

Copyright
by
Sook-Jung Lee
2007

**The Dissertation Committee for Sook-Jung Lee Certifies that this is the approved
version of the following dissertation:**

**THE INTERNET AND ADOLESCENT SOCIAL CAPITAL:
WHO BENEFITS MORE FROM INTERNET USE?**

Committee:

Sharon Strover, Supervisor

Elizabeth Vandewater

Karin Wilkins

Laura Stein

Kathleen Tyner

**THE INTERNET AND ADOLESCENT SOCIAL CAPITAL:
WHO BENEFITS MORE FROM INTERNET USE?**

by

Sook-Jung Lee, B.A., M.A.

Dissertation

Presented to the Faculty of the Graduate School of
The University of Texas at Austin
in Partial Fulfillment
of the Requirements
for the Degree of

Doctor of Philosophy

**The University of Texas at Austin
December, 2007**

Dedication

To my parents, for their endless love and support

Acknowledgements

This dissertation would not have been possible without intellectual and emotional support and love from my advisors, colleagues, friends, and family. First and foremost I would like to acknowledge gratefully my supervisor, Sharon Strover. Since I started my graduate program, she has been my mentor and my role model as a scholar and as a teacher. Her encouragement and support have always pushed me forward, even when I was in doubt. I am truly grateful for her support, insight, and guidance. I am so glad that she has been in my life at Austin.

Elizabeth Vandewater is the most significant person that made this dissertation possible. It has been a great pleasure working with her, and she has enriched my academic and professional life. Because of her, I could experience how great and productive a collective work is, and I could work in the lab with great colleagues. I should learn her enthusiasm and insights in research and friendly attitudes toward students. She deserves my appreciation.

I am grateful to other committee members, Karin Wilkins, Laura Stein, and Kathleen Tyner, who have guided the formation of this work as well as my scholarly development. I learned a lot from Karin Wilkins. She gave me directions of the way of thinking and writing. She has always provided me a good example of a responsible professor. Laura Stein's scholarly insight and comments

helped make this dissertation better. I am also truly grateful for Kathleen Tyner's emotional support and guidance. She has always welcomed me with open arms, and I have always enjoyed meetings with her.

Many thanks to my friends and colleagues in the lab: Silvia Bartolic, Seoung Eun Park, Erin Lee, Xuan Huang, and Jin Li. I especially appreciate Silvia proofread my dissertation from the first to the last page. It was a great pleasure working together with them, and I could learn a lot from each of them in terms of personal as well as professional development. I am grateful for their encouragement, advice, and friendships. I should also appreciate all my friends who have prayed for me during my life at Austin.

Finally, my deepest love and appreciation go to my family. They always believe in me and support everything I do. Their support and love is a source of my ability. My parents provide a great example to me in how I lead a life and in how I raise my children. I also deeply appreciate my parents-in-law's support. My greatest joy comes from my children, Hoon and Jiho. They are precious beings that enliven and vitalize my life. My love to Young-Gil: As a husband, a colleague, and a friend, he has always supported me. I am truly grateful to share my life with him. I love all of you with all my heart!

THE INTERNET AND ADOLESCENT SOCIAL CAPITAL: WHO BENEFITS MORE FROM INTERNET USE?

Publication No. _____

Sook-Jung Lee, Ph. D.

The University of Texas at Austin, 2007

Supervisor: Sharon Strover

The purpose of this study was (1) to capture the digital divide in adolescent specific computer and online activities, and (2) to understand each online activity's meanings in adolescent social development or social capital. To assess the issue of the digital divide, the present study examined the socio-demographic, neighborhood, family, and child characteristic factors which influence each type of computer and online activity. To identify how online and computer activities can influence social capital, the present study examined diverse outcomes related to social capital which could be obtained from each online activity, and tested models explaining the relationships among sociability, Internet use, and social outcomes.

The data used in the present study came from the Panel Study of Income Dynamics Child Development Supplement. The sample was 1,312 adolescents

ages 12 to 18. This nationally representative dataset includes measures of computer and Internet use, diverse indicators of adolescent social behaviors and social relations, and time diaries that provide records of how and with whom they spent their time. The data were analyzed by regression and structural equation modeling.

According to the findings, social economic status including family income to needs ratio, parental education, and neighborhood quality was a significant factor explaining frequent use of the Internet and a computer. However, among users, these factors were not significant in predicting the amount of time spent using a computer. Race, maternal employment, gender, and age explained adolescent different type of computer and Internet use. Analysis of the social impacts of Internet and computer use suggests that Internet and computer use have different impacts depending on the purpose individuals use them for and social outcomes examined. For instance, while adolescent Internet use for educational purposes was related to cohesive relationships with parents, their use of online communication was associated with cohesive friendship and school connectedness. Furthermore, it supports the rich get richer model, indicating that those who have strong social ties will have an increased ability to enhance their social capital by using the Internet and a computer as tools for social interaction than those who have weak social ties.

Table of Contents

List of Tables	xii
List of Figures	xiv
Chapter 1 Introduction	1
Statement of the problem	1
Purpose of the study	7
Significance of the study	11
Chapter 2 Review of The Literature	15
Access and Use of a Computer and the Internet	15
Family economic status	16
Parental education level	17
Ethnicity	18
Neighborhood environment	20
Child age	20
Child gender	22
Summary	24
The Internet and Social Capital	25
Displacement hypothesis	26
Increase hypothesis	29
Rich get richer hypothesis	32
Social compensation hypothesis	35
Summary	36
Chapter 3 Method	47
Descriptions of Sample and Measures	47
The CDS sample and subsample	47
Measures of adolescent Internet and computer use	49
Measures of predictors of adolescent media use	51

Measures of initial sociability	53
Measures of social outcomes	54
Analysis Plan	58
Overarching analytical strategies	58
Analysis of predictors of Internet and computer use	59
Analysis of social outcomes of Internet and computer use	60
Chapter 4 Results	65
Descriptions of Key Variables	65
Predictors of Internet and Computer Use	70
Frequency of Internet use	70
Computer time	72
Summary	76
Social Outcomes of Internet and Computer Use	77
Time displacement hypothesis	77
Displacement and increase hypotheses	79
Rich get richer and social compensation hypotheses	87
Chapter 5 Discussion	102
Discussion of Findings	102
Significant factors of Internet and computer activity	102
Hypotheses regarding social outcomes	106
Theoretical Implications	110
Methodological Implications	112
Limitations and Future Research	114
Conclusion	117

Appendix A Questionnaires	119
Appendix B Correlation Matrix 1	123
Appendix C Correlation Matrix 2	126
Bibliography	128
Vita	138

List of Tables

Table 2-1:	Empirical Studies about Social Outcomes of Internet Use	39
Table 4-1:	Means and Standard Deviations.....	65
Table 4-2:	Frequency of Each Type of Internet Use	67
Table 4-3:	Among Users, Average Minutes Spent in Computer Activities	68
Table 4-4:	Among Users, Average Minutes Spent in a Computer with Whom.....	69
Table 4-5:	Standardized Coefficients of Factors Predicting Frequency of Each Type of Online Activity	71
Table 4-6:	Standardized Coefficients of Factors Predicting If Adolescents Spent Time Using a Computer.....	73
Table 4-7:	Unstandardized Coefficients of Factors Predicting Time Spent in Computer use, Among Users	75
Table 4-8:	Unstandardized Coefficients of Each Type of Computer use Predicting Social Time.....	78
Table 4-9:	Standardized Coefficients of Each Type of Internet Use Predicting Relationships with Parents	80
Table 4-10:	Standardized Coefficients of Computer Activities Predicting Relationships with Parents.....	81
Table 4-11:	Standardized Coefficients of Each Type of Internet Use Predicting Friendships	82
Table 4-12:	Standardized Coefficients of Computer Activities Predicting Friendships.....	83

Table 4-13: Standardized Coefficients of Each Type of Internet Use Predicting Internalizing Behavior Problems, School Connectedness, and Social Trust	84
Table 4-14: Standardized Coefficients of Computer Activities Predicting Internalizing Behavior Problems, School Connectedness, and Social Trust	86
Table 4-15: Interaction terms of Initial Sociability and Internet Use on Relationships with Parents	88
Table 4-16: Interaction terms of Initial Sociability and Internet Use on Friendships	88
Table 4-17: Interaction terms of Initial Sociability and Internet Use on Internalizing Behavior Problems, School Connectedness, and Social Trust	89
Table 4-18: Interaction terms of Initial Sociability and Computer Communication on Relationships with Parents	89
Table 4-19: Interaction terms of Initial Sociability and Computer Communication on Friendships	90
Table 4-20: Interaction terms of Initial Sociability and Computer Communication on Internalizing Behavior Problems, School Connectedness, and Social Trust	90
Table 4-21: Standardized Factor Loadings for Measurement Model.....	92

List of Figures

Figure 2-1: Conceptual Model for the Displacement Hypothesis	43
Figure 2-2: Conceptual Model for the Increase Hypothesis	44
Figure 2-3: Conceptual Model for the Rich Get Richer Hypothesis	45
Figure 2-4: Conceptual Model for the Social Compensation Hypothesis	46
Figure 3-1: The Full SEM with Observed Indicators	64
Figure 4-1: Result of Hypothesized SEM on Cohesive Friendships	96
Figure 4-2: The Alternative Model of Figure 4-1	97
Figure 4-3: Results of Hypothesized SEM on School Connectedness	100

Chapter 1: Introduction

STATEMENT OF THE PROBLEM

In 2004, 74% of American youth ages 8-18 had a home Internet connection. They used home computers more often for recreational activities rather than for educational purposes, and their most common recreational activities were playing games and communicating through instant messaging (Rideout, Roberts, & Foehr, 2005). Even for pre-school children under 6, almost half had some experience surfing online looking at websites for kids (Calvert, Rideout, Woolard, Barr, & Strouse, 2005). The phrase “generation M” expresses how well a variety of media -- from radio and television to computers, video games, the Internet and MP3s -- are integrated into the fabric of young people’s lives. Young people’s fast adaptation to and familiarity with new interactive media are demonstrated by such terms as “the digital generation,” or “cyberkids.”

Research concerning new media tends to start with issues of access (Wartella & Jennings, 2000). The access issues include both the prevalence of media in people’s lives as well as its absence, usually associated with existing structural factors. That is, some research focuses on how prevalent new media are in the lives of youth comparing differences by socio-demographic factors, and other critical approaches to new media highlights the gap in access to and use of the media by economic, social, and cultural capital and the social inequity resulting from the digital divide.

Two recent national surveys, *Generation M: Media in the lives of 8-18 year-olds* (2005) conducted by the Kaiser Family Foundation, and *Teens and Technology: Youth are leading the transition to a fully wired and mobile nation* (2005) conducted by Pew Internet & American Life Project provide useful information on children and adolescents' access and use of diverse media. Specifically, *Generation M* addresses young peoples' media environment in the home context, the amount of media exposure, media content consumed, family rules around media, and differences in media access and use by demographic characteristics and family rules. Media use diaries conducted as part of the surveys provide relatively reliable information about time use in media, the multitasking of media use, and the social context of media use. *Teens and Technology* presents how well adolescents utilize new media for communication, information seeking, and leisure activities. Although these surveys show how socio-demographic factors are associated with differences in these topics, their focus is on the prevalence of media in young people's lives.

On the other hand, the digital divide research has thoroughly documented which social-demographic groups are more likely to access and use computers and the Internet: those highly educated, White, and younger people are more likely to use a computer and the Internet than the uneducated, Black or Hispanic, and older people (Katz & Rice, 2002). As a result, the digital divide issue among children and adolescents led to federal policies such as E-rate, community

technology center program, and No Child Left Behind Act of 2001 (NCLB). Although the rapidly increasing rate in the proportion of children and adolescents having *ever* used a computer or the Internet has been reported, differences in computer and Internet use still exist.

Children, the digital divide, and federal policy (2004), reported by the Kaiser Family Foundation, points out that simply looking at the proportion of children and adolescents' computer and Internet use can cover important differences. In their report, they emphasize the importance of gaps by the quality of access, by technological literacy, and by access to useful content beyond basic access to new media. The U.S. Department of Education's statistical analysis of *computer use and Internet use by students* points out that differences in how or for what purposes students use computers are larger than overall differences in rates of use (DeBell & Chapman, 2006). *The Internet Playground: Children's access, entertainment and mis-education* (Seiter, 2005), which is an ethnographic study of two elementary schools differentiated by geographic and economic factors, reports not only differences in access but also qualitative differences in usability of new technology for their personal and social purposes. As the digital divide issue has shifted to gaps in the way children and adolescents utilize the media, we need more information about what factors make a difference in their specific computer and internet activities or in their *meaningful* access.

When computers and the Internet are prevalent, research shifts to issues about their effect on children (Wartella & Jennings, 2000). Historically, the introduction of a new medium has always aroused similar promises and concerns that old media had about its influences on children. The research agenda is shaped by public concerns, including worries about learning, socialization, emotions, sleep patterns, and moral development (Wartella & Reeves, 1985). The advent of the Internet and public concerns about its influence on children is not an exception. Particularly for the Internet, which has two contradictory features such as a personalized/individualized medium vs. an interactive/connecting medium, the issue regarding the influence on children's social isolation or social interaction may be more prominent than for other media.

The observation that a computer is placed in an individual's room rather than a family room and that a child uses a computer alone without any other family members' presence amplifies concerns about social isolation and harmful influences on children's social development (Roberts, 1999). A few empirical studies identify that time spent using the Internet displaces time spent in face-to-face interaction with family members (Nie, Hillygus, & Erbring, 2002). On the other hand, the statistical figures regarding the use of email and instant messaging to communicate with families and friends support the argument that the Internet is a social tool that connects people. Some argue that even electronic games and information online can be a source of conversation and interaction among peer

groups (Livingstone & Bovill, 2001; Valentine & Holloway, 2002). While positive evaluations and concerns over Internet use coexist, some studies try to elaborate the hypotheses regarding the impact of Internet use on social interaction, social relationships, and social capital. A body of literature on the association of the Internet with social capital is growing. However, most studies focus on adults' Internet use and their social interaction; furthermore, their findings are not consistent. We do not have enough information about youth's Internet use and its social developmental outcomes. In short, despite great promises and concerns about the impact of the Internet on children and adolescents' social development, there is little empirical research using representative samples.

The existing research has limitations in providing understanding of children's Internet use and its social outcomes. First, the studies which examine the factors that influence Internet use – generally adults' Internet use – focus on socio-demographic factors and access issues. They do not consider the contextual factors that can influence Internet use of *children or adolescents* in the *home* environment. Second, although it is believed that different types of Internet use have different effects, most studies examine general use of the Internet. While some studies focus on online communication, little is known about the influence of Internet use for games and educational purposes on social development. One recent study found that nonsocial uses of the Internet such as web surfing did not make any differences in users' network size, but social uses such as email and

chatting were related to more contact with friends (Zhao, 2006). Zhao's findings emphasize the necessity of differentiated analyses of the Internet, or analyses of the Internet by a certain type.

Third, most prior studies measure social relationships or the social network as a narrowly defined concept, with one single item, or with inaccurate measurements of time. For instance, Wellman et al. measured only the frequency of contact with people to examine the concept of network capital (Wellman, Haase, Witte, & Hampton, 2001); Kraut et al. and Mesch measured time spent with family based on participants' estimate of minutes (Kraut et al., 2002; Kraut et al., 1998; Mesch, 2003). There is a need for data that provides rich information about contextual factors surrounding young people's Internet use, diverse indicators of social relationships and social connection, and accurate measures of media use.

PURPOSE OF THE STUDY

Both the Internet and social capital¹ have significant meanings for adolescents. The Internet is getting integrated into the fabric of youth's lives, as entertainment media, communication media, and educational media. Furthermore, the Internet is one social environment in which they can explore their identities, connect with people, and learn norms and values as a process of socialization. Increased social interaction, the formation of close relationships, and the improvement of sociability, all of which increase social capital, are important developmental tasks in childhood and adolescence.

Social capital is important in that social capital increases "the likelihood of success in a purposive action" (Lin, 2002, p.24). Specifically, for adolescents, social capital is a resource that increases the likelihood of academic achievement,

¹ Social capital is defined differently by scholars. For instance, Bourdieu defines social capital as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition, in other words, to membership of a group" (Bourdieu, 1985, p. 248). He noted an actor's social capital depends on the size of network, and the volume of capital/resources by each of those to whom he is connected. Portes defined social capital as "the ability of actors to secure benefits by virtue of membership in social networks or other social structures" (Portes, 1998, p.3). They emphasize different elements of social capital. For instance, Bourdieu emphasize the resources embedded in the networks or possessed by each member linked to the networks, and Portes highlights an actor's ability to get benefits from social networks. However, they have a commonality about the mechanism by which they can benefit from social network. Boudieu noted that for an individual to get benefits from social networks, the networks should be based on solidarity, and Portes suggested internalized norms, bounded solidarity, reciprocity, and enforceable trust as sources of social capital. That is, the quality of social relations such as solidarity/cohesion, reciprocity and trust explains the process that resources embedded in networks or resources possessed by others are transferred to an actor. Thus, the quality of social relations is one of the most significant components generating an actor's social capital. The present study focuses on the quality of social relation of an individual's existing social networks in terms of social capital.

supports physical health and mental health, and helps the formation of a stable identity (Coleman, 1988; Furstenberg & Hughes, 1995; Portes, 1993). The Internet as a social environment could increase young people's social capital by increasing the density of social networks, and improving sociability, solidarity, and reciprocity. However, the Internet may take away time and needs for face-to-face interaction, which is important in formation and maintenance of relationships. Furthermore, if we consider that users actively choose their online activities for their own purposes, and online activities are extensions of offline life, Internet use and its impact on users' social life may depend on their initial social capital (or level of sociability in face to face interactions). The current study could help improve our understanding of the reciprocal relationships between children and interactive media.

The goals of the current study are: (1) to identify the still-existing digital divide in terms of meaningful use of the Internet, and (2) to build a model to explain the social implications of Internet use for children and adolescents. Specifically, the study first investigates socio-economic, contextual, and individual factors that are related to various types of Internet use. Second, it formulates a model to show how adolescents' Internet use influences their social networks and social attitudes and behaviors, which are crucial for the formation of stable identity and an understanding of their social world. The study utilizes the Child Development Supplement (CDS) of the Panel Studies of Income Dynamics

(PSID) dataset. The data provide information about family, school, and neighborhood contexts, children's activities including media use, and their developmental outcomes.

The first research question identifies which factors are more significant in explaining adolescents' different purposes of Internet use. The factors examined include socio-economic factors (family income to need ratio and parental education level), child ethnicity, parental work hours, neighborhood quality, child age, and gender. Previous research in this area does not provide enough information about the difference in predictors for each type of Internet use. For example, we know that the higher a parent's education level is, the greater the chance a child has a home Internet connection or Internet use. However, it is not clear if a parent's education level is related to the child's Internet use for educational purposes, or for games. Moreover, beyond socio-demographic factors, this study uses an ecological perspective in understanding children's media use. The ecological perspective suggests that we simultaneously need to consider the characteristics of the individual child, the structural and social setting of the home, and the cultural environment (Jordan, 2004). Thus, the present study considers parents' work hours and neighborhood quality as factors influencing children's media use.

The second research question seeks to explain the social outcomes of adolescents' Internet use, by investigating four hypotheses: (1) the *displacement*

hypothesis, (2) the *increase* hypothesis, (3) the *rich get richer* hypothesis, and (4) the *social compensation* hypothesis. The displacement hypothesis proposes that time spent online displaces or interferes with time that would be spent in face-to-face interaction, and as a result, it weakens strong ties built through face-to-face interaction. In contrast, the increase hypothesis states that Internet use, particularly online communication, will increase social interaction and strengthen closeness. In contrast, Beyond the unidirectional influence of the Internet on social relationships, the rich get richer and the social compensation hypotheses attend to the fact that Internet use should be understood as part of daily life: the impact of the Internet depends on users' initial social capital/resources (social networks and sociability). The rich get richer hypothesis argues that the social benefits of Internet use are greater for those who have strong social relationships and sociability. The social compensation hypothesis suggests that those who have poor social networks and social anxiety can get more benefit by disclosing themselves freely and creating new relationships through the Internet. That is, new relationships and interactions online may compensate for the social capital/resources these people lack in the offline world. Based on the examination of these four hypotheses, the current study builds a model that explains which kinds of Internet use provides social benefits for young people, or which factors allow for greater social benefits.

