploring the impact of new technology in terms of the time people devote to each media activity (Robinson, Kestnbaum, Neustadtl, & Alvarez, 2000). According to Robinson and Kestnbaum (1999), the 'zero sum' rule may be the most appropriate feature of time study in this regard. Zero-sum relationship is the basic assumption of the displacement effect for the amount of time spent in various daily activities. Time displacement suggests that the introduction of online media into a user's schedule of activities will cause a reduction of time spent on other activities. In other words, when a new media activity is introduced into our scheduled lives, corresponding reduction in the time invested in other activities is expected.

Time displacement effect has been tested whenever a new medium has been introduced to our scheduled lives. When radio was new, the influence on the print media was tested (Lazarsfeld, 1940). When television, cable television, VCRs, and computers were introduced, the influence on the existing media was investigated (Belson, 1961; Kaplan, 1978; Henke & Donohue, 1989; James & Wotring, 1995).

Many researchers have proposed that television viewing might displace some other activities that are essential for children in terms of intellectual, social, and physical development. Many of the studies about displacement effect of a new medium on other activities have been focused on children because of children's vulnerability and the potential importance of activities which provide growth and development for children (Mutz & Roberts, 1993). Maccoby (1951) addressed the concern over the effect of television on how children spend their time in terms of the question, "what children would be doing if they do not watch television during these hours?" Mutz and Roberts (1993) also claimed that such activities, including homework, out-of-school reading, clubs, organized sports, or hobbies along with media activities, such as television watching, going to movies and listening to the radio, would be classified as important activities for children's intellectual, social, and physical growth, whereas such activities as hanging out or daydreaming would be less important activities. In addition, they pointed out the negligence of time spent in school attendance or sleep in the children's time study.

One consideration of displacement effect is the 'functional equivalence' of television to other activities. That is, other activities that have similar functions to television will be displaced by television. Mutz and Roberts (1993) pointed out the

functional similarity issue in the study of displacement effect of television on the patterns of media use and other leisure activities. Since television serves as a source of information, entertainment, relaxation, passing time, etc., activities that serve the same functions as television might be displaced as the time spent with television increases.

Mutz and Roberts (1993) stated three possible displacement hypotheses. First would be "the more, the less" hypothesis, which means that the more children watch television, the less time they will devote to other activities. Second is "the more, the more" hypothesis, which suggests that children who actively participate in one activity are likely to participate in other activities as well. Thus, these children may use a new medium more when a new medium is introduced to their lives. Third would be called, "marginal activities hypothesis." This hypothesis introduced the notion that time spent on television viewing might come from marginal activities that could not be measured as well as unspecific. Nevertheless, this hypothesis assumes that time spent with television should come from time spent on other activities. The question would be where this time comes from, whether from important activities or marginal activities, from media activities or non-media activities and from one activity or several activities.

However, the simple displacement notion has not been consistently evident in previous time use diary studies. One of the reasons the researchers considered to explain this inconsistency is that the displacement models are too simplistic. That is, to examine the association between time spent with media and time spent with other activities would be too simple. In case of television viewing, one way of avoiding the simplicity of the displacement effect is to consider the content of television program (Neuman, 1991). Educational programming might stimulate an interest in reading, for example. People

who watch a lot of sports might have more participation in sports activities. Likewise, various activities on the Internet, such as, e-mail, finding information, playing game, shopping, chatting, or surfing can explain the relations between time spent with the Internet and other activities. For example, people who use the Internet mostly for e-mail might have more social interaction with people, while people who mostly play games on the Internet possibly spend little time with people in real life.

Among the modern technologies, only communication media like television, radio, or the Internet may be considered directly related to time displacement (Robinson et al. 2000). In other words, other modern technologies, such as, washing machines and microwave, seem to make people use their time more effectively. By contrast, television or the Internet seems to take time from scheduled lives.

Although Robinson (1969) mentioned the multitasking function of television, which means that people often watch television as a secondary activity. The Internet requires more attention and engagement than television (Nie & Erbring, 2000). It would be possible to use the Internet while eating something or listening to radio. However, most activities, including television viewing, physical activities, or attending community events, are not easily done while using the Internet. Since the Internet has different features than television, it may possibly have different explanations in regard to the displacement effect.

As the Internet becomes a part of people's lives, one major question to consider is what activities will be replaced by the increasing time spent on the Internet.

2) Displacement of existing media

When television was introduced in the 1950s, several studies attempted to examine the influence of television on attending movies and listening to radio (Schramm, Lyle, & Parker, 1961; Williams & Boyes, 1986). These studies suggested that the introduction of television induced a reduction in the amount of time spent attending movies and listening to the radio. The new media apparently displaced activities that had equivalent functions and offered similar gratification, primarily an entertainment function in this case.

Some studies report that time spent on the computer is taken directly from the time spent on television. Tapscott claimed that the Net generation is represented by the shift from broadcast to interactive (Tapscott, 1996). He also reported that children watched television four hours less than their parents and over an hour less than five years ago. "Surveying the digital future," a publication of the University of California Los Angeles (2001), noted that time spent on television was reduced as time spent on the Internet increased. The Stanford study by Nie and Erbring (2000) also reported that Internet use seemed to decrease the amount of time with traditional media, especially television watching. About 60% of respondents responded that the Internet had reduced television-watching time whereas one third of them reported that they spent less time with newspapers. It is assumed that Internet displaces television in terms of functional displacement. Since television and the Internet have similar functions in terms of providing information and entertainment, the Internet users may cut their time with television. Also, because Internet users can read the newspaper online, they may not need to read the hard copy of the newspaper anymore.

Indeed, the news study by Pew Research Center (1996) indicated that television news viewership declined due to the news search on the Internet by young adults. This means that the Internet is gradually substituting for the traditional media. National School Boards Foundation study (n.d.) also found that the amount of time watching television was reduced once children started to use the Internet. However, this study reported that children spent more time reading the newspaper, magazines and books. About one quarter of children answered that they watched less television than before in the UCLA study (2001).

James and Wotring (1995) examined electronic bulletin board users focusing on the adoption process and social impact. They found that bulletin board use displaced television, book, telephone, and letter whereas magazine, face-to-face conversation and other on-line communications were not affected. This study found that television was the first to be reduced. Further, the authors noted the importance of studying new communication activities based on the media displacement theory.

Ferguson and Perse (2000) investigated young adults as to whether the World Wide Web (WWW) was a functional alternative to television viewing. From surveying and using online media diaries from 250 college students, they suggested that the WWW differed functionally from television although the WWW has television-like motivations, such as entertainment, pass time, and relaxation and is functionally similar in diversion. They argued that Web surfing might not provide relaxation as much as television because the interactivity of the Internet and the effort to 'click' to go to other sites might demand more involvement and attention than flipping channels on television.

The study by Mutz and Roberts (1993) demonstrated that the introduction of television influenced only other media activities, primarily movie attendance and radio listening. From analyzing the longitudinal data from school children between the 5th through 12th grades in South African before and after the introduction of television, they found that time spent with television watching was negatively associated with time spent with going to movies and listening to radios even six years after television was introduced to their lives.

Kayany and Yelsma (2000) tested the displacement effect by investigating the influence of online media on the traditional media and family communication. In this study, they supported the time displacement hypothesis that the amount of time spent on other activities were reduced. The time displacement effect was more apparent for children than adult whereas there was no difference between genders. Kayany and Yelsma noted possible reasons why children exhibit a higher displacement effect: children might not have established media habits well and they absorb new media technology quickly. Regarding the level of Internet use, they reported that heavy users had experienced a greater level of displacement effect in telephone use, newspaper reading, and family communication. For functional displacement, it was found that television was gradually displaced by online media in terms of information. However, newspaper use was not displaced by online media. It was found that there was no indication of displacement of television and newspaper by online media in terms of the entertainment function. The findings of this study suggest important implications. First, children might experience a greater level of displacement effect than adults. Second, the

functions of media should be considered when examining the displacement effect of new media.

However, several studies suggested no time reduction of traditional media by introducing the Internet. Analysis of 1998 new technology survey of the Pew Center of 3,993 national respondents aged 18 and older by Robinson, et al. (2000) examined whether the time spent on media and social activities by the owners of personal computers and online service users is decreasing or not. This study used the "yesterday" approach, which asked respondents what they did yesterday, and found that Internet use was not significantly associated with traditional media and social activities in regard of time displacement and prosocial responses. Specifically, the authors found that usage time of traditional media, such as, radio, newspaper, and even television had remained literally unchanged since 1994 whereas the time spent on the Internet had tripled from 1995 to 1999. This study also noted the possible multitasking of computer or Internet use by respondents, which resulted in no time change of traditional media. This means that people can browse the web while the radio or television is on.

One other interesting finding of media displacement would be by Van den Bulck and Van den Bergh (2000). The result of their study showed that the restriction of one medium by parents might lead to increased consumption of other medium. In other words, when parents restrict the amount of watching television, a child uses computer more. They argued that children tended to move to another medium that offers similar gratification when their use of one medium was restricted, which was called "media displacement effect."

In spite of some studies that have found no reduction of the amount of television watching, it is generally assumed that Internet reduces the amount of television watching. In addition, it would be interesting to see how the displacement effect is different in terms of the level of experience with the Internet. For example, Huston and Wright (1998) suggested that the effect of television viewing on physical and social activity was the greatest in the early stage of the introduction of television.

Based on the literature review on the displacement effect of the Internet on existing media, the following research questions and hypotheses are presented.

RQ 3: Does use of the Internet displace existing media, including newspaper, radio, and television?

H 3-1: Internet will displace the existing media. In other words, children who are heavy Internet users are likely to spend less time with traditional media than are light Internet users.

H 3-2: The Internet will displace functionally equivalent media.

3) Displacement of other daily activities

Several early studies addressed and expressed concerns about the issue of time displacement of children's other leisure activities by the introduction of television (Belson, 1959; Schramm, Lyle, &, Parker, 1961; Murray & Kippax, 1978; Williams & Boyes, 1986). Robinson (1969) addressed the issue of the impact of television on our leisure time activities. He suggested that television has played a huge role in people's daily lives, especially in the consumption of their time. He even argued "television is responsible for a greater rearrangement of time usage than the automobile."

Huston et al. have made other possible explanations of displacement (1999). They argued that television would be more attractive, available, and require less cognitively complex, physical or social effort, than such activities as reading, participating in physical activities, and socializing. Thus, they have proposed that television might displace other activities, such as, physical activities, reading, and social interactions

In a study of Australian towns, Murray and Kippax (1978) suggested that children in a town with no television read books less frequently than children in a town with television, while Williams and Boyes (1986) found little relation between television viewing and use of print media.

Timmer, Eccles, and O'Brien (1985) found that television viewing was not associated with most leisure time activities. Although some studies found negative relations between television watching and leisure time reading (Medrich, Roizen, Rubin, Buckley, 1982; Ritchie, Price, & Roberts, 1987), the relations were very minimal after controlling other variables, such as, age, gender, and parent education.

Some studies suggested the potential displacement effect of the Internet on children's daily activities. Izenberg and Lieberman (1998) asserted that the Internet could waste children's time and displace all kinds of important activities that were essential for children's development. Likewise, Coffey and Stipp (1997) argued that as computer use increases, time spent with other free activities will be diminished because of the limitation of free time. Also, they explained that computers and the Internet offered more interactivity than traditional media, which led people to be more interested and to spend more time.

Although some studies reported the possible time displacement effect of new media, several studies found different results and claimed that the Internet played a complementary role rather than displace media and non-media activities.

Robinson and Kestnbaum (1999) analyzed the 1997 Survey of Public Participation in the Arts (SPPA) that used telephone interviews with a national sample of 12, 376 people aged 18 years or over about personal computer use and free time activities. SPPA examined whether personal computer use for hobbies and enjoyment would bring lower levels of participation in other free time activities. From the analysis of the SPPA, Robinson and Kestnbaum suggested that personal computer users were more likely to participate in other cultural and leisure activities, such as reading, and attending arts-related events. They pointed out that several researchers explained this phenomenon as a "rich get richer" pattern, which suggests that already active participant become more active in other areas (Meyersohn, 1968; Robinson & Godbey, 1999; Robinson & Kestnbaum, 1999). However, as the authors mentioned, this study didn't include important other activities such as, education, church attendance, organizational activities, which possibly can be displaced by new technology. In addition, children may have a different activity framework from adults, and a different time displacement effect.

Since the previous research had mixed findings, this study addresses only a research question and not a hypothesis.

RQ 4) Does the Internet use displace children's non-media activities including time spent with sleeping and eating?

4) Displacement of physical activities

Children can have physical and social benefits from participating in organized sports (American Academy of Pediatrics, 2001). Participation in both unorganized and organized sports helps develop motor skills, social interaction, creativity, and enjoyment (American Academy of Pediatrics, 2001). Also, participation in physical activity can enhance psychological health (Calfas & Taylor, 1994).

Almost all media activities are not involved with physical activities and face-to-face social interaction (Huston, & Wright, 1998). Since media activities cannot offer these things, children are heavy media users might lack certain activities that are needed for their physical and psychological development.

Although television watching may not involve physical activities, some studies have reported no relation between the amount of time spent with television and physical activities or that physical activities increased.

Medrich, Rubin, and Buckley (1982) found little relationship between television viewing and organized sports or social activities. Murray and Kippax (1978) reported that children in a town with no television spent more time playing and participating in outdoor social activities. Also, National School Boards Foundation (n.d.) demonstrated that the amount of time playing outdoors and doing arts/crafts increased as children's amount of time spent on the Internet increased.

In contrast, several studies have reported that media use might reduce the participation in physical activities. In a study of three towns one with no television, one with only a public channel, and one with several channels, Williams and Handford (1986) found that participation in organized sports and social activities outside of the home

declined after television was introduced. Also, Selnow and Reynolds (1984) found that heavy television viewing led children to participate less in organized group activities.

Durant and Baranowski (1994) observed television watching and physical activity among 191 young children aged 3 to 4 years and reported that young children who watched more television were less likely to participate in physical activity than children who watched less. However, television watching was not associated with body composition.

Some studies examined the effect of media on people's obesity. A study by Dietz and Gortmaker (1985) found that frequent television viewing in early childhood predicted obesity in adolescence even when controlling initial obesity level. A recent study of low-income preschool children aged 1 to 5 years regarding the relationship between television viewing and overweight risk by Dennison, Erb, and Jenkins (2002) confirmed that the amount of time spent viewing television and video tapes was significantly associated with being overweight. This relation was particularly significant for children who had a television set in their bedrooms.

A study by Dietz and Gortmaker (1985) found a significant association between television viewing and obesity among children aged 6 to 17. This study conducted both cross-sectional and longitudinal analyses of 6,965 children aged 6 to 11 years and of 6,671 children aged 12 to 17 years old from the National Health Examination Survey. In this large survey, it was observed that both children and adolescents who watched more television experienced more obesity than children who watched less frequently even when controlling for other variables including prior obesity, region, season, race, and family variables.

Salmon, Bauman, Crawford, Timperio, and Owen (2000) examined the relationship between television viewing and physical activity and obesity among Australian adults. Based on the assumption that sedentary behavior would lead to being overweight, they argued that television viewing, which is a sedentary activity, might be associated with being overweight due to decreased physical activity. From surveying 3392 adults, they found that television viewing was associated with being overweight. However, this relationship was not totally independent of physical activity. This means that people who are physically active are not at risk as much as people who are inactive even though they watch same amount of television.

