

STUCK ONLINE:
INTERNET USE AND SELF-CONTROL IN CHILDREN IN GRADES 4 THROUGH 6

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A Thesis Presented to
The Faculty at Humboldt State University
In Partial Fulfillment of the Requirements for the Degree
Masters of Arts in Psychology: Academic Research

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December 2012

ABSTRACT

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The current study examined differences in time spent online and behavioral and internet self-control in 280 children in grades 4 through 6. The combination of time spent online and behavioral self-control created support for the construct of Internet self-control. Behavioral self-control focused on an ability to monitor, evaluate, and modify behavior(s) in general. Internet self-control measured one's ability to control time spent on the Internet. Internet self-control is a new concept and addition to the literature. Internet self-control is considered a type of behavioral self-control, applied to the domain of the internet instead of general behavior.

Self-report scales of Internet and Behavioral Self-Control were used as indicators of levels of self-control. Children reported spending an average of 1.35 ($SD = 1.41$) hours online per day, with varying results with some students reporting no time online per day and others reporting to spend 8 hours online each day. When grouped into high, low, and

average time spent online groups, high and low time online groups significantly differed in both behavioral and internet self-control.

Children reporting high time online reported lower internet and behavioral self-control whereas children reporting low time online had higher internet and behavioral self-control than did children reporting high time online. Additionally, the relationship between internet and behavioral self-control was moderately positive as hypothesized, also suggesting validity for the concept of Internet Self-Control. Differences in high and low time spent online in internet and behavioral self-control highlight the importance of both internet use and self-control in children in grades 4 through 6.

ACKNOWLEDGEMENTS

I have so many people to thank that if I do forget you, I apologize. I “never” thought I would finish this project, but I finally did! It would not have been possible without the support of my husband, Wes Highfield. He stood behind me and did everything he could to help me get through the rough times, encouraging me to keep going, and that I was worth it. He was my backbone throughout this endeavor, and without him, it would not have been possible. He would always remind me that there is going to be a light at the end of this tunnel; and he was right.

My mom and dad, Craig and Brenda Barry. They have always been there for me and believed in me. Their support and encouragement has been boundless throughout this entire endeavor. I am lucky to have such wonderful parents full of love and encouragement to help me keep going. They had faith in me when I lost faith in myself. They never doubted my ability to finish this project, and for that, I thank them. Without them, I wouldn’t be the person I have become today. No words are enough to express my gratitude. Kayla Barry, my “little” sister... always telling me “You can do it! You’re the smart one!” Those small words meant a lot and kept me going through the rough times. She never doubted my ability, and always encouraged me to keep going (and still does!). I want to thank the rest of my family, especially, my brand-new niece, Amaranth; my nephew, Orion; and my basically-a-brother-in-law, Andy; Grandpa Ed; also, thank you to my good friends – Tabetha, Liz, and Rose –for your continued words of encouragement

and support throughout this process. I also want to recognize my cats, Penny, Binx, and BeeBee, for providing me with comfort, solace and distraction when I needed it. Also, Simba Dog, my dog at my parent's house we have had since I was 16 – she was always waiting for me to come and see her when I needed a break, giving me so much love and companionship during those visits. She recently passed and I miss her terribly, but I know she is no longer in pain. She was very old and lived a wonderful life (going to the lake every weekend, cat chasing, flower-bed digging, etc.), and was loved very much (even if some people [Dad] don't want to admit it, hehe). I know she would be proud of me, and she will live forever in my heart.

I learned so much throughout this process from my advisor, Dr. William Reynolds. He was supportive when I needed it, and provided feedback and direction when I became lost. He also was an incredible and persisting encouragement to “keep going”, knowing that I was capable of producing a good document to call a thesis. I want to thank him for the hard work he put into helping me finish this document. Thank you to Dr. Chris Abernethy and Dr. Gregg Gold, other mentors and professors who have been supportive, helpful and encouraging throughout this long, enduring, and painful process. They have given me guidance when I needed it, never questioning my ability to finish.

All the hard work was well worth it, and I thank all of you for the experience you have provided me with, the information and learning opportunities that you have put forth for me, and the encouragement to continue working, because there is a light at the end of the tunnel. I found the light.

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CHAPTER I

INTRODUCTION

The Internet provides immense opportunity for gathering information and engaging in activities. Internet activities are among the most popular of all interactive activities (Rideout, Foehr, & Roberts, 2010). It is an important asset for corporate and educational systems as the Internet allows unprecedented materials to reach into homes. People rely on the Internet for many activities previously only possible in face-to-face interactions such as socialization, recreation and entertainment, banking, e-mailing, and gambling. Approximately 84% of U.S. children 8 to 18 years old are Internet users, with nearly 70% of these children logging onto the Internet daily (Rideout et al., 2010). Because of the prevalence of the Internet in peoples' lives, specifically children, the ability to control one's internet usage is an important concept to study.