SIGNIFICANCE OF THE STUDY

Theoretically, the present study adds to the previous research in two ways. First, this study emphasizes the importance of how adolescents utilize the Internet and a computer for specific purposes rather than whether they can access and use the tools. Although access is an important issue when a new medium is introduced into our lives, focus on basic access may make us miss the underlying gaps in the way we actually utilize the medium. Examination of differences in the actual use helps clarify the limitations of structural approach which is to solve the digital divide by providing universal access, and helps understanding where the differences result from. Second, as the concept of social capital has been examined with respect to adults and media use, the present study focuses on adolescents who are in a developmental stage where they are learning to build and maintain their social networks, and who are actively utilizing the Internet and joining in cyberspace activities as part of their social life. This study elaborates a model explaining the relationships between Internet use and social networks/connections among adolescents, by testing competing hypotheses proposed in previous research. One hypothesis may explain all relationships for all conditions. However, the present study assumes that Internet use has not just one single effect, and thus tries to find out which hypothesis is supported in certain conditions.

Methodologically, the data utilized in this study have some advantages in examining the relationships between the Internet and social capital (social relationships, closeness, sociability, and reciprocity) among adolescents. The CDS provides rich data regarding young people's social interaction, social relationships, social attitudes and behavior in diverse contexts. Most surveys in the area of media studies, even though they provide good information about media activities, have relatively poor information on children's characteristics and developmental outcomes. However, the CDS data provide not only information about children's media use but also other activity level variables, socio-economic and contextual variables related to children's developmental outcomes, and diverse indicators to measure social capital. The variables used to measure sources of social capital include interaction/communication with family and with friends, closeness with them, connectedness to school, internal behavior problems, time with family and friends, pro-social behavior such as helping and supporting others, and trust.

The present study uses the time diary data (as part of the CDS) which is considered highly reliable, because it is less subject to estimate error from recall and distortions of social desirability than surveys (Nie et al., 2002; Vandewater & Lee, in press). An accurate measure of time and the full count of time which can be obtained from the time diaries are critical to test the displacement hypothesis of time. The research conducted by the Kaiser Family Foundation, *Generation M* (2005), used media-use diaries to measure time spent in media. However, the

research focused on descriptive analysis of media use and multitasking rather than an examination of specific relationships of media use to social outcomes. Most of all, the media use diaries recorded by a self-selected sub-sample of surveys capture the amount of time by 30 minute intervals. For instance, the participants were asked to check which type of media they used during 6:00-6:30. Thus, their data on television viewing, for instance, does not distinguish the difference between viewing for 10 minutes and viewing for 25 minutes.

Nie et al.'s study (2002) which examined whether online time displaces social time also used time diary data, but this data was collected only on adults aged 18 to 64. In addition, the time diaries were recorded for randomly selected six hour time segments. The CDS time diary data is virtually the only existing representative data to measure time children and adolescents spend using the computer and time with family and friends (Vandewater & Lee, in press).

The CDS provides longitudinal data on a nationally representative sample of children and adolescents. This study takes advantage of the uniqueness of the PSID-CDS data, which is especially important, given that there are only a small number of empirical studies to date utilizing representative samples of adolescents in the area of the Internet and young people's social development. In addition, two waves of the CDS data allow consideration of the influence of initial social relationships on Internet use.

In sum, the current study adds to the understanding of social implications of adolescent's Internet and computer use, by examining critical, possible hypotheses regarding the relationships between Internet use and social capital with reliable, representative, and longitudinal data. The next chapter will describe the factors that previous studies have identified as predictors of Internet and computer use, and summarizes four hypotheses around Internet use and social capital. Based on the review, the research questions and models examined in the present study will be significant new additions to our understanding of these problems. Chapter 3 will address the sample of the present study, the measurements of the variables, and analysis plans for each research question and hypothesis. Chapter 4 presents a descriptive analysis of variables and findings from analyses addressing research questions, and summarizes the findings on the hypotheses. The final chapter will discuss the implications of the findings and supported hypothesis, and address limitations and provide suggestions for future research.

Chapter 2: Review of the Literature

ACCESS AND USE OF A COMPUTER AND THE INTERNET

Access to the Internet is considered important for social equity, although the Internet does not always have a positive impact on all individuals, and not all online activities are beneficial. Optimists of technology believe that access to the Internet could get people to overcome existing gaps driven by geography, social class, race, age, and gender, by providing more opportunities to disadvantaged and minority groups. The critical approach emphasizes that unequal access to new technologies is worsening the gap, which is usually collected under the phrase, called the digital divide. Over time, the digital divide, based on income, gender, age, education, and race is bridging, but the gap in access to new technologies within demographic variables is still significant (Katz & Rice, 2002).

The concept of access is evolving along with technological and market development (Livingstone, 2006). The digital divide was at first defined as the gap between those who have access and those who have never used a computer and the Internet anywhere. However, households are now differentiated by access at home, access to broadband, the number of locations they can access, and personal access in their bedrooms (Fox, 2005; Livingstone, 2006). Moreover, access to certain content, service, and applications is getting more important in research on new media and its impacts. The effects depend on what people do

online, that is, the content or services that they access and utilize (Kraut et al., 2002; Mesch, 2003; Papadakis, 2003; Wellman et al., 2001).

The present study assumes that there are some differences in access to new media and in activities users undertake with new media in terms of social, economic, contextual, and individual factors. Thus, this section reviews the socio-economic, neighborhood, familial, and child individual factors that may make a difference in whether children use the Internet at home and what they do online.

Family Economic Status

While young people's access to the Internet is rapidly growing in all demographic groups since the mid 1990s, youth from low income groups have poorer access to a computer and the Internet, particularly access at home, than others (Kaiser Family Foundation, 2004). While schools help bridge the gap in access and use, media availability in a home environment is still differentiated by family income. According to surveys of young people aged 8 to 18 conducted by the Kaiser Foundation, family income is related to differences in computer ownership, Internet connections, Instant messaging programs, and DVRs in a home environment (Rideout et al., 2005). Pew Internet surveys of teens aged 12 to 17 also indicate that teens from the lowest income families are the least likely to report use of the Internet (Lenhart, Madden, & Hitlin, 2005). The digital divide by household income is clearer for younger children. While 95% of children aged 6

months to 6 years from families with income \$75,000 or more have a computer at home, about half (54%) of children from families with income less than \$20,000 have a home computer (Rideout & Hamel, 2006).

Families with higher incomes can afford to purchase home media devices more readily than families with lower incomes. Furthermore, family economic status shapes the way children utilize Internet tools. According to a report from the National Center for Education Statistics, differences in a specific activity with the media are larger than differences in rates of overall use. For instance, compared to children from families with incomes under \$20,000 annually, children who live in families with incomes of \$75,000 or more, are nearly four times more likely to use email at home (DeBell & Chapman, 2006).

Parental Education Level

Katz and Rice argue that concerning access, the digital divide is persistent but declining in all demographic factors except education (Katz & Rice, 2002). It is extremely difficult to solve the gap in access to and use of new technologies caused by users' education levels. Children's access to new technologies is influenced by their parent's educational levels. According to surveys conducted by the Kaiser Foundation, parents' education levels are related to home media availability such as Internet connections, instant messaging programs, and three or more computers (Rideout et al., 2005). Parents' education levels influence time children spend using computers as well. Anand & Krosnick (2005) found that

children of fathers with some college education or who were college graduates spend more time using computers than did children with fathers who had no high school education. Mothers' education level was not related to children's time using the computer.

The higher their parent's education level, the more children engage in almost every type of computer and Internet activity. Particularly compared to children whose parents have not completed high school, children whose parents have any graduate education are four times more likely to use email and instant messaging, and two times more likely to use the Internet for school assignments (DeBell & Chapman, 2006). Given that highly educated parents themselves use the Internet for communication and for learning more than less educated parents, the difference in children's Internet use by their parents' educational level suggests that the ways children use media is shaped by their family practice of media use.

Ethnicity

A child's ethnicity is another factor related to media ownership and media use. According to surveys conducted by the Kaiser Foundation, 80% of White children, 67% of Hispanic children, and 61% of Black children have Internet connections at home. White youth are more likely to spend more time using a computer than Black or Hispanic youth, while there is no significant difference between Black and Hispanic children (Rideout et al., 2005). However, Pew

Internet surveys of teens ages 12 to 17 show that White and English speaking Hispanic teens are more likely than African-American teens to report going online (Lenhart et al., 2005). Among young children aged 6 months and 6 years, differences by ethnicity in access to a computer and computer use are also clear (Calvert et al., 2005; Rideout & Hamel, 2006). Concerning computer activities, White children spend more time instant messaging than Black or Hispanic children, and Black children spend slightly more time playing games than White and Hispanic children (Rideout et al., 2005).

The reason that Black and Hispanic children are less likely than White children to be connected to the Internet is partly because they are from relatively low income families. However, the difference in time spent online and in the type of online activities may also be accounted for by differences in beliefs toward the value of particular media. For instance, African American children tend to watch television more than White American children, and they have more favorable attitudes toward television. Black people tend to prefer programs featuring blacks and identify celebrated blacks on screen with themselves (Bickham et al., 2003; Huston et al., 1992). On the other hand, black people have more negative and skeptical attitudes toward the Internet than Whites. According to Jackson et al.'s study (2003), African Americans were more likely to believe that children could be harmed by using the Internet than were Caucasians, and the negative attitudes were related to less Internet use.

Neighborhood Environment

Neighborhood environment is considered one of the influential factors of children's developmental outcomes as well as their activities or time use. Buckingham (2000) proposes that parents' perception of risk of the outside urge the households to have domestic entertainment media which can displace children's plays on the street. Danger and lack of facilities in neighborhood contexts may make parents purchase media related products for their children's indoor play and increase the likelihood that children spend their leisure time watching television or playing video games. According to Livingstone & Bovill (2002), the media-rich bedroom has multiple faces: a refuge from the dangers of outside world, a threat to constructive leisure activities and family relationships, a private place to express identity and individuality, and a social space for interacting with friends.

However, the access to and use of new technologies may be different from the use of mass media. Given that the digital divide still exists, neighborhood environments distinguished by the socio-economic status of residents and geography may serve as one of the factors that worsens the gap between the haves and have-nots.

Child Age

It is clear that age is positively related to both access to the Internet and time spent online. Older children are more likely than younger children to live in

a house that has an Internet connection and instant messaging on the computer (Rideout et al., 2005). According to the surveys conducted by the Kaiser Foundation and Pew Internet, regardless of the range of children's age, older teens go online more frequently, and spend more time online than younger teens (Anand & Krosnick, 2005; Lenhart et al., 2005; Rideout et al., 2005).

Age may predict what children do with the Internet. According to Lenhart et al. (2001), younger teens (ages 12 to 14) are more likely than older teens (ages 15 to 17) to play or download a game online. Older teens are more likely than younger teens to send email, to use instant messaging, to visit a chat room, to download music, and so forth. Interestingly, the more experience they have online, the more they use instant messaging and email. Kent and Facer found that as age increases, young people are less likely to use the computer for leisure activities, and more frequently for school work (Kent & Facer, 2004).

The difference in online activities by age implies that there are different needs and motives for Internet use depending on age or developmental stage. Motives for Internet use are constructed socially by families and peer groups as well as individually by personal experience with and understanding of the Internet (even though personal experience and understanding is partly affected by social influences, including family and friends). Yan (2006) found that the age of young Internet users was related to technical and social understanding of the Internet; technical understanding had unidirectional effect on social understanding, and the

frequency of using the Internet had small but significant effects on social understanding. The students in grade 4, 5, and 6 showed similar levels of technical and social understanding of the Internet.

Child Gender

Boys are usually earlier adopters of new technologies than girls. In the early days when the Internet was introduced, boys were more connected to the Internet than girls. Now, while gender difference is disappearing concerning access to computers and the Internet, there are still differences in personal ownership of computers and the Internet (Rideout et al., 2005). According to surveys conducted by the Kaiser Foundation, although from 1999 to 2004 the proportion of young people's ownership of personal media increased, the increase was greater for boys. Particularly, in terms of Internet connection, only boys showed a significant increase.

Research identifies gender differences with regards to type of activity done on a computer and the Internet (Kent & Facer, 2004; Lenhart, Rainie, & Lewis, 2001; Rideout et al., 2005). For instance, boys are more likely than girls to play games, to download music, to search for hobby information and sports news, and to trade online. Girls are more likely than boys to surf websites, to use instant messaging, and to search for health and dieting information. Kent & Facer found that among English children, the greatest difference by gender was shown in

online gaming, but there was no difference in sending email, talking in chat rooms, and use of the Internet for school-related information.

Gross (2004) challenged the dominant belief of gender differences in online activities such as games and instant messaging. She found that there were no statistically significant difference between female and male adolescents in time spent in online games and instant messaging, after excluding 14 heavy game players – consisting dominantly of boys – as outliers (5% of the sample). That is, she argues that among normal adolescents excluding outliers, boys' and girls' online activities are more similar than different (Gross, 2004). Statistically outliers with extreme scores can a substantial effect on the magnitude of relationships (Bobko, 2001). However, an outlier is a relative definition, and furthermore heavy users are one type of user group which exists in reality, thus should be examined rather than excluded in the analysis.

While it has been assumed that boys are better at using technology than girls, empirical findings are mixed with regard to gender differences in skills of computer and the Internet. According to Livingstone (2006), boys have been online for longer and have higher levels of online skill than girls. Regardless of technological skills, they take more risks online than girls, because they are more likely to seek out pornographic and violent web sites on purpose and by accident. However, Yan (2006) found that there was no difference in technological and social understanding of the Internet by gender. Differences in skills or usability

may not explain the differences in the way boys and girls use a computer and the Internet.

Summary

The factors which may make a difference in access to and use of the Internet were reviewed: Family economic status, parental education level, ethnicity, neighborhood environment, child's age and child's gender. While almost all children and adolescents have a chance to use a computer and the Internet at school or in a library, a gap still exists in terms of personal ownership, the quality of access, and the type of computer and online activities one does. Descriptive studies identify differences in specific activities done on a computer and the Internet by their socio-demographic status. However, little is known about the statistical significance of the differences and which factors are the most significant. In addition, even though the family systems approach argues that children and adolescents' Internet use at home is shaped by family contexts, little is known about the relationships of parents' working schedule to children's Internet use.

THE INTERNET AND SOCIAL CAPITAL

Increases in interaction and communication with others, formation of close relationships, and improvement of sociability, which increase social capital, are important developmental tasks in childhood and adolescence. Social capital can be defined as an actor's ability to get benefits from resources embedded in social networks and relationships as a member of a group. An individual's social capital depends on the size of social networks and the volume of resources possessed by each of those to whom he is connected. For an actor to get benefits from one's existing social networks, the networks should be based on internalized norms, bounded solidarity, reciprocity, and enforceable trust (Bourdieu, 1985; Portes, 1998). The Internet may influence social capital by increasing or decreasing the size of social networks, improving or degrading solidarity, reciprocity, and trust of the existing social network, and increasing or decreasing resources (e.g. information) embedded in the networks.

The current study discusses the likelihood of the Internet to increase or decrease social capital by examining the impact of the Internet on young people's existing social networks – family, peer, and school networks. Given that the primary place of computer and Internet use is at home, and students' use of a computer and the Internet at the school environment is limited and structured by a teacher's curriculums and a limited number of computers (Kerawalla, & Crook, 2002), this study focuses on more dynamic computer and online activities in the

home environment. This section reviews four hypotheses that explain the association between Internet use and its likelihood to increase or decrease social capital: (1) the *displacement* hypothesis, (2) the *increase* hypothesis, (3) the *rich get richer* hypothesis, and (4) the *social compensation* hypothesis.

Displacement Hypothesis

The Internet may be harmful to young people's social development because online time displaces time they would spend interacting with families and friends, and weak ties formed online displace strong ties offline. The displacement hypothesis has been one of the most dominant hypotheses explaining the negative effects of media on children's development. This argument is based on a zero-sum assumption of time use. That is, people have limited time, thus time spent in one activity interferes with time that would be spent in another activity. While all activities are not displaced by media use, some studies empirically found that social interaction is one valuable activity that is displaced by media use. For instance, Vandewater, Bickham, and Lee (2006) found that time children spent viewing television displaced time spent interacting with families. In addition, Nie et al. (2002) found that time people spent using the Internet displaced time spent with family and friends.

One of the earlier studies prompting the displacement hypothesis of Internet use and social interaction is Kraut et al.'s research in 1998. Their research, called the HomeNet study, used longitudinal data to examine the relationship

between Internet use, social involvement, and psychological consequences. They found that greater use of the Internet was associated with declines in family communication and the size of the local social circle, and increases in loneliness and in depression (Kraut et al., 1998). Despite some limitations, such as a small sample size in one city (Pittsburgh), panel attrition, the possibility of exposure to factors like history and maturation, and no control group, their study has been frequently cited in the press and in other academic papers, which have amplified public concerns about the harmful effects of Internet use.

Nie et al. (2002) also present arguments for the displacement effect of Internet use. They used a time diary approach, criticizing that most studies use inaccurate measures of time spent in Internet use. Their time diary data showed that greater Internet use was related to less time spent with family and friends (Nie et al., 2002). While there is no study using time diaries to examine displacement of time among adolescents, some studies based on surveys suggest that adolescents' Internet use is negatively related to family relationships. For instance, Mesch, who studied Israeli adolescents' Internet use, found that Internet use was negatively related to family closeness, and positively related to family conflicts (Mesch, 2003, 2006).

Some studies focus on the quality of online communication (Cummings, Butler, & Kraut, 2002; Gross, Juvonen, & Gable, 2002; Parks, 1996). For instance, Cummings, Butler, & Kraut (2002) argue that people perceive email as a less

useful means for developing and maintaining close social relationships than face-to-face contact and telephone conversations, and the listservs as less valuable than offline small groups for establishing a sense of belonging and for gaining social support. The perception of inferiority of online communication may result from a lack of social cues and absence of physical proximity.

In sum, the displacement hypothesis has been supported by findings that time online is negatively related to time in face-to-face interaction, that online communication is less useful than face-to-face communication, and that Internet use is negatively related to the existing intimate relationships such as families. However, these findings should be interpreted with caution: First, time displacement is not enough to account for the negative influence of Internet use on the quality of relationships. Second, even though online communication is inferior to face-to-face communication, online communication can serve as an additional, not a trade-off, to face-to-face communication. Particularly in certain situations such as remote relationships, online interaction is an alternative to face-to-face interaction. Third, even though online relationships are not as strong as offline relationships, weak ties online may be able to serve as social resources for adolescents. As social network theorists suggested (Burt, 2001; Granovetter, 1982; Lin, 2001), weak ties which bridge two different social groups can contribute to social capital by facilitating the flow of information among groups.

Increase Hypothesis

The increase hypothesis suggests that Internet use increases social interaction, the size of social networks, and closeness with others, as a means of maintaining existing social ties and creating new ones. The positive perspective of Internet use is based on the potential of the Internet as an interactive media that can connect people to people while overcoming the barriers of time and place. In addition, the characteristics of the Internet such as anonymity and lack of social cues may facilitate users initiating new relationships. The increase hypothesis of the impact of the Internet on social relationships and social networks is supported by the following empirical studies.

Most studies supporting the increase hypothesis start from factual statistics indicating that one of the main activities with the Internet is communication through email and instant messaging (Gross et al., 2002; Howard, Rainie, & Jones, 2001; Lenhart et al., 2005; Lenhart et al., 2001). That is, they emphasize the fact that people use the Internet to interact with families and friends, and sometimes with strangers. Wellman et al. (2001) found that frequent Internet users were more likely to contact friends and relatives via email than were less frequent users, while contact via email did not reduce the frequency of face-to-face contact and phone calls.

Unlike the findings of their earlier study in 1998, Kraut et al.'s follow-up study with the original sample in 2002 found that the negative relationships

between Internet use and family communication and size of social network were no longer significant. In addition, the analysis of a new sample consisting of recent purchasers of computers and television presented that those who used the Internet had larger increases in face-to-face interaction with friends and family, in the size of the local social circle, and in the size of the distant social circle. Particularly for teens, their frequent use of the Internet increased family communication and social support. Shklovski et al. (2004) suggest that offline interaction stimulates, rather than is stimulated by, online interaction. They found that visiting a family member increased the frequency of emailing that person, while emailing neither increased nor decreased the frequency of communicating by phone or in person (Shklovski, Kraut, & Rainie, 2004).

The studies focusing on adolescents' Internet use consistently present the idea that instant messaging is used as an additional communication tool rather than displacing the telephone (Gross, 2004; Gross et al., 2002; Lenhart et al., 2005; Lenhart et al., 2001). Most instant messaging partners are friends or best friends from school. Their online interactions occur in a private setting, with friends who are part of their daily offline lives, with ordinary yet intimate topics. Their communication of intimate topics may strengthen their closeness with friends, as shown in Valkenburg & Peter's findings that adolescents with a high frequency, intensity, and rate of chatting felt closer to their friends (Valkenburg &

Peter, 2005). Children's contact with strangers through instant messaging and chatting is not likely to happen as frequently as parents may believe (Gross, 2004).