The relationship between television viewing and obesity and physical activity was examined both cross-sectionally and longitudinally among adolescent girls (Robinson, Hammer, Killen, Kraemer, Wilson, Hayward, & Taylor, 1993). This study reported that the amount of time watching television was not associated with obesity as measured by the Body Mass Index. In addition, the level of physical activity was weakly associated with the amount of time watching television. However, longitudinal data suggested that the amount of television watching was not significantly associated with changes in the level of physical activity.

Television viewing, time spent playing outside, single parent status, and safety of the environment are among the determinants of physical activity that may correlate with obesity (Fulton, Burgeson, Perry, Sherry, Galuska, Alexander, Wechsler, & Caspersen, 2001). Based on the previous research, this study asks the following questions.

RQ 5-1: Does Internet use displace physical activities?

RQ 5-2: What is the relationship between children's Internet use and their attitude toward physical activity?

RQ 5-3: What is the relationship between the Internet use and obesity among children?

5) Displacement of social involvements and relations

The social effect of the Internet on people can be divided into social involvement and social relations. Social involvement indicates participation and engagement with social activities while social relations represent relationship with people.

Moy, Scheufele, and Holbert (1999) tested Putnam's time displacement hypothesis by interviewing 416 adults. They examined how television watching and newspaper reading were related to the perceptions of time pressure[2] and the level of civic engagement. In this study, they found that the amount of time spent on television watching was negatively associated with levels of civic engagement whereas newspaper reading was positively associated with levels of civic engagement, which is consistent with Putnam's findings. However, television watching didn't have any effect on the perception of time pressure, which suggests that the relations between the time spent with media and social capital would be determined by factors other than time pressure.

Gustavo (2001) examined 927 Israeli youth about the relationship between Internet use and leisure activities, peer relations, and prosocial attitudes. This study found that heavy Internet users are more likely to engage in outdoor activities, including sports, movies, concerts, and parties. Also, frequent Internet users read more books. However, heavy Internet users are more likely to feel social isolation from friends and report fewer

[2] To measure the perception of time pressure, respondents were asked 'how likely it would be for them to participate and how difficult it would be for them to fit such an activity into their weekly schedule.'

friends than light Internet users. In terms of prosocial attitudes, heavy Internet users reported less importance on helping others. Thus, adolescents who have fewer friends and fewer friends who listened to them were more likely to be heavy Internet users.

Many believe that the Internet changes society and people who live in the society whether it is a positive social impact or negative influence. However, there has not been much research regarding the change. More specifically, there has been much debate whether the Internet reduces people's human relationships or whether it creates new space for human relationships.

There have been some studies that looked at how new technology and the Internet affects the interpersonal relationships people have with friends, family, and relatives. These studies presented different results. Some studies reported that new communication technologies prevent people from having face-to-face interaction and further isolate people from society (Carlson, Chan, Chan, Kurato, Soong, & Yang, 1999; Nie & Erbring, 2000). One of the key findings of the Stanford study by Nie and Erbring (2000) was that as people spend more time on the Internet, they lose contact with their social environment: less time talking to friends and family on the phone, being with friends and family, and attending events outside of home. Nie even argued that the Internet could be the isolating technology that made people unable to participate social events outside the home and further isolate them from society.

In early 1980s, the effects of television viewing on family interaction was investigated (Brody, Stoneman, & Sanders, 1980). From observational study, they reported that family interaction was reduced when watching television. This study

indicated that television, which was believed to be an important social agent, induced people to talk less and interact less.

In contrast, some argue that involvement in the online community can bring a new home for people who are seeking social relationships (Hampton & Wellman, 1999; Wellman, 2001; Wellman et al., 2001). In fact, the cyber community provides space for people to communicate with each other through various online tools, such as e-mail, bulletin boards, and chat rooms.

According to Hampton and Wellman (1999), new communication tools have been introduced to maintain relationships with various people through a virtual community on the Internet. Also, the UCLA study found that more than 80% of Internet users agreed that e-mail helped them to talk with people who otherwise don't normally talk (2001). In addition, Wellman (2001) insisted that computer networks are inherently social networks and the Internet can have a positive impact on community ties. Thus, the Internet may increase social relationships with friends and family who live near or far away. In fact, Hampton and Wellman (2001) investigated how new high-speed Internet access affected the social networks that people and community have. In this study, the authors found that a high-speed Internet service helped bring people together and to have community gathering. However, this study pointed that people who have been on line for a long period and visited online very frequently didn't feel that they were part of the online community. It might indicate that as people have more experiences with the Internet, they tend to seek out real relationships rather than being interested in virtual online relationships.

Another large survey of visitors to the National Geographic Society Web site also noted that people's face-to-face visits and telephone calls were not influenced by Internet use (Wellman et al., 2001). The participants in this study were not novices in using the Internet. About 58% had been online for over two years. This study not only found that the Internet was a supplement for social interaction and increased organizational participation but also reported that the Internet might reduce commitment to online community. They argued that Internet use provided more opportunity and a new way to communicate with people besides telephone and face-to-face contacts. However, people who had had much experience with the Internet tended to have less commitment to the online community because their heavy Internet use might lead to bad online experiences and result in low commitment.

In addition, both the National School Boards Foundation study (n.d.) and the UCLA study (2001) claimed that the Internet seemed not to disrupt children's relationships with their family members, peers or communities. Rather, the Internet appeared to be a useful communication tool for connecting people and maintaining relationships.

Cyberspace is often described as a new communication space for Internet users. A study by Peris, Gimeno, Pinazo, Ortet, Carrero, Sanchiz, and IbÁÑez (2002) demonstrated that online chat rooms were a place where socially oriented people interacted with each other. The results showed that the main motivation to go online was for communication with people that was as real as face-to-face relationships. Chat users could fulfill their needs to communicate with people in cyberspace. However, this research only observed 66 adults, and could provide different results from children.

Parks and Floyd (1996) explored the relationships people form on the Internet newsgroups and emphasized that personal relationships online are common. These relationships evolved with time spent online and with increased experience. In addition, they suggested that online, as a new setting of personal relationships, should be examined to understand the function of cyberspace.

Shah, Kwak, and Holbert (2001) argued that not only how much people use the Internet but also how they use it should be examined in the study of impact of new media on people's civic life. A secondary analysis of DDB Life Style Study (1999) was performed to examine the relationship between Internet use and people's civic engagement. This study found that the types of the Internet use were important predictors. Although overall Internet use was positively associated with civic engagement, when type of Internet use was considered, the relationship between Internet use and civic engagement was not significant. In other words, people's use of the Internet for 'information exchange (searching for information and sending e-mail)' was positively related to civic engagement whereas the Internet use for 'social recreation (chatting and playing games)' was negatively related to civic engagement. Likewise, the amount and types of television viewing contributed to the prediction. People who were heavy television viewer were less likely to be participants in civic activities whereas viewers of television news were more likely to participate in civic life. This study showed that the patterns of Internet use as well as the amount of the Internet use played an important role in predicting the relationship between Internet use and people's civic involvement.

Hampton and Wellman (1999) conducted research about online and offline relationships among 'Netville[3]' residents. They were interested in whether the Internet made people change in terms of the social networks, civic involvement, and attitudes toward the community. As the Internet provides many of the activities previously known as public activities, such as, socializing, shopping, working, learning, and leisure time, the Internet may foster suspicions of fading of community gatherings and social interactions in the real world setting. In a preliminary analysis of the study, Hampton and Wellman suggested that the Internet supports a variety of social interactions and ties among people within this special community through increased online community communication and activities.

The amount of experience with the Internet may be a crucial factor in predicting the relationship between Internet use and social interaction in general and level of depression (LaRose, Eastin, & Gregg, 2001). Hampton and Wellman (1999) also pointed out the costs and benefits of studying only Internet novices. An Internet paradox study (Kraut, Patterson, Lundmark, Kiesler, Mukopadhyay, & Scherlis, 1998), that examined people who had used the Internet for the first time as subjects reported that online relationships could lead to reduced social relationships in the real world and bring weak social ties. Since novice Internet users tend to experience difficulties when using the Internet and feel uncomfortable in making friends with strangers, they seems to have stress from less competence. Thus, novice Internet users could have less interaction and social support on line and this may induce the depression.

[3] Netville is a suburban Toronto, Canada, development, which is a wired community with high-speed network provided. For two years during late 1990s, Netville residents were provided with free, high-speed Internet access and communication technologies. In return of this free service, residents were agreed to participate in the study.

However, some studies that focused on Internet users with more than two years experience with the Internet presented different results. The Internet project by Pew Research Center in 2000 found that experienced Internet users had more social interaction in the real world (Pew Research Center, 2000b). In addition, when the Internet paradox study was revisited by Kraut, Kiesler, Boneva, Cummings, Helgeson, and Crawford (2002) with respondents who had experience with the Internet for over two years, it was found that Internet use had positive impact on the social involvement. Face-to-face interactions with family were increased with Internet use. Therefore, the amount of experience with the Internet could be an important variable when studying the impact of the Internet on people's social and psychological well-being.

The Internet is also a place where people who don't know each other can meet and communicate. If relationships with people who don't know, see, or touch each other can be the basis of the real face-to-face relationship is still questionable. Although the Internet is a good place for communication between people, it is not easy to communicate with just words. Face-to-face communication may be particularly necessary for intimate relationships and building trusts. In addition, when it comes to time displacement and relations with family members and close friends, the displacement effect may occur unlike previous results.

Very few researches dealt with children regarding displacement effect of the Internet on social involvement and relations. Therefore, this study proposes the following questions for investigating the displacement effect of social involvement and relations for children.

RQ 6-1: Does Internet use displace children's social involvement, such as attending community events?

RQ 6-2: Does Internet use displace children's face-to-face interaction with family members and friends?

RQ 6-3: What is the relationship between the children's Internet use and perception of social relations?

RQ 6-4: What is the relationship between the children's Internet use and pro-social attitudes?

6) Relationship with loneliness

Loneliness can be defined as "nearly always an aversive experience and an enduring condition of emotional distress that arises when a person feels estranged from, misunderstood, or rejected by others and/or lacks appropriate social partners for desired activities, particularly activities that provide a sense of social integration and opportunities for emotional intimacy (Rook, 1984)." Although some believe that young children are not susceptible to loneliness, research has shown that even very young children (kindergarten and first grade) understand the meaning of loneliness and relate to peer relationships at school (Cassidy & Asher, 1992). Children may feel loneliness often in the school environment with peers. Also, loneliness may occur when children get rejected, ignored, and have no friends at school (Solomon, 2000). In other words, whether children feel satisfaction in their relationships with friends can be a basis for assessing the level of loneliness for children.

Several studies attempted to examine the relationship between Internet use and people's psychological well-being. A study of children aged 10 to 13 years old by Gross,

Juvonen, and Gable (2002) investigated the relationship between Internet use and well-being by examining communication partners in instant messaging activities. This study indicated that children who reported more loneliness and social anxiety were more likely to communicate with strangers online. However, this study didn't take account of the amount of Internet use as a variable.

The Internet paradox study by Kraut et al. (1998) addressed the issue of social impact of the Internet in terms of social involvement and psychological well-being. They argued that despite the fact that the Internet has been used as a communication tool and has far more social aspects than television, heavy Internet use might reduce social involvement in terms of face-to-face contacts with close friends and family. From examining 169 participants who had had Internet experience less than two years, they concluded that Internet use was associated with the decline of social involvement as measured by communication within the family, size of local social network, and psychological well-being. They reported that Internet use led to increasing loneliness even when controlling initial level of loneliness and personal characteristics.

When the Internet paradox was revisited by Kraut et al. (2002), they found that the negative effects observed earlier had dissipated. From a 3-year follow up of 208 participants, it was found that loneliness was not associated with Internet use for people who had used the Internet over three years.

Also, Wästlund, Norlander, and Archer (2001) investigated whether the Internet affected people's psychological well-being by surveying 329 college students and found no relationship between Internet usage and psychological well-being.

Another study by Moody (2001) examined the relationship between Internet use and loneliness. Based on the theory of loneliness by Weiss (1973), loneliness could be classified into two forms: social loneliness and emotional loneliness. This study found that heavy Internet users were more likely to have higher levels of emotional loneliness and lower levels of social loneliness. This finding suggests that people still can feel the emotional loneliness, such as feelings of emptiness and lack of intimate relationships, even with a heavy amount of Internet use. However, social loneliness evidenced by boredom and sense of not belonging might be reduced from using the Internet.

Page, Frey, Talbert, and Falk (1992) examined the relationship between children's loneliness and participation in physical activity from surveying 601 children who were in grades 1 through 6. In this study, they found that children who reported high scores on the loneliness scale were less likely to participate in physical activity. This shows that physical activity may be a part of social activity for children. Thus, children who lack social satisfaction in peer relationship may not want to participate in physical activity.

Qualter and Munn (2002) argued that social rejection might not be enough to measure childhood loneliness and suggested that emotional loneliness and social loneliness should both be considered. Perhaps children who are socially rejected by peers may not feel emotional loneliness at all. In fact, in the study of 640 children aged 4 through 9, they indicated that social and emotional loneliness should be examined separately. However, several studies have used the loneliness scale by Asher and have demonstrated that peer acceptance, friendship, and victimization by friends contributed to the measure of the feelings of loneliness in children (i.e., Asher, & Gazelle, 1999). In addition, when it comes to investigating the relationship between Internet use and

childhood loneliness, social loneliness would be the more appropriate since the current study focuses on the Internet as a communication tool and a new medium that takes up time from children.

Researchers so far have not yet reached consensus on the effects of the Internet on social and psychological well-being of people. Moreover, there have not been enough studies regarding the issue of the relations between the Internet use and loneliness to justify specific prediction. Thus, this study examines following question.

RQ 7: What is the relationship between children's Internet use and loneliness?

CHAPTER 3

METHOD

Sample

1) Subjects and procedures

A pilot study was conducted in January 2003 with 17 children. As a result of the pilot test, more instruction for some questions was added for children's better understanding of the questions and some wording was changed.

For the main data collection, this study used self-reported survey from children 4th through 9th grades during February 2003. Five schools in Clarke County, Barrow County, and Jackson County in Georgia were included. In detail, this sample consists of two private schools and three public schools, including one elementary school, one middle school, and one high school. For public schools, the superintendent in each county was contacted and gave permission for each county's school district. Then, the principals were contacted and authorized the survey process in their schools. For private schools, only principal's authorization satisfied the permission process.

The survey package included one cover letter, two parental consent forms, two child assent forms, and the questionnaire. The teacher distributed the survey package to students. Then children took the questionnaire home and parents or guardian reviewed the questionnaire and signed the consent forms while child signed the child consent forms. Each parent and child was asked to keep one of the each parental consent forms and child assent forms and return one of the each form to the researcher. Children were

asked to fill out 30 questions. After the children filled out the questionnaire, they brought them back to school. The researcher later collected the completed questionnaire from the teacher. A total of 1,600 questionnaires were distributed to children and 297 children returned the survey. The response rate was 19%. Since children were required to take the questionnaire home for parental consent and returned the filled-out questionnaire to school, more children's effort was needed than most surveys and thus might lead to a little lower response rate.