There is considerable understanding of internet addiction and other psychosocial aspects of internet use in adults and college students (Kraut, Patterson, Lundmark, Kiesler, Mukopadhyay, & Scherlis, 1998; Kraut, Kiesler, Boneva, Cummings, Helgeson, & Crawford, 2002); however, little research exists on children and adolescent's ability to control the time they spend on the Internet. The current study complements the research on internet use and self-control through the addition of children as study participants. This study examined the amount of self-reported time children spent online per day as well as their behavioral and internet self-control. The combination of time spent online

and behavioral self-control create support for the suggested construct of Internet self-control. Internet self-control measures one's ability to control time spent on the Internet.

The current study defined self-control, or self-regulation (used interchangeably throughout this study unless otherwise noted), as a person's ability to monitor, evaluate, and modify one's behaviors, cognitions, and/or feelings (Baumeister & Vohs, 2007; Baumeister, Vohs, & Tice, 2007; Duckworth & Seligman, 2006; Jahromi & Stifter, 2008; Tangney, Baumeister, & Boone, 2004; Todd & Lewis, 2006; Tsukayama, Duckworth, & Kim, 2011). More specifically, this study concentrated on behavioral self-control, a type of self-control focused on one's ability to control what one is doing (Bandura, 1991, 1996; Wills, Walker, Mendoza, & Ainette, 2006), particularly related to one's internet use.

It is important to note that a person's ability to control his/her behavior can vary intrapersonally across domains of behaviors (e.g., using the Internet, chatting online, e-mailing, playing sports, talking on the phone, watching TV, doing homework, working, eating, etc; Tsukayama, Duckworth, & Kim, 2011). A person who is task-oriented, prompt, and hard-working at his/her job, reporting high scores of self-control on a job inventory questionnaire, may not necessarily report similar levels of self-control in regards to other behaviors (e.g., using the internet, watching TV, exercising, eating, etc.; Tsukayama et al., 2011).

Work on internet addiction (Young & Rodgers, 1998) focuses on lack of control over internet use, among other constructs. Lack of control of the internet refers to an

inability to control or regulate use of the internet (Huang & Leung, 2009; van den Eijnden et al., 2008; Widyanto & McMurrin, 2004). More broadly, lack of control over internet use fits with the concepts of maladaptive regulatory behaviors or dysregulation (e.g., Bandura, 1991). Individuals tend to stop self-monitoring behaviors through justification of their actions (e.g., excusing the amount of time spent online), diffusion of responsibility by blaming others for their actions, and misinterpreting the consequences of such actions (e.g., not doing homework because spent too much time online; Bandura, 1996).

The importance of self-control/regulation in development is multifaceted, as is the concept itself. Self-control/regulation plays a role in every aspect of a person's life, whether it is one's ability to resolve a conflict, to inhibit a snide remark in response to a rude comment, or to set and attempt to reach a goal. Good self-regulatory abilities play a role in positive outcomes and/or emotions, such as quality academic achievement and happiness (Baumeister & Vohs, 2007). Children who do not learn how to self-regulate often report more problems than those who do learn how to self-regulate (Posner & Rothbart, 2000; Raffaelli, Crockett, & Shen, 2005). There has been research on child psychosocial and emotional behaviors in relation to internet use whereas little research related to self-control and internet use has been conducted. The current study examined internet use and behavioral self-control based on child self-report questionnaires to explore differences in self-control constructs based on time spent online.

CHAPTER II

LITERATURE REVIEW

The current study examined Internet use and self-control in children in grades four through six. This literature review discussed self-control, including definitions and developmental background. Next, it focused on time spent online per day in childhood and adolescence. The final section, Problems in the Self-Control of Internet Use, focused on the development and description of the concept of Internet self-control and its relationship to time spent online.

Self-Control in Children and Adolescents

Introduction

Throughout childhood and into pre-adolescence, young people are practicing and constantly expanding their capacity to govern both their emotional and behavioral exchanges (Raffaelli et al., 2005). Self-control is a conscious ability to make decisions, set goals or other behavioral expectations, and change behaviors and emotions in response to both internal and external influences. In a simpler sense, it is the ability to monitor, evaluate, and modify one's behavior (Baumeister & Vohs, 2004; Baumeister & Vohs, 2007).