Adolescents may improve their social relationships not only through online communication activities, but also by utilizing the Internet as a source of shared activities and common culture among peer groups. Some ethnographic studies suggest that children use online games together with their friends, and information and ideas gathered online are used as common topics for offline interaction (Orleans & Laney, 2000; Suoninen, 2001; Valentine & Holloway, 2002). Adolescents not only use email, instant messaging or chatting for the purpose of social activities and communicating with their friends, but online activities such as games and information may promote interaction and communication with friends.

The social and psychological consequences of the Internet may depend on the purposes for which people use the Internet. Mesch (2003) found that adolescent Internet use for learning is positively related to perceived closeness to parents, although overall Internet use is negatively related (Mesch, 2003). Weiser (2001) found that Internet use for social purposes was negatively related to social integration. However, Internet use for information gathering was positively associated with social integration, which was positively related to psychological well-being. Given that these studies are based on cross-sectional data, the relationship may function in the opposite direction: for instance, adolescents who

have close relationships with parents may tend to use the Internet for learning as a positive outcome of parental mediation, or people with less social integration may use the Internet for social purposes more frequently. The next two hypotheses, the rich get richer hypothesis and the social compensation hypothesis, discuss whether socially integrated persons or socially isolated persons use the Internet more frequently, particularly for the purposes of communication, and who benefits more from Internet use.

Rich Get Richer Hypothesis

The rich get richer hypothesis, which was first suggested by Kraut et al (2002), proposes that those who already have strong social networks and social skills benefit the most from the Internet. This hypothesis suggests that the increase hypothesis applies only to people who already have strong social capital. Or, one's existing social capital is a factor which may increase Internet use, providing some benefits to users. We can observe that the digital divide occurs in the area of social interaction, social network, or social capital. Wealthy and highly educated individuals or families are more likely to be connected to the Internet; they have more ability and means to utilize the Internet for their purposes, and thus they can get more benefits socially, economically, and politically from the Internet than poor or uneducated people. Similarly, socially connected persons may have more social motivation and skill to use the Internet for maintaining and enhancing their social capital compared to socially isolated persons.

This hypothesis can be elaborated when we test two propositions separately: First, even if all types of people use the Internet, socially integrated people or sociable persons may get more benefits from Internet use than socially isolated individuals. Second, socially integrated persons or extroverts are more likely than socially isolated persons or introverts to use the Internet more frequently, which in turn is helpful in developing and maintaining social relationships or improving social and physiological well-being. The former addresses the moderation of initial social ties and sociability on the impact of Internet use on social capital. The latter asserts that initial social ties and sociability are an antecedent variable to Internet use, and Internet use mediates changes in social ties and sociability over time. It can be examined by path analysis among initial social ties and sociability, Internet use, and later social ties and sociability.

Kraut et al. (2002) suggest that initial social connection or competence functions as a moderator based on the interaction effect of Internet use with extroversion. They found that Internet use was associated with better outcomes for extroverts and worse outcomes for introverts. For extroverts, using the Internet was related to increases in well-being, including increases in self-esteem, and decreases in loneliness, negative affect, and perceived time pressure. In contrast, introverts showed decline in well-being associated with these same variables (Kraut et al., 2002).

Some studies suggest that existing social connection or competence may be an antecedent variable of Internet use. For instance, Gross et al. (2002) found that teens with strong connections to school-based peers use the Internet to seek out additional opportunities to interact with them, while teens who felt lonely and socially anxious tried online communication with strangers. The Pew Internet survey also found that buddy list size was directly related to the intensity and duration of instant messaging use (Lenhart et al., 2005). Bryant, Sanders-Jackson, and Smallwood (2006) found that adolescents who had more friends were more likely to use instant messaging than those had fewer friends. Valkenburg and Peter (2005) performed path analysis to examine which hypothesis, between the rich get richer hypothesis and the social compensation hypothesis, is appropriate in explaining adolescents' Internet use and friendships. They found that social anxiety was negatively related to online communication, which in turn was positively related to closeness to peers (Valkenburg & Peter, 2005). That is, their path analysis supports the rich get richer hypothesis. In sum, they argue that online communication contributes to the solidarity of peer group networks for sociable adolescents, because sociable adolescents are more likely than socially anxious adolescents to use online communication more frequently. However, because of cross-sectional data, we cannot identify causal relationships between initial social resources or sociability and Internet use.

Social Compensation Hypothesis

The social compensation hypothesis, proposed as the opposite model of the rich get richer hypothesis in Kraut et al.'s study (2002), states that the Internet is more beneficial for socially anxious and isolated people. The Internet may compensate for lack of a social network offline because socially anxious people may feel more at an advantage in developing intimate relationships online. Kraut et al.'s proposal of the social compensation hypothesis is rooted in McKenna & Bargh's conceptual framework describing how online interaction compensates for lack of sociability and social network (McKenna & Bargh, 1999). Stigmatized identity, constrained identity, social anxiety, and loneliness serve as motivators for online interaction. The characteristics of the online environment such as text-based communication, lack of visual and auditory cues, and anonymity facilitate disclosure of a true or idealized self, gaining intimacy with others through self-disclosure, and formation of new relationships. As a consequence, social networks increase, and loneliness and depression should decrease.

McKenna & Bargh's theoretical argument is partly supported by several empirical studies. McKenna, Green, & Gleason (2002) found that better self-disclosure over the Internet was related to formation of close online relationships, and moved to face-to-face relationships. In addition, studies examining introverts' attitudes toward online communication support the conceptual model about motivation of online communication. For instance, Goby (2006) found introverts

more strongly agreed that online modes of communication offered greater freedom of expression. In addition, the proportion of adolescents choosing online communication for interactions with friends was higher for introverts than for extroverts. Stritzke et al. (2004) found that shy people had much lower level of shyness, lower levels of rejection sensitivity, and higher levels of interpersonal competence in initiating relationships online than offline. Bessiere, Kiesler, Kraut, and Boneva (2006) examined the interaction effect between initial social resources and Internet use on depression. They categorized the type of Internet use by the purpose for Internet use and found different results by type of Internet use. According to their findings, while overall Internet use was not related to users' well-being, using the Internet for meeting people reduced depressive affect for people with low initial social resources. Their findings suggest that who gets benefits from Internet use may depend on users' motivations or purposes.

Summary

This chapter reviewed the four hypotheses that discuss whether Internet use contributes to or damages social relationships. Table 2-1 summarizes the main empirical studies concerning social outcomes of Internet use. The table includes the year the data collected, the age of the sample, sample size, research design (cross-sectional or longitudinal), measure of Internet use, and measures of social outcomes.

The *displacement* hypothesis proposes that the Internet displaces social interaction and strong ties offline, thus increasing isolation and depression. Kraut et al's study in 1998 amplified concerns about the displacement effects of the Internet on social and psychological well-being, and has been frequently cited. However, their findings were rejected by their follow-up study in 2002, which suggests positive effects of Internet use. They noted that maturation of participants, changes in the way they used the Internet, and changes in the Internet environment itself might explain the changes in the findings of their two studies.

Additionally, the social impacts of the Internet may be different by the type of social relationships (family relationships vs. friendships), and the type of research design (cross-sectional vs. longitudinal). Shklovski, Kiesler, and Kraut's meta-analysis of 16 surveys shows that people's Internet use is not related to their interaction with family members. For the impact on friendships, cross-sectional designs show the negative relationships between Internet use and interaction with friends, and longitudinal designs suggest that more Internet use is associated with a slight increase in interaction with friends over time (Shklovski, Kiesler, & Kraut, 2006). However, most studies focusing on adolescents' Internet use, even though they are cross-sectional, found that adolescents used the Internet to maintain relationships with peers. Because young people's Internet use happens in the home environment, time spent on the Internet may decrease time in face-to-face interaction with family members. Moreover, they use online communication to

contact friends rather than families. That is, adolescents may use the Internet in the home environment in order to be connected to people beyond the home boundary.

Table 2-1. Empirical Studies about Social Outcomes of Internet Use

Study	Data Year	Sample Age	Sample Size	Design	Measure of Internet Use	Findings (direction of relationships)
Kraut et al. (1998)	1995 1996	10+	69	L	Amount of time recorded by computer software	Family communication (-) Size of local social network (-) Size of distant social network (-) Social support (n.s)
Wellman (2001)	1998	Online visitors	39,211	C	Frequency	Contact to friends (+) Contact to relatives (+) Participation (+) Commitment to online community (-)
Weiser (2001)		Undergraduate students	435	C	Frequency of use for social purposes	Social integration (-)
					Frequency of use for information	Social integration (+)
Lenhart et al. (2001)	2000	12-14	754	C	Self-report of Internet impacts	Family relationships (-)
Lee & Kuo (2002)	1999 2000	Secondary school	817	L	Amount of time by self-report	Interacting with family (n.s.) Interacting with friends (+)
Nie et al. (2002)	2001	18-64	6146	C	Time diaries	Time with family (-) Time with friends (-)
Gross et al. (2002)	2001	12, 15	261	C	Frequency	Social anxiety (n.s) Loneliness (n.s.)
Kraut et al. (2002)	1998 1999	13+ (original HomeNet sample)	208	L	Amount of time	Family communication (n.s.) Size of local social circle (n.s.) Size of distant social circle (n.s.)
	1998 1999	10+ (New buyer	403	L	Frequency	Face to face interaction (+) Size of local social circle (+)

		of computer and TV)				Size of distant social circle (+) Family communication (+) Social support (+)
Mesch (2003)	2000	13-18	569	C	Frequency of overall use	Time with family (n.s.) Closeness to parents (-)
					Frequency of educational use	Closeness to parents (+)
Shklovski et al. (2004)	2000	18+	1501	C	Frequency of Internet use	Calling friends & relatives (n.s.) Visiting (n.s.), Going out to dinners with people (+) Social support (n.s.)
	2000, 2001	18+	1501	L	Frequency of Internet use	Visiting (-)
	2000, 2001	18+	432	L	Visiting	Emailing (+)
Gross (2004)	2001	12, 15	261	C	5 point scale for amount of time	Loneliness (n.s.) Social anxiety (n.s.) Depression (n.s.) Daily life satisfaction (n.s.)
Peter, Valkenburg & Schouten (2005)		9-18	493	C	Frequency of online communication	Online friendship formation (+)
Valkenburg & Peter (2005)		10-17	816	C	Online communication: How many days, how many time, and how long on the last day	Closeness with friends (+)
Mesch (2006)	2000	12-18	396	C	Frequency	Family time (-) Family conflict (+)

Zhao (2006)	2000	18+	2,817	C	Email & Chat	Contact with friends (+)
Bessiere et al. (2006)	2000 2002	13-94	1,222	L	Frequency for overall use	Depression (n.s)
					Use to meet people	Depression (-)
Williams (2007)			884	C	Global estimates of online time per week	Offline bridging (-) Offline bonding (-) Online bridging (+) Offline bonding (+) Depression (n.s.) Diverse interaction online (+)

The present study adds to the existing literature in three ways: (1) by enhancing construct validity of social relationships, (2) by assuming different effects by the type of online activities based on their purposes and (3) by elaborating the rich get richer and social compensation hypotheses through the moderation model and the mediation model. In other words, the present study examines diverse social outcomes including quantitative measures (e.g. time spent together), and qualitative measures (e.g. closeness, support, connectedness, and trust). The outcomes will be predicted not by overall Internet and computer use but by different types of Internet and computer use. The rich get richer and social compensation hypotheses will be elaborated by examining whether these hypotheses are supported by interaction effects of sociability and Internet use on social outcomes, or by the linear relationships among sociability, Internet use, and social outcomes. To summarize, the main research questions are: (1) among socio-economic, neighborhood, family, and child characteristic factors, which factors are more strongly related to the type of adolescents' Internet and computer use?; and (2) which of the four hypotheses predicting social outcomes from Internet use – displacement, increase, rich get richer, and social compensation hypotheses – is most supported by the data?

The conceptual models of each hypothesis regarding the relationships between Internet use and social outcomes can be summarized as follows.

Displacement Hypothesis

- (1) Time displacement: Time spent in using a computer is negatively related to time with parents and time with friends.
- (2) Displacement of social relationships in terms of quality: Internet and computer use is negatively related to social relationships offline

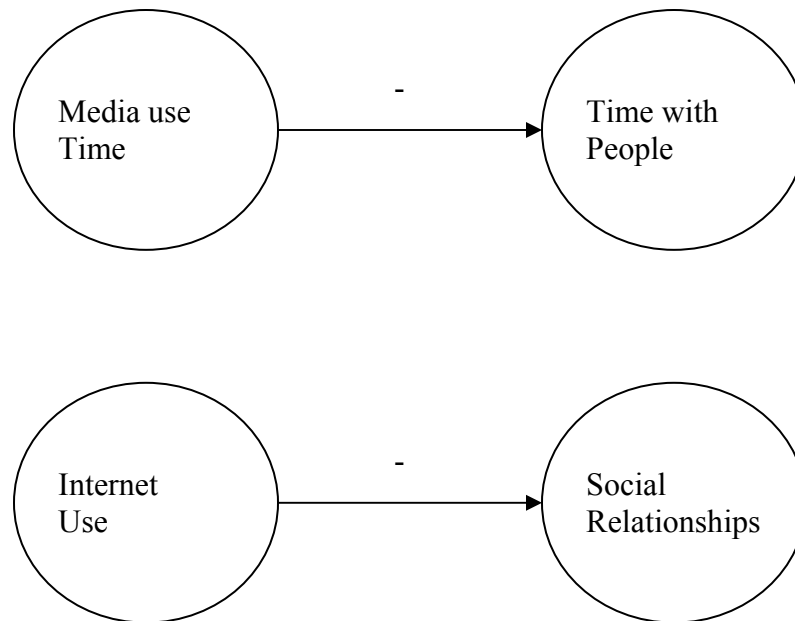


Figure 2-1. Conceptual Model for the Displacement Hypothesis

Increase Hypothesis

Internet and computer use are positively related to social relationships and general social attitudes

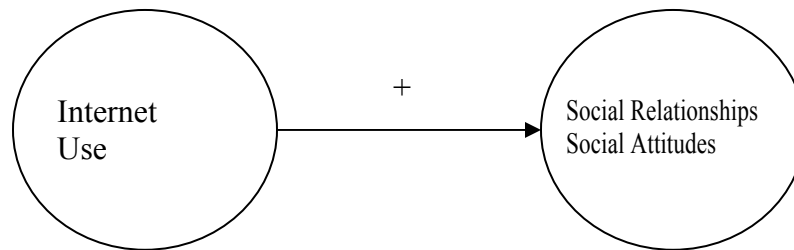
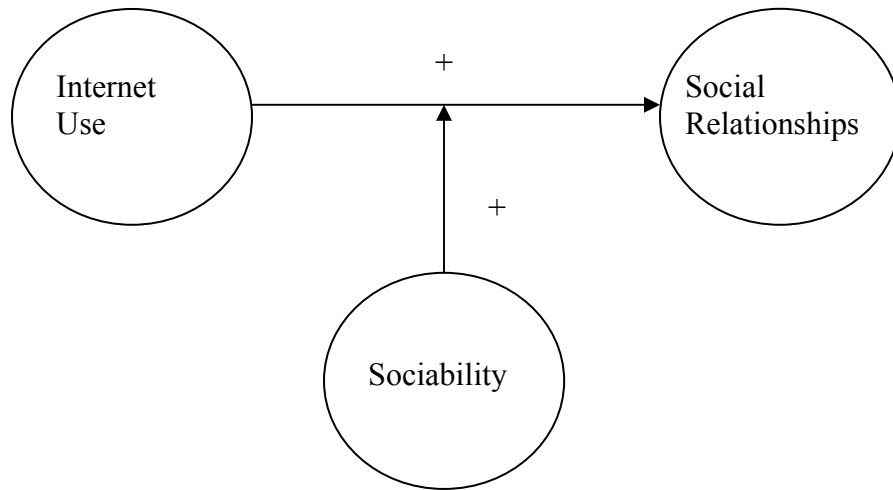


Figure 2-2. Conceptual Model for the Increase Hypothesis

Rich Get Richer Hypothesis

(1) *Moderation model*: Internet use is positively related to social relationships for those who already have strong social ties and sociability.



(2) *Mediation Model*: Initial social ties and sociability are positively related to Internet use, which in turn is positively related to social relationships.

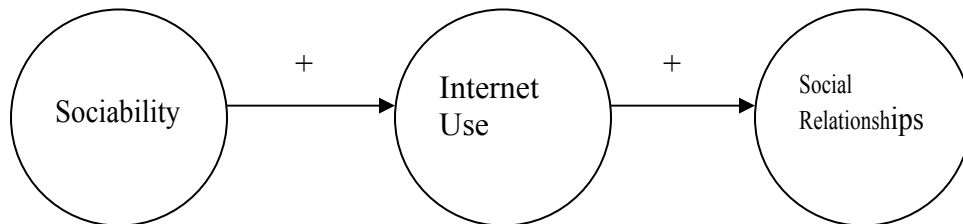
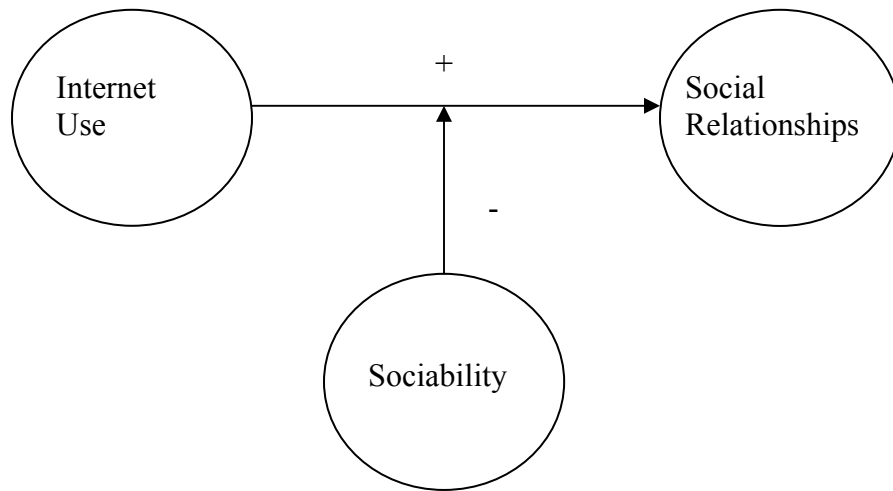


Figure 2-3. Conceptual Model for the Rich Get Richer Hypothesis

Social Compensation Hypothesis

(1) *Moderation model*: Internet use is positively related to social relationships for those who have weak social ties and poor sociability.



(2) *Mediation Model*: Initial social ties and sociability are negatively related to Internet use, which in turn is positively related to social relationships.

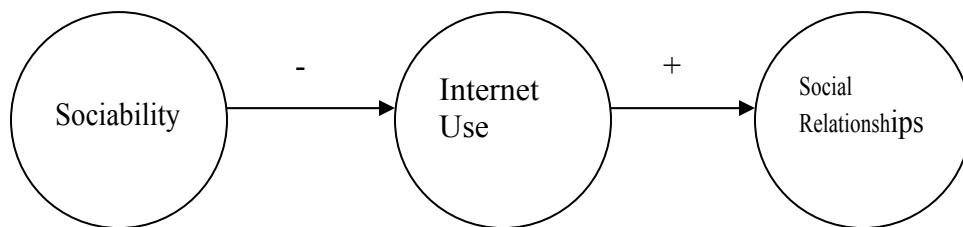


Figure 2-4. Conceptual Model for the Social Compensation Hypothesis

Chapter 3: Method

DESCRIPTIONS OF SAMPLE AND MEASURES

The CDS Sample and Subsample

Data for this study come from the Panel Study of Income Dynamics (PSID) – Child Development Supplement (CDS). The PSID, began in 1968, is a longitudinal study of a representative sample of U.S. individuals and their families. It focuses on the transfer of capital within families. In 1997 (Wave 1), data was collected on 0- to 12-year-old children and their parents (3,563 children), focusing on children's developmental outcomes within the context of family, neighborhood, and school environments. In 2002-2003 (Wave 2), CDS recontacted the families and children, and interviewed 2,907 children and adolescents aged 5 to 18 years (See <http://psidonline.isr.umich.edu> for further details regarding measures and procedures). Appropriately weighted, these data provide nationally representative estimates.²

² See <http://psidonline.isr.umich.edu/CDS/weightsdoc.html> & <http://psidonline.isr.umich.edu/CDS/weightsdoc.html> for a detailed discussion of sampling procedures and sample weight (“The PSID consists of two separate samples, a nationally representative sample of U.S. households designed by the University of Michigan Survey Research Center and an oversample of low income, mostly African-American, families from the Survey of Economic Opportunity. The analysis of weights constructed for the CDS I are the product of three factors: 1) a household selection weight which is the inverse of the household's probability of selection; 2) a poststratification factor which adjusts the sample household totals to the 1997 Current Population Survey estimates total for forty-eight demographic/geographic cells, and 3) a within household selection weight which is the inverse of the probability of selection of the child from the set of children age 1-12 in the family.” “The CDS II weight is a product of CDS I weight and the attrition adjustment factor.”)