Measurements

1) General questions

a) Demographic variables

The respondents were asked to fill out some demographic questions, including who they live with, gender, and age. Each item was coded as the following: Who they live most of the time as "both parents" = 1, "mother" = 2, "father" = 3, "other" = 4; Gender as "boy" = 0, "girl" = 1. Children were asked to write down the age in an open-ended question and coded as the number. Age was ranged from 8 to 16.

b) General perception about the influence of the Internet

To examine children's general perception about the impact of the Internet on children's time use, direct questions were addressed. Respondents were asked to answer four questions regarding their general thoughts of the influence of the Internet on themselves and today's young people. This variable included four questions: "keeps me (young people) from doing more important things"; "leads me (young people) to do dangerous or harmful things"; "takes away from the time I (young people) spend with my (their) friends"; and "takes away from the time I (young people) spend with my (their) families" Respondents were given four choices as following: "not at all" = 1, "only a

little" = 2, "some" = 3, "a lot" = 4. This question was extracted from the Princeton Survey Research Associates for the Pew Internet in American Life Project (2001). The four items for the effect on young kids were subjected to a promax (oblique) rotated principal component factor analysis[4] to verify the internal reliability between the items. One factor was extracted from the four items, which explained 59.64% of total variance with an eigenvalue of 2.39. The Cronbach's alpha reliability coefficient of four items was .77. Likewise, four items for the effect on themselves were subjected to a promax (oblique) rotated principal component factor analysis. One factor was extracted from the four items, which explained 54.87% of total variance with an eigenvalue of 2.20. The Cronbach's alpha reliability coefficient of four items was .72. Composite variables for each were created with possible low score of 4 to high score of 16. Higher score means indicate greater perceived effect of the Internet.

c) General perception about the Internet credibility

Based on the assumption that children may believe what the Internet offers for them and be influenced by it, children's general perception of information on the Internet was examined. Flanagin and Metzger (2000) claimed that the most common and consistent dimension of measuring media credibility consisted of five elements: believability, accuracy, trustworthiness, bias, and completeness of the information of the media. Respondents were asked to rate the credibility of the Internet in terms of these five

[4]An oblique rotation method was used based on the claim by Park, Dailey, & Lemus (2002) saying, "An orthogonal rotation method (e.g., varimax, equimax, quartimax, etc.) constrains factors to be independent of each other, while an oblique rotation method (e.g., promax, oblimin, quartimin, etc.) allows factors to be correlated. It is often believed that an orthogonal rotation produces a simpler and more easily interpretable structure of factors. However, this common belief (or convention of preferring varimax rotation) is unwarranted and unrealistic. …. Many constructs in communication research cannot be expected to be independent of each other and, even if the factors are indeed unrelated, an oblique rotation will show correlations close to zero."

elements. Semantic differential scales were used to measure the variable. The seven-point scale was reduced to a five-point scale for children's convenience and better judgment. Respondents were given a series of five point scales as bipolar attitudes, including a. believable/unbelievable, b. accurate/inaccurate, c. untrustworthy/trustworthy, d. biased/unbiased, and e. complete/incomplete.

2) Independent variables

a) Home media environment

In this study, home media environment was defined as the number of each media at the children's home. Children were asked what sort of media equipment they have in their home, including television sets, computers, online accessible computers, VCRs, DVDs, newspapers, and video game players. This variable was used to assess the relationship between the home media environment and the amount of media activities.

b) Amount of the Internet use

Respondents were asked to write down the number of hours and minutes they spend on the Internet by an open-ended question. How much time children spend on the Internet at school and how much time children spend on the Internet at home were both asked. The amount of time was coded as minutes.

c) Types of Internet use

Types of Internet use are defined as the various kinds of online activities, including e-mail, instant messaging, checking news, research for school work, chatting room, bulletin board, playing online games, surfing the Web for fun, information about entertainment, information about sports, information about hobbies, shopping, and downloading music files. Respondents were asked to check how often they do these

things on the Internet on a scale: "never" = 1, "rarely" = 2, "sometimes" = 3, "often" = 4, "very often" = 5. The thirteen online activities were subjected to a promax (oblique) rotated principal component factor analysis to reduce the items. Three factors were extracted from 11 items (two items were reduced because of a low factor loading coefficient). Factor one was referred to as "Internet use for communication," which included Internet use for e-mail, instant messaging, chatting room and bulletin board. This factor explained 37.48 % of total variance with an eigenvalue of 4.87. The Cronbach's alpha reliability coefficient of 4 items was .79. Factor two was referred to as "Internet use for information," which consisted of Internet use for checking news, research for schoolwork, information about sports, and information about hobbies. This factor explained 12.33 % of total variance with an eigenvalue of 1.60. The Cronbach's alpha reliability coefficient of 4 items was .71. Factor three was called "Internet use for entertainment," which included Internet use for playing online games, surfing the Web for fun, and information about entertainment. This factor explained 7.88 % of total variance with an eigenvalue of 1.02. The Cronbach's alpha reliability coefficient between the 3 items was .72. Composite variables for each factor were created by summing the scores. Possible score ranged from 4 to 20 for factor one and two and from 3 to 15 for factor three.

d) Internet experience

The Internet experience may explain children's Internet use and type. The Internet experience was assessed by five items extracted from Flanagin and Metzger (2000). Respondents were asked to rate their Internet experience on five point bipolar scale[5].

[5] Five point scale was used for children's better understanding and assessment instead of the seven point scale that was originally used by Flanagin and Metzer.

Items included the followings: "I never use the Internet," which was coded as 1 to "I very often use the Internet," coded as 5; "I have no experience using the Internet = 1" to "I have a great deal of experience using the Internet = 5"; "I am not at all expert using the Internet = 1" to "I am completely expert using the Internet = 5"; "I am not at all familiar with the Internet = 1" to "I am extremely familiar with the Internet = 5"; "It is extremely difficult for me to access the Internet = 1" to "It is extremely easy for me to access the Internet = 5."

The five items were subjected to a promax (oblique) rotated principal components factor analysis. A single factor was extracted from five items, which explained 65% of total variance with an eigenvalue of 3.25. The Cronbach's alpha reliability coefficient was .86. Possible range of the score was 5 to 25. The highest score indicated the highest level of Internet experience.

e) Ownership of the computer and Internet access

Respondents were asked whether they own their own computer and whether they can access the Internet from their computer.

3) Dependent variables

a) Amount of media activity

In addition to the amount of the Internet use, how much time children spend on other media activities, such as television, newspaper, book, radio, video games, and computer, was measured. Similar to the questions about the amount of Internet use, respondents were asked to write down the number of hours and minutes they spend on each media activity. This variable was asked to explain the displacement effect of the Internet on existing media to determine if the amount of time spent on each media

activity will be reduced because of Internet use. The amount of time was coded as minutes.

b) Amount of non-media activity

The amount of time spent on non-media activities per day was asked to examine a displacement effect of the Internet on non-media activities. In this study, non-media activities were defined as school, homework, commuting, household chores, baby-sitting, sleeping, eating, and grooming. This study encompassed various kinds of activities children may do either at school or at home to examine children's time use comprehensively. Respondents were asked to write down the number of hours and minutes they spent on each non-media activity in open-ended questions. The amount of time was coded as minutes.

c) Amount of physical activity

According to Kientzler (1999), "physical activity" can be defined as "sports (school, club, or recreational), personal fitness activities (aerobics, weight training, rollerblading), and general physical activity (pick up sports activities with friends)." In this study, six different kinds of physical activities, which were abstracted from Kientzler (1999), measured the amount of spent on the physical activities by children. The questions include the following: playing on a school sports team; playing on a club (recreational) sports team; doing physical activity in school; doing physical activity outside school; hanging out by themselves; and hanging out with friends after school. Respondents were asked to write down the number of hours and minutes spent on each physical activity per day. The amount of time was coded as minutes. In addition, respondents wrote down every activity they were currently involved in at least once a

week for 30 minutes (not including physical education class). The activities the respondents wrote were coded as the number of physical activities. For example, when respondents wrote down only one activity such as basketball, it was coded 1, while when respondents wrote none it was coded as 0.

d) Attitudes toward physical activity

To examine the relations between the Internet use and attitudes toward physical activity, the revised Children's Attitudes Toward Physical Activity (CATPA) (Schutz, Smoll, & Wood, 1981) was used. The revised CATPA, which was taken from Simon and Smoll's (1974) inventory, was proven to be superior and more suitable for children because of its reduced length and the improved internal reliability between the items (Schutz, Smoll, & Wood, 1981). The revised CATPA is divided into seven dimensions: a) Social Growth - taking part in physical activities that give you a chance to meet new people b) Social Continuation – taking part in physical activities that give you a chance to be with your friends c) Health & Fitness – taking part in physical activities to make your health better and to get your body in better condition d) Vertigo – taking part in physical activities that could be dangerous because you move very fast and must change direction quickly e) Aesthetic – taking part in physical activities that have beautiful and graceful movements f) Catharsis – taking part in physical activities to reduce stress or to get away from problems you might have g) Ascetic – taking part in physical activities that have long and hard practices you need to give up other things you like to do. Respondents were asked to rate each seven dimensions with using five point bipolar adjectives, including good/bad, of no use/useful, not pleasant/pleasant, nice/awful, and happy/sad.

Five items in each of the seven dimensions were subjected to a promax (oblique) rotated principal component factor analysis to verify the internal reliability between the items. For the "social growth" dimension, one factor was extracted from five items. This factor had explanation of 68.3% of total variance with an eigenvalue of 3.42. The Cronbach's alpha reliability coefficient of five items was .88. For the "social continuation" dimension, one component was extracted from five items. The factor explained 65% of total variance with an eigenvalue of 3.25. The Cronbach's alpha reliability coefficient of five items was .85. For the "health & fitness," one factor was extracted, which had explanation of 71.1% of total variance with an eigenvalue of 3.56. The Cronbach's alpha reliability coefficient among the five items was .89. One factor was extracted from five items for the "vertigo" dimension, which had an explanation of 84.8% of total variance with an eigenvalue of 4.24. The Cronbach's alpha reliability coefficient of five items was .95. Also, one factor was extracted from the items for the "aesthetic" dimension with an explanation of 85.2% of total variance and an eigenvalue of 4.26. The Cronbach's alpha reliability coefficient of items was .96. For the "catharsis" dimension, one factor was extracted with an explanation of 79.3% of total variance and an eigenvalue of 3.96. The Cronbach's alpha reliability coefficient of items was .93. For the "ascetic" dimension, also one factor was extracted with an explanation of 76.4% of total variance and an eigenvalue of 3.82. The Cronbach's alpha reliability coefficient of items was .92. Thus, the items for each dimension of the attitudes toward physical activity were proven to be reliable.

The scores on the five items for each sub-dimension were summed to examine the relationship between the amount of the Internet use and the children's attitudes toward

physical activities. Possible range of scores for each dimension was 5 to 25. The highest score indicated positive attitudes toward the physical activity.

e) Social involvement

Social involvement was assessed as the amount of time spent on four activities per month, including "attending community events," "attending concerts," "attending church," and "volunteer work." Respondents were given five choices ("none" = 0, "once" = 1, "twice" = 2, "3 times" = 3, "4 times or more" = 4) for how often they participate in each activity per month. This variable was used to explore the relationship between the children's Internet use and the participation in the social events.

f) Face-to-face interaction with family and friends

Children's face-to-face interaction with family members and friends may or may not decline as time spent on the Internet increases. This variable was used to assess the relationship between Internet use and children's interaction with people. To measure children's face-to-face interaction with family members, the amount of time spent with family face-to-face was measured. Respondents were asked how often they talk with their parents and siblings per day and given five choices coded as the following: "not at all" = 1, "rarely" = 2, "sometimes" = 3, "often" = 4, "very often" = 5. For relations with friends, respondents were asked how many friends they regularly see and talk to on a face-to-face basis (not including family members). Also, five choices were given to the respondents, which were from none to 5 or more, and coded as the number of friends.

g) Social relations

To explain the relationship between Internet use and children's social relations, three items were extracted from Mesch's (2001) study to measure social relations with

friends: "It is important for me to spend time with friends"; "I have had close friends for a long time"; "My friends are willing to listen to my problems" Respondents were asked to answer by Likert scale from "strongly disagree" to "strongly agree," which was coded from 1 to 5. 1 indicated a low level of social relations while 5 indicated a high level of social relations. Three items were subjected to promax (oblique) rotated principal components factor analysis and one factor was extracted. The factor explained 56.1% of total variance with an eigenvalue of 1.68. The Cronbach's alpha reliability coefficient among the items was .60. A composite variable was created with possible low score of 3 to high score 15.

h) Pro-social attitudes

Three items from Mesch (2001) assessed pro-social attitudes: "It is important to help others"; "It is important to understand others"; "It is important to contribute to society" Respondents were asked to answer with a Likert scale that ranged from "strongly disagree" to "strongly agree," which was coded from 1 to 5. 1 indicated low level of pro-social attitudes whereas 5 mean high level of pro-social attitudes. Three items were subjected to promax (oblique) rotated principal components factor analysis and one factor was extracted. The factor had an explanation of 74.5% of total variance with an eigenvalue of 2.24. The Cronbach's alpha reliability was .82. A composite variable was created with possible low score of 3 to high score 15. Children's pro-social attitudes were assessed to explore whether children's Internet use had any effect on children's social attitudes.

i) Loneliness

If children's Internet use influences their psychological well-being has been a controversial issue among researchers. Children's loneliness was measured to examine this relationship. To measure children's loneliness, Asher's scale was used. Asher, Hymel and Renshaw (1984) developed 16 items of a loneliness measure and assessed the reliability of the scale. In surveying about 500 children in 3rd through 6^{th} grade, they found the measure was internally consistent and reliable. They concluded that the scale they had developed was reliable in measuring children's feelings of loneliness and social dissatisfaction. The findings also indicated that children who were unpopular were more likely to feel loneliness.

Sixteen questions were asked to measure children's loneliness. The questions included, a) It is easy for me to make new friends at school; b) I have nobody to talk to in class; c) I'm good at working with other children in my class; d) It's hard for me to make friends at school; e) I have lots of friends in my class; f) I feel alone at school; g) I can find a friend in my class when I need one; h) It's hard to get kids in school to like me; I) I don't have anyone to play with at school; j) I get along with my classmates; k) I feel left out of things at school; l) There's no other kids I can go to when I need help in school; m) I don't get along with other children in school; n) I'm lonely at school; o) I am well liked by the kids at school; p) I don't have any friends in class.

Respondents were asked to rate each of the items by indicating how much the statement was true for them. The answer was coded as: "always true" = 1, "true most of the time" = 2, "sometimes true" = 3, "hardly ever true" = 4, "not true at all" = 5. Several items, such as b) I have nobody to talk to in class, d) It's hard for me to make friends at

school, f) I feel alone at school, h) It's hard to get kids in school to like me, i) I don't have anyone to play with at school, k) I feel left out of things at school, l) There's no other kids I can go to when I need help in school, m) I don't get along with other children in school, n) I'm lonely at school, and p) I don't have any friends in class were recoded. High score indicates the high level of loneliness.