Self-control involves both motivation and cognitive ability in its processes. Motivation, defined as the actual desire of playing out an urge or participating in an activity/behavior, is a major ingredient in a person's ability (and/or willingness) to do something, whereas cognition (or cognitive ability) assists a person in deciding what it is

s/he wants and how s/he plans on getting it (Baumeister & Vohs, 2004). Self-control requires motivation to insure the person's willingness to complete an "activity", and cognitive ability to apply the techniques necessary in which to perform the "activity" (Baumeister & Vohs, 2004). The current study defined self-control as the ability to change, interrupt, or stop undesired impulses, thoughts, emotions, or other actions and behaviors (LaRose & Eastin, 2004; Raffaelli & Crockett, 2003; Tangney et al., 2004).

General Self-Control

The self-regulatory mechanism consists of three sub-functions: self-monitoring, judgmental process, and self-evaluation. These mechanisms of self-control are a continuously evolving set of processes, with the ability to direct behavior toward long-term goals developing throughout childhood and adolescence (Bandura, 2005; Raffaelli et al., 2005). The goal of self-control is to bring one's behavioral responses "into line with standards such as ideals, values, morals, and social expectations" (Baumeister, Vohs, et al., 2007, p. 351). To control one's behavior, a person must first be aware of and have the ability to monitor one's behavior. S/he therefore expends effort to attend to one's actions, which can then lead someone with good self-control to modify undesired behavior, thoughts, or feelings (Baumeister & Vohs, 2004; Raffaelli et al., 2005; Wills et al., 2006).

Bandura's theory of self-regulation (1991) describes the process by which individuals engage in regulatory abilities. Self-monitoring is described as the first step in attaining self-regulatory abilities, and defined as one's ability to pay attention to his/her

behavior. Self-evaluation/reaction follows self-monitoring in the self-regulatory development process, which consists of one's perception of his/her ability to monitor his/her behavior. Finally, a method of judgment is introduced, where a person evaluates and compares his/her behavior against personal and societal standards and decides what s/he might want to do about such behavior (Bandura, 1991, 1996).

The self-regulating/self-controlling person must be able to accurately identify the behavior in question and identify goals regarding expectations related to both societal and personal standards. Awareness of one's behavior is the first step in learning how to self-monitor as well as a necessary component in self-regulation. If a person is unaware of and unable to monitor his/her behavior, the process of self-regulation will become stalled and unlikely to be completed. Due to individual differences in self-regulation and activity preferences, various activities and behaviors fluctuate in levels of self-control as some people report better abilities to control some behaviors over others. Once aware of a behavior, a person can then apply self-observation and self-monitoring skills to this behavior, choosing to change or continue the current behavior, for example.

Part of the expansion and growth in this progression and advance of self-control requires the person presenting and developing these self-regulatory mechanisms to mature in ability to complete, process, and improve in self-observations independently, consistently, dependently, and in a timely manner. Additionally, Bandura (2005) describes self-efficacy, defined as a person's belief that s/he has the ability to complete specific or general behaviors, as a necessary part of self-regulatory development. If a

person does not believe s/he has the capability of completing an activity or monitoring a specific behavior (e.g., motivation, or lack thereof), it is unlikely that s/he will follow through with such behavior (Bandura, 2005).

Children are currently developing an ability to self-monitor their behavior, so their evaluation and judgment of the amount of time they spend on the Internet, for example, may not be completely accurate (Bandura, 1991; 1996; 2005). Without an ability to self-monitor, a person will have difficulty completing other tasks followed in the process of self-regulation. With the ability to self-monitor comes the ability to set goals regarding one's behavior while attempting to reach said goals. While striving to reach these goals, the person will likely be monitoring and evaluating his/her behavior.

Behavioral Self-Control

Behavioral self-control or regulation includes the ability to monitor, evaluate, and change one's behaviors (Bandura, 1991; Jahromi & Stifter, 2008; Matthews, Ponitz, & Morrison, 2009; Wills, Pokhrel, Morehouse, & Fenster, 2011; Wills et al., 2006). Studies have shown that the lack of behavioral control in early childhood positively relates to later externalizing behaviors such as substance use or aggression (Wills et al. 2006).

Similar to behavioral self-control when described as content-specific, content-specific self-control examines a specific behavior or aspect of behavior, such as Internet use, television watching, substance use, text messaging, etc. (Duckworth & Kern, 2011; Tsukayama et al., 2011). Research suggests that people with good self-control do not necessarily have good control of other content-specific behaviors (e.g., internet use, drug

use, eating, text messaging, academic achievement, television watching, etc.). Self-control can be broken down into various aspects, including behavioral self-control, which can be broken down into content-specific self-control, which focuses on a particular behavior within the scope of behavioral self-control and under the umbrella of general self-control.