The CDS data were collected through diverse methods including a time diary, interviews with children, interviews with primary caregivers about a target child and about the household, interviews with teachers, and interviewer observations. The child's family level data, including information about family income and parental education, are provided in a demographic file. The primary caregiver interview about the household provides information about the neighborhood environment and media availability within a household. The child interview, in which children at least 8 years old were eligible to participate, provides information about child's media use, social relationships, interactions, closeness within family, friends, and school contexts, and their well-being. The primary caregiver interview about the child provides information about media access and use and child's social behavior problems. The time diary data provide information about all the activities of each child during 24 hours on one randomly selected weekday and one weekend day.

The current study focuses on adolescence, because this developmental stage is widely accepted as a time in which individuals spend a great deal of energy creating and maintaining social relationships. Among the 1,468 adolescents aged 12 to 18 in the CDS II sample, 89% participated in the child interview, which provides data regarding the frequency of Internet use for specific purposes. The present sample consists of all the adolescents who answered the frequency of Internet use. Missing values on other variables were handled by full

information maximum likelihood estimation. Thus, the sample size for this study is 1,312 adolescents aged 12 to 18.

Measures of Adolescent Internet and Computer Use

All questions in the dataset are reproduced in Appendix A. Information on children's Internet and computer use is drawn from the child interview and the time diary data. In the child interview, adolescents were asked if they had ever used the Internet. If they said yes, the adolescents were asked to report how often they used the Internet for any of the following purposes in the last month: (1) to visit websites, (2) to use email, (3) to use a chat room or instant messenger, (4) to do research for school work, and (5) to play games. The scale ranged from 1 to 6 (1: never, 2: once or twice in the last month, 3: about once a week, 4: two or three times a week, 5: almost every day, 6: everyday). Ninety-six percent of the sample said they used the Internet, and 3.6% (n=47) responded they had not. In order to include the adolescents who had never used the Internet, those who responded "no" were coded as 1 (never) for the question regarding how often they use the Internet for visiting websites, using email, using a chat room/IM, doing research for school work, and playing games.

The time diary captures adolescents' computer use. Each child completed two time diaries, one for a weekday and one for a weekend day. These days were randomly selected when the interviewer completed the initial contact for the household. On the diary, every minute of the two 24-hour periods was accounted

for with a primary activity and, if applicable, a secondary activity. Children were also asked who was doing the activity with them and who was there but not participating directly in the activity. Children's computer use was calculated by summing the minutes spent using a computer on a weekday and a weekend day. The coding did not distinguish Internet use from computer use, but computer use was separately coded: (1) computer communication, (2) computer use for study and school work, (3) computer games, and (4) other recreational computer activities. Computer communication includes email, computer/video/speaker phone, Internet phone, teleconferencing, chat rooms, instant messaging, and e-cards. Computer use for study includes using a computer for homework, studying, research, and reading related to classes. Other recreational computer activities included surfing the net, downloading pictures, music, movies, burning CDs, watching DVDs on computer, and creating/programming.

The time diary is considered a highly reliable and valid method for large scale surveys to capture time an individual spends in a certain activity. However, because a time diary is typically collected for a single day or two days, it is good at capturing daily activities, but it underestimates the activities which do not occur daily (Elizabeth & Lee, in press). While CDS time diary data is the only existing representative data about children's whole daily activities including media use, it has the same problem. CDS time diaries for two days suggest that 38% of children ages 8-18 spent time using a computer on those days, and 62% spent zero

minutes. These are not missing cases, but they have an actual value of zero. There is no problem in calculating the average time American adolescents ages 12-18 spend in computer use, and in examining the displacement of time or trade-offs of activities that happen on the same days. However, we need to be cautious when analyzing time using a computer as a dependent variable in the regression model. Given that regression analysis assumes a normal distribution for the dependent variable, use of data with a large proportion of zero values may distort the results. Thus, this semicontinuous data was handled by creating a binary variable and a continuous variable (Muthén & Muthén, 2006).

In sum, this study uses three types of measures of Internet and computer use: frequency of Internet use from the child interview; zero time and greater than zero time spent on the computer from the time diaries (binary variable) ; and the amount of time spent in computer use (continuous variable). Internet use includes visiting websites, email, chat/IM, use for school work, and online games.

Measures of Predictors of Adolescent Media Use

The CDS data contains socio economic status, neighborhood, family, and child level variables that address whether youth use new technology or not, how often, how much, and for what purposes. The variables include: a family income to needs ratio, parental education level, ethnicity, parent's work hours, neighborhood quality, child age, and gender.

Family income to needs ratio: The income to needs ratio is calculated by dividing each family's reported total income by the poverty threshold. The census bureau reports annual poverty thresholds appropriate for the size of family and the number of children. Thirteen percent of the sample falls below the poverty level (i.e. income to needs ratio is equal to one and less than one). This reflects a nationally representative estimate.

Parental education level: The head of each child's household was asked the number of years of education he or she had completed (1 to 17 years). Seventeen percent of the heads of households had not graduated high school, 29.5% had a high school diploma, 22.1% had some college, and 26.5% had attained a bachelor degree or higher.

Ethnicity: Ethnicity was coded as a series of dummy variables with White as a reference group (Black ; Hispanic; and Asian and others). Sixty-three percent of the sample was White, 17.6% were Black, 13.5% were Hispanic, and 6.2% were Asian, Native American, and others.

Neighborhood quality: Neighborhood quality was measured by two items, asking the primary caregiver "how would you rate your neighborhood as a place to raise children? (1: poor, 2: fair, 3: good, 4: very good, 5: excellent)," and "how safe is it to walk around alone in your neighborhood after dark? (1: extremely dangerous, 2: somewhat dangerous, 3: fairly safe, 4: completely safe)." Because the range of scales for these two questions is different, standardized scores for the

two variables were calculated. The mean standardized score is used as the score for the neighborhood quality index ($\alpha = .65$).

Father's work hours: The household heads' report on the average of their own work hours per week was used.

Mother's working status: Thirty-nine percent (38.7%) of the wives did not work at all. While father's work hours were used as a continuous variable, mother's working status was coded as a dummy variable (employed, not employed).

Child's age: Child age is calculated in years (from 12 to 18).

Child's gender: Child gender is coded as a dummy variable, where boys are coded 0 and girls are coded 1. Half of the sample (49.4%) were boys and half (50.6%) were girls.

Measures of Initial Sociability

Initial sociability includes two variables, social relationships and internalizing behavior problems, which were measured by the primary care giver's report at Wave 1.

Social relationships (Wave 1): The quality of social relationships include four items assessing a child's relationships with friends, with the primary caregiver, with the other parent, and with a teacher. The scale ranged from 1 (poor) to 4 (excellent), and the mean score of the items was used as the score of earlier social relationships ($\alpha = .66$).

Internalizing behavior problems (Wave 1): The measure for internalizing behavior problems is a sub-scale of the Behavior Problem Index (BPI) which was originally developed by James Peterson and Nicholas Zill from the Achenbach Behavior Problems Checklist (User Guide for CDS II). The internalizing behavior problem measure includes a set of 14 behaviors such as feeling that no one loves him/her, high strung/tense/nervous, and too fearful/anxious ($\alpha = .82$). Complete items are in the Appendix B. A primary caregiver was asked whether these behaviors were not true, sometimes true, or often true of the target child. The sum of 14 items was used as a score of earlier internalizing behavior problems.

Measures of Social Outcomes

Social outcomes measured in this study refer to the quality of social relations of an individual's exiting social network, which serve as sources generating social capital. That is, for an individual as a member of groups to benefit from resources possessed by others linked to social networks, the network should be based on solidarity/cohesion, reciprocity and trust. These elements can be captured by cohesion and connectedness among members.

Cohesion with parents was operationalized in four ways: conversations with parents about their social life; self-report of perceived closeness; behavioral support and help to parents; and time interacting with parents.

Conversation with parents about their social life: This was measured by three items assessing the frequency of a child's conversation with his/her mother

about his/her social life, such as “in the last month, how often did you talk with your mother/stepmother about things that are going with your friends; about your plans for the future; about problems you are having in school?” The questions about frequency in conversation with the father were asked as well. However, forty percent of the children reported they did not live with their father, and as a result 40% of the sample did not respond to conversations with a father items. Thus, conversation with parents included only three items asking about conversations with their mother in order to maintain the sample size. The scale ranged from 1 (never) to everyday (6), and was created by the mean score of the items ($\alpha = .72$).

Closeness to parents: This variable was measured by asking a child, “How close do you feel towards your mother?” The scale ranged from 1 (not very close) to 4 (extremely close).

Support to parents: Adolescents were asked to report in the last six months how often they have helped their parents with things they had to get done such as chores and running errands; and how often they have provided emotional support to their parents such as making them feel better when they were sad. The scale ranged from 1 (almost never) to 7 (everyday), and was created by the mean score of the four items.

Time with parents: Time with parents was measured by using the time diaries to indicate the amount of time the child spent with either parent while

doing an activity together on one weekday and one weekend. However, the time that the child used the computer with either parent was subtracted from the total amount of time they spent with parents. This is to prevent overlap between independent and dependent variables.

Cohesive friendships were operationalized in four ways: conversations with friends about their social life; self-report of perceived closeness to friends; behavioral support to friends; and time interacting with friends.

Conversation with friends about one's social life: This was measured by three items assessing the frequency of a child's conversation with his/her friends about his/her social life, such as "in the last month, how often did you talk with your friends about things that are going with your friends; about your plans for the future; about problems you are having in school?" The scale ranged from 1 (never) to 6 (everyday), and was created by the mean score of the items ($\alpha = .73$).

Closeness to friends: This variable was measured by asking a child, "How close do you feel towards your friends?" The scale ranged from 1 (not very close) to 4 (extremely close).

Support to friends: Adolescents were asked to report in the last six months, how often they have helped their friends with things they had to get done, such as homework or chores, and provided emotional support to their friends such as giving them advice on a problem or making them feel better. The scale ranged

from 1 (almost never) to 7 (everyday), and was created by the mean score of the four items.

Time with friends: Time with friends was measured by using the time diaries to indicate the amount of time the child spent with friends while doing an activity together on one weekday and one weekend. However, the amount of time that the child used a computer with friends was subtracted from the total amount of time they spent with friends.

General Social relationships beyond the family and friends boundaries include three measures: connectedness to school, social trust, and internalizing behavior problems.

Connectedness to school was measured by three items assessing the degree of inclusiveness, closeness, and happiness at school. The questions included: “in the last month, how often did you feel like you were part of your school; close to people at your school; and happy to be at your school?” The scale ranged from 1 (never) to 6 (everyday), and was created by the mean score of three items ($\alpha = .64$).

Social trust was measured by four items adapted from the MacArthur MIDUS Youth (User guide for CDS-II). They were asked to report in the last month, how often they felt that people are basically good; that the way our society works made sense; that they have warm and trusting relationships with other kids;

that our society is becoming a better place. The scale ranged from 1 to 6, and was created by the mean score of four items ($\alpha = .79$)

Internalizing behavior problem measure was based on the primary caregiver's reports of a child's behaviors in Wave 2. The items used to measure internal behavior problems in Wave 2 were the same as in Wave 1. They included feeling that no one loves him/her, having trouble getting along with other people his/her age, and feeling worthless ($\alpha = .83$). The sum of all the items was used for the measure of internalizing behavior problems.

ANALYSIS PLAN

Overarching Analytic Strategies

The structure of the CDS data demand specific analytical attention.

Sampling weight. The CDS data are based on an oversample of low income families, mostly African Americans. In addition, as a panel study, CDS II data has a sample attrition issue. Thus, all the analyses were performed using a CDS II sample weight, which was created by the inverse of the probability of sample selection and attrition adjustment factor. Using this weight, the CDS data is a nationally representative sample.

Nested nature of the data. The CDS sample includes up to two children randomly selected from one family. The siblings have family level data including family income to needs ratio, parental education level and neighborhood quality and child level data including Internet use and friendships. This data feature

violates the assumption of independence stating that the error associated with each data point is independent of every other error value, thus resulting in an increase in the type 1 error rate. Thus, non-independence of in the CDS sample is corrected in the analysis.

Missing data procedures. The missing values on variables are handled by full information maximum likelihood estimation (FIML). Thus the present study could maintain the same sample size in all analyses.

These characteristics of the CDS data are handled by using MLR in Mplus. MLR, one type of FIML, is a maximum likelihood estimator with robust standard errors using a numerical integration algorithm. The estimates by MLR are robust to non-normality and non-independence of observations (Muthén & Muthén, 2006). The following analyses were performed in Mplus 4.2.

Analysis of Predictors of Internet and Computer Use

OLS regressions are performed to examine the factors that contribute to explaining the different types of Internet use and computer use. Independent variables explaining Internet and computer use are: family income to needs ratio, parental education, ethnicity, neighborhood quality, father's work hours, mother's working status, child age, and child gender. Dependent variables of Internet use are: frequency of visiting websites, frequency of email, frequency of instant messaging and chatting, frequency of using the Internet for study, and frequency of online games. Dependent variables of computer time, which were collected

from the time diaries on two days, have a semicontinuous data feature (i.e. continuous variables with a preponderance of zeros, and as a result, a skewed distribution). To handle semicontinuous dependent variables, a binary variable and a continuous variable are created from the original variable. Thus, dependent variables of computer time includes a binary variable indicating non-use or use, and a continuous variable indicating among users, the amount of time spent using a computer (Muthén & Muthén, 2006)

Analysis of Social Outcomes of Internet and Computer Use

Covariates. In examining social outcomes from Internet and computer use, covariates include: family income to needs ratio, parental education, ethnicity, neighborhood quality, age, and gender. In addition, two variables of sociability in Wave 1 – social relationships and internalizing behavior problems – are controlled.

Time displacement. The time displacement hypothesis which suggests time spent using a computer displaces time in social interaction is examined by using only time use variables, because the reliable measurement of time and full count of 24 hours are crucial. In each model of social time – time with parents and time with friends – the total time adolescents spent using a computer is entered as independent variables.

Displacement and increase hypotheses. OLS regressions performed to examine if Internet and computer use increase or displace cohesive social

relationships. The social outcomes from Internet and computer use includes: conversation with parents, closeness to parents, support to parents, conversation with friends, closeness to friends, support to friends, internalizing behavior problems, connectedness to school, and social trust. To examine social outcomes from frequent Internet use, the five types of Internet use – visiting websites, email, chat/IM, use for school work, games – are entered together as main independent variables in each model. To examine social outcomes from computer use, the four types of computer time – time in computer-mediated communication, time in computer use for study, time in computer games, and time in computer use for other recreation are included.

Rich get richer and social compensation hypotheses are elaborated statements from the increase hypothesis. These elaborated hypotheses are interested in Internet users' sociability, which may moderate the social impact of Internet use, or may serve as an antecedent variable of Internet use.

The moderation model. This refers to whether the association between Internet use and social outcomes is altered by initial sociability and social relations. The moderation effect is examined by the interaction terms of earlier sociability and Internet use for communication.

The mediation model. This refers to whether Internet use mediates the association between initial sociability and social outcomes. That is, it is suggested that initial social relations serves as a motivator of Internet use, which in turn

improves or worsens social relationships. Thus, this study examines the rich get richer vs. social compensation hypotheses in two ways, that is, through the moderation model and the mediation model, focusing on Internet use for communication. The mediation model is examined by a structural equation model, which is presented in Figure 3-1. *Quality of Social relationships* refers to relationships with friends, a primary caregiver, other caregiver, and a teacher at time 1. *Internalizing behavior problems index* has five items with highest factor loadings. *Online communication* consists of two items, the frequency of email and the frequency of chatting/instant messaging. *Friendships* refers to talk with friends, closeness with them, and helping/supporting them. Age and gender were entered as covariates.

Underlying assumptions of SEM were validated: multivariate normality and univariate normality, outliers, linearity, multicollinearity, and missing data. Multivariate normality can be detected by skewness and kurtosis of univariate distribution. Skewness and kurtosis of all the variables except for items related to internalizing behavior problems were within the range of ± 1.96 , which indicates acceptable boundaries of normality. Given that maximum likelihood estimation (ML), which is the common method in SEM for estimating path coefficients, requires multivariate normality, particularly, normality of endogenous variables, skew and kurtosis of items related to internalizing behavior problems – one of the exogenous variables – is acceptable. Moreover, MLR (robust ML) used in this

study is maximum likelihood estimation with standard errors that are robust to non-normality and non-independence of complex survey data, that is, weighted or cluster data. The model is evaluated by chi-square (χ^2), the comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). A good fit is denoted by a nonsignificant chi-square, a RMSEA less than .05, a SRMR less than .10, and CFI more than .90 (Klein, 2005; Marsh, Hau, & Wen, 2004; Zhu, et al., 2006).

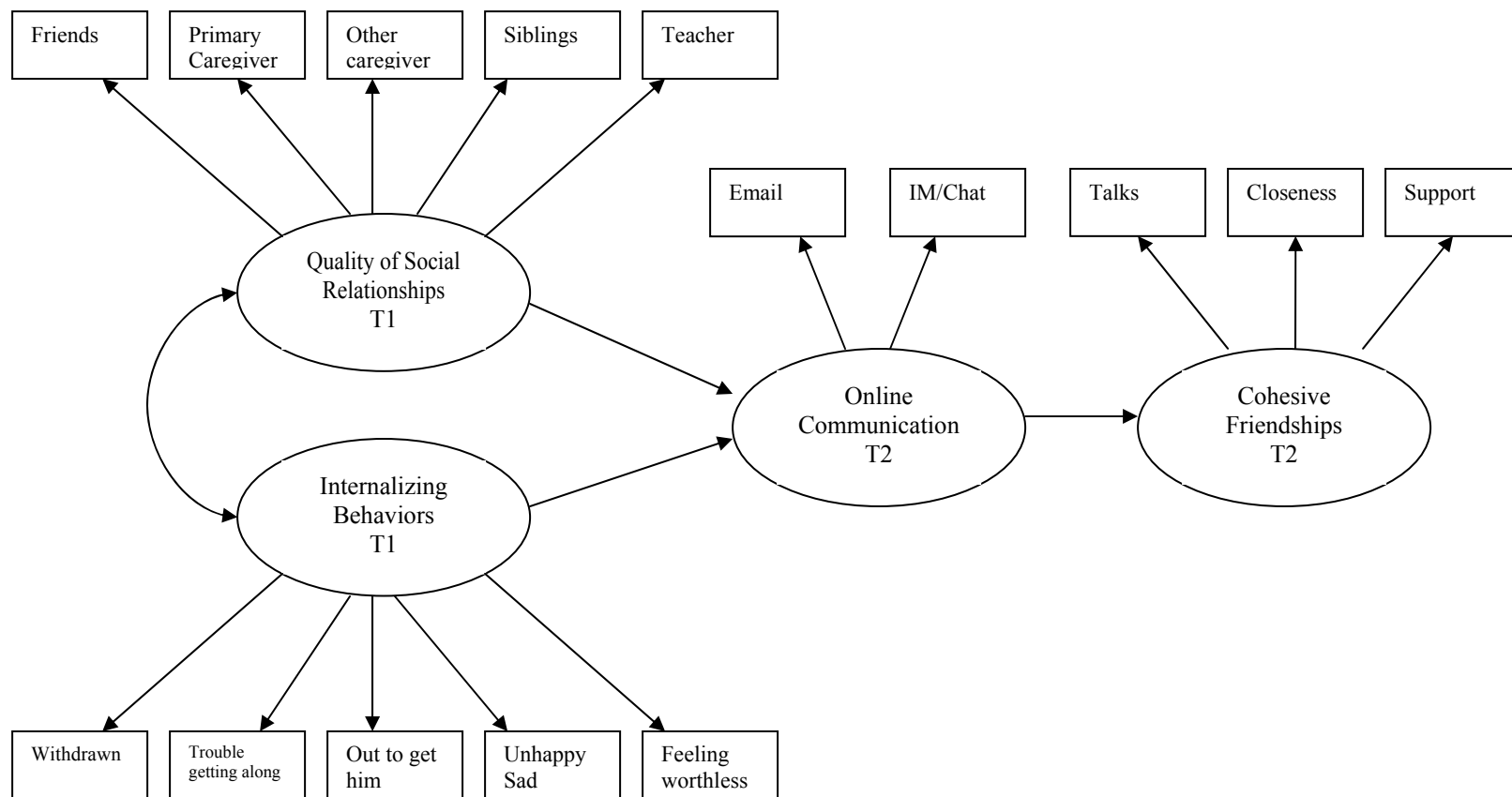


Figure 3-1. Full Structural Equation Model with Observed Indicators

Chapter 4: Results

DESCRIPTIONS OF KEY VARIABLES

Table 4-1 shows the means and standard deviations for each variable. The variables include predictors of Internet and computer use, Internet use, time spent on a computer, relationship with parents, friendships, and other social outcome variables. The values in the table are weighted to represent national averages. The correlations matrix is presented in Appendix B.