All 16 items were subjected to promax (oblique) rotated principal components factor analysis to create a composite scale. Only nine items (d, e, f, h, i, k, l, n, p) loaded on one factor. Factor analysis was performed for these nine items and explained 51.1% of total variance with an eigenvalue of 4.60. The Cronbach's alpha reliability coefficient among the nine items was .87. A composite scale was created with those nine items indicating children's loneliness. A possible score ranged from 9 to 45. The highest number indicated the highest loneliness.

j) Obesity

The influence of television on children's obesity has been studied among many pediatricians (e.g., Dietz & Gortmaker, 1985; Durant & Baranowski, 1994; Robinson et al., 1993). However, few researches have examined the impact of the Internet on children's obesity. Children's obesity was measured to see the relationship with their Internet use. In this study, obesity was defined by the Body Mass Index (BMI), which was calculated by the ratio of weight (kg) / height (m^2). BMI was calculated by the body mass index BMI calculator.[6] A body mass index of 25 or more is considered as "overweight" while 30 or more is considered as "obese" for adults. For children, using the charts of Body-Mass-Index for Age, BMI of greater than the 85th percentile is

[6] BMI calculator can be found at http://www.halls.md/body-mass-index/overweight.htm

considered as "overweight," while the 95th percentile is considered as "obese."[7] According to boys BMI-for-age charts, BMI index of 18 or more, 18.6 or more, 19.4 or more, 20.2 or more, 21 or more, 21.8 or more, 22.6 or more 23.4 or more, 24.2 or more is considered as "overweight" for 8 through 15 years old boys, respectively. For girls, BMI index of 18.2 or more, 19 or more, 20 or more, 20.8 or more, 21.6 or more, 22.8 or more, 23.4 or more, 24 or more, 24.6 or more is considered as "overweight" for 8 through 16 years old respectively.

[7] This is current definition of overweight using body mass index that is used by Center for Disease Control (CDC) and World Health Organization (WHO).

CHAPTER 4

RESULTS

Sample Description[8]

Respondents consisted of 105 boys (35.4%) and 184 girls (62 %). Eight children did not provide their gender. About 80% of respondents attend public school. The range of age among respondents was 8 through 16 years old (M = 11.67, SD = 1.63). The majority of respondents were aged from 9 through 14. About 70% of children reported that they lived with both parents while 4% of children said they lived with others (e.g. grandparents). 19.5 % of children lived with mother while 4.7% of children lived with father[9].

Children's Media Activity

Research question 1-1 was interested in the general characteristics of children's media use, such as watching television, reading newspaper, listening to radio, playing video games, reading books and using the Internet. The amount of time spent on each of these media activities per day by children is described in Table 4.2. Over half of children watched television about 2 hours and 30 minutes per day (M = 168.33, SD = 108.1) while over 70% of children did not read a newspaper at all (M = 7.7, SD = 21.37). About half of the children listened to radio over an hour per day (M = 131.01, SD = 204.39). Fifty eight percent of children reported that they played video game over 30 minutes a day while

[8] See Table 4.1.

34% of them did not play at all (M = 53.19, SD = 74.8). About half of children read books for an hour or more per day (M = 61.76, SD = 80.23). Thus, it is apparent that children in this sample are heavy media users with a total of approximately eight hours of combined media exposure per day.

In this study, the home media environment was defined as the amount of media equipment at home. Table 4.3 shows these results. About 74% of homes owned three or more TV sets (M = 3.07, SD = .95). About 22% of homes had two or more online accessible computers (M = 1.08, SD = .83). To assess the relationship between the home media environment and the amount of time spent on each media activity, Pearson correlations were performed (Table 4.4). The amount of television watching was negatively associated with the number of computers in home (p< .05) while positively correlated with the number of newspapers in the home (p< .05). However, the amount of television watching was not associated with the number of online access computers. The amount of video game playing was positively associated with the number of video game players (p< .05). The amount of Internet use by the child at home had a positive correlation with the number of television sets (p< .05), computers (p< .01), online accessible computers (p< .001), DVD players (p< .01), and video game players (p< .01).

Research question 1-2 addressed the general characteristics of children's Internet use, and general perception about the credibility of the Internet and the effect of the Internet on their time use. It also addressed how the perception of the Internet effect on time use is different in terms of age, gender, and Internet experience. Table 4.2 shows the

[9] According to U.S. Census Bureau, about 68% of American children lived with two parents, which was declined from 77% in 1980 (Retrieved March, 27, 2003, from http://www.co.missoula.mt.us/measures/children.htm)

children's amount of Internet use, with Internet use at school and Internet use at home, reported separately. About 44% of children said they did not use the Internet at school at all. Mean of the amount of Internet use at school was 21.6 minutes (SD = 31.23). Children used the Internet more at home than school. About half of children spent 30 minutes or over daily with Internet at home (M = 56.39, SD = 87.01). Table 4.5 indicates how often children do various types of online activities on the Internet. The major online activity by children was surfing the web for fun, followed by research for schoolwork, playing games, e-mail, instant messaging, downloading music files, information about entertainment, information about sports, information about hobbies, shopping, checking news, chatting room, and bulletin board.

Table 4.6 shows the children's general perception about the effect of the Internet on their time use. Children generally perceived that the Internet had some negative impact on other young kids but not themselves. The mean for every item for effect on other young kids was between 2 (a little) to 3 (some) whereas mean for every item for effect on themselves was between 1 (not at all) to 2 (a little). This suggests a possible third-person effect, which hypothesizes that people tend to believe that mass communication messages have little effect on people like you and me, but that other people are likely to be influenced a lot (Davison, 1983; Severin & Tankard, 1997). A t-test was used to examine the mean difference of the perception about the effect of the Internet on children's time use by demographics and Internet experience (Table 4.7). There was no difference of the perception about the effect of the Internet on children's time use between genders. However, there was a difference between younger children (M = 8.67) and older children (M = 9.42) for the effect of the Internet on other young kids'

time use. Also, there was a difference between younger child (M = 5.81) and older child (M = 6.38) for their own time use. Older children perceived the Internet as a more harmful medium both for other young kids and themselves. Children with less experience (M = 9.43) on the Internet thought that Internet might keep young people from doing more important things, spending time with friends and families, and lead to dangerous or harmful things than children with more experience (M = 8.65). However, there was no mean difference in the perceived effect of the Internet on their time use by their Internet experience.

Table 4.8 shows the children's general perception of Internet credibility. They reported scores a little higher than neutral for "believability" (M = 3.53), "accuracy" (M = 3.62), "trustworthiness" (M = 3.24), "completeness" (M = 3.56), and a little lower than neutral for "bias" (M = 2.88). This indicates that children in the sample perceive the Internet as relatively believable, accurate, trustworthy, complete, and slightly biased.

Research question 1-3 asked that how Internet use by children was different in terms of the home media environment, Internet access, Internet experience and age. Multiple regression analysis was performed to examine which variable predicted children's Internet use. The results revealed that all four variables had predictive power for the amount of the Internet use at home (Table 4.9). The number of online accessible computers at home was positively correlated with the amount of the Internet use at home ($p < .05$). The ownership of an Internet accessible computer by the child positively predicted the amount of Internet use ($p < .05$). Also, both Internet experience ($p < .01$) and age ($p < .05$) were positively associated with the amount of Internet use. Thus, the

older child who has a lot of experience with Internet may use the Internet more than the younger child who has less experience.

Hypothesis 1-1 stated that children who own their own Internet accessible computer would spend more time on the Internet than children who don't. Table 4.10 shows the t-test for the amount of Internet use at home by Internet access, Internet experience, and age. A t-test was used to test children's amount of Internet use by the ownership of an Internet accessible computer. Findings revealed that children who owned an online accessible computer spent more time on the Internet than children who didn't (owner: $M = 104.73$, non-owner: $M = 33.15$). Thus, the hypothesis that children who own their online accessible computer will spend more time on the Internet than children who don't was supported.

Hypothesis 1-2 stated that children who have more experience with the Internet would spend more time on the Internet. A t-test was performed to test children's amount of Internet use by Internet experience. Findings suggested that children with much experience spent more time with the Internet than children with less experience (much experience: $M = 83.14$, less experience: $M = 31.92$). Thus, the hypothesis that children who have more experience with the Internet would spend more time on the Internet was supported.

Hypothesis 1-3 stated that older children would use more Internet than younger children. T-test was used to test children's amount of the Internet use by age. Findings revealed that older children spent more time on the Internet than younger children (older children: $M = 65.68$, younger children: $M = 46.1$). Thus, the hypothesis that older children would spend more time on the Internet than younger children was supported.

Research question 1-4 was concerned whether the amount of Internet use by children was different by gender. A *t*-test was performed to test the mean difference between genders on the children's amount of Internet use. The findings showed no significant difference. To examine the question more precisely, t-tests were performed for the types of the Internet use by gender (Table 4.11). Although, there was no difference in the total amount of Internet use by gender, it was found that some online activities differed between genders. Findings show that girls spent more time on the Internet for e-mail, instant messaging, chatting room, and shopping than boys. Boys used the Internet more for playing games, information about sports, and information about hobbies than girls.

Children's Non-Media Activity

Research question 2 asked that how much time children spend on non-media activities, such as school, eating, sleeping, commuting, physical activities and social involvement. Table 4.12 describes the amount of time spent on each activity by children per day. The majority of children's time was spent by sleeping and school followed by hanging out with friends after school, hanging out alone, doing own physical activity outside school, eating, homework, grooming, doing own physical activity in school, house chores, club sports team, school sports team, and baby sitting. Respondents were asked to estimate how often they attend social events per month. The findings (Table 4.13) revealed that about half of children attended community events one or more times per month while about 46% of children did not attend community events at all. Of the sample, about 63% said that they did not attend concerts at all while about half of children attended church 4 times or more per month. About 44% of respondents said they

attended volunteer work one or more times per month while about 56% said they did not attend at all. Regarding face-to-face communication with family members (Table 4.14), about 72% of the respondents said they talked with parents face-to-face "often" or "very often" while about 8% did not talk or rarely talked with parents. About 60% of children said they talked with siblings face-to-face "often" or "very often" while about 20% of them did not talk or rarely talked with siblings.

Displacement of Existing Media

Research question 3 asked if Internet use displaced the existing media, including television viewing, newspaper reading, radio listening, video game playing, and book reading. Partial correlation between the amount of Internet use at home and the amount of other media use was performed controlling for age, gender, and Internet experience (Table 4.15). The variables were controlled one at a time. Results indicate a positive relationship between the amount of Internet use and the amount of television watching ($p < .001$), radio listening ($p < .001$), video game playing ($p < .01$), book reading ($p <. 000$), and Internet using at school ($p < .001$). Newspaper reading was not associated with the Internet use.

Hypothesis 3-1 stated children who are heavy Internet user are more likely to spend less time with traditional media than those who are light users. T-test was performed to test the difference of the amount of existing media use among low/high groups for Internet use. The findings indicated that there was no difference between Internet use groups in terms of television watching, newspaper reading, radio listening, and video game playing. However, a significant difference was found between Internet use groups for the amount of book reading. Table 4.16 shows that children who use

Internet more (M = 72.40) spent more time on reading books than children who use the Internet less (M = 48.58). Thus, this study found no evidence of a displacement effect.

Hypothesis 3-2 stated that Internet would displace functionally equivalent media. Multiple regression analysis, predicting the amount of existing media use by the types of Internet use, was performed to test the hypothesis (Table 4.17). Of the types of Internet use, nothing predicted the amount of television watching (because of insignificant F value), newspaper reading (insignificant F value), and book reading (no items showed significant correlations). The amount of radio listening was negatively correlated with both Internet use for playing online games ($p < .05$) and Internet use for information for sports ($p < .05$). The amount of video game use was positively associated with Internet use for chatting ($p < .001$) and playing online games ($p < .01$) while negatively associated with Internet use for instant messaging ($p < .01$), research for school ($p < .01$), and online shopping ($p < .05$). Since many online games are for competing with people or provide a chatting room for the players, it seems that video game players are more likely to spend more time using the Internet for online game playing and chatting.

Displacement of Non-Media Activities

Research question 4 asked if the Internet use would displace children's non-media activities including time spent with sleeping and eating. Correlations between the amount of Internet use and the amount of time spent with non-media activities, such as school, homework, commuting, household chores, sleeping, and eating were performed. The findings indicated no relationship between those variables (Table 4.18). Also, t-tests were performed to test the difference of the amount of time spent on each non-media activity between high Internet use group and low Internet use group and no significant difference

was found. To examine the effect of the types of Internet use on the amount of time spent on each non-media activity, multiple regression was performed and no significant results were found (Table 4.19). Thus, this study found no evidence of displacement effect for non-media activities.

Displacement of Physical Activity

Research question 5-1 asked if Internet use displaces children's physical activities. Partial correlation was used to test the relationship between the amount of Internet use and the amount of time spent on physical activities controlling age, gender, and Internet experience (Table 4.20). The variables were controlled one at a time. The amount of Internet use was positively correlated with doing own physical activity in school ($p < .001$), doing own physical activity outside school ($p < .01$), "hanging out" alone ($p < .001$), and "hanging out" with friends after school ($p < .01$). The findings indicate children who spend more time with the Internet spend more time on their own physical activities but not organized sports activities. Table 4.21 shows the multiple regression analysis predicting amount of physical activity by the types of Internet use. Although playing on a school sports team was not associated with the amount of Internet use on the partial correlation analysis, it was positively correlated with Internet use for information for sports ($p < .01$). Also, the amount of time spent doing own physical activity outside school was negatively associated with the Internet use for research for school ($p < .01$). The number of physical activities was positively associated with Internet use for instant messaging ($p < .05$) and information for sports ($p < .01$). Specific types of Internet use were not correlated with the amount of time spent on playing on a club (or

recreational) sports team, doing own physical activity in school, "hanging out" alone, and "hanging out" with friends after school.

Research question 5-2 was interested in the relationship between children's Internet use and the attitudes toward physical activity. Partial correlation was performed between the amount of Internet use and attitudes toward physical activity controlling for age, gender, and Internet experience (Table 4.22). The amount of Internet use was negatively associated with "social growth" when controlling gender, while negatively associated with "social growth," "social continuation," and "health & fitness" when controlling Internet experience. This finding indicates that children who spend more time on the Internet are more likely to have negative attitudes on at least some dimensions of physical activity. Multiple regression analysis was performed predicting attitudes toward physical activity by types of Internet use (Table 4.23). Children's attitudes toward physical activity for the "social growth" dimension were positively associated with Internet use for information for sports ($p < .01$). Attitudes toward physical activity for "social continuation" were positively correlated with Internet use for email ($p < .05$) and information for sports ($p < .01$) but negatively associated with Internet use for bulletin board ($p < .001$) and information for hobbies ($p < .01$). Attitudes toward the physical activity for the dimension of "health & fitness" were positively predicted by Internet use for information for sports ($p < .05$). The dimension of "vertigo" was positively correlated with Internet use for instant messaging ($p < .05$) and information for sports ($p < .01$). The "ascetic" dimension was also positively associated with the Internet use for information for sports ($p < .01$). Findings revealed that Internet use for information about sports was a predominant predictor for the attitudes toward physical activity.