Wills et al. (2006) examined 489 middle school children (average age = 12.2 years, 46% female) and 602 high school students (average age = 15.8 years, 52% female), finding aspects of good behavioral self-control to have small negative relationships with substance use in both high school ($r = -.30, p < .001$) and middle school students ($r = -.30, p < .001$). The small positive relationships between poor behavioral self-control and substance use are similar in both middle school ($r = .10, p < .05$) and high school students ($r = .22, p < .001$). The composite measures used as indicators of behavioral self-control included items taken from other general self-control scales (e.g., planfulness, problem solving, cognitive effort, self-reinforcement, distractibility, and impulsiveness). Every indicator except for distractibility and impulsiveness was slightly negatively correlated ($r = -.18$ to $-.25$), suggesting children and adolescents reporting better planfulness, problem solving, cognitive effort, and self-reinforcement skills also reported less substance use. Impulsiveness was slightly positively correlated with substance use ($r = .12, p < .01$). These relationships suggest behavioral self-control to be an important factor in examining behaviors in children and adolescents. In relation to Internet use, children and adolescents with higher behavioral self-control were expected to report low

time spent online, whereas those with lower behavioral self-control were expected to report high time online (Wills et al., 2006).

In their studies describing the creation and validation of the Self-Control Scale (SCS) and the Brief Self-Control Scale (BSCS), Tangney, Baumeister, and Boone (2004) used both empirical and rational methodology to generate scale items representing a reasonable approximation of the content domain of self-control. The final Self-Control Scale included 36 items measured on a 5-point Likert scale where *1 = not at all like me* and *5 = very much like me*. Study 1 included 351 undergraduate students averaging 20 years old ($SD = 4.99$; range = 18 – 55), with 28% male, 49% White, 20% Asian, and 11% African American; study 2 included 255 students (average age = 20, $SD = 4.23$; range = 18 – 49), with 19% male, 58% White, 13% Asian, and 11% African American. Internal consistency for the SCS was good with α 's of .89 in both studies 1 and 2. The BSCS reported α 's of .83 and .85 in studies 1 and 2, respectively. Additionally, convergent validity for the Total SCS was shown by small negative correlations with a drug behaviors subscale ($r = -.34, p < .001$) and a food behaviors subscale ($r = -.32, p < .001$; Tsukayama et al., 2011).

Other studies using the BSCS in children and adolescents also reported good reliability (e.g., α 's of .85 and .82 in Duckworth & Seligman, 2005; Duckworth, Quinn, & Tsukayama, 2012). The BSCS showed good test-retest reliability ($r = .87$). Validity was shown through a moderately strong positive relationship between a composite self-discipline score and the BSCS across two studies ($r = .66$ & $.68$ in studies 1 & 2,

respectively; Duckworth & Seligman, 2005). Convergent validity for both the SCS and the BSCS was shown through moderate relationships between self-control and grade point average (GPA; $r = .39, p < .001$, for both the SCS and the BSCS in Study 1 of Tangney et al., 2004). A moderate to strong relationship was found between the Eysenck Junior Impulsivity Subscale and the BSCS ($r = .62, p < .001$; Duckworth et al., 2012), also supporting convergent validity for the BSCS. Correlations between the BSCS and the SCS were .93 and .92 in scale development studies 1 and 2, respectively (Tangney et al., 2004).

Students reporting good self-control were related to less substance use and less reported peer substance use in addition to better academic performance than students reporting poor self-control. Convergent validity was portrayed through Wills' various research studies. These studies showed negative relationships between good self-control and substance use ($r = -.31$, Wills et al., 2011; $r = -.23$ to $-.28$, Wills & Stoolmiller, 2002); positive relationships between peer substance use and poor self-control ($r = .31$ & $.38$, studies 1 and 2, respectively, Wills et al., 2002); and negative relationships between academic competence (i.e., higher academic performance) and control problems ($r = -.24$ & $-.19$ in studies 1 and 2, respectively, Wills, Sandy, & Yaegar, 2002).