Table 4-1. Means and Standard Deviations (N=1312)

Variables	Range	Mean	SD
Income to needs ratio	0-75.75	4.29	5.91
Parent's education	1-17	12.96	3.04
Race: Black ^a	0-1	0.18	0.38
Hispanic ^b	0-1	0.14	0.34
Asian and others ^c	0-1	0.06	0.24
Father work hours	0-85	41.49	14.6
Mother working status ^d	0-1	0.61	0.49
Neighborhood quality ^e	-2.64-1.18	0.06	0.82
Child age	12-18	14.82	1.95
Child gender ^f	0-1	0.51	0.05
Frequency of Internet use for			
Visiting websites	1-6	3.79	1.64
Email	1-6	3.07	1.91
IM/Chatting	1-6	2.79	1.98
Study	1-6	2.99	1.50
Games	1-6	2.58	1.62

(continued)

Variables	Range	Mean	SD
Time spent using a computer ^g			
Total time	0-1290	85.71	150.84
Communication	0-745	24.12	79.32
Study	0-435	7.60	37.50
Games	0-647	26.35	79.30
Other recreational use	0-1290	27.10	82.13
Social outcomes			
Time w/ parents ^g	0-1380	312.09	262.02
Conversation w/ parents	1-6	3.01	1.28
Closeness to parents	1-4	3.35	0.76
Support to parents	1-7	4.06	1.34
Time w/ friends ^g	0-1550	257.44	284.40
Conversation w/ friends	1-6	3.22	1.37
Closeness to friends	1-4	3.18	0.81
Support to friends	1-7	3.90	1.47
Connectedness to school	1-6	4.49	1.18
Social trust	1-6	3.45	1.23
Internalizing behaviors	0-14	3.46	3.42

^a White = 0; Black =1

^b White = 0; Hispanic =1

^c White = 0; Asian and others =1

^d Stay-at-home mother = 0; Working mother =1

^e Mean of two standardized items

^f Boys = 0; Girls =1

^g The means represent the amount of time spent in each activity over the two diary days (one weekday and one weekend)

Descriptive information of adolescents' Internet and computer use are presented. Table 4-2 indicates the proportion of how often in last month adolescents has used the Internet for each purpose. Almost three quarters of the total sample was using the Internet for visiting websites at least once a week. About forty percent of them were visiting websites almost everyday or everyday. Thirty percent were using email or instant messaging almost daily.

Table 4-2. Frequency of Each Type of Internet Use (%)

	Visiting websites	Email	Chat/IM	School work	Games
Never	11.1	35.0	45.6	20.1	37.1
Once or twice in the last month	15.7	12.4	11.2	23.5	20.7
Once a week	14.1	9.8	6.8	17.9	12.2
Two or three times a week	20.8	12.6	7.7	20.1	12.9
Almost everyday	18.8	14.1	12.6	13.0	11.2
Everyday	19.4	16.2	16.1	5.5	6.0

According to the time diary data, on the average, American adolescents ages 12 to 18 (n=1,221), who recorded at least one time diary during the sampled week, spent 35.85 minutes using a computer on a weekday, and they spent 50.26 minutes on a weekend day. Excluding those who recorded zero minute using a

computer, that is, among those who did use a computer, the average time adolescents spent using a computer was 101.3 minutes per weekday, and 141.5 minutes per weekend day. Table 4-3 shows the average minutes the computer users spent in each type of computer activity. On the average, adolescents spent about half hour per weekday and forty to forty-five minutes per weekend day in computer-mediated communication, games, and other recreation respectively. Computer use for school work is the activity in which young computer users spent the least time.

Table 4-3. Among Users, Average Minutes spent in Computer Activities

	Computer communication	School work	Computer games	Other recreational use
Weekday (N=349) ^a	29.20	10.60	30.32	30.10
Weekend (N=361) ^b	39.13	10.95	44.27	46.62

^a The number of those who spent more than zero minute using a computer on a sampled weekday

^b The number of those who spent more than zero minute using a computer on a sampled weekend day

Time diary data provide not only time spent in each type of computer activity but also with whom the users used a computer. The information of *with whom* shows how solitary – physically solitary – adolescent’s computer use is or whether their computer use is a shared activity with family and with friends.

Table 4 presents the average minutes the users spent using a computer alone, with friends, with parents, and with siblings. For most of time they spent with computer, they are physically alone. However, the fact that they spent about 30 minutes with friends while using a computer during one weekend suggests that computer use can be a shared activity among peers.

Table 4-4. Among Users, Average Minutes spent using a Computer with Whom

	Alone	With a friend	With a parent	With a sibling
Weekday (N=349) ^a	73.91	12.53	5.59	5.51
Weekend (N=361) ^b	98.35	24.72	8.47	13.44

^a The number of those who spent more than zero minute using a computer on a sampled weekday

^b The number of those who spent more than zero minute using a computer on a sampled weekend day

PREDICTORS OF INTERNET AND COMPUTER USE

OLS regressions were performed to examine which factors are significant in explaining adolescents' Internet and computer use. Assuming different factors explain different purposes for which adolescents use the Internet and a computer, each type of Internet and computer use was entered as a dependent variable.

Frequency of Internet Use

Family income to needs ratio, parental education, ethnicity, mother's working status, neighborhood quality, child age, and gender were significantly related to adolescents' specific purposes of Internet use (See Table 4-5). The findings are summarized by the purpose of Internet use.

Visiting websites. Adolescent age is the most significant factor for visiting websites. Family income to needs ratio was also positively related. Interestingly, adolescents with a working mother were more likely to go online to surf websites more frequently than those with a stay-at-home mother. We may say that older adolescents and adolescents with working mother are likelier than younger adolescents and those with a stay-at-home mother to use the Internet even without specific purposes, sometimes for surfing to spend time.

Table 4-5. Standardized Coefficients of Factors Predicting the Frequency of Each Type of *Online Activity*

	Visiting websites	Email	Chat/IM	Study	Game
Income to needs ratio	.10***	.08*	.11***	.03	.02
Parent education	.09	.13***	.13***	.07	-.03
Father's work (hour)	-.01	-.02	-.04	.01	-.06
Mother employment ^a	.08*	.04	.03	.00	.06
Race1 (A-A) ^b	-.06	-.11***	-.20***	.12**	.13***
Race2 (Hispanic) ^c	-.03	-.02	-.07	.11*	.02
Race3 (Asian/others) ^d	.05	.04	-.05	.10*	.11*
Neighborhood Quality	.06	.09*	.10**	.11**	.01
Child age	.18***	.16***	.09**	.04	-.08*
Child gender (Girl) ^e	-.00	.23***	.12***	.10**	-.10*
R ²	.10	.17	.16	.04	.05

*** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$

a. Stay-at-home mother = 0; working mother = 1

b. White = 0; African American = 1

c. White = 0; Hispanic = 1

d. White = 0; Asian/others = 1

e. Boys = 0; Girls = 1

Email. Adolescent gender was the most important factor predicting email.

Then, age, parental education, African American, neighborhood quality, and income to needs ratio were significantly related, with race being negatively related.

Chat/IM. While the factors were ranked in a different order, the same factors predicting email were related to chat/IM. Being Black was the most

important factor predicting less use of chat/IM. Then, parental education, gender, income to needs ratio, neighborhood quality, and age were significantly related.

Internet use for school work. Race, neighborhood quality and gender were significantly related to Internet use for doing research for school work. Interestingly, Black, Hispanic, and Asian adolescents were more likely than White to utilize the Internet for educational purposes.

Online games. Race, gender and age were significant factors predicting online games. Black and Asian adolescents used the Internet for games more frequently than white adolescents. Consistently with literature reviewed, boys and younger adolescents played online games more frequently than girls and older adolescents. Unlike other Internet uses, family's structural factors – income, parental education, and parents working were not related to online games

Computer Time

Participants in time diaries recorded how much they spent time using a computer on randomly selected two days, one weekday and one weekend day. Given that more than 60% of participants recorded they did not use a computer (that is, they spent zero time with a computer) on those days, it needs to examine factors explaining both whether they used computers or not and if they used them, how much they spent time in each type of computer activity. That is, a binary variable indicating non-use or use, and a continuous variable indicating among users, the amount of time spent using a computer were examined as dependent

variables. However, we need to be cautious when we interpret the findings of whether they used it or not: Time diary data indicating they did use a computer meant they used a computer at least once a week, which can be called weekly uses.

Table 4-6 presents factors significant in predicting whether adolescents used a computer overall and for specified purposes at least once a week. The findings are summarized by the purposes of computer use.

Table 4-6. Standardized Coefficients of Factors Predicting If Adolescents Spent Time Using a Computer.

	Overall use	Communication	Study	Game	Other recreation
Income to needs ratio	.05	.01	.04	-.11	.03
Parent education	.10*	.15**	-.05	-.03	.10*
Father's work (hour)	.02	.06	.13	.03	-.06
Mother's job	-.02	-.02	-.18*	-.10	.15**
Race1 (Black)	-.13***	-.28***	-.10	-.12**	-.05
Race2 (Hispanic)	-.06	-.01	-.12	-.06	-.07
Race3 (Asian/others)	.03	-.00.	-.01	-.03	.09*
Neighborhood Quality	.11**	.08*	.14*	.11*	.07
Child age	.03	.10*	.13	-.06	.09
Child gender (Girl)	.10*	.17***	.03	-.08	.19***
R ²	.07	.16	.10	.07	.12

*** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$

Overall use. Being African American was the most significant factor, a negative one, predicting weekly use. African American adolescents used a

computer significantly less than white adolescents. Neighborhood quality, parental education, and female adolescents were positively related to overall computer use.

Computer communication. With frequent online communication, African American, girls, parental education, child age, and neighborhood quality were significantly related to computer communication. Among them, being African American was the most significant factor predicting less use of computer communication.

Computer use for school work. Interestingly, maternal employment is the most important factor predicting less computer use for school work. Neighborhood quality was also positively related. Those with stay-at-home mother and with better neighborhood quality are likely to spent more time in computer use for school work or study than those with working mother and with poorer neighborhood quality.

Computer games. Being Black and neighborhood quality were significantly related to computer games. However, unlike the findings of frequent use of online games, being Black was negatively related to computer games.

Computer use for other recreation. Other recreation includes surfing the net, downloading pictures, music, movies, burning CDs, and watching DVDs. Gender and maternal employment were the most significant factors. The positive relationship of maternal employment to computer use for recreation is consistent

with the findings of its relationships to adolescents' Internet use for visiting websites.

Among users, factors predicting the amount of time spent in each type of computer use (in Table 4-7). Unstandardized coefficients from regression models can be interpreted in terms of change in the amount of time (minutes) that adolescents spend using a computer when one predictor changes one unit.

Table 4-7. Unstandardized Coefficients of Factors Predicting Time Spent in Computer Use, Among Users

	Total time	Communication	Study	Game	Other recreation
Income to needs ratio	-0.82	-0.00	0.40	-3.86	-0.10
Parent education	-1.4	3.63	-2.52	5.87	3.89
Father's work (hour)	-0.37	-0.80	1.39	-0.68	-0.65
Mother's job	-27.13	-34.34	-23.66	-14.53	16.45
Race1 (Black)	-114.42***	-87.84***	-19.26	-62.49***	-18.69
Race2 (Hispanic)	-73.02*	-26.75	-8.51	22.77	-45.55*
Race3 (Asian/others)	-24.12	-49.61	-46.87	62.56	-10.87
Neighborhood Quality	6.58	8.37	18.43	-4.46	-17.61
Child age	14.78**	10.27	12.32**	-1.23	1.45
Child gender (Girl)	-17.79	-18.57	28.69	-78.19***	13.14
R ²	.07	.10	.15	.19	.03

*** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$

Once adolescents used a computer at least once a week, family income to needs ratio, parental education, and neighborhood quality were not related to the amount of computer time. Only ethnicity (African American and Hispanic), age

and gender were significantly related to the amount of computer time. Among them, ethnicity differences were clear in all the type of computer use except for educational use. On the average, African American adolescents spent less time using a computer by almost 2 hours (114.42 minutes) than white adolescents. Hispanic adolescents spent less time by almost 1 and half hour (73.02 minutes). African American adolescents spent less time in computer communication by almost one and half hours (87.74 minutes) and in computer games by about one hour (62.49 minutes) than white adolescents. Hispanic adolescents spent less time in computer use for recreation by 45 minutes than white adolescents.

Adolescents' age was positively related to the total time spent in computer use. The amount of time they spent using a computer increased 15 minutes as they were older by one year. Gender differences also were found in computer games. Boys spent more time in computer games by more than one hour (78.19 minutes) than girls. While girls used the Internet and a computer for communication more frequently than boys, there was no significant difference in the amount of time they spent.

Summary: Predictors of Internet and Computer Use

Social economic status, which can be expressed in terms of family income to needs ratio, parental education, and neighborhood quality, was still a significant factor to explain frequent use of the Internet and a computer. As expected, adolescents with higher social economic status were more likely to use the

Internet and a computer. However, these factors were not significant in predicting the amount of time spent in computer use among weekly users (i.e. users who used a computer at least once a week).

Given that the primary place of children's media use is home, parental time structure, which can be reflected in parents' working schedule, is expected to influence adolescent's media use. The findings indicated no relationships of father's work hour but significant relationships of maternal employment to adolescent's Internet and computer use. Specifically, adolescents with a working mother were more likely to use the Internet for visiting a websites and a computer for recreation than those with an stay-at-home mother. However, adolescents with an stay-at-home mother were more likely to use a computer for educational purposes than others.

Race differences were very clear in both the frequency of using the Internet and a computer and the amount of time spent in computer use. It is noteworthy that there were significant and substantial differences in the amount of time in overall computer use and computer communication between White adolescents and Black adolescents. Age and gender differences were also clear. Older and female adolescents were more likely to use the Internet and a computer, except for games, than younger and male adolescents. Boys spent much more time in computer games than girls.

SOCIAL OUTCOMES OF INTERNET AND COMPUTER USE

Time Displacement Hypothesis

Time use variables were used to test the time displacement hypothesis.

(See Table 4-8).

Table 4-8. Unstandardized Coefficients of Each Type of Computer Use (Time) Predicting Social Time

	Time interacting with Parents	Time interacting with Friends
Communication use	-.40***	.00
Study	-.20	-.51*
Game	-.13	-.26
Other recreational use	-.36***	-.21*
R ²	.15	.08

*** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$

Overall, the findings supported the displacement hypothesis between computer time and social time: Time spent in computer communication displaced time spent interacting with parents. Unstandardized coefficients indicated that increase of one minute in computer-mediated communication explained a decrease of 0.4 minute in time spent interacting with parents. In terms of hours, an increase of one hour in computer-mediated communication results in a decrease of 24 minutes in time with parents. Computer use for recreation also displaced time with parents. Even though computer use for school work and computer

games had negative coefficients, their relationships were not statistically significant.

Interestingly, time spent in computer communication did not displace time spent interacting with friends. However, computer time for school work and computer time for recreation were negatively related to time with friends. The negative relationships between a computer use for school work and time with friends might be understood as a relationship between total time for study/homework and time with friends.

Displacement and Increase Hypotheses

The displacement hypothesis predicts that Internet use not only displaces time spent in face-to-face interaction but also weakens strong relationships. As opposed to the displacement hypothesis, the increase hypothesis proposes that the more adolescents use the Internet, particularly for communication, the better social relationships they would maintain. If this is true, adolescents' Internet use would be a beneficial activity for social relationships.

Nine dependent variables all used as social outcomes – conversation with parents, closeness to parents, support and help to parents, conversation with friends, closeness to friends, support and help to friends, internalizing behavior problems, school connectedness, and social trust. The findings are presented by the type of social relationship: relationships with parents, peer relationships, and

general social attitudes and behaviors. Covariates were controlled, but not presented in Tables.

Cohesive Relationships with Parents

Internet use

Table 4-9 presents standardized coefficients of each type of Internet use predicting relationships with parents. Only frequent use for school work was significantly related to frequent talks with a mother, closeness to a mother, and support and help to parents. The more frequently adolescents used the Internet for school work, the better their relationships with parents in terms of conversation, closeness, and support. Visiting websites and chatting had negative coefficients, but the relationships were not significant. Thus, regarding Internet use and relationships with parents, the displacement hypothesis was not supported.

Table 4-9. Standardized Coefficients of Each Type of Internet Use Predicting Relationships with Parents

	Conversation	Closeness	Support/help
Visiting websites	.01	-.00	-.09
Email	.03	-.02	.06
Chat/IM	-.08	-.08	-.02
Internet for Study	.29***	.16***	.23***
Online Games	-.03	.03	.04
R ²	.16	.07	.08

*** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$

Computer time

Table 4-10 presents standardized coefficients of computer activities predicting relationships with parents. The amount of time adolescents spent using a computer for study was positively related to frequent talks with parents about their school life, friends, and future. The amount of time adolescents spent using a computer for recreation including surfing net and downloading music were negatively related to closeness with a mother. The amount of time adolescents spent using a computer for communication were also negatively related to their support and help to parents.

Table 4-10. Standardized Coefficients of Computer Activities (time) Predicting Relationships with Parents

	Conversation	Closeness	Support/help
Computer Communication	-.02	-.04	-.08***
Computer for Study	.08*	.03	-.03
Computer Games	-.02	-.02	.01
Computer for Recreation	.04	-.08*	-.03
R ²	.09	.05	.04

*** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$

The consistent finding in analyses of frequent Internet use and of computer time is that use for school work is positively related to frequent talks with parents about school life, friends, and the future, which supports the increase

hypothesis. However, other computer time spent in communication and recreation supported the displacement hypothesis.

Cohesive Friendships

Internet use

Overall, adolescents' Internet use for email, chatting/instant messaging and study was significantly related to cohesive friendships (Table 4-11).

Table 4-11. Standardized Coefficients of Each Type of Internet Use Predicting Friendships

	Conversation	Closeness	Support/help
Visiting websites	.03	.03	-.04
Email	.03	-.03	.13*
Chat/IM	.11*	.18***	.10*
Internet for Study	.15***	.03	.21***
Online Games	-.03	-.03	-.02
R ²	.20	.13	.18

*** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$

Specifically, chatting/instant messaging and use for school work were positively related to frequent talks with friends. Chatting/instant messaging was positively related to perceived closeness with friends. Emailing, chatting/instant messaging, and use for school work were positively related to frequent giving emotional support and helping to friends with homework. In short, regarding the relationships between Internet use, particularly for communication and

educational purposes, and friendships, the findings support the increase hypothesis.

Computer time

Table 4-12 presents the relationships between time on the computer and friendships. The amount of time spent in computer communication was positively related to closeness with friends and frequent support/help to friends. That is, the more adolescents spent time using a computer for communication, the closer they felt with friends and the more they gave emotional support or advice to friends. The amount of time spent in computer use for school work, game and other recreation was not related to friendships. As expected from the increase hypothesis, online communication had positive relationships with cohesive friendships.

Table 4-12. Standardized Coefficients of Computer Activities (time) Predicting Friendships

	Conversation	Closeness	Support/help
Computer Communication	.05	.06*	.06*
Computer for Study	.01	-.03	-.02
Computer Games	-.01	-.05	-.08
Computer for Recreation	.06	-.03	.05
R ²	.15	.11	.11

*** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$

General Social Attitudes: Internalizing, School Connectedness, & Social Trust

Internet use

Table 4-13 presents the relationships between Internet use and internalizing behavior problems, and school connectedness, and social trust.

Internalizing behavior problems. There was no significant relationship between online activities and internalizing behavior problems, after controlling for social relationships and internalizing behavior problems measured at Wave 1. Thus, we can say that Internet use did not exacerbate or reduce an adolescent's social behaviors/attitudes problems as manifest through withdrawal, anxiety, and troubles in getting along.

Table 4-13. Standardized Coefficients of Each Type of Internet Use (Frequency) Predicting Internalizing Behavior Problem, School connectedness, and Social Trust

	Internalizing	School connectedness	Social trust
Visiting websites	-.03	-.03	-.02
Email	.02	-.03	-.03
Chat/IM	-.06	.12*	-.02
Internet for Study	-.08	.19***	.25***
Online Games	.06	-.09*	.04
R ²	.19	.11	.13

*** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$

Connectedness to school. Online activities were related to school connectedness including a sense of belongingness, closeness and happiness in school. While chatting/instant messaging and use for school work were positively related to school connectedness, online games were negatively related. That is, the more frequently adolescents used the Internet for communication and school work, the more often they felt connected to school in terms of belongingness, closeness, and happiness. However, the more they used the Internet for games, the less often they felt connected to school.