Research question 5-3 asked what the relationship is between Internet use and obesity among children. A t-test was performed to test the difference of amount of Internet use between normal and overweight children. No significant result was found. Also, t-test for the other media use found no significant difference between these two groups. Correlation analysis indicated that children's Internet use and obesity was not significantly correlated with each other. However, there was a difference of attitudes toward physical activity for the dimension of "social growth," "social continuation," and "vertigo" between the two groups. Overweight children had less positive attitudes toward the physical activity in these three dimensions (Table 4.24).

Displacement of Social Involvements and Social Relations

Research question 6-1 asked if Internet use displaces children's social involvement. Partial correlation was performed between the amount of Internet use and social involvement controlling for age, gender, and Internet experience (Table 4.25). The variables were controlled one at a time. The findings revealed a positive relationship between the amount of Internet use and attending community events ($p < .01$), attending concerts ($p < .01$), and volunteer work ($p < .01$). The more children use the Internet, the more children participate in the social events. Multiple regression analysis was performed to investigate which types of Internet use predicted children's social involvement (Table 4.26). Results indicated that children's Internet use for communication was positively related to attending community events ($p < .01$), attending concerts ($p < .001$), and doing volunteer work ($p < .05$). Children's Internet uses for information and entertainment were not associated with social involvement. This suggests that children who use the Internet

for communication are more likely to participate in social events than children who use the Internet for information or entertainment.

Research question 6-2 asked if Internet use displaces children's face-to-face interaction with family members and friends. Partial correlation controlling age, gender and Internet experience was used to examine the relationship between the amount of Internet use and face-to-face interaction with family members and friends (Table 4.27). The variables were controlled one at a time. When controlling age and Internet experience, the amount of Internet use was not associated with face-to-face interaction with parents, siblings, and friends. However, when controlling gender, the amount of Internet use was negatively associated with face-to-face interaction with siblings. The more Internet use, the less face-to-face interaction with siblings.

In addition, multiple regression analysis for predicting face-to-face interaction with family members and friends by the type of Internet use was performed (Table 4.28). The findings show that Internet use for communication was negatively associated with face-to-face interaction with siblings ($p < .05$) while positively associated with face-to-face interaction with friends ($p < .05$). The results indicates that children who use the Internet for communication had less face-to-face interaction with siblings but apparently had more or closer friends whom they regularly see and talk to on a face-to-face basis. The type of Internet use did not predict the face-to-face interaction with parents.

Research question 6-3 inquired about what the relationship between children's Internet use and their social relations. Research question 6-4 asked about the relationship between children's Internet use and their pro-social attitudes. Partial correlation was performed between the amount of Internet use and social relations and pro-social

attitudes controlling demographics and Internet experience (Table 4.29). The findings revealed no relations between the variables. Table 4.30 shows the multiple regression analysis for predicting social relations and pro-social attitudes by type of Internet use. The findings revealed that the Internet use for communication was positively associated with social relations ($p < .01$), which indicates that children's Internet use for communication positively predicted children's view of social relations. Since the items that measured social relations were mainly for social relations with friends, children who use the Internet for communication seem to have more positive view of social relations with friends. On the other hand, the pro-social attitudes variable was positively correlated with the Internet use for information ($p < .01$) and negatively correlated with the Internet use for entertainment ($p < .05$). This suggests that children who use the Internet for information are more likely to place more importance on helping others while children who use the Internet for entertainment are more likely to place less importance on helping others.

Internet Use and Loneliness

Research question 7 asked about the relationship between children's Internet use and their loneliness. A t-test was performed to investigate the difference of loneliness scores for high and low Internet use groups (Table 4.31). The findings show that children who spend less time with the Internet felt lonelier than children who use the Internet a lot. The mean of the loneliness score for low Internet user group was 15.24 ($SD = 6.85$) while mean for high Internet use group was 13.65 ($SD = 5.49$). In addition, multiple regression analysis was performed to examine the types of Internet use for predicting loneliness. No specific types of Internet use predicted loneliness.

Table 4.1. Demographic Data

Items	Frequency (%)
Age	
8 years old	2 (.7)
9	21 (7.1)
10	53 (17.8)
11	65 (21.9)
12	57 (19.2)
13	48 (16.2)
14	28 (9.4)
15	13 (4.4)
16	1 (.3)
Missing	9 (3.0)
Gender	
Boy	105 (35.4)
Girl	184 (62.0)
Missing	8 (2.7)
Whom they live with	
Both parents	205 (69.0)
Mother	58 (19.5)
Father	14 (4.7)
Other	12 (4.0)
Missing	8 (2.7)
School system	
Public	238 (80.1)
Private	59 (19.9)

Table 4.2. Amount of Time Spent on Media Activities per Day

Items	N	Mean (minutes)	SD
Television	290	168.33	108.10
Newspaper	295	7.70	21.37
Radio	290	131.01	204.39
Video game	293	53.19	74.80
Books	291	61.76	80.23
Internet at school	291	21.60	31.23
Internet at home	293	56.39	87.01

Table 4.3. Home Media Environment

Items	N	Mean	SD
Television	294	3.07	.95
Computer at home	294	1.43	.91
Online access computer	295	1.08	.83
VCRs	295	2.19	1.09
DVDs	296	1.09	.99
Newspaper	291	.86	1.02
Video game player	295	1.90	1.28

Note. Home media environment is defined as the number of media equipment in home.

Table 4.4. Pearson's Correlations between Amount of Media Activities and Home Media Environment (N = 297)

	Internet use at home	TV watching	Newspaper reading	Videogame playing	Book reading
# of television set	.12*	.01	-.09	.10	.01
# of computers at home	.24**	-.14*	-.03	-.03	.05
# of on-line access computers at home	.31***	-.11	-.02	-.07	.08
# of VCRs	.09	-.02	-.08	.01	.08
# of DVDs	.17**	-.08	-.04	.07	.03
# of Newspapers	.11	.13*	.06	.12	.05
# of Video game players	.17**	.10	-.04	.32*	.05

Note. * $p < .05$
** $p < .01$
*** $p < .001$

Table 4.5. Means of Types of Internet Use

Internet use for	N	Mean	SD
Surfing the web	293	3.18	1.51
Research for school works	290	3.17	1.23
Playing games	294	3.04	1.42
E-mail	294	2.67	1.55
Instant messaging	291	2.32	1.59
Downloading music files	291	2.30	1.53
Information about entertainment	294	2.21	1.32
Information about sports	295	2.15	1.36
Information about hobbies	293	2.08	1.25
Shopping	292	1.90	1.35
Checking news	287	1.88	1.14
Chatting room	292	1.86	1.36
Bulletin board	290	1.55	1.06

Note. Subjects were asked to check how often they do each activity on the Internet on the scale: “never” = 1, “rarely” = 2, “sometimes” = 3, “often” = 4, “very often” = 5. The higher the mean, the more the frequency of doing each activity.

Table 4.6. Perception of the Effects of the Internet on Time Use

Items	N	Mean	SD
Keeps young people from doing more important things	295	2.29	.92
Leads young people to do dangerous or harmful things	294	2.05	1.04
Takes away from the time young people spend with their friends	294	2.19	1.02
Takes away from the time young people spend with their families	295	2.52	1.08
Keeps me from doing more important things	295	1.74	.88
Leads me to do dangerous or harmful things	294	1.14	.47
Takes away from the time I spend with my friends	295	1.51	.85
Takes away from the time I spend with my families	295	1.72	.97

Note. The higher the mean, the more concern about the effects of the Internet on time use. Subjects were asked to check on a scale: "not at all" = 1, "only a little" = 2, "some" = 3, "a lot" = 4 on each items.

Table 4.7. *t*-test for the Perception of the Effects of the Internet Use on Time Use by Age and Internet Experience

Items	Groups (N)	Mean	SD	t	Sig
<u>For other young kids</u>					
Age	Young (140)	8.67	3.00	-2.04	P < .05
	Old (150)	9.42	3.24		
Internet experience	Low (151)	9.43	3.08	2.11	P < .05
	High (139)	8.65	3.17		
<u>For themselves</u>					
Age	Young (139)	5.81	2.16	-2.01	P < .05
	Old (154)	6.38	2.59		
Internet experience	Low (152)	6.11	2.60	.02	P > .05
	High (141)	6.11	2.18		

Note. The higher the mean, the more concern about the effects of the Internet on time use. Children were divided into two groups by the means of age (M = 11.67) and means of Internet experience (M = 18.59).

Table 4.8. Perception of the Internet Credibility

Items	N	Mean	SD
Believability	278	3.53	1.03
Accuracy	266	3.62	1.00
Trustworthiness	266	3.24	1.06
Bias	256	2.88	.95
Completeness	265	3.56	1.06

Note. The higher the mean, the higher the perception of the Internet credibility. Subjects were asked to rate the credibility of the Internet on 5-point scale for each item.

Table 4.9. Multiple Regressions for Predicting the Amount of Internet Use at Home

Items	Internet use at home (ß)	t
# of online access computer	.18*	2.31
Internet access	.19*	12.36
Internet experience	.20**	3.02
Age	.14*	2.04
R^2	.21	
AR^2	.19	
F	12.37***	
Df	4, 193	

* p < .05
** p < . 01
*** p < .001

Note. The numbers in Internet use column are standardized coefficient betas. Internet access indicates the ownership of the online accessible computer by child.
There is a moderate multicollinearity between the number of online access computer and Internet access (see Appendix A.)

Table 4.10. *t*-test for the Amount of Internet Use at Home by Internet Access, Internet Experience, and Age

Items	Groups (N)	Mean	SD	t	Sig
Internet access	Non-owner (113)	33.15	61.07	-5.56	p < .001
	Owner (92)	104.73	119.13		
Internet experience	Less experience (153)	31.92	59.63	-5.26	p < .001
	Much experience (140)	83.14	103.12		
Age	Younger children (139)	46.10	66.43	-1.93	p < .05
	Older children (154)	65.68	101.41		

Note. The numbers in Mean column are shown in minutes. The higher the mean, the more the amount of time spent on the Internet at home. Children were divided into two groups by the means of age (*M* = 11.67) and means of Internet experience (M = 18.59). Internet access indicates the ownership of the online accessible computer by child.

Table 4.11. *t*-test for the Types of the Internet Use by Gender

Internet use for	Groups (N)	Mean	SD	t	Sig
E-mail	Boy (103)	2.28	1.35	-3.34	P < .01
	Girl (183)	2.91	1.61		
Instant messaging	Boy (104)	2.02	1.41	-2.48	P < .05
	Girl (180)	2.50	1.66		
Chatting room	Boy (104)	1.61	1.18	-2.48	P < .05
	Girl (180)	2.02	1.44		
Playing games	Boy (103)	3.41	1.36	3.31	P < .01
	Girl (183)	2.84	1.42		
Information about sports	Boy (104)	2.62	1.49	4.41	P < .001
	Girl (183)	1.90	1.21		
Information about hobbies	Boy (104)	2.35	1.33	2.78	P < .01
	Girl (181)	1.92	1.18		
Shopping	Boy (102)	1.64	1.13	-2.38	P < .05
	Girl (182)	2.03	1.42		

Note. Subjects were asked to check how often they do each activity on the Internet on the scale: “never” = 1, “rarely” = 2, “sometimes” = 3, “often” = 4, “very often” = 5. The higher the mean, the more the frequency of doing each activity.

Table 4.12. Description of Amount of Time Spent on Non-Media Activities per Day

Items	N	Mean	SD
Sleeping	286	501.63	127.73
School	290	437.07	93.10
Hanging out with friend after school	289	114.47	165.73
Hanging out alone	286	107.80	143.78
Own physical activity outside school	292	70.97	63.85
Eating	290	70.88	69.01
Homework	292	70.43	43.58
Commuting	267	62.19	87.03
Grooming	284	46.26	52.31
Own physical activity in school	292	40.21	57.14
House chores	291	39.48	41.62
Club (Rec.) sports team	287	32.31	69.67
School sports team	291	29.12	64.06
Baby sitting	290	29.09	73.59

Note. The numbers in Mean column are shown in minutes

Table 4.13. Frequency (%) of Attending Social Events per Month

	None	Once	Twice	Three times	Four or more
Community events	139 (46.8)	92 (31.0)	31 (10.4)	16 (5.4)	14 (4.7)
Concerts	189 (63.6)	63 (21.2)	16 (5.4)	5 (1.7)	8 (2.7)
Church	52 (17.5)	31 (10.4)	35 (11.8)	26 (8.8)	142 (47.8)
Volunteer works	167 (56.2)	57 (19.2)	29 (9.8)	13 (4.4)	23 (7.7)

Note. Subjects were asked to check how much they attend each event per month on scale: "none" = 0, "once" = 1, "twice" = 2, "3 times" = 3, "4 times or more" = 4.

Table 4.14. Frequency (%) of Face-to-Face Interaction with Family per Day

	Not at all	Rarely	Sometimes	Often	Very often
With parents	7 (2.4)	17 (5.7)	56 (18.9)	88 (29.6)	126 (42.4)
With siblings	24 (8.1)	34 (11.4)	49 (16.5)	82 (27.6)	98 (33.0)

Note. Subjects were asked to check how often they talk with parents/siblings face-to-face per day.

Table 4.15. Partial Correlation between the Amount of Internet Use at Home and the Amount of Other Media Use Controlling for Demographics and Internet Experience

Items	Age	Gender	Internet experience
Television	.24***	.24***	.24***
Newspaper	.11	.12	.11
Radio	.23***	.23***	.24***
Videogame	.19**	.21**	.20**
Book	.49***	.49***	.47***
Internet use at school	.25***	.24***	.28***

* p < .05
** p < . 01
*** p < .001

Note. The variables were controlled one at a time. The same results were found when controlling age, gender, and Internet experience simultaneously.

Table 4.16. *t*-test for the Amount of Book Reading by Internet Use Group

Internet use group	Groups (N)	Mean	SD	t	Sig
Low Internet use	130	48.58	41.33	-2.54	P <.05
High Internet use	161	72.40	100.17		

Note. Children were divided into two groups (low/high Internet use) by the mean of the amount of Internet use. The numbers in Mean column are shown in minutes of book reading.