Duckworth and Seligman (2005) examined self-discipline scores and academic performance in two samples of eighth grade students from the same school, the first in November 2002 and the second in October 2003. Study 1 included 140 students averaging 13.4 years old, with 56% female and 55% Caucasian. Similarly, study 2

included 164 students averaging 13.8 years old, with 54% female and 52% Caucasian. Survey instruments for Study 1 included the Eysenck Junior Impulsiveness Subscale, the Brief Self-Control Scale (BSCS), the Self-Control Rating Scale completed by parents and teachers about their child(ren), and the Kirby Delay-Discounting Rate Monetary Choice Questionnaire measuring ability to delay immediate gratification and wait for a better reward. All of these measures combined to represent a composite score of self-discipline. In study 2, instead of using the Self-Control Rating Scale, parents and teachers completed an adapted version of the BSCS, rating each child on his/her self-control ability. The Delay Choice Task replaced the Kirby Delay Choice Task in study 2, with students evaluated based on whether or not they kept an envelope with \$1 in it or returned it to the surveyors in order to receive \$2 the following week. The BSCS showed good internal consistency with Cronbach's α 's of .83 and .86 in studies 1 and 2, respectively. Study 1 found that children and adolescents reporting higher levels of self-discipline also reported better academic achievement with higher report card grades and standardized test scores at the end of the year, measured seven months after conducting the initial survey. Study 2 was a replication of Study 1, also finding self-discipline as a better predictor of final grades than standardized test scores, IQ, and initial grades (Duckworth & Seligman, 2005). Self-discipline is strongly positively related to parent ($r = .74$) and teacher ($r = .78$) self-control ratings. The relationship between self-discipline and the BSCS was $r = .66$ in study 1 and $r = .68$ in study 2, suggesting sound validity in the construct of self-discipline as the BSCS is a well-used scale of self-control abilities.

Wills, Ainette, Mendoza, Gibbons, and Brody (2007) examined self-control and substance use symptomatology in 332 9-year-old students (52% female, 52% Caucasian) and found poor self-control related to higher internalizing and externalizing behavior. Good self-control was measured by a composite measure of general self-control and reinforcement measures including components of soothability (i.e., ability to calm one's self down; $\alpha = .74$), planfulness ($\alpha = .70$), problem solving ($\alpha = .83$), delay of gratification ($\alpha = .70$), and positive self-reinforcement ($\alpha = .85$). Poor self-control was represented by aspects of impatience ($\alpha = .61$), distractibility ($\alpha = .77$), impulsiveness ($\alpha = .82$), anger coping ($\alpha = .87$), immediate gratification ($\alpha = .72$), tension maintenance ($\alpha = .88$), and self-criticism ($\alpha = .76$). Internalizing behaviors included loneliness, anxiety, sadness, fatigue, and nervousness, and were moderately positively related to poor self-control, $r = .35$, $p < .001$, indicating higher internal distress to be positively related to poor self-control. Externalizing symptoms were moderately positively related to poor self-control, $r = .41$, $p < .001$, and also moderately negatively related to good self-control, $r = -.32$, $p < .001$, indicating that poor self-control is more likely to be related to negative outcomes than is good self-control (Wills et al., 2007).

Wills and Stoolmiller (2002) examined substance use and changes in self-control over time using a time-varying approach and latent growth model, running multiple-group analyses to determine whether the use of substances over time varies in relation to changes in one's self-control. Authors predicted that adolescents reporting improvements or maintenance of self-control over several time periods would also report either the same

amounts or lower amounts of substance use. Additionally, they predicted that adolescents whose self-control abilities decline across time periods will report higher levels of substance use. The study assessed students at four time periods, starting when the children were in 6th grade ($n = 1,810$; 94% completion rate; mean age = 11.5 years, $SD = 0.6$) and measuring these children every year thereafter until they were in 9th grade. If new students entered the school, they were added as participants as long as they spoke English. Study retention was about 70% ($n = 1,794$ at time 4 in 9th grade), with the final sample consisting of 50% females, 27% African Americans, 23% Hispanics, 3% Asian Americans, 35% Caucasians, 7% other ethnicities, and 5% mixed ethnicities. Authors found adolescents with good self-control reported lower participation in substance use during early adolescence, whereas poor self-control was associated with higher levels of initial substance use as well as increasing use of substances over time. Specifically, adolescents reporting poor self-control reported higher levels of initial substance use and increasing usage as they got older (Wills & Stoolmiller, 2002), supporting the authors' hypothesis.

Developmental Aspects of Self-Control

Self-regulatory abilities begin developing in early childhood (i.e., infancy and toddlerhood), and continue through adolescence and adulthood, with more complex processes (i.e., goal setting, future planning, abstract thinking) taking longer to develop, thus developing in late childhood (Bandura, 1991; Garon et al., 2008; Kopp, 1982; Posner & Rothbart, 2000; Raffaelli et al., 2005; Rueda, Posner, & Rothbart, 2005).

Newborns depend on other people to help in the regulation of behaviors as well as with physiological mechanisms such as the sleep-wake cycle and temperature control. Infants often need reinforcement to be assisted to sleep, as they also need help in the regulation of their body temperature. Additionally, newborns require assistance in specific activities, such as eating and playing.