Social trust. Internet use for school work was positively related to social trust. Online communication and online games neither decreased nor increased trust toward general people, other kids, and society.

Computer time

Table 4-14 presents the relationships between time on the computer and internalizing behavior problems, and school connectedness, and social trust.

Internalizing behavior problems. With Internet use, the amount of time on the computer for each purpose was not related to users' internalizing behavior problems.

Connectedness to school. With Internet use for school work and study, the amount of time spent in computer use for school work was positively related to users' perceived connectedness to school.

Social trust. The amount of time spent in computer communication was negatively related to users' perceived social trust, even though the coefficients are small.

Table 4-14. Standardized Coefficients of Computer Time Predicting Internalizing Behavior Problem, School Connectedness, and Social Trust

	Internalizing	School connectedness	Social trust
Computer Communication	-.02	-.03	-.06*
Computer for Study	.00	.06*	-.02
Computer Games	-.01	-.06	-.08*
Computer for recreation	-.01	-.03	-.01
R ²	.18	.07	.09

*** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$

Summary: Displacement and Increase Hypotheses

Regarding the relationships of computer time to social time, the findings supported time displacement hypothesis. Computer time spent in communication and recreation displaced time interacting with parents, and computer time spent in school work and recreation displaced time with friends. Interestingly, time spent using a computer for communication did not displace time with friends.

The impacts of Internet and computer use on social relationships cannot be fully explained by one hypothesis. It depends on for what purpose they use computers and the Internet and it depends on the type of relationships. Generally,

Internet and computer use for school work was positively related to relationships with parents and school connectedness. Online communication was positively related to friendships and school connectedness, but negatively related to relationships with parents. Online games were negatively related to school connectedness.

Rich Get Richer and Social Compensation Hypotheses

Moderation model

The rich get richer and the social compensation hypotheses were tested by both a moderation model and a structural equation model. The moderation model was used to examine if social benefits of Internet use are moderated by initial sociability, that is, if there is interaction effect between initial sociability (at time 1) and Internet use (at time 2) on later social outcomes (at time 2). Focusing on online communication, four interaction terms between social relationships and email, between earlier social relationships and chat/IM, between internalizing behavior problem and email, and between internalizing behavior problem and chat/IM were entered into regression models. As a result, no interaction effect on any social outcomes was found (See Table 4-15, Table 4-16, and Table 4-17: only standardized coefficients of interaction terms are presented).

Table 4-15. Interaction Terms of Initial Sociability and Internet Use on Relationships with Parents

	Conversation	Closeness	Support/help
Quality of Social Relationships (T1) * email	-.02	-.11	-.01
Quality of social relationships (T1) * chat/IM	.04	-.02	.01
Internalizing (T1) * email	-.02	-.05	.03
Internalizing (T1) * chat/IM	-.05	.01	-.01
R ²	.16	.08	.09

Table 4-16. Interaction Terms of Initial Sociability and Internet Use on Friendships

	Conversation	Closeness	Support/help
Quality of Social Relationships (T1) * email	.08	.04	.11
Quality of social relationships (T1) * chat/IM	.00	-.03	.03
Internalizing (T1) * email	.00	.03	.01
Internalizing (T1) * chat/IM	-.03	-.06	.01
R ²	.20	.13	.18

Table 4-17. Interaction Terms of Initial Sociability and Internet Use on Internalizing Behaviors, School Connectedness, and Social Trust

	Internalizing	School Connectedness	Social Trust
Quality of Social Relationships (T1) * email	-.07	-.02	-.05
Quality of social relationships (T1) * chat/IM	.02	.01	-.04
Internalizing (T1) * email	.03	-.04	-.01
Internalizing (T1) * chat/IM	.05	-.01	-.07
R ²	.19	.11	.14

The analysis of time diary data also showed the same results. That is, no interaction effects between initial sociability and time spent in computer communication were found. Thus, the findings did not support the argument that users' sociability moderates the social outcomes of online communication (See Table 4-18, Table 4-19, and Table 4-20: only standardized coefficients of interaction terms are presented).

Table 4-18. Interaction Terms of Initial Sociability and Computer Communication (time) on Relationships with Parents

	Conversation	Closeness	Support/help
Quality of Social Relationships (T1) * Computer communication	-.04	-.06	.02
Internalizing (T1) * Computer communication	-.02	-.01	.08
R ²	.09	.06	.05

Table 4-19. Interaction Terms of Initial Sociability and Computer Communication (time) on Friendships

	Conversation	Closeness	Support/help
Quality of Social Relationships (T1) *	-.00	.01	.04
Computer communication Internalizing (T1) *	.03	.03	.06
Computer communication			
R ²	.15	.11	.11

Table 4-20. Interaction Terms of Initial Sociability and Computer Communication (time) on Internalizing Behaviors, School Connectedness, and Social Trust

	Internalizing	School Connectedness	Social Trust
Quality of Social Relationships (T1) *	.01	-.03	.04
Computer communication Internalizing (T1) *	.12	.03	.06
Computer communication			
R ²	.19	.07	.09

Structural equation model

The structural equation model proposed in this study examines whether those who have strong ties and high sociability more frequently use the Internet, which in turn increases their relationships with friends, or whether those who have weak ties and internalizing behavior problems more frequently use the Internet, which in turn compensates for their social relationships. Given that the rich get richer and social compensation hypotheses have been elaborated from the increase hypothesis, the structural equation models were tested only on the social outcomes which were supported by the findings to test the increase hypothesis, that is, cohesive friendships and connectedness to school. The correlation matrix is presented in Appendix C. The factor loadings for measurement model are presented in Table 4-21.

Table 4-21. Standardized Factor Loadings for Measurement Model

Latent construct and Observed Indicators	Factor loading
Social Relationships	
With friends	.61
With a primary caregiver	.58
With other caregiver	.54
With siblings	.56
With a teacher	.59
Internalizing behaviors	
Withdrawn	.45
Trouble getting alone	.54
Feeling other get out to him	.60
Unhappy, sad, depressed	.65
Feeling worthless	.75
Online communication	
Email	.89
IM/Chat	.73
Cohesive friendships	
Conversation	.74
Closeness	.49
Supporting/helping	.63
Connectedness to school	
Inclusiveness to school	.66
Closeness to school	.74
Happiness at school	.65

Cohesive friendships

The SEM with the four latent variables, social relationships, internalizing behavior problems, online communication, and cohesive friendships, were tested. Figure 4-1 shows the standardized path coefficients and the variance explained for each endogenous factor. The tests of model fit suggested that the hypothesized model was acceptable (See Figure 4-1, $\chi^2 (108) = 241.30$, $p < .000$; CFI = 0.94; RMSEA = .03; SRMR = .04). The chi-square test was significant, which means that the estimate model was significantly different from the observed data, in other words, the estimate model did not fit the data. However, a chi-square is sensitive to sample size, and usually leads to model rejection. Thus, a chi-square/degree of freedom ratio, “normed chi-square,” that does not exceed five indicates reasonable model fit (Klein, 2005). The normed chi-square in this model was 2.57. CFI, RMSEA, and SRMR indicate acceptable model fit.

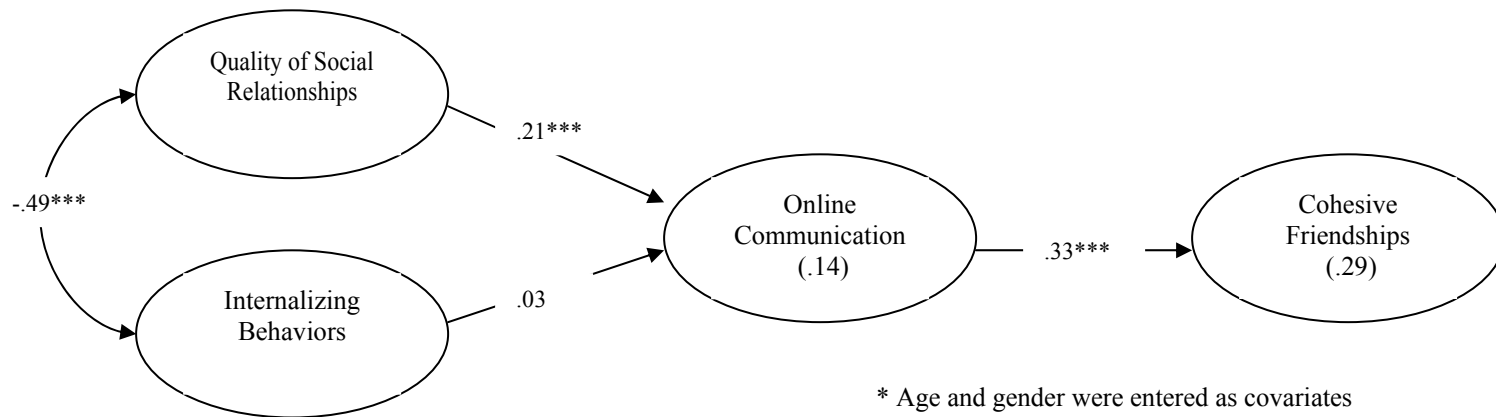
Twenty nine percent of the total variance in friendships was explained. Earlier social relationships were positively related to online communication, which was in turn positively related to friendships. That is, adolescents who had better earlier social relationships more frequently used online communication, which in turn is related to the outcome of better friendships. On the other hand, earlier internalizing behavior problems were not significantly related to online communication and friendships.

To test if online communication mediates the relations between earlier social relationships/internalizing behavior problems and later friendships, I followed the procedures Holmbeck recommended (Holmbeck, 1997; Hombeck, 1997). Mediation requires three conditions: given that X is a predictor, M is a mediator, and Y is an outcomes, 1) X is significantly related to M, 2) M is significantly related to Y, and 3) The relationship of X to Y disappears or reduces when M is in the model

To examine the third condition of mediation, the following three models were tested: 1) The first model: $X \rightarrow Y$, 2) The nested model: $X \rightarrow M \rightarrow Y$ without a direct path from X to Y (Figure 4-1), and 3) The alternative model: $X \rightarrow M \rightarrow Y$ with a direct path from X to Y (Figure 4-2). The goodness-of-fit of the nested model is compared with that of the alternative model, on the basis of the difference between chi-squares of two models. If there is a mediation effect, the addition of the $X \rightarrow Y$ path should not improve the fit. No improvement of model fit implies that the previously significant $X \rightarrow Y$ path in the first model should be reduced to nonsignificance in the alternative model or the relationships of X to Y must decrease substantially upon adding M.

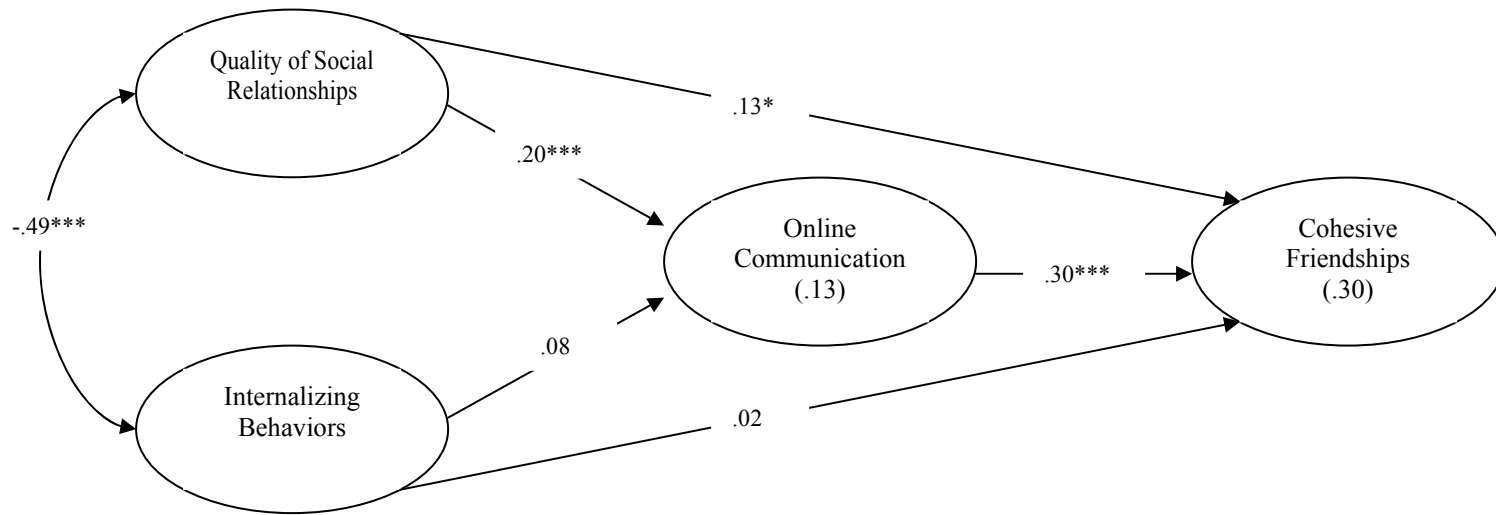
According to Holmbeck's recommendation, the present study compared chi-squares of the nested model and the alternative model and compared direct path coefficients of earlier social relationships to friendships in the first model and the third model. The alternative model fit the data as well (See Figure 4-2: $\chi^2 =$

236.145.18, $p < .000$; CFI = 0.94; RMSEA = .03; SRMR = .04).). To compare the nested model and the alternative model, the Satorra-Bentler scaled chi-square difference test (TRd), which is used in estimations using MLR, was performed (Muthen & Muthen, 2005). Using this test, the chi-square was not significantly improved in the alternative model (Trd = 2.56, that is, $\chi^2(2) = 2.56$, $p > .05$). In addition, the path coefficients between earlier quality of social relationships and cohesive friendships in the first model ($\beta = .18$, $p < .001$) was reduced to .13 ($p < .05$) in the alternative model. Thus, based on model parsimony principle (i.e. if two models have similar model fit, the simpler one is to be preferred), the nested model presented in Figure 4-1 was considered the final model in this study. We could say that online communication mediated the relation between earlier social relationships and friendships.



Model Fit: $\chi^2 (108) = 241.30, p < .000$; CFI = 0.94; RMSEA = .03; SRMR = .04

Figure 4-1. Result of Hypothesized SEM on Cohesive Friendships (The Nested Model)



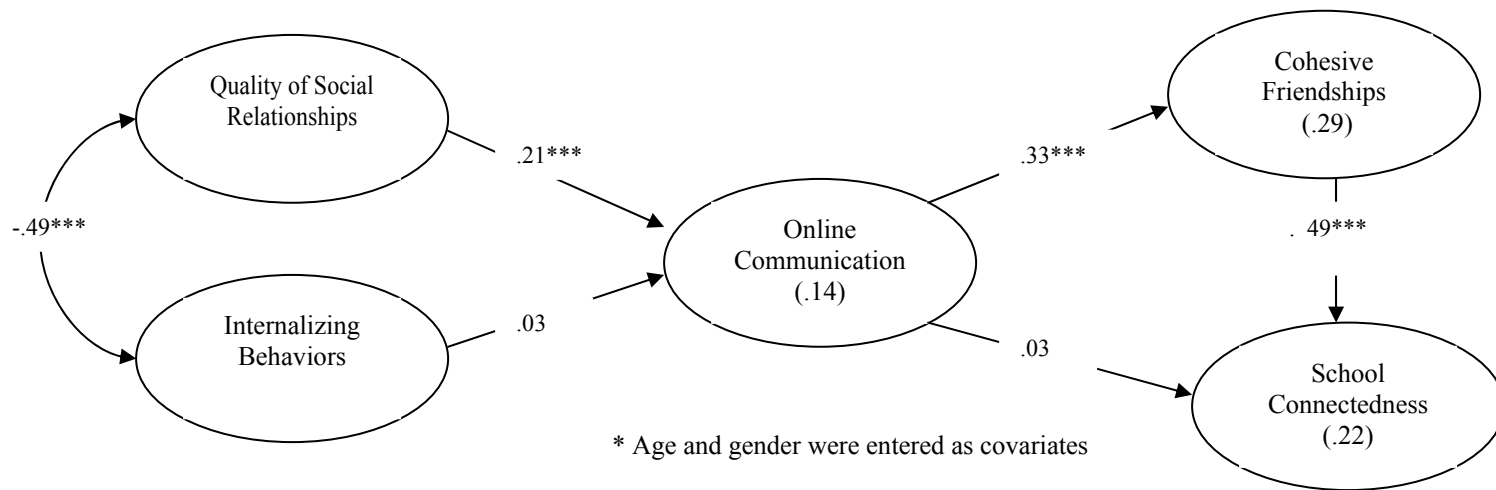
Model Fit: $\chi^2 = 236.145$, $p < .000$; CFI = 0.94; RMSEA = .03; SRMR = .04

Figure 4-2. The Alternative Model of Figure 4-1

Connectedness to school

The SEM with the five latent variables, social relationships, internalizing behavior problems, online communication, cohesive friendships, and connectedness to school, was tested. Figure 4-3 shows the standardized path coefficients and the variance explained for each endogenous factor. The tests of model fit suggested that the hypothesized model were acceptable (See Figure 4, $\chi^2(154) = 299.912$, $p < .000$; CFI = 0.94; RMSEA = .03; SRMR = .05). The normed chi-square in this model was 1.95. CFI, RMSEA, and SRMR indicate acceptable model fit.

Unlike the positive relationship between online communication and school connectedness in OLS regression model, the SEM with the direct path of friendship to school connectedness indicated no direct influence of online communication on school connectedness. However, the indirect influence of online communication through cohesive friendships on school connectedness was significant (standardized indirect path coefficients = .16, $p < .001$).



Model Fit: $\chi^2 (154) = 299.91, p < .000$; CFI = 0.94; RMSEA = .03; SRMR = .05

Figure 4-3. Result of Hypothesized SEM on School Connectedness

The findings of SEM supported the mediation model of the rich get richer hypothesis rather than the social compensation hypothesis. Adolescents who had earlier good relationships are more likely to use online communication more frequently. Those who use online communication more frequently are more likely to have better friendships. Online communication mediated the relations between earlier social relationships and later cohesive friendships. In addition, online communication was indirectly related to connectedness to school through cohesive friendships, and the direct effect of online communication on school connectedness was reduced to nonsignificance after adding cohesive friendships.

Summary: the rich get richer and social compensation hypotheses

Both the moderation model and the mediation model for the rich get richer and social compensation hypotheses were tested. In the moderation model, the interaction effects between earlier sociability and online communication were not found. Given that regression models examining whether online communication is beneficial for friendships supported for increase hypothesis, regardless of their earlier sociability adolescents could get social benefits with more use of online communication.

However, the findings from the structural equation model suggest that adolescents who had better social relationships in younger ages used online communication more than those who had poorer social relationships, and as a result they could develop cohesive friendships, and furthermore connectedness to

school. Thus, we can say that adolescents who had good social relationships in younger ages could obtain more social benefits from online communication use, not because they had better social relationships in early age, but because they used online communication more than those who had less strong social ties. In short, the mediation effects of online communication on the relationships between earlier social relationships and later cohesive friendships supported rich get richer hypothesis.

Chapter 5: Discussion

The purpose of this study was (1) to capture the digital divide in adolescents' specific computer and online activities, and (2) to understand each online activity's meanings in adolescent social development or social capital. To assess the issue of the digital divide, the present study examined the socio-demographic, neighborhood, family, and child characteristic factors which influence each type of computer and online activity. To identify how online and computer activities influence social capital, the present study examined diverse outcomes related to social capital which could be obtained from each online activity, and tested models explaining the relationships among sociability, Internet use, and social outcomes. This chapter discusses the findings in relation to previous theoretical and empirical literature, the theoretical and methodological implications of the present study, and the limitations of the present study and suggestions for future research.

DISCUSSION OF FINDINGS

Significant Factors of Internet and Computer Activity

Online Communication. Race (African American), gender, age, parental education, neighborhood quality, and family income to needs ratio were related to frequency of online communication. As presented in previous studies (DeBell & Chapman, 2006; Lenhart et al., 2001; Rideout et al., 2005), African American adolescents, boys, younger adolescents, and adolescents from lower socio-

economic households were less likely to use online communication than Whites, girls, older children, and adolescents from higher socio-economic households. However, once they became frequent users, these factors were no longer significant. Only race remained a significant factor explaining the amount of time spent in online communication. As Lenhart et al. (2005) found, teens who go online more frequently are more likely to use email.

The fact that African American adolescents spent less time in computer communication may be partly explained by the fact that Black adolescents spent much less time in overall computer use. However, the difference between Caucasian and African American adolescents in the amount of computer time for *communication* was larger than any other computer activity. This may be explained by African American peoples' attitudes and preference toward communication modes, or their perception of meanings or roles of online communication (Kretchmer, & Carveth, 2001). For instance, if African Americans prefer oral communication over text communication, or if they think online communication is not effective in maintaining offline relationships, they may spend less time in online communication than Caucasians.