Table 4.17. Multiple Regressions Predicting the Amount of Other Media Use by the Types of Internet Use (N = 297)

Predictor variables	Television β (*t*)	Newspaper β (*t*)	Radio β (*t*)	Video game β (*t*)	Book β (*t*)
Internet use for					
E-mail	-.11 (-1.15)	.04 (.43)	.12 (1.33)	-.03 (-.31)	.14 (1.49)
Instant messaging	-.08 (-.80)	.00 (.001)	-.04 (-.38)	-.25** (-2.72)	.08 (.82)
Checking news	.01 (.14)	.16* (2.17)	-.08 (-1.03)	.07 (1.02)	.01 (.20)
Research for school works	-.10 (-1.42)	-.10 (-1.44)	-.02 (-.24)	-.21** (-3.36)	.11 (1.62)
Chatting room	.06 (.70)	.01 (.17)	.09 (1.05)	.31*** (4.04)	.07 (.87)
Bulletin board	.04 (.57)	-.01 (-.07)	.05 (.58)	-.07 (-.90)	-.07 (-.83)
Playing game	-.01 (-.16)	-.08 (-1.05)	-.19* (-2.50)	.21** (2.95)	-.07 (-.96)
Web surfing	-.05 (-.51)	-.01 (-.06)	-.02 (-.27)	-.02 (-.28)	.05 (.54)
Information for entertainment	.18* (2.16)	.04 (.42)	.03 (.33)	.002 (.02)	.13 (1.56)
Information for sports	.05 (.56)	.16* (1.97)	-.16* (-2.03)	.10 (1.32)	-.01 (-.16)
Information for hobbies	.01 (.13)	-.03 (.39)	.14 (1.73)	.11 (1.37)	-.04 (-.52)
Information for shopping	-.01 (-.17)	.04 (.61)	-.03 (-.48)	-.14* (-2.06)	-.02 (-.25)
Downloading music files	.03 (.41)	-.02 (-.29)	.19 (1.42)	.06 (.78)	-.05 (-.71)
R^2	.05	.06	.09	.19	.09
AR^2	.004	.01	.04	.15	.04
F	1.08	1.29	1.92*	4.62***	1.86*
Df	13, 259	13, 263	13, 259	13, 262	13, 259

* p < .05
** p < . 01
*** p < .001

Note. Subjects were asked to check how often they do each activity on the Internet on scale: "never" = 1, "rarely" = 2, "sometimes" = 3, "often" = 4, "very often" = 5. The numbers for β are standardized coefficient betas. There is moderate multicollinearity between Internet use for e-mail and instant messaging (See Appendix B)

Table 4.18. Pearson Correlations between the Amount of Internet Use and Non-media Activities (N = 297)

	1	2	3	4	5	6	7
1. Internet use	1.00	.07	.10	.12	.03	-.06	.09
2. School		1.00	-.06	.12*	.01	.10	.01
3. Homework			1.00	.09	.04	-.14*	-.01
4. Commuting				1.00	.28***	-.03	.15*
5. House chores					1.00	-.05	.02
6. Sleeping						1.00	-.14*
7. Eating							1.00

* p < .05
** * p < .001

Table 4. 19. Multiple Regressions Predicting the Amount of Non-media Activities by Types of Internet Use

Predictor variables	School ? (t)	Homework ? (t)	Commuting ? (t)	House chores ß (t)	Sleeping ? (t)	Eating ? (t)
Internet use for						
E-mail	.06(.68)	.08(.87)	.01(.14)	-.01(-.13)	.01(.99)	.03(.26)
Instant messaging	-.02(-.20)	.04(.40)	.20*(1.98)	-.01(-.13)	-.01(-.08)	-.04(-.37)
Checking news	-.03(-.33)	.01(.09)	-.01(-.16)	.02(.28)	-.02(-.22)	.05(.71)
Research for schoolwork	-.13 (-1.78)	.14(2.0)	.10(1.36)	.07(1.03)	-.11 (-1.52)	-.03(-.37)
Chatting room	.08(1.01)	-.01(-.15)	-.002(-.02)	-.06(-.70)	-.12(-1.43)	-.06(-.65)
Bulletin board	.002(.03)	-.16(-2.03)	-.04(-.42)	.01(.16)	.01(.11)	.07(.80)
Playing game	-.01(-.09)	-.05(-.67)	.03(.37)	.01(.15)	.07(.90)	.06(.73)
Web surfing	-.01(-1.5)	-.09(-.99)	-.11(-1.20)	.05(.58)	.05(.55)	.03(.30)
Information for entertainment	.04(.47)	-.13(-1.57)	.14(1.62)	-.06(-.30)	.02(.19)	.02(.25)
Information for sports	.02(.29)	.01(.12)	-.09(-1.12)	-.13(-1.63)	.02(.19)	.03(.32)
Information for hobbies	.01(.12)	.09(1.03)	.02(.28)	-.02(-.21)	-.07(-.84)	-.07(-.77)
Information for shopping	.001(.01)	.16(.83)	-.15(-1.93)	-.10(-1.34)	.02(.21)	.01(.14)
Downloading music files	.04(.53)	.003(.04)	.11(1.38)	.22** (2.78)	.02(.26)	-.03(-.40)
R^2	.03	.07	.09	.05	.03	.02
AR^2	-.02	.02	.03	.002	-.02	-.04
F	.58	1.46	1.62	1.05	.61	.30
df	13,260	13,260	13,240	13,259	13,255	13,258

* p < .05
** p < .01

Note. Subjects were asked to check how often they do each activity on the Internet on scale: "never" = 1, "rarely" = 2, "sometimes" = 3, "often" = 4, "very often" = 5. The numbers for β are standardized coefficient betas. There is moderate multicollinearity between Internet use for e-mail and instant messaging (See Appendix B)

Table 4.20. Partial Correlation between the Amount of Internet Use and the Amount of Physical Activity Controlling for Demographics and Internet Experience (N = 297)

Amount of physical activity	Age	Gender	Internet experience
Playing on a school sports team	.04	.07	.06
Playing on a club (Rec.) sports team	.12	.12	.10
Doing own physical activity in school	.23***	.23***	.23***
Doing own physical activity outside school	.17**	.17**	.13*
Hanging out alone	.29***	.28***	.29***
Hanging out with friends after school	.21**	.21**	.22***
# of physical activities	.11	.12	.07

* $p < .05$
** $p < .01$
*** $p < .001$

Note. The variables were controlled one at a time. The same results were found when controlling age, gender, and Internet experience simultaneously. # of physical activities was measured by how many physical activities subjects were currently involved at least once a week for 30 minutes.

Table 4.21. Multiple Regressions Predicting the Amount of Physical Activity by Types of Internet Use (N = 297)

Predictor variables	School sports team β(t)	Own physical activity outside school β(t)	# of physical activity β(t)
Internet use for			
E-mail	-.16 (-1.78)	-.06 (-.69)	-.08 (-.89)
Instant messaging	.17 (1.75)	.11 (1.11)	.21* (2.11)
Checking news	-.06 (-.76)	.04 (.54)	-.07 (-.96)
Research for school works	.10 (1.39)	-.19** (-2.85)	.13 (1.93)
Chatting room	-.03 (-.39)	-.01 (-.18)	-.13 (-1.57)
Bulletin board	.13 (1.57)	.10 (1.27)	.11 (1.39)
Playing game	-.03 (-.33)	.13 (1.67)	-.09 (-1.23)
Web surfing	-.10 (-1.19)	.002 (.02)	.08 (.98)
Information for entertainment	-.05 (-.62)	-.09 (-1.10)	-.10 (-1.18)
Information for sports	.23** (2.90)	.11 (1.34)	.25 **(3.10)
Information for hobbies	-.09 (-1.08)	-.04 (-.54)	-.11 (-1.31)
Information for shopping	.09 (1.24)	-.02 (-.26)	.10 (1.45)
Downloading music files	0.001 (.02)	.16 (2.16)	.02 (.29)
R^2	.10	.11	.13
AR^2	.05	.06	.08
F	2.01*	2.31**	2.68**
df	13, 259	13, 260	13,249

* p < .05
** p < . 01

Note. Subjects were asked to check how often they do each online activity on scale: "never" = 1, "rarely" = 2, "sometimes" = 3, "often" = 4, "very often" = 5. The numbers for β are standardized coefficient betas. # of physical activity was measured by asking what kinds of physical activities subject were currently in at least once a week for 30 minutes. The activities the respondents wrote were coded as the number of physical activities. There is moderate multicollinearity between Internet use for e-mail and instant messaging (See Appendix B)

Table 4. 22. Partial Correlation between Amount of Internet Use and Attitudes toward Physical Activity Controlling Demographics and Internet Experience (N = 297)

Attitudes toward physical activity	Age	Gender	Internet experience	Age, gender, and Internet experience
Social growth	-.07	-.09	-.14*	-.15*
Social continuation	-.12	-.14*	-.19**	-.20**
Health & fitness	-.10	-.11	-.17*	-.17*
Vertigo	.02	.05	.001	.02
Aesthetic	-.0007	-.05	-.01	-.05
Catharsis	-.04	-.03	-.07	-.08
Ascetic	.06	.07	.04	.05

* $p < .05$
* * $p < .01$

Note. The variables were controlled one at a time. The attitudes toward the physical activity have seven sub-dimension: "social growth: how do you feel about taking part in physical activities that give a chance to meet new people," "social continuation: taking part in physical activities that give a chance to be with friends," "health & fitness: taking part in physical activities to make health better and to get body in better condition," "vertigo: taking part in physical activities that could be dangerous because move very fast and must change direction quickly, " "aesthetic: taking part in physical activities that have beautiful and graceful movement," "catharsis: taking part in physical activities to reduce stress or to get away from problems," and "ascetic: taking part in physical activities that have long and hard practices to spend time in practice you needed to give up other things." Subjects were asked to rate each seven dimensions with using five point bipolar adjectives, including good/bad, of no use/useful, not pleasant/pleasant, nice/awful, and happy/sad.

Table 4.23. Multiple Regressions Predicting Attitudes toward Physical Activity by Types of Internet Use (*N*= 297)

Predictor variables	Social growth β(*t*)	Social continuation β(*t*)	Health & fitness β(*t*)	Vertigo β(*t*)	Ascetic β(*t*)
Internet use for					
E-mail	.06 (.65)	.20* (2.10)	.07 (.72)	-.04 (-.43)	.15 (1.55)
Instant messaging	.14 (1.41)	.06 (.56)	.08 (.75)	.25* (2.36)	.13 (1.30)
Checking news	-.01 (-.17)	.01 (.15)	.14 (1.73)	-.04 (-.54)	-.14 (-1.73)
Research for school works	.06 (.88)	-.01 (-.16)	-.03 (-.46)	-.06 (-.77)	.03 (.33)
Chatting room	-.01 (-.10)	-.01 (-.09)	-.12 (-1.39)	-.14 (-1.62)	-.16 (-1.86)
Bulletin board	-.15 (-1.76)	-.30*** (-3.56)	-.18 (-2.01)	.10 (1.10)	-.04 (-.43)
Playing game	-.07 (-.82)	-.002 (-.02)	-.07 (-.89)	-.03 (-.32)	-.06 (-.75)
Web surfing	.15 (1.75)	.06 (.65)	.03 (.31)	.06 (.63)	-.02 (-.26)
Information for entertainment	-.04 (-.50)	-.06 (-.73)	.02 (.21)	-.08 (-.88)	.04 (.47)
Information for sports	.29** (3.39)	.25** (3.10)	.20* (2.31)	.26** (3.05)	.27** (3.19)
Information for hobbies	-.12 (-1.34)	-.23** (-2.71)	-.02 (-.23)	-.04 (-.42)	-.01 (-.11)
Information for shopping	.01 (.17)	-.02 (-.30)	-.07 (-.91)	-.02 (-.26)	-.08 (-1.06)
Downloading music files	-.15 (-1.84)	.06 (.73)	.09 (1.14)	-.10 (-1.24)	-.01 (-.09)
R^2	.11	.14	.10	.10	.11
AR^2	.05	.08	.04	.04	.05
F	1.98*	2.62**	1.80*	1.81*	1.96*
Df	13, 231	13, 231	13, 229	13, 228	13, 228

Note. * p < .05 ** p < . 01 *** p < .001. Subjects were asked to check how often they do each activity on the Internet on scale: "never" = 1, "rarely" = 2, "sometimes" = 3, "often" = 4, "very often" = 5. The attitudes toward the physical activity have seven sub-dimension: "social growth: how do you feel about taking part in physical activities that give a chance to meet new people," "social continuation: taking part in physical activities that give a chance to be with friends," "health & fitness: taking part in physical activities to make health better and to get body in better condition," "vertigo: taking part in physical activities that could be dangerous because move very fast and must change direction quickly, " "aesthetic: taking part in physical activities that have beautiful and graceful movement," "catharsis: taking part in physical activities to reduce stress or to get away from problems," and "ascetic: taking part in physical activities that have long and hard practices to spend time in practice you needed to give up other things." The "aesthetic" and "catharsis" dimension were not associated with any types of Internet use. Subjects were asked to rate each seven dimensions with using five point bipolar adjectives, including good/bad, of no use/useful, not pleasant/pleasant, nice/awful, and happy/sad. The higher number, the more positive attitudes toward the physical activity. The numbers for β are standardized coefficient betas. There is moderate multicollinearity between Internet use for e-mail and instant messaging (See Appendix B)

Table 4.24. *t*-test for the Attitudes toward Physical Activity by Obesity

Attitudes toward the physical activity	Groups (N)	Mean	SD	*t*	Sig
Social growth	Normal (149)	21.54	3.74	3.00	P < .01
	Over weight (69)	19.83	4.26		
Social continuation	Normal (150)	23.53	2.84	2.53	P < .05
	Over weight (68)	22.40	3.54		
Vertigo	Normal (145)	15.46	6.52	2.55	P < .01
	Over weight (66)	13.00	6.44		

Note. Subjects were divided into two groups (normal/overweight) by the Body Mass Index. "Social growth: how do you feel about taking part in physical activities that give you a chance to meet new people," "social continuation: taking part in physical activities that give you a chance to be with your friends," and "vertigo: taking part in physical activities that could be dangerous because you move very fast and must change direction quickly" are among the seven sub-dimensions of attitudes toward the physical activity. Subjects were asked to rate each dimensions with using five point bipolar adjectives, including good/bad, of no use/useful, not pleasant/pleasant, nice/awful, and happy/sad. The higher the mean, the more positive attitudes toward the physical activity.

Table 4.25. Partial Correlation between the Amount of Internet Use and Social Involvement for Controlling Demographics and Internet Experience

Items	Age	Gender	Internet experience
Attending community events	.20**	.21**	.18**
Attending concerts	.18**	.18**	.17**
Attending church	.06	.05	.07
Volunteer works	.17**	.18**	.17**

** p < . 01

Note. Subjects were asked to check how much they attend each event per month on scale: "none" = 0, "once" = 1, "twice" = 2, "3 times" = 3, "4 times or more" = 4. The variables were controlled one at a time. The same results were found when controlling age, gender, and Internet experience simultaneously.

Table 4.26. Multiple Regressions for Predicting Social Involvement by Types of Internet Use (N = 297)

Predictor variables	Community events β(t)	Concerts β(t)	Volunteer works β(t)
Internet use for			
Communication	.22 ** (3.26)	.32*** (4.74)	.16* (2.35)
Information	.08 (1.12)	-.03 (-.41)	.12 (1.58)
Entertainment	-.06 (-.76)	-.06 (-.83)	-.06 (-.76)
R^2	.06	.09	.04
AR^2	.05	.08	.03
F	5.23**	7.90***	3.76*
Df	3, 262	3, 255	3, 262

* p < .05
** p < . 01
*** p < .001

Note. Subjects were asked to check how much they attend each event per month on scale: "none" = 0, "once" = 1, "twice" = 2, "3 times" = 3, "4 times or more" = 4. Types of The composite variables for types of the Internet use were used. Internet use for "communication" includes items of e-mail, instant messaging, chatting room and bulletin board. "Information" consists of such items as checking news, research for schoolwork, information about sports, information about hobbies. "Entertainment" includes items of playing online games, surfing the Web for fun, and information about entertainment. The numbers for β are standardized coefficient betas. There is a moderate multicollinearity between the predictor variables (see Appendix C)

Table 4.27. Partial Correlation between the Amount of Internet Use and Face-to-face Interaction with Family members and Friends Controlling for Demographics (*N* =297)

Items	Age	Gender
With parents	-.08	-.08
With siblings	-.11	-.12*
With friends	.07	.07

* p< .05

Note. Subjects were asked to check how often they talk with parents/siblings face-to-face per day on scale: "not at all" = 1, "rarely" = 2, "sometimes" = 3, "often" = 4, "very often" = 5. For face-to-face interaction with friends, subjects were asked to check how many friends they have who they regularly see and talk to on a face-to-face basis on scale of "none" to "5 or more." Demographic variables were controlled one at a time. No significant results were found when controlling age and gender simultaneously.