In the first three months of life, the infant learns functional behaviors and reflexes in the neurophysiological modulation phase, the first phase defined by Kopp (1982), as well as an ability to self-soothe in response to anxiety-provoking situations or stimuli (Bandura, 1991; Kopp, 1982; Posner, Rothbart, Sheese, & Yang, 2007; Raffaelli et al., 2005; Rueda et al., 2005). The second phase defined by Kopp (1982) is sensorimotor modulation, lasting from 3 months to approximately 9 to 12 months. In this stage, the infant, once able to perform sequential actions, begins to then engage in voluntary behaviors; however, while these behaviors may be voluntary, they are also unconscious so are not yet considered aspects of self-control (Rueda et al., 2005). The efficacy of this phase depends on both internal and external factors, such as individual differences in the development of voluntary movement, and environmental influences, such as the infant's interaction with his or her caregiver(s) (Kopp, 1982; Posner et al., 2007). This phase is important in building later developmental milestones such as emotion regulation, autonomy, and peer relationships (Todd & Lewis, 2006). This stage is also important in assisting young children to begin differentiating their thoughts or actions from the thoughts or actions of others.

The toddler's ability to initiate his or her own behavior and comply with commands or instructions develops throughout the control phase (Kopp, 1982), beginning around 9 to 12 months of age and lasting through about 18 to 24 months. The child's conscious awareness sprouts, and s/he develops the ability to self-monitor behavior internally, where s/he begins learning and applying problem-solving skills to his/her understanding of right and wrong (Garon, Bryson, & Smith, 2008; Matthews et al., 2009). The child learns to be more adaptive and flexible during the final stage of regulation, beginning around 24 months of age and continuing to develop throughout adolescence. In this regulation phase, the child develops a better ability to delay gratification and adapt to varying situations. The child's conscious awareness also expands during the regulation phase, giving him/her the ability to contemplate, or reflect, on his/her behavior and make conscious decisions reflecting his/her behavior. The child's self-regulatory abilities as discussed in Kopp remain in early stages and have some maturing to do before becoming fully functional (Garon et al., 2008; Kopp, 1982; Posner et al., 2007; Raffaelli et al., 2005). This early development of self-control and regulation reflects the child's ability to get along in the outside world. For example, preschoolers reporting high self-control reported less negative emotional arousal and more social competence than those with low self-control (Finkenauer, Engels, & Baumeister, 2005).

During early childhood, children familiarize themselves with how people respond or react to their behaviors and emotions, and how others' emotions affect them. There are individual differences in levels of regulatory abilities due to temperament and

environmental influences, as well as genetic and biological influences and predispositions (Posner & Rothbart, 2000; Posner et al., 2007; Rueda et al., 2005; Todd & Lewis, 2006). Research on regulatory development indicates that children between the ages of five and six have developed enough cognitive ability to internalize and regulate some of their thoughts, emotions, and cognitions. During these ages, aspects of effortful control, defined as the regulation of behaviors based on current and future needs or wants, begin internalizing self-regulatory processes (Posner & Rothbart, 2000).

Advancement of the executive functioning system, located in the prefrontal cortex, is a major developmental milestone during the first five or six years of a child's life (Posner et al., 2007). During the maturation of the prefrontal cortex, the child develops control over goal-related behaviors, making his/her own decisions, learning how to problem-solve, and controlling automatic thoughts, feelings, and/or behaviors (Garon et al., 2008; Jahromi & Stifter, 2008). The prefrontal cortex is in charge of the regulation of a person's thoughts, perceptions, and activating and inhibiting behaviors. The prefrontal cortex is one of the most important functions and foundations for the development of self-control as well as many other aspects of development (e.g., identity and social competence; Garon et al., 2008).

Jahromi and Stifter (2008) examined self-regulation in preschoolers at two separate times over a one-year period. Participants were first observed interacting with their mothers, and subsequently invited back two weeks later to be observed interacting with their fathers. Participants at time 1 included 92 children 4.5 years old; 90

participants returned two weeks later with their fathers for similar observations. At time 2, 86 children returned to complete the study, now averaging 5.5 years old. Findings indicated that emotional, behavioral, and cognitive self-regulation were all interrelated aspects of self-control. Any behavior changes were expected to influence thought processes, cognitions, and emotions. For example, a child instructed to stop a behavior has to exhibit behavioral control to stop the behavior; s/he must also show emotional regulation to inhibit one's emotional reaction (i.e., frustration) to the instruction to 'stop' the behavior in which s/he was engaging. Both cognitive and emotional self-regulation play a part in behavioral self-control, as children must decide not to engage in a specific behavior and to inhibit such behavior despite one's thoughts (i.e., cognitive self-regulation) or feelings (i.e., emotional self regulation). This behavioral inhibition can be difficult for children, and even adults, as it is natural to act on one's thoughts and feelings (i.e., Jahromi & Stifter, 2008).