Use for School Work. Maternal employment and neighborhood quality were related to time spent using a computer for school work. Adolescents who had a stay-at-home mother were more likely than those with a working mother to spend more time using a computer for school work. This may result from the

difference in parenting practices or parental mediation of media use between stay-at-home mothers and working mothers. Even though both may want to encourage their children to use media for meaningful purposes, working mothers have less time to monitor what their children do online and less time to guide or help their children to use a computer for educational purposes. Parenting practices such as parental Internet mediation, recommending good websites and using the Internet together, is related to children's educational use of the Internet (Lee & Chae, 2007). Thus, the relationships among maternal employment and parenting practices, specifically parental mediation of the Internet, and children's online activities need further examination.

Living in a good neighborhood is restricted by his/her economic ability. However, the quality of neighborhood reflects more than residents' socio-economic status. The neighborhood has cultural components generated by the residents. That is, one neighborhood has their common cultural values among residents. For instance, those who live in the same neighborhood may have similar attitudes and values of education, academic skills, and media. Parents who live in a good neighborhood tend to be more involved in their child's education. The better the neighborhood quality, the more they can access the Internet, a computer, and diverse software. Parents evaluate the educational benefits of computer use more highly, and the parents have more means to utilize a computer

by themselves (Seiter, 2005). As a result, children living in a good neighborhood may have an increased probability of using a computer for educational purposes.

The association between race and Internet/computer use for school work needs additional explanation in terms of methodology. According to reports of frequency of Internet use, African American, Hispanic, and Asian adolescents were more likely than Caucasians to use the Internet for school work.. However, in the analysis based on time diary data, the ethnicity factor was not related to computer time for school work. This inconsistency can be explained by the different measures of media use: frequent use of the Internet vs. time spent on the computer. That is, Internet use is not identical with computer use, and frequency is a different measure from the amount of time spent. However, given that self-report surveys are less reliable or more biased than time diaries (Vandewater & Lee, in press), the report of frequency may be biased by subjective perception as frequency is a relative concept. African American and Hispanic adolescents who use the Internet less overall and particularly in online communication, might feel that they use the Internet more for school work than Whites.

Games. Race, neighborhood quality, age and gender were related to frequent use of online games. Among game players, race and gender were related to the amount of time spent in computer games. While African American adolescents reported they played online games more frequently than Caucasians, they actually spent less time playing computer games. This may be partly

explained by the fact that African American adolescents spent much less time in overall computer use. Regarding gender, while there was no gender difference in total time of computer use, girls spent less time playing computer games by more than one hour than boys. Gender differences in game playing are consistent with previous studies (Kent & Facer, 2004; Lenhart, et al., 2001; Rideout et al., 2005), and can be explained by gender differences in preference toward features of computer/online games. Hartmann & Klimmt (2006) found that the features of games such as competitive elements and lack of meaningful social interaction were main reasons why females are less attracted to computer game playing.

Hypotheses Regarding Social Outcomes of Internet Use

Displacement hypothesis. As predicted by the time displacement hypothesis, the present study found that computer time was negatively related to social time, which is consistent with Nie et al.'s findings (2002). Specifically, time spent using a computer for communication and recreation displaced time with parents, and time spent with a computer for school work and recreation displaced time with friends. However, time spent in computer communication was not related to time with friends. The displacement of strong social ties was partly supported. While frequent Internet use for any purpose was not related to cohesive relationships with parents, computer time for recreation was negatively related to closeness with parents, and computer time for communication was also negatively related to support and help to parents.

Time displacement assumes that all individuals have a limited amount of time, thus an increase in time spent in one activity leads to a decrease of time spent in another activity. However, there may be some principles that modify the trade-off of activities. Neuman (1991) suggested it depends on functional similarity, physical and psychological proximity, and marginal fringe activities. Based on these principles, the findings that computer time in the home environment displaces time interacting with parents more than time interacting with friends can be explained: computer communication provides as much as or more satisfaction than interaction with parents; computer activity and family interaction usually occur in the same place at home; family interaction is a lower priority or less attractive than peer interaction for adolescents, and thus family interaction is more easily transformed or displaced than peer interaction.

Increase hypothesis. The positive relationship between Internet use for school work and cohesive relationships with parents supported the Increase hypothesis. This finding is consistent with Mesch's study (2003), which found that educational Internet use was positively related to closeness with parents.

Overall, the relationships between Internet and computer use and friendships were supported by the increase hypothesis. The present study found that Internet and computer use, particularly online communication, were positively related to cohesive friendships including conversation, closeness, and reciprocal behaviors for friends. Time spent in computer communication was also

positively related to closeness with friends and reciprocal behaviors. The increase hypothesis with regards to the social impact of Internet use on friendships has been supported by previous empirical studies. For instance, Wellman et al. (2001) and Lee & Kuo (2002) found that frequent Internet use is positively related to interaction with friends. Gross (2004) who interviewed 12 year-old and 15 year-old adolescents found that they used instant messaging in order to maintain friendships and they talked about other friends and homework through IM. Valkenburg & Peter (2005) also found that frequent online communication is positively related to closeness with friends.

The increase hypothesis also predicted the relationship between instant messaging and connectedness to school. According to regression analysis, the more frequently children used IM, the more they felt connected to school. More analysis through the structural equation model suggested that the relationship between online communication and school connectedness was mediated by cohesive friendships. That is, the SEM found no direct effect, but a significant indirect effect of online communication to school connectedness through cohesive friendships. That is, online communication improves friendships, which in turn increases connectedness to school.

Rich get richer hypothesis. To test this hypothesis both moderation and mediation models were tested. Unlike Kraut et al.'s findings that individuals' extroversion moderated the social outcomes of Internet use (Kraut et al., 2002),

the present study did not find moderation effects, but rather found mediation effects. Findings from the structural equation model support the rich get richer hypothesis rather than the social compensation hypothesis. Adolescents who already had strong social relationships were more likely to use online communication, which in turn predicted more cohesive friendships. Unlike the social compensation hypothesis, the present study did not find significant relationships between poor sociability and frequent online communication. A few prior studies suggest that the social compensation hypothesis may predict the relationships of sociability and online communication under certain conditions. Specifically, Bessiere et al. (2006) found that when using the Internet for the purpose of meeting people, depressive affect decreased for those who had poor social resources. Valkenburg & Peter (2005) found that the extent of self-disclosure was positively related to online communication. Taken together, social anxiety and shyness is not a direct motivator of Internet use or online communication. If socially anxious and shy individuals who expect to meet new people through online communication are willing to self-disclose using online communication, then they would gain some social benefits which may compensate for their poor sociability offline.

THEORETICAL IMPLICATIONS

The present study has several theoretical implications. First, the structural approach of the digital divide, which suggests that the gap in new technologies between haves and have-nots can be solved by providing better access to technology, is not enough to explain and solve the differences in use of the Internet and computer by adolescents. The present study examined factors which are assumed to explain adolescents' different purposes in using the Internet, and their actual time spent in each type of activity. Even though socially and economically the lower class's accessibility and availability to new technology and software is less, this only partially explains less use in most types of online and computer activity. Among adolescents with equal accessibility, the way they used the Internet and a computer still differed. Particularly, race differences were clear in online communication. Perception of the functional and symbolic roles of the Internet and a computer may differ by ethnic group. Thus, the present study suggests that the gaps in actual use may be explained by understanding how ethnic groups differently construct the functional and symbolic roles of new media.

Second, the present study examined competing hypotheses explaining social outcomes of Internet and computer use. The hypotheses supported by the data depended on the type of online activity and the type of social outcome examined. Computer time for online communication and recreation was

negatively related to time with parents. However, educational online activity was positively related to cohesive relationships with parents. Regarding friendships, online communication not only displaced time with friends, but was positively related to cohesive friendships, which was positively related to school connectedness. These findings suggest that the social impact of Internet and computer use should be specified by the type of online activity and the type of social networks.

Third, the present study provides theoretical implications for studies of the Internet and social capital. The relationships of Internet use to social capital can be examined with diverse approaches, as many as definitions of social capital, and as many as elements of social capital. When like Bourdieu (1985), we define social capital as resources embedded in social networks, we can examine the resources of online social networks to which an individual are linked. The contribution of Internet use to social capital can be examined at the individual level (e.g. interpersonal social contact) or at the community level (e.g. civic engagement or participation). The present study focused on the association of Internet use with the quality of social relations of the networks, and found that Internet use, particularly online communication, contributed to cohesive peer relationships and school connectedness. Given that an actor can get more benefits from social capital when the networks or relations are based on cohesion/solidarity/trust, the findings suggest that Internet use contributes to the

process that resources embedded in social networks or possessed by others linked to the networks are transferred to an actor.

Fourth, the findings supporting the rich get richer hypothesis suggest that Internet and computer use, particularly online communication and educational use, may lead to the digital divide in social capital. As economically rich persons have more chance to access the Internet, socially rich persons with strong ties more frequently use online communication, and as a result, they can build or maintain more cohesive friendships and connectedness to school than persons with lower sociability. That is, while online communication contributes to social capital by improving social relations, persons who had already strong ties or sociability can get social benefits of online communication more than those who have lower sociability. Social capital which an actor can acquire through Internet use is restricted by an actor's initial sociability.

METHODOLOGICAL IMPLICATIONS

The present study used both regression analyses and the structural equation model in order to identify social outcomes from Internet use. The study shows the advantages of using the structural equation model over regression analyses. While the study could examine diverse outcomes from family relationships to social trust through regression analysis, it discusses the advantage of SEM over regression. First, even though regression coefficients indicated significant social outcomes, we cannot test for model fit with regression. However,

SEM provides overall model fit as well as coefficients. Thus, in SEM, we can determine whether a conceptual model is sound based on model fit indexes, and significant coefficients between measures.

Second, SEM allows for multiple indicators per latent variable. Use of multiple indicators is a common way to reduce measurement error (i.e. reliability), and to cover diverse aspects of a construct (i.e. validity). For instance, the observed variable of “closeness with friends” was used as a dependent variable in regression, but the variable was used as one indicator for the latent variable, “cohesive friendships”. The measure of cohesive friendships consisted of frequent conversation, closeness, and support or helping and was found to be more valid than using one indicator of closeness.

Third, regression analysis provides total effects, but in SEM the total effect can be separated into direct effects and indirect effects. Use of a mediator in SEM shows whether the relationship between one variable and another variable is direct or indirect. For instance, while regression analysis showed a significant relationship between online communication and school connectedness, SEM found that the effect of online communication on school connectedness was an indirect effect mediated by cohesive friendships. In other words, rather than online communication being directly related to school connectedness, online communication is related to cohesive friendships, which in turn is related to connectedness to school.

Finally, the rich get richer and social compensation hypothesis was elaborated by examining whether initial sociability or social capital is a moderator of the social impact of Internet use or if Internet use serves as a mediator of sociability and social outcomes. Kraut et al. (2002) found that extroversion served as a moderator, and Valkenburg & Peter (2005) examined introversion as an antecedent variable of Internet use. The present study showed that there were no significant interaction effects of sociability on social impact of Internet use, but sociability was an antecedent of online communication, which mediated the relationships between earlier sociability and later social outcomes.

LIMITATIONS AND FUTURE RESEARCH

The present study benefited from the use of PSID-CDS data, which has a representative sample, rich indicators of social outcomes, and time diary data. In addition, the longitudinal nature of the data provides information regarding change in adolescents' social relationships. However, the longitudinal data with only two time points has some limitations in developing longitudinal structural equation models. In the SEM examining earlier sociability, Internet use, and social outcomes, the information about Internet use and social outcomes were collected at the same time, so they have a cross-sectional nature. Thus, while the present study identified the longitudinal relationship between earlier sociability and Internet use, which is crucial for examination of the rich get richer and social

compensation hypotheses, the cross-sectional relationship between Internet use and social outcomes cannot imply a causal relationship.

Time diary data are considered more reliable and valid than global estimates, but they underestimate less frequent activities such as volunteering (Vandewater & Lee, in press). The CDS time diaries collected 24-hour activities on one weekday and on one weekend day. Given that computer use is not a daily or weekly activity for every adolescent, it is arguable that CDS time diaries underestimate adolescent's computer use. Seven-day media diaries which the Kaiser Family Foundation collected can capture media use that occurred at least once per week. However, the seven-day media diary overestimates use by asking participants to indicate what their main media activity and secondary activity was during any given half-hour time slot (Rideout et al., 2005). This may overestimate adolescents' media use, because the half-hour time slot cannot distinguish ten-minute media use from half-hour media use. In addition, the media diary sample was self-selected from the original sample. It is virtually impossible to collect more than two days from a representative sample. Given that there is no perfect measure, the choice of measurements depends on research questions and research design. Even though the CDS time diaries may underestimate the amount of time adolescents spent on a computer, it makes sense to use time diary variables than use frequency variables to test the time displacement hypothesis.

Future research will have more advantages from use of the upcoming third wave of the CDS data, because having three waves of data fulfills the first condition of longitudinal analysis of change. The three waves of CDS data will allow a researcher to examine (1) changes in children and adolescents' Internet and computer use, and their social relationships over time, (2) the predictors which are related to changes in Internet and computer use, and (3) the influence of Internet use on changes in social relationships over time.

The scope of the sample can be extended to younger children. While the present study examined adolescent's Internet use and its social impact, the focus on younger children may result in different findings, given that social developmental tasks or outcomes differ by their developmental stage. For younger children, family relationships are more primary, and peer relationships are more primary for adolescents. Thus, for younger children, Internet use may influence family relationships more than friendships.

Ethnographic research or in-depth interviews can give more insight into the roles or meanings of the Internet for African Americans. It is clear that African Americans use the Internet less for online communication than Caucasians do. This may be explained by their preference for a certain type of communication mode, or their perception of effectiveness of online communication. Future research is needed to examine the possibility of these explanations, and investigate additional reasons through in-depth interviews. Given that online

communication contributes to social capital, how to motivate African Americans to benefit from the Internet should be addressed.

The findings of the present study did not support the social compensation hypothesis. Overall, the rich get richer hypothesis was supported. However, the social compensation hypothesis may explain social benefits of new social networks created online by those who have poor social resources, rather than social benefits through online communication with offline friends. It is the social benefits in the level of groups, which may in the end, lead to benefits for individuals. Future research can add to our understanding of the impact of the Internet on social capital, by examining the formation of online relationships and social resources embedded in online networks.

CONCLUSION

The Internet and computer are integrated into children and adolescents' lives. With the prevalence of new technology in their lives, it is time to identify its social impacts and benefits from Internet use. The present study suggests that social impacts of new technologies are multiple, and depend on the purpose individuals use them for and social outcomes examined. Furthermore, it supports the rich get richer model, indicating that those who have strong social ties will have an increased ability to enhance their social capital by using the Internet and a computer as tools for social interaction than those who have weak social ties. Future research should address how such benefits of Internet use as cohesive peer

networks and connectedness can be provided to those who have poor social capital.

Appendix A. Questionnaires

Internet and Computer use

CHILD INTERVIEW

Have you ever used the Internet? (Yes/No)

How often did you use the Internet for any of these in the last month?

To visit websites

To use email

To use a chatroom or instant messaging

To do research for school work

To shop

To play games

(1) NEVER

(2) ONCE OR TWICE IN THE LAST MONTH

(3) ABOUT ONCE A WEEK

(4) 2 OR 3 TIMES A WEEK

(5) ALMOST EVERYDAY

(6) EVERYDAY

TIME DIARIES

Minutes spent in using a computer

Playing computer games

Other recreational computer activities

Using the computer for homework, studying, research, reading for classes

Computer communication - email, computer/video/speaker phone,

Internet phone, teleconferencing, chatrooms, instant messaging, e-cards

Conversation with a mother

In the last month, how often did you..

Talk with your mother/stepmother about how things are going with your friends.

Talk with your mother/stepmother about your plans for the future

Talk with your mother/stepmother about problems you are having in school

(1) NEVER

(2) ONCE OR TWICE IN THE LAST MONTH

(3) ABOUT ONCE A WEEK

(4) 2 OR 3 TIMES A WEEK

(5) ALMOST EVERYDAY

(6) EVERYDAY

Closeness with a mother

How close do you feel towards your mother

- (1) NOT VERY CLOSE
- (2) FAIRLY CLOSE
- (3) QUITE CLOSE
- (4) EXTREMELY CLOSE

Support and help to parents

How often have you helped your parents with things they had to get done such as chores or running errands?

How often have you provided emotional support to your parents, such as making them feel better when they were sad?

- (1) ALMOST NEVER
- (2) LESS THAN ONCE A MONTH
- (3) 1-3 TIMES A MONTH
- (4) ABOUT ONCE A WEEK
- (5) A FEW TIMES A WEEK
- (6) ALMOST EVERY DAY
- (7) EVERY DAY

Conversation with friends

In the last month, how often did you..

Talk with your friends about how things are going with your friends.

Talk with your friends about your plans for the future

Talk with your friends about problems you are having in school

- (1) NEVER
- (2) ONCE OR TWICE IN THE LAST MONTH
- (3) ABOUT ONCE A WEEK
- (4) 2 OR 3 TIMES A WEEK
- (5) ALMOST EVERYDAY
- (6) EVERYDAY

Closeness with friends

How close do you feel towards your friends

- (5) NOT VERY CLOSE
- (6) FAIRLY CLOSE
- (7) QUITE CLOSE
- (8) EXTREMELY CLOSE

Support and help to friends

How often have you helped friends with things they had to get done, such as homework or chores?

How often have you provided emotional support to your friends, such as giving them advice on a problem or making them feel better when they were sad?

- (1) ALMOST NEVER
- (2) LESS THAN ONCE A MONTH
- (3) 1-3 TIMES A MONTH
- (4) ABOUT ONCE A WEEK
- (5) A FEW TIMES A WEEK
- (6) ALMOST EVERY DAY
- (7) EVERY DAY

Connectedness to school

In the last month, how often did you..

- A. feel like you were part of your school?
- B. feel close to people at your school?
- C. feel happy to be at your school?

- (1) NEVER
- (2) ONCE OR TWICE
- (3) 2 OR 3 TIMES A WEEK
- (4) ALMOST EVERY DAY
- (5) EVERY DAY

Social Trust

In the last month, how often did you feel...

That our society is becoming a better place

That people are basically good?

That the way our society works made sense to you?

That you have warm and trusting relationships with other kids?

- (1) NEVER
- (2) ONCE OR TWICE
- (3) ABOUT ONCE A WEEK
- (4) 2 OR 3 TIMES A WEEK
- (5) ALMOST EVERY DAY
- (6) EVERY DAY

Quality of Social Relationships (Wave 1)

Please rate each of the following parts of child's life as..

Friendships

Relationship with you (primary caregiver)

Relationship with siblings

Relationship with the other parent

Relationship with a teacher

(1) Poor

(2) Fair

(3) Good

(4) Excellent

Internalizing Behavior Problem Index (Wave 1)

For the next set of statements, decide whether they are often true, sometimes true or not true according to (CHILD'S) behavior.