Table 4.28. Multiple Regressions for Predicting Face-to-face Interaction with Family Members and Friends by Types of the Internet Use (*N* =297)

Predictor variables	With parents β(t)	With siblings β(t)	With friends β(t)
Internet use for			
Communication	-.05 (-.74)	-.17* (-2.45)	.14* (2.01)
Information	.05 (.66)	.07 (.95)	.12 (1.58)
Entertainment	-.02 (-.23)	-.05 (-.58)	.05 (.67)
R^2	.003	.03	.06
AR^2	-.008	.02	.05
F	.29	2.57*	5.41**
Df	3, 263	3, 259	3, 265

* p< .05
** p< .01

Note. Subjects were asked to check how often they talk with siblings face-to-face per day on scale: "not at all" = 1, "rarely" = 2, "sometimes" = 3, "often" = 4, "very often" = 5. For face-to-face interaction with friends, subjects were asked to check how many friends they have who they regularly see and talk to on a face-to-face basis on scale of "none" to "5 or more." Types of The composite variables for types of the Internet use were used. Internet use for "communication" includes items of e-mail, instant messaging, chatting room and bulletin board. "Information" consists of such items as checking news, research for schoolwork, information about sports, information about hobbies. "Entertainment" includes items of playing online games, surfing the Web for fun, and information about entertainment. The numbers for β are standardized coefficient betas. There is a moderate multicollinearity between the predictor variables (see Appendix C)

Table 4.29. Partial Correlation between Amount of Internet Use and Social Relations and Pro-social Attitudes Controlling for Demographics and Internet Use (N = 297)

Items	Age	Gender	Internet experience
Social relations	.10	.08	.06
Pro-social attitudes	-.0006	-.01	-.02

Note. The variables were controlled one at a time. Social relations was measured by three items: "It is important for me to spend time with friends"; "I have had close friends for a long time"; "My friends are willing to listen to my problems" Subjects were asked to answer by Likert scale from "strongly disagree" to "strongly agree," which was coded from 1 to 5. 1 indicated low level of social relations while 5 indicated high level of social relations. Composite variable was used. Pro-social attitudes were measured by three items: It is important to help others"; "It is important to understand others"; "It is important to contribute to society" Subjects were asked to answer by Likert scale from "strongly disagree" to "strongly agree," which was coded from 1 to 5. 1 indicated low level of pro-social attitudes whereas 5 mean high level of pro-social attitudes. The same results were found when controlling age, gender and Internet experience simultaneously.

Table 4.30. Multiple Regressions for Predicting Social Relations and Pro-social Attitude by Types of Internet Use (*N*=297)

Predictor variables	Social relations β(t)	Pro-social attitude β(t)
Internet use for		
Communication	.22** (3.20)	.01 (.08)
Information	.04 (.57)	.25** (3.31)
Entertainment	-.08 (-1.02)	-.19* (-2.56)
R^2	.05	.05
AR^2	.03	.04
F	4.02**	4.11**
Df	3, 261	3, 261

* p< .05
** p< .01

Note. Social relations was measured by three items: "It is important for me to spend time with friends"; "I have had close friends for a long time"; "My friends are willing to listen to my problems" Subjects were asked to answer by Likert scale from "strongly disagree" to "strongly agree," which was coded from 1 to 5. 1 indicated low level of social relations while 5 indicated high level of social relations. Composite variable was used. Pro-social attitudes were measured by three items: It is important to help others"; "It is important to understand others"; "It is important to contribute to society" Subjects were asked to answer by Likert scale from "strongly disagree" to "strongly agree," which was coded from 1 to 5. 1 indicated low level of pro-social attitudes whereas 5 mean high level of pro-social attitudes. Types of The composite variables for types of the Internet use were used. Internet use for "communication" includes items of e-mail, instant messaging, chatting room and bulletin board. "Information" consists of such items as checking news, research for schoolwork, information about sports, information about hobbies. "Entertainment" includes items of playing online games, surfing the Web for fun, and information about entertainment. The numbers for β are standardized coefficient betas. There is a moderate multicollinearity between the predictor variables (see Appendix C)

Table 4.31. *t*-test for the Loneliness by the Amount of Internet Use (*N* = 297)

Internet use group	Group (N)	Mean	SD	t	Sig
Low Internet user	123	15.24	6.85	2.15	P < .05
High Internet user	157	13.65	5.49		

Note. Children were divided into two groups (low/high Internet use) by the mean of the amount of Internet use. The high the mean, the more the lonely.

CHAPTER 5

DISCUSSION

The purpose of this study was to examine children's Internet use and how Internet usage influences children's daily lives. This study sought to determine if there was a possible displacement effect for daily activities and an impact on children's physical, social, and psychological well-being. There has been little research concerning the displacement effect of the Internet for children and the research that does exist has shown mixed findings. Specifically, this study investigated children's Internet use and its impact on their existing media use, non-media activities, physical activities, social involvement and relations, and loneliness. Results revealed that children's amount of Internet use was predicted by the number of Internet-capable computers at home, ownership of a computer with Internet access by child, and Internet experience.

Children who spent more time on the Internet also spent more time with other existing media, including television, radio, video games, and books. This finding supported the "the more, the more" hypothesis (Mutz & Roberts, 1993) and the "rich get richer" pattern (Meyersohn, 1968; Robinson & Godbey, 1999c; Robinson & Kestnbaum, 1999). Children who actively participated in one activity were more likely to participate in other activities as well. Children who were media savvy (Tapscott, 1998a) seemed to make more use of every medium. They have grown up with television and video games and continued their media use with the computer and listening to radio as teens. Concerning the relationship between the Internet use and physical activity, it was

interesting to see that the amount of Internet use was not associated with time spent with organized physical activities that involving competitiveness, while positively associated with doing own physical activity or just "hanging out."

Putnam's (1995a; 1995b) displacement hypothesis has been criticized in that he was concerned about only the total amount of media use rather than focusing on the content of television programs or specific types of Internet use. Neuman (1991) claimed that the content of television programs should be considered to avoid the simplicity of displacement effect. This study indicated that children's types of Internet use predicted the children's activity. For example, children's Internet use for information about sports positively predicted their attitudes toward physical activity. Obesity was not found to be associated with children's Internet use but was related to physical activity as Salmon, Bauman, Crawford, Timperio, and Owen (2000) had found. Overweight children had less positive attitudes toward physical activity in the "social growth," 'social continuation," and "vertigo" dimensions.

Regarding displacement of social involvement, it was found that children who were high Internet users spent more time on social events. However, it should be noted that social involvement was positively associated only with children's Internet use for communication but not with Internet use for information and entertainment. Once again, the types of Internet use and not the total amount of Internet use explained the involvement with other activities.

The amount of Internet use was found to decrease face-to-face interaction with siblings. With respect to the types of Internet use, children used the Internet for communication with friends. The Internet was a place where children continued to

maintain friendship from offline to online. Although Gustavo (2001) reported that frequent Internet users had lower levels of pro-social attitudes (e.g. importance of helping others), this study found that only Internet use for entertainment was negatively associated with pro-social attitudes. Another interesting finding was that children who spent more time on the Internet felt less lonely than children who spend less time on the Internet. These data supported the Internet as a place for social relations and communication.

This study has several implications. First, it supported the "the more, the more" displacement hypothesis for existing media. Children who use one medium a lot spent more time with other media. In other words, the time spent with a new medium did not come from the time spent on existing media. Also, it did not come from the time spent on non-media activities. Moreover, high Internet use children spent more time on their own physical activities and attending social events than did children with low Internet use. Then, the question would be where does all this time come from? This question could be answered by three possibilities. One would be the results of this study might be sample specific results. The percentage of the ownership of computer by household in this study was 88.8% while 83% of national sample of family households reported computer ownership in 2002 (Corporation for Public Broadcasting, 2003), which indicates the sample in this study was slightly above the average in terms of computer access at home. It is also possible that participants in this study were perhaps more media active children. Second would be that the time spent on new media could come from marginal activities that cannot be measured as well as unspecific activities (Mutz & Roberts, 1993). Since this study did not include all kinds of activities in detail, it is possible that time spent on

the Internet could be from activities that were not measured in this study. Third, the time spent on the Internet might come from several activities not just one activity. In this situation, it is possible to find no significant reduction of time with other activities. For example, time spent on the Internet could come from a small portion of sleeping, a small portion of physical activities, and a small portion of other media activities. If so, it may not be possible to detect the significant reduction of time spent on other activities.

The discussion of the displacement effect in this study suggests that an alternative theory for displacement effect should be developed. For example, although there was no time displacement of children's activities by the Internet, there could be a psychological or attitudinal displacement. In this study, children who spent more time on the Internet tended to have negative attitudes toward physical activities (in social growth, social continuation, and health & fitness dimensions) while children who were heavy Internet users were more likely to spend more time on personal physical activities. This indicated the displacement effect of children's attitudes toward physical activity by the Internet. Thus, displacement effect should be examined in multi-dimensional level.

Second, this study considered not only the total amount of time spent with the Internet but also the specific types of Internet activities. Internet use for information for sports positively predicted children's participation in physical activities whereas Internet use for research for schoolwork negatively predicted physical activities. In addition, children who use the Internet for communication were more likely to attend social events. When the Internet is used for communication and establishing social relationship with people, it might lead children to attend more social events. Although Internet use for communication in general predicted the face-to-face interaction with friends, it decreased

the amount of face-to-face interaction with siblings. It indicates that Internet use might play a negative role at least in relationship with siblings. Overall, the types of the Internet use had more precise predictable explanation for the displacement effect of the Internet.

Third, this study dealt with the impact of the Internet on children's daily lives in a broader sense. That is, it encompassed all kinds of children's daily activities from media activities to non-media activities, physical activities, social involvement and loneliness. This study was concerned not only the amount of time spent on each activity but also the attitudes toward the physical activity, loneliness, perception of social relations, and pro-social attitudes, which helped to explore the influence of the Internet on children's daily lives.

Fourth, this study can offer some answers to parents who are concerned about the influence of the Internet on their child. Does the Internet disrupt children's typical daily activities? The answer would be no. Children's daily activities are not disrupted by their Internet use. Although we are all concerned that today's children spend too much time in front of the computer, children do all kind of activities along with Internet use. The sleep deprivation or unhealthy eating styles (e.g. skip meals) do not seem to be problems for children. Children who use the Internet more tend to read more books. Since children can encounter much information about books on the Internet during surfing the Web, it might lead them to read those books in real life.

Is the Internet harmful to children's physical health? The answer would be probably not. Children who are high Internet users are more likely to spend their time on doing personal physical activities both in and outside of school than children who are low Internet users. Children still have enough time to do physical activities and get along with

friends. However, children who spent a lot of time on their personal physical activity outside school tended to spend less time on the Internet doing research for school assignments. This suggests that parents should monitor Internet use and talk with children about what they do on the Internet.

Concerning children's obesity, the Internet doesn't make children overweight although overweight children are more likely to feel bad about taking part in physical activities that offer children a chance to meet new people and to be with friends and involve active movements.

Does the Internet use isolate children? The answer would be no. Children who have many close friends in real life have more friends whom they regularly see and talk to. These children have more friends whom they talk to online, too. Children consider the Internet as a place for communicating and maintaining relationship with friends. In addition, children who spend more time on the Internet tend to participate in more social events, which is good for children's social development. However, children seem to sacrifice time spent on face-to-face interaction with siblings to spend time with friends online. Also, children who use the Internet for playing online games, surfing the Web for fun, and searching information for entertainment place less importance on helping others, understanding others, and contributing society. Again, this suggests that parents should monitor Internet use and talk about the contents and sites that children visit.

This study of course has several limitations. First, although it tried to include every possible activity, such as sleeping, eating, house chores, and "hanging out," all activities could not be measured. Marginal activities that are not easily measured as well as unspecific behaviors might explain the displacement effect of the Internet. A time-use

diary may help to explain the relationship between Internet use and children's daily activities more in detail. Second, this study also has methodological shortcomings. This study used the self-report method for data collection, which has some limitations. Children may not estimate their time spent on each activity as accurately as adults. Concerning physical activity, different results may be found if the data had been collected during other seasons--spring, summer, or fall. Since the data in this study were collected during the winter and when school just started, children might not spend as much time in organized sports activities than during other seasons. Third, similar to other survey research, this study doesn't not provide evidence of cause and effect. Gustavo (2001) found that adolescents who were more socially isolated were more likely to be frequent Internet users, although he found that Internet use did not displace other social activities. Similarly, although this study found that children who use the Internet more felt less lonely, it may be possible that children's loneliness lead them to spend more time on the Internet.

For future study, the following things are recommended. First, this study strongly suggests that types of Internet use should be examined to test the displacement effect of new media. Online activities, particularly online game playing, chat rooms, and bulletin boards are important in investigating displacement of children's social relations and involvements. In fact, chat rooms and bulletin boards are mainly for communication and relationships with people. People talk to each other and are making friends. Sometimes online relationships lead to off line relationships. Nobody can tell if online relationships are inferior to off line relationships. Some people have more serious and intimate relationships on line where they can get understanding and support. Online game playing

is a context for communication as well as playing games. Many online games provide chatting room for people who have the same interest—the online game. Thus, examining the impact of the specific types of Internet use on children's daily activities will provide better understanding of the influence of the Internet on children. Second, the issue of Internet addiction would be interesting to investigate in terms of the displacement effect as well as children's physical and psychological health. Particularly, how MUDs (Multi User Dungeons) users allocate their time in all activities would be interesting to examine. Since Internet addiction apparently will influence children's time spent on daily activities as well as physical and psychological development, it is recommended to examine those factors.

Loneliness is a multi-concept. Loneliness can be described as existential loneliness, meaninglessness, self-estrangement, or anomie. Concerning the relationship between Internet use and loneliness, the loneliness scale this study used was more focused on the social loneliness. Moody (2001) suggested that not only social loneliness but also emotional loneliness should be examined. He found that high levels of Internet use were correlated with low levels of social loneliness and high levels of emotional loneliness. Although this study found that high Internet use children felt less socially lonely than those with low users, the high Internet use children may have higher emotional loneliness. Thus, it is recommended that further study concerning loneliness and Internet use should examine both social and emotional loneliness.