The transition from childhood to adolescence initiates many changes in one's regulatory abilities, especially risk-taking and decision-making (Magar, Phillips, & Hosie, 2008). Problems with self-control, in addition to positive aspects of self-control, become both explicit and apparent to outside observers and the adolescent him/herself. Good self-control in adolescence takes the form of the ability to solve problems and make decisions based on rational, logical reasoning skills, good academic abilities and social competence. Poor self-control in adolescence, however, may be related to behaviors such

as substance use, sexual promiscuity, aggression or bullying, social withdrawal, and/or poor decision-making (Magar et al., 2008; Raffaelli et al., 2005; Wills et al., 2006).

A longitudinal study comparing childhood and adolescent development of self-regulation examined children ($n = 646$, 75% of the initial cohort) at three separate sessions across eight years, beginning when the children were 4 and 5 years old (Time 1), then 8 and 9 years old (Time 2), and finally 12 and 13 years old (Time 3; Raffaelli et al., 2005). Based on mother's reports of their child(ren), girls had higher self-regulatory abilities than boys at all ages (Raffaelli et al., 2005). Increases in age also related to better self-regulatory abilities, suggesting that older children showed higher levels and abilities of self-control than younger children. Gender differences across all age groups suggested self-regulation to be critical in the development of the self during childhood and adolescence (Raffaelli et al., 2005). This study particularly focused on the young adolescent population and described some aspects of the development of self-control, such that the older one gets, the better his/her self-regulatory abilities become.

Summary

Self-control influences everyone differently and relates to many psychosocial and environmental aspects of behavior. Self-control involves paying attention to, modifying, and evaluating one's behavior (i.e., Duckworth & Kern, 2011; Duckworth & Seligman, 2005, 2006; Tsukayama et al., 2011; Wills et al., 2011). The current study focused on behavioral self-control in addition to content/domain-specific self-control, which highlighted the construct of time spent online or internet use.

Internet Use in Children and Adolescents

Introduction

For some users, it started with short, quick instant messages or longer messages sent via e-mail. For others, downloading music and online gaming instigated their initial use of the Internet. For all users, though, the Internet is one of the most popular media and entertainment activities in today's society (Livingstone, 2006). The Internet provides people with an easy-to-use, readily available medium to carry out activities such as surfing the web, playing games, communicating with others, shopping, gambling, etc. Due to its widespread availability, the possibility of spending too much time on the Internet has the potential to develop. Child and adolescent use of the Internet has specifically risen throughout the past few years due partially to the popularity and ease of communication the Internet provides among their friends, colleagues, businesses, and educational systems (Livingstone 2002, 2003, 2006; Livingstone, Haddon, Görzig, & Ólafsson, 2010).

The Internet is prevalent in most adolescents' lives, excessively so for some (Subrahmanyam & Greenfield, 2008). Eighty-four percent of children 8 to 18 years old reported to have used the Internet in 2009, significantly higher than 74% in 2004 and 47% in 1999 (Rideout et al., 2010). Seventy percent of these children reported logging onto the Internet on an average day (Rideout et al., 2010). The Pew Internet and American Life Project carried out several research projects throughout the past decade measuring frequency and prevalence of Internet use in adolescents and adults, among

other topics. Lenhart, Purcell, Smith, and Zickuhr (2010) conducted a telephone survey in September 2009, finding 93% of 800 teenagers ages 12 to 17 years go online in general, with 63% of these teens visiting the Internet daily, 26% weekly, and 11% logging on less than once per week. Teens are more likely to use the Internet if they have access through mobile devices (i.e., cell phone, laptop, etc.) or broadband internet services at home or school (Lenhart et al., 2010).

The current study examined internet use in the form of time spent online. Time spent online was measured by the amount of hours spent online per day. The estimated hours spent online were self-reported by the participants of the study.

Time Spent Online

The current study examined Internet use specific to time spent online. Time online is generally measured by self-reported amount of time (often measured in hours) an individual spends on the Internet each day (Mottram & Fleming, 2009; van den Eijnden et al., 2008; van der Aa, Overbeek, Engels, Scholte, Meerkerk, & van den Eijnden, 2009). This study similarly measured time spent online in number of hours children spent on the internet each day.