(He/She) feels or complains that no one loves him/her

(He/She) is rather high strung, tense and nervous

(He/She) is too fearful or anxious

(He/She) is easily confused, seems to be in a fog

(He/She) does not seem to feel sorry after (he/she) misbehaves

(He/She) has trouble getting along with other children

(He/She) feels worthless or inferior

(He/She) is not liked by other children

(He/She) has a lot of difficulty getting (his/her) mind off certain thoughts

(He/She) is unhappy, sad or depressed

(He/She) is withdrawn, does not get involved with others

(He/She) cries too much

(He/She) is too dependent on others

(He/She) feels others are out to get (him/her)

(He/She) worries too much

Appendix B. Correlation Matrix 1

Table B-1. Correlation Matrix among All Variables used in Regression Analyses

	1	2	3	4	5	6	7	8	9	10	11	12
1. Gender (Boys vs. Girls)	1											
2. Head's Education	.00	1										
3. Income to Needs Ratio	.03	.30	1									
4. Father Work Hour	-.01	.26	.17	1								
5. Neighborhood Quality	-.02	.32	.23	.14	1							
6. Age	.06	.03	.03	-.01	.05	1						
7. Race (Non-White vs. White)	.05	.38	.24	.17	.36	.01	1					
8. Mother Employment	.03	.10	.13	.27	.15	.05	.24	1				
9. Visiting Websites	.02	.17	.17	.06	.15	.19	.13	.13	1			
10. Email	.24	.22	.18	.07	.19	.18	.19	.11	.60	1		
11. Chat/IM	.14	.24	.21	.07	.22	.11	.29	.12	.54	.65	1	
12. Internet Use for Study	.10	.05	.04	.02	.07	.05	-.09	-.00	.47	.33	.22	1
13. Online Games	-.12	-.04	-.02	-.07	-.03	-.09	-.13	-.01	.39	.22	.25	.16
14. Computer Games	-.15	.03	-.02	.02	.07	-.00	.06	-.07	.10	.04	.10	-.04
15. Computer Communication	.04	.11	.07	.04	.12	.08	.18	.02	.25	.30	.38	.01
16. Computer for Study	.06	.04	.06	.07	.10	.10	.07	-.03	.07	.09	.06	.08
17. Computer for recreation	.11	.12	.07	.01	.08	.06	.12	.10	.26	.29	.31	.08
18. Talk with Friends	.31	-.06	.02	-.01	.05	.17	.01	-.00	.19	.23	.21	.23
19. Close to Friends	.19	.11	.10	.15	.15	.02	.20	.14	.15	.19	.25	.08
20. Support/Help to Friends	.27	.05	.04	.05	.03	.04	.04	-.04	.19	.28	.23	.28
21. Quality of Social Relations(W1)	.08	.22	.16	.10	.23	-.08	.16	.18	.13	.14	.16	.11
22. Internalizing (W1)	-.03	.01	-.07	-.06	-.06	.02	-.02	-.11	-.14	-.12	-.09	-.06
23. Talk with a Mother	.22	-.01	.06	.04	.02	.11	.00	-.03	.13	.13	.05	.30
24. Close to a Mother	-.06	-.05	.00	-.01	-.03	-.14	-.03	.08	.01	-.05	-.07	.13
25. Support/Help to Parents	.09	-.10	-.09	-.03	-.08	.03	-.11	-.07	.03	.06	-.01	.21
26. School Connectedness	-.01	.12	.07	.07	.14	-.10	.07	.07	.09	.09	.13	.18
27. Social Trust	-.03	-.07	.02	.03	.04	-.16	.02	.11	.10	.04	.04	.23
28. Internalizing (w2)	.06	-.11	-.07	-.03	-.19	-.09	-.05	-.13	-.15	-.11	-.13	-.12

Table B-1. Correlation Matrix among All Variables used in Regression Analyses

	13	14	15	16	17	18	19	20	21	22	23	24
1. Gender (Boys vs. Girls)												
2. Head's Education												
3. Income to Needs Ratio												
4. Father Work Hour												
5. Neighborhood Quality												
6. Age												
7. Race (Non-White vs. White)												
8. Mother Employment												
9. Visiting Websites												
10. Email												
11. Chat/IM												
12. Internet Use for Study												
13. Online Games	1											
14. Computer Games	.19	1										
15. Computer Communication	.09	.03	1									
16. Computer for Study	.01	.09	-.02	1								
17. Computer for recreation	.10	-.01	.07	.04	1							
18. Talk with Friends	-.01	-.05	.08	.05	.09	1						
19. Close to Friends	-.01	-.07	.10	.00	.02	.37	1					
20. Support/Help to Friends	.03	-.11	.08	-.00	.08	.46	.29	1				
21. Quality of Social Relations(W1)	-.03	-.01	.08	.01	.00	.10	.14	.10	1			
22. Internalizing (W1)	-.02	.04	-.03	-.01	-.01	-.10	-.13	-.09	-.27	1		
23. Talk with a Mother	-.03	-.04	.00	.11	.06	.47	.11	.33	.09	-.04	1	
24. Close to a Mother	.04	-.04	-.07	-.01	-.09	.02	.17	.05	.09	-.03	.37	1
25. Support/Help to Parents	.04	-.02	-.09	-.03	-.05	.23	.06	.41	.00	-.01	.36	.29
26. School Connectedness	-.04	-.05	-.01	.06	-.01	.22	.29	.17	.16	-.14	.18	.22
27. Social Trust	.07	-.08	-.05	-.04	-.01	.14	.22	.20	.19	-.16	.18	.32
28. Internalizing (w2)	.02	-.01	-.06	-.02	-.03	-.06	-.20	-.05	-.20	.34	-.02	-.16

Table B-1. Correlation Matrix among All Variables used in Regression Analyses

	25	26	27	28
1. Gender (Boys vs. Girls)				
2. Head's Education				
3. Income to Needs Ratio				
4. Father Work Hour				
5. Neighborhood Quality				
6. Age				
7. Race (Non-White vs. White)				
8. Mother Employment				
9. Visiting Websites				
10. Email				
11. Chat/IM				
12. Internet Use for Study				
13. Online Games				
14. Computer Games				
15. Computer Communication				
16. Computer for Study				
17. Computer for recreation				
18. Talk with Friends				
19. Close to Friends				
20. Support/Help to Friends				
21. Quality of Social Relations(W1)				
22. Internalizing (W1)				
23. Talk with a Mother				
24. Close to a Mother				
25. Support/Help to Parents	1			
26. School Connectedness	.12	1		
27. Social Trust	.23	.45	1	
28. Internalizing (w2)	.01	-.23	-.15	1

Appendix C. Correlation Matrix 2

Table C-1. Correlation Matrix among All Variables Used in Structural Equation Model

	1	2	3	4	5	6	7	8	9	10	11	12
1. Relationship w/ Friends (W1)	1											
2. w/ the Parent (W1)	.36	1										
3. w/ Siblings (W1)	.34	.34	1									
4. w/ the other Parent (W1)	.31	.32	.29	1								
5. w/ a Teacher (W1)	.33	.34	.35	.36	1							
6. Withdrawn	-.24	-.07	-.12	-.12	-.10	1						
7. Trouble getting along	-.30	-.17	-.17	-.15	-.17	.25	1					
8. Feeling others out to get him	-.22	-.19	-.12	-.16	-.17	.25	.42	1				
9. Feeling worthless, inferior	-.26	-.12	-.23	-.13	-.16	.27	.30	.38	1			
10. Unhappy, sad, depressed	-.27	-.22	-.21	-.19	-.15	.26	.37	.43	.53	1		
11. Email	.08	.12	.06	.12	.09	-.00	-.08	-.02	-.02	-.05	1	
12. Chat/Instant messaging	.11	.10	.03	.11	.12	-.03	-.05	.01	-.00	.00	.65	1
13. Talks with Friends	.07	.09	.07	.05	.09	-.02	-.04	-.01	-.04	-.01	.24	.21
14. Closeness with Friends	.13	.09	.02	.09	.10	-.11	-.09	-.09	-.03	-.06	.19	.25
15. Support/Help to Friends	.11	.07	.04	.02	.08	-.07	-.03	-.00	-.05	.03	.28	.23
16. Part of School	.09	.07	.08	.02	.08	-.04	-.10	-.08	-.13	-.15	.08	.07
17. Close to School	.12	.09	.03	.05	.11	-.02	-.02	-.09	-.10	-.10	.09	.16
18. Happy at School	.14	.10	.14	.08	.09	-.05	-.09	-.11	-.15	-.13	.07	.09
19. Gender	.04	-.01	.09	.03	.14	-.01	-.07	-.02	-.03	.00	.24	.14
20. Age	.02	-.06	-.05	-.03	-.17	.10	-.04	.07	.10	.11	.18	.11

(Continued)

Table C-1. Correlation Matrix among All Variables Used in Structural Equation Model

	13	14	15	16	17	18	19	20
1. Relationship w/ Friends (W1)								
2. w/ the Parent (W1)								
3. w/ Siblings (W1)								
4. w/ the other Parent (W1)								
5. w/ a Teacher (W1)								
6. Withdrawn								
7. Trouble getting along								
8. Feeling others out to get him								
9. Feeling worthless, inferior								
10. Unhappy, sad, depressed								
11. Email								
12. Chat/Instant messaging								
13. Talks with Friends	1							
14. Closeness with Friends	.37	1						
15. Support/Help to Friends	.46	.29	1					
16. Part of School	.18	.16	.15	1				
17. Close to School	.21	.35	.17	.49	1			
18. Happy at School	.17	.20	.14	.43	.48	1		
19. Gender	.31	.18	.27	.03	.01	.01	1	
20. Age	.17	.02	.04	-.11	-.08	-.08	.06	1

Bibliography

- Amichai-Hamburger, Y., & Ben-Artzi, E. (2003). Loneliness and Internet use. *Computers in Human Behavior, 19*, 71-80.
- Anand, S., & Krosnick, J. A. (2005). Demographic predictors of media use among infants, toddlers, and preschoolers. *American Behavioral Scientist, 48*(5), 539-561.
- Bargh, J. A., & McKenna, K. Y. A. (2004). The Internet and social life. *Annu. Rev. Psychol., 55*, 573-590.
- Bessiere, K., Kiesler, S., Kraut, R., & Boneva, B. (2006). Longitudinal effects of Internet use on depressive affect: A social resources approach.
- Bickham, D. S., Vandewater, E. A., Huston, A. C., Lee, J. H., Caplovitz, A. G., & Wright, J. C. (2003). Predictors of children's electronic media use: An examination of three ethnic groups. *Media Psychology, 5*, 107-137.
- Bobko, P. (2001). Correlation and regression: Applications for industrial organizational psychology and management. Thousand Oaks: Sage Publications.
- Bryant, J. A., Sanders-Jackson, A., & Smallwood, A. M. K. (2006). IMing, text messaging, and adolescent social networks. *Journal of Computer-Mediated Communication, 11*(2).
- Buckingham, D. (2000). *After the death of childhood: growing up in the age of electronic media*. Cambridge: Polity Press.

- Burt, R. S. (2001). Structural holes versus network closure as social capital. In N. Lin, K. Cook & R. S. Burt (Eds.), *Social capital: theory and research*. New York: Walter de Gruyter, Inc.
- Calvert, S. L., Rideout, V. J., Woolard, J. L., Barr, R. F., & Strouse, G. A. (2005). Age, ethnicity, and socioeconomic patterns in early computer use. *American Behavioral Scientist*, 48(5), 590-607.
- Caplan, S. E. (2003). Preference for online social interaction: A theory of problematic Internet use and psychosocial well-being *Communication Research*, 30(6), 625-648.
- Cummings, J. N., Butler, B., & Kraut, R. (2002). The quality of online social relationships. *Communication of the ACM*, 45(7), 103-108.
- DeBell, M., & Chapman, C. (2006). *Computer and Internet use by students in 2003*(NCES2006-065). U.S. Department of Education. Washington, DC: National Center for Education Statistics.
- Fox. (2005). *The future of the Internet*. Washington, D.C.: Pew Internet & American Life Project.
- Gross, E. F. (2004). Adolescent Internet use: What we expect, what teens report. *Applied Developmental Psychology*, 25, 633-649.
- Gross, E. F., Juvonen, J., & Gable, S. L. (2002). Internet use and well-being in adolescence. *Journal of Social Issues*, 58(1), 75-90.

- Hartmann, T., and Klimmt, C. (2006). Gender and computer games: Exploring females' dislikes. *Journal of Computer-Mediated Communication*, 11(4), article 2. <http://jcmc.indiana.edu/vol11/issue4/hartmann.html>
- Holmbeck, G. N. (1997). Toward terminological, conceptual, and statistical clarity in the study of mediators and moderators: Example from the child-clinical and pediatric psychology literatures. *Journal of Consulting and Clinical Psychology*, 65, 599-610.
- Hombeck, G. N. (1997). Toward terminological, conceptual, and statistical clarity in the study of mediators and moderators: Example from the child-clinical and pediatric psychology literatures. *Journal of Consulting and Clinical Psychology*, 65, 599-610.
- Howard, P. E. N., Rainie, L., & Jones, S. (2001). Days and nights on the Internet. *American Behavioral Scientist*, 45(3), 383-404.
- Huston, A. C., Donnerstein, E., Fairchild, H., Feshbach, N. D., Katz, P. A., Murray, J. P., et al. (1992). *Big world, small screen: The role of television in American society*. Lincoln: University of Nebraska Press.
- Jackson, L. A., Eye, A. v., Barbatsis, G., Biocca, F., Zhao, Y., & Fitzgerald, H. E. (2003). Internet attitudes and Internet use: Some surprising findings from the HomeNetToo Project. *International Journal of Human-Computer Studies*, 59, 355-382.

- Jordan, A. B. (2004). The role of media in children's development: An ecological perspective *Journal of Developmental & Behavioral Pediatrics*, 25(3), 196-206.
- Kaiser Family Foundation. (2004). *Children, the digital divide, and federal policy*. Washington, D.C.: The Henry J. Kaiser Family Foundation.
- Katz, J. E., & Rice, R. E. (2002). *Social consequences of internet use*. Cambridge: The MIT Press.
- Kent, N., & Facer, K. (2004). Different world? A comparison of young people's home and school ICT use. *Journal of Computer Assisted Learning*, 20, 440-455.
- Kerawalla, L., & Crook, C. (2002). Children's computer use at home and at school: Context and continuity. *British Educational Research Journal*, 28(6), 751-771.
- Klein, R. B. (2005). *Principles and practice of structural equation modeling*. New York, NY: The Guilford Press.
- Kraut, R., Kiesler, S., Boneva, B., Cummings, J., Helgeson, V., & Crawford, A. (2002). Internet paradox revisited. *Journal of Social Issues*, 58, 49-74.
- Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukopadhyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist*, 53(9), 1017-1031.

- Lee, S. J. & Chae, Y. G. (2007). Children's Internet use in a family context: Influence on Family Relationships and Parental Mediation. *CyberPsychology & Behavior, 10*(5):640.
- Lee, W., & Kuo, E. C. Y. (2002). Internet and displacement effects: children's media use and activities in Singapore. *Journal of Computer-Mediated Communication, 7*(2).
- Lenhart, A., Madden, M., & Hitlin, P. (2005). *Teens and technology: Youth are leading the transition to a fully wired and mobile nation*. Washington, D.C.: Pew Internet & American Life Project.
- Lenhart, A., Rainie, L., & Lewis, O. (2001). *Teenage Life online: The rise of the instant-message generation and the Internet's impact of friendships and family relationships*. Washington, D.C.: Pew Internet & American Life Project.
- Lin, N. (2001). Building a network theory of social capital. In N. Lin, K. Cook & R. S. Burt (Eds.), *Social Capital: theory and research* (pp. 3-30). New York: Walter de Gruyter, Inc.
- Lin, N. (2001). *Social capital: A theory of social structure and action*. Cambridge: Cambridge University Press.
- Livingstone, S. (2006). Drawing conclusions from new media research: Reflections and puzzles regarding children's experience of the Internet. *The Information Society, 22*, 219-230.

- Livingstone, S., & Bovill, M. (2001). *Children and their changing media environment*. Mahwah: Lawrence Erlbaum Associates.
- Marsh, H. W., Hau, K., & Wen, Z. (2004). In search of golden rules: comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's findings, *Structural Equation Modeling*, 11, 320-341
- McKenna, K. Y. A., & Bargh, J. A. (1999). Causes and consequences of social interaction on the Internet. *Media Psychology*, 1, 249-269.
- McKenna, K. Y. A., Green, A. S., & Gleason, M. E. J. (2002). Relationship formation on the Internet: What's the big attraction? *Journal of Social Issues*, 58(1), 9-31.
- Mesch, G. (2003). The family and the Internet: The Israeli case. *Social Science Quarterly*, 84(4), 1038-1050.
- Mesch, G. (2006). Family relations and the Internet: Exploring a family boundaries approach. *Journal of Family Communication*, 6(2), 119-138.
- Moody, E. J. (2001). Internet use and its relationship to loneliness. *CyberPsychology & Behaviors*, 4(3), 393-401.
- Muthén, L. K., & Muthén, B. O. (2006). *Mplus User's Guide*. Los Angeles, CA: Muthen & Muthen.
- Neuman, S. (1991). *Literacy in the television age*. Norwood: Ablex Publishing.

- Nie, N. H., Hillygus, D. S., & Erbring, L. (2002). Internet Use, Interpersonal relations, and sociability: A time diary study. In B. Wellman & C. Haythornthwaite (Eds.), *The Internet in Everyday Life* (pp. 215-243). Malden: Blackwell Publishers Ltd.
- Orleans, M., & Laney, M. C. (2000). Children's computer use in the home: Isolation or sociation? *Social Science Computer Review* 8(1), 56-72.
- Papadakis, M. (2003). Data on family and the Internet: What do we know and how do we know it? In J. Turow & A. L. Kavanaugh (Eds.), *The wired homestead* (pp. 121-140). Cambridge: The MIT Press.
- Parks, M. R. (1996). Making friends in cyberspace. *Journal of Communication*, 46(1), 80-97.
- Portes, A. (1998). Social capital: its origins and applications in modern sociology. *Annual Review of Sociology*, 24(1), 1-24.
- Rideout, V., & Hamel, E. (2006). *The media family: Electronic media in the lives of infants, toddlers, preschoolers and their parents*. Washington, D.C.: The Henry J. Kaiser Family Foundation.
- Rideout, V., Roberts, D. F., & Foehr, U. G. (2005). *Generation M: Media in the lives of 8-18 year-olds*. Washington, D.C.: The Henry J. Kaiser Family Foundation
- Seiter, E. (2005). *The Internet playground: Children's access, entertainment, and mis-education*: Peter Lang Publishing.

- Shklovski, I., Kraut, R., & Rainie, L. (2004). The Internet and social participation: Contrasting cross-sectional and longitudinal analyses. *Journal of Computer-Mediated Communication*, 10(1).
- Shklovski, I., Kiesler, S., & Kraut, R. (2006). The Internet and social interaction. In R. Kraut, M. Brynin & S. Kiesler (Eds.), *Computers, phones, and the Internet: Domesticating information technology* (pp. 765-807). London: Oxford University Press.
- Suoninen, A. (2001). The role of media in peer group relations. In S. Livingstone & M. Bovill (Eds.), *Children and changing media environment*. Menhwhah: Lawrence Erlbaum Associates.
- Valentine, G., & Holloway, S. L. (2002). Cyberkids? Exploring children's identities and social networks in on-line and off-line worlds. *Annals of the Association of American Geographers*, 92(2), 302-319.
- Valkenburg, P., & Peter, J. (2005). *Adolescents' online communication and their closeness to friends*. Paper presented at the International Communication Association, New York.
- Valkenburg, P. M., & Peter, J. (2007). Online communication and adolescent well-being: Testing the stimulation versus the displacement hypothesis. *Journal of Computer-Mediated Communication*, 12(4), article 2. <http://jcmc.indiana.edu/vol12/issue4/valkenburg.html>

- Vandewater, E. A., Bickham, D. S., & Lee, J. H. (2006). Time well spent? Relating television use to children's free time activities. *Pediatrics*, *117*, e181-e190.
- Vandewater, E. A. & Lee, S. J. (in press). Measuring children's media use in the digital Age: Issues and challenges. *American Behavioral Scientist*.
- Wartella, E., & Jennings, N. (2000). Children and computers: New technology - old concerns. *The Future of Children*, *10*(2), 31-43.
- Wartella, E., & Reeves, B. (1985). Historical trends in research on children and the media: 1900-1960. *Journal of Communication*, *35*, 118-133.
- Weiser, E. B. (2001). The functions of Internet use and their social and psychological consequences. *CyberPsychology & Behaviors*, *4*(6), 723-743.
- Wellman, B., Haase, A. Q., Witte, J., & Hampton, K. (2001). Does the Internet increase, decrease, or supplement social capital? *American Behavioral Scientist*, *45*(3), 436-455.
- Williams, D. (2007). The Impact of Time Online: Social Capital and Cyberbalkanization, *CyberPsychology & behavior*, *10*(3), 398-406
- Zhao, S. (2006). Do Internet users have more social ties? A call for differentiated analyses of Internet use. *Journal of Computer-Mediated Communication*, *11*(3).

Zhu, B., Walter, S. D., Rosenbaum, P. L., Russell, D. J., Raina, P. (2006).
Structural equation and log-linear modeling: A comparison of methods in
the analysis of a study on caregivers' health, *BMC Medical Research
Methodology*, 6(49), <http://www.biomedcentral.com/1471-2288/6/49>

Vita

Sook-Jung Lee was born in Korea on February 11, 1972, the daughter of Sang-Chil Lee and Kwang-Ja Choi. She received her degree of Bachelor of Arts from Yonsei University in 1995, where she majored in English Language and Literature. She also received her degree of Master of Arts in the area of Mass Communication from the same university in 1998. Her master's thesis was entitled with *Program Type Preferences and Program Choice between Cable subscribers and Non-subscribers*. In 2000, she entered the department of Radio-TV-Film at The University of Texas at Austin as a graduate student. Her master's thesis at UT, *Online Marketing Practices and Children's Online Privacy: Analysis of Korean Kid's Website*, was an investigation of commercial websites' marketing practices integrated with consumers' information collection and its implication in terms of online privacy. In 2002, she started her doctoral program at the same department. With her colleagues at the Center for Research on Interactive Technology, Television, and Children (CRITC) and the Children's Digital Media Center (CDMC), she has worked on many research projects examining the contexts and outcomes associated with children and adolescents media use.

Permanent address: Lucky Apt 20-106, Onchon-2-dong, Dongrae-gu,
Busan, Rep. of Korea

This dissertation was typed by the author.