Third, it would also be better to collect data not only from children but also from parents to compare the results. Also, a longitudinal study is suggested to examine the longitudinal effect of the Internet on across important development periods from younger

children to adolescent and to adults. Another suggestion would be to examine the displacement effect within school time. Since the school time is fixed for most of children and it takes up almost half of the day, it would be interesting to see the displacement effect. How the Internet displaces class activities, such as math or time spent on library research for schoolwork would be interesting to investigate.

Overall, this study found no displacement effect of the Internet on children's daily activities. Rather, it found that the more time children spend on the Internet, the more time they are likely to spend with other media, the more time on some kind of physical activities, and were more socially involved they are likely to be. The Internet provides a place for communication and social relationships for children. Net-generation children surrounded by media are not necessarily giving up other activities that are also important for their intellectual, physical, social and psychological development.

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APPENDIX A. CORRELATION BETWEEN THE VARIABLES

	1	2	3
1.# of online access computer	1.00	.537***	.204***
2. Internet access		1.00	.252***
3. Internet experience			1.00

*** $p < .001$

Note. Internet access indicates the ownership of the online accessible computer by child.

APPENDIX B. CORRELATIONS BETWEEN THE VARIABLES OF TYPES OF INTERNET USE

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	1.00	.690***	.316***	.218***	.406***	.428***	.162**	.364***	.323***	.184**	.227***	.335***	.419***
2		1.00	.264***	.141*	.537***	.415***	.079	.287***	.307***	.250***	.237***	.367***	.459***
3			1.00	.352***	.189**	.351***	.190**	.293***	.282***	.348***	.373***	.267***	.267***
4				1.00	.113	.163**	.204**	.260***	.276***	.277***	.293***	.172**	.216***
5					1.00	.473***	.186**	.317***	.339***	.172**	.228***	.266***	.322***
6						1.00	.226***	.272***	.360***	.309***	.294***	.282***	.381***
7							1.00	.519***	.322***	.348***	.309***	.106	.207***
8								1.00	.520***	.366***	.356***	.223***	.395***
9									1.00	.419***	.520***	.357***	.403***
10										1.00	.564***	.218***	.323***
11											1.00	.322***	/340***
12												1.00	.401***
13													1.00

** p < .01
*** p < .001
Note. Internet use for: 1 = E-mail, 2 = Instant messaging, 3 = Checking news, 4 = Research for school, 5 = Chatting, 6 = Bulletin board, 7 = Playing games, 8 = Web surfing, 9 = Information about entertainment, 10 = Information about sports, 11 = Information about hobbies, 12 = Shopping, 13 = Downloading music files.

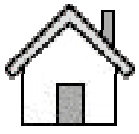
APPENDIX C. CORRELATION BETWEEN THE VARIABLES

Internet use for	1	2	3
1. Communication	1.00	.387***	.414***
2. Information		1.00	.555***
3. Entertainment			1.00

*** $p < .001$

APPENDIX D. QUESTIONNAIRE

The Impact of the Internet on the Children's Daily Lives



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Child's Survey

1. The first part of this survey is about media environment in your home. Please circle the number that applies the most to you.

Example: How many pets do you have? If you have two pets, you may circle 2.

a. How many television sets do you have in your home?
0 1 2 3 4+

b. How many computers do you have in your home?
0 1 2 3 4+

c. How many computers have on-line access in your home?
0 1 2 3 4+

d. How many VCRs do you have in your home?
0 1 2 3 4+

e. How many DVD players do you have in your home?
0 1 2 3 4+

f. How many newspapers are delivered to your home?
0 1 2 3 4+

g. How many video game players do you have in your home?
0 1 2 3 4+

2. Next questions are about your media use. Please write down the number of hours and minutes you spend on each activity. Put zero if you spend no time.

Every day how much time do you spend:	hours	and	minutes
a. Watching television?	_____		_____
b. Reading a newspaper?	_____		_____
c. Listening to radio?	_____		_____
d. Playing video games?	_____		_____
e. Reading books?	_____		_____
f. Use the computer at school (including Internet)?	_____		_____
g. Use the computer at home (including Internet)?	_____		_____
h. Use the Internet at school?	_____		_____
i. Use the Internet at home?	_____		_____

3. Next questions are about your daily activities. Please write down the number of hours and minutes you spend on each activity. Put zero if you spend no time.

Every day how much time do you spend on:	hours	and	minutes
a. School	_____		_____
b. Homework	_____		_____
c. Commuting	_____		_____
d. Household Chores	_____		_____
e. Baby sitting	_____		_____
f. Sleeping	_____		_____
g. Eating	_____		_____
h. Grooming	_____		_____

4. Next questions are about some other activities. Please write down the number of hours and minutes you spend on each activity. Put zero if you spend no time.

Every day how much time do you spend:	hours	and	minutes
a. Playing on a school sports team	_____		_____
b. Playing on a club (Rec.) sports team	_____		_____
c. Doing your own physical activity in school	_____		_____
d. Doing your own physical activity outside school	_____		_____
e. "Hanging out" by yourself	_____		_____
f. "Hanging out" with friends after school	_____		_____

5. What kinds of physical activities are you currently in at least once a week for 30 minutes (not including physical education class)? **Please write down all the physical activities you are in**. (Example: baseball, basketball, soccer, gymnastics, rollerblading, martial arts, biking etc.)_____
_____

_____

6. How many organized activities (including Rec. or club activities) are you in?

None 1 2 3 4 or more

7. **Every month** how much do you do the following things? Please circle the one that applies you the most.

a.	Attending community events	None	once	twice	3 times	4 times or more
b.	Attending concerts	None	once	twice	3 times	4 times or more
c.	Attending church	None	once	twice	3 times	4 times or more
d.	Volunteer work	None	once	twice	3 times	4 times or more

8. How often do you talk with your parents face to face **per day**? Please answer by circling.
Not at all Rarely Sometimes Often Very often

9. How often do you talk with your brothers and sisters face to face **per day**?
Not at all Rarely Sometimes Often Very often

10. Do you have your own computer? Yes_____ No_____

11. If yes, can you get on the Internet from your computer? Yes_____ No_____

12. How long have you used the Internet? **Please write down the number of years and months** you have used the Internet.
_____years _____ months

13. Next questions are about your Internet experience
Please rate yourself and check (v) the one that applies you the most.

(Example)
I love to ride a bicycle _____:___v____:_____:_____:_____ I hate to ride a bicycle
If you love to ride a bicycle but not very much, you can check on the second underline from the left.
I love to ride a bicycle _____:___ ___:_____:_____:_ ___v__ I hate to ride a bicycle
If you really hate to ride a bicycle, you can check on the first underline from the right.

Neutral

a. I never use _____ : _____ : _____: _____ :_____ I very often use
the Internet the Internet

b. I have no _____ : _____ : _____: _____ :_____ I have a great deal
experience of experience
using the Internet using the Internet

c. I am not at all _____ : _____ : _____: _____ :_____ I am completely
expert using ` expert using
the Internet the Internet

d. I am not at all _____ : _____ : _____: _____ :_____ I am extremely
familiar with familiar with
the Internet the Internet

e. It is extremely It is extremely easy
difficult for me_____ : _____ : _____: _____:_____ for me to access
to access the the Internet
the Internet

14. How often do you do these things on the Internet? Please circle the one that most applies to you

	Never	Rarely	Sometimes	Often	Very often
a. E-mail	1	2	3	4	5
b. Instant Messaging	1	2	3	4	5
c. Checking news	1	2	3	4	5
d. Research for school work	1	2	3	4	5
e. Chatting Room	1	2	3	4	5
f. Bulletin board	1	2	3	4	5
g. Playing online games	1	2	3	4	5
h. Surfing the Web for fun	1	2	3	4	5
i. Information about entertainment	1	2	3	4	5
j. Information about sports	1	2	3	4	5
k. Information about hobbies	1	2	3	4	5
l. Shopping	1	2	3	4	5
m. Downloading music	1	2	3	4	5
n. Other (specify)_____					

15. How often do you **watch television** to learn about:

	Never	Rarely	Sometimes	Often	Very often
a. News or current events information	1	2	3	4	5
b. Entertainment information	1	2	3	4	5
c. Reference or factual information	1	2	3	4	5
d. Commercial or product information	1	2	3	4	5

16. How often do you **use the Internet** to learn about:

	Never	Rarely	Sometimes	Often	Very often
a. News or current events information	1	2	3	4	5
b. Entertainment information	1	2	3	4	5
c. Reference or factual information	1	2	3	4	5
d. Commercial or product information	1	2	3	4	5

17. How many close friends do you have (not counting family members)? Please circle the answer

None 1 2 3 4 5 or more

18. How many friends do you have who you regularly see and talk to on a face-to-face basis (not counting family members)?

None 1 2 3 4 5 or more

19. How many friends do you regularly communicate with **online** (not counting family members)?

None 1 2 3 4 5 or more

20. **Thinking about kids today.** How much, if at all, do you think using the Internet does the following things for **young kids you know?**

	Not at all	Only a little	Some	A lot
a. Keeps young people from doing more important things	1	2	3	4
b. Leads young people to do dangerous or harmful things	1	2	3	4
c. Takes away from the time young people spend with their friends	1	2	3	4
d. Takes away from the time young people spend with their families	1	2	3	4

21.**Now, think about yourself**. How much, if at all, do you think the Internet does the following things for **you**?

	Not at all	Only a little	Some	A lot
a. Keeps me from doing more important things	1	2	3	4
b. Leads me to do dangerous or harmful things	1	2	3	4
c. Takes away from the time I spend with my friends	1	2	3	4
d. Takes away from the time I spend with my families	1	2	3	4

22. **The Next statements are about your relations with your friends**
Please rate yourself and circle the one that applies the most to you

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a. It is important for me to spend time with friends	1	2	3	4	5
b. I have had close friends for a long time	1	2	3	4	5
c. My friends are willing to listen to my problems	1	2	3	4	5
d. It is important to help others	1	2	3	4	5
e. It is important to understand others	1	2	3	4	5
f. It is important to contribute to society	1	2	3	4	5

23. **The Next questions are about physical activities**. **Please rate yourself and check (v) the one that applies the most to you**

a. How do you feel about taking part in **physical activities that give you a chance to meet new people?**

neutral

Good _____ : _____ : _____ : _____ : _____ Bad
Of no use _____ : _____ : _____ : _____ : _____ Useful
Not pleasant _____ : _____ : _____ : _____ : _____ Pleasant
Nice _____ : _____ : _____ : _____ : _____ Awful
Happy _____ : _____ : _____ : _____ : _____ Sad

b. How do you feel about taking part in **physical activities that give you a chance to be with your friends?**

neutral

Good _____ : _____ : _____ : _____ : _____ Bad
Of no use _____ : _____ : _____ : _____ : _____ Useful
Not pleasant _____ : _____ : _____ : _____ : _____ Pleasant
Nice _____ : _____ : _____ : _____ : _____ Awful
Happy _____ : _____ : _____ : _____ : _____ Sad

c. How do you feel about taking part in **physical activities to make your health better and to get your body in better condition?**

neutral

Good _____ : _____ : _____ : _____ : _____ Bad
Of no use _____ : _____ : _____ : _____ : _____ Useful
Not pleasant _____ : _____ : _____ : _____ : _____ Pleasant
Nice _____ : _____ : _____ : _____ : _____ Awful
Happy _____ : _____ : _____ : _____ : _____ Sad

d. How do you feel about taking part in **physical activities that could be dangerous because you move very fast and must change direction quickly?**

neutral

Good _____ : _____ : _____ : _____ : _____ Bad
Of no use _____ : _____ : _____ : _____ : _____ Useful
Not pleasant _____ : _____ : _____ : _____ : _____ Pleasant
Nice _____ : _____ : _____ : _____ : _____ Awful
Happy _____ : _____ : _____ : _____ : _____ Sad

e. How do you feel about taking part in **physical activities that have beautiful and graceful movements?**

neutral

Good _____ : _____ : _____ : _____ : _____ Bad
Of no use _____ : _____ : _____ : _____ : _____ Useful
Not pleasant _____ : _____ : _____ : _____ : _____ Pleasant
Nice _____ : _____ : _____ : _____ : _____ Awful
Happy _____ : _____ : _____ : _____ : _____ Sad

f. How do you feel about taking part in **physical activities to reduce stress or to get away from problems you might have?**

neutral

Good _____ : _____ : _____ : _____ : _____ Bad
Of no use _____ : _____ : _____ : _____ : _____ Useful
Not pleasant _____ : _____ : _____ : _____ : _____ Pleasant
Nice _____ : _____ : _____ : _____ : _____ Awful
Happy _____ : _____ : _____ : _____ : _____ Sad

g. How do you feel about taking part in **physical activities that have long and hard practices to spend time in practice you need to give up other things you like to do?**

neutral

Good _____ : _____ : _____ : _____ : _____ Bad
Of no use _____ : _____ : _____ : _____ : _____ Useful
Not pleasant _____ : _____ : _____ : _____ : _____ Pleasant
Nice _____ : _____ : _____ : _____ : _____ Awful
Happy _____ : _____ : _____ : _____ : _____ Sad

24. **How often is each of the following statements true about you? Please circle the one that applies to you the most**

	Always True	True most of the time	Sometimes true	Hardly ever true	Not true at all
a. It's easy for me to make new friends at school	1	2	3	4	5
b. I have nobody to talk to in class	1	2	3	4	5
c. I'm good at working with other children in my class	1	2	3	4	5
d. It's hard for me to make friends at school	1	2	3	4	5
e. I have lots of friends in my class	1	2	3	4	5
f. I feel alone at school	1	2	3	4	5
g. I can find a friend in my class when I need one	1	2	3	4	5
h. It's hard to get kids in school to like me	1	2	3	4	5
i. I don't have anyone to play with at school	1	2	3	4	5
j. I get along with my classmates	1	2	3	4	5
k. I feel left out of things at school	1	2	3	4	5
l. There's no other kids I can go to when I need help in school	1	2	3	4	5
m. I don't get along with other children in school	1	2	3	4	5
n. I'm lonely at school	1	2	3	4	5
o. I am well liked by the kids at school	1	2	3	4	5
p. I don't have any friends in class	1	2	3	4	5

25. **Next questions are about TV and the Internet. Please rate each on the following**

[INTERNET]

neutral

a. Believable _____ : _____ : _____ : _____ : _____ Unbelievable

b. Accurate _____ : _____ : _____ : _____ : _____ Inaccurate

c. Untrustworthy_____ : _____ : _____ : _____ : _____ Trustworthy

d. Biased _____ : _____ : _____ : _____ : _____ Unbiased

e. Complete _____ : _____ : _____ : _____ : _____ Incomplete

[TELEVISION]

neutral

a. Believable _____ : _____ : _____ : _____ : _____ Unbelievable

b. Accurate _____ : _____ : _____ : _____ : _____ Inaccurate

c. Untrustworthy_____ : _____ : _____ : _____ : _____ Trustworthy

d. Biased _____ : _____ : _____ : _____ : _____ Unbiased

e. Complete _____ : _____ : _____ : _____ : _____ Incomplete

26. How much do you weigh? _____ pounds _____ ounces

27. How tall are you? _____ feet _____ inches

28. Who do you live with most of the time?

_____ both parents
_____ mother
_____ father
_____ other (specify)_____

29. I am a
_____ boy
_____ girl

30. On my last birthday, I was _____ years old