A sample of 2,002 8-to-18 year old children and adolescents from randomly selected school locations between October 2008 (time 1) and May 2009 (time 2) reported spending an average of 1.5 hours each day on the computer (standard deviation not reported). Students indicated the amount of time they spent online by recalling the time they spent on the computer the day prior to completing the survey. The measure of

computer time included both online and offline computer usage, as well as specific online/offline computer-related recreational activities (e.g., social networking, gaming, viewing video websites such as YouTube, viewing other websites, instant messaging, e-mailing, viewing graphics/photos, reading magazines/newspapers, etc.; Rideout et al., 2010). Participants between 8 and 10 years old spent the least amount of time online (0:46 minutes) than both 11- to 14-year-olds (1:46) and 15- to 18-year olds (1:39) (Rideout et al., 2010). Rates of average recreational computer/internet use have shown significant increases among children 8-to-18 years old throughout the years of 1999 and 2009. In 1999, this age group averaged 27 minutes online per day; in 2004, they averaged 1 hour, 2 minutes online per day; and in 2009, they averaged 1 hour, 30 minutes online per day (Anderson & Rainie, 2010; Byun et al., 2009; Rideout et al., 2010).

A longitudinal study on Internet use and related characteristics in the Netherlands in November 2003 (time 1) and June 2004 (time 2) found adolescents spent an average of 1.29 hours online per day (or 9 hours a week as reported in the study). Participants completing the study at both times included 663 eighth graders (318 males, 345 females, average age = 13). Students spent an average of 8 hours ($SD = 8.85$) online per week (or 1.14 hours per day) at Time 1 and 10 hours ($SD = 9.9$) online per week (or 1.43 hours per day) at Time 2 (van den Eijnden et al., 2008).

A study examining 994 Irish children and adolescents indicated that 53% of 9- to 16-year-olds in Ireland use the Internet almost daily (O'Neill, Grehan, & Olafsson, 2011). These children reported spending an average of 61 minutes online each day. By age

group, 9 and 10 year old Irish children spend approximately 45 minutes online per day whereas 15 and 16 year olds report spending about 1 hour 20 minutes online per day.

The EU Kids Online Network interviewed a random sample of 23,420 children ages 9 to 16 from 25 different European countries during the spring and summer of 2010 regarding their internet use (Livingstone et al., 2010). Only those children who reported using the internet at least once a week were included in the study. Ninety-two percent of internet-using children were classified into two separate groups: daily or almost-daily internet use (57%) and once or twice a week internet use (35%). The other 8% of children reported using the Internet a few times a month or less often. Boys (60%) reported more daily internet use than did girls (55%). Children reported spending an average of 1 hour 26 minutes online per day, with boys and girls reporting nearly equal amounts of time spent online. Age differences existed in that 15 and 16 year olds spent nearly twice the amount of time 9 and 10 year olds did online on average per day (1 hour, 55 minutes [115 minutes] vs. 57 minutes, respectively; Livingstone et al., 2010).

Van Rooij, Schoenmakers, van den Eijnden, and van de Mheen (2010) examined Internet use in Dutch adolescents ages 13 to 15 twice across a two-year period: Time 1 in 2007 ($n = 3,873$, 51% boys) and Time 2 in 2008 ($n = 3,924$, 49% boys). Time spent online was measured using a 5-point Likert scale with $1 = \text{never}$, $2 = 1 \text{ day per week or less}$, $3 = 2/3 \text{ days per week}$, $4 = 4/5 \text{ days per week}$, and $5 = (\text{almost}) \text{ daily}$, with an overall mean of 2.75 ($SD = 1.21$), indicating an average of about 2 days online per week. In comparison to other countries' use of the Internet, this estimate appears low. This study is

limited in that the measure of Internet use was represented by days per week in a Likert-style scale. Participants were unable to indicate the approximate time they spent online per day, but instead had to choose from the response choices given.

Kelleci and Inal (2010) surveyed 2,480 (final $n = 2,080$; 53% males, average age = 16) randomly selected Turkish high school students in grades 10 through 12 from 14 high schools. Researchers randomly chose two classes from each grade (10, 11, and 12) to participate in the study. Almost 80% of the sample ($n = 1,656$) reported using the Internet. More boys than girls (881 vs. 775, respectively) were classified as internet users; however, no significant differences existed between genders. The authors found that about 52% ($n = 860$) of Internet users spent 1 to 2 hours online per day, compared to nearly 43% ($n = 711$) spending 3 to 4 hours online per day, and 5% ($n = 85$) spending 5 or more hours online per day.

Willoughby (2008) measured the frequency of Internet use in Canadian high school students ($n = 1,591$) by averaging the amount of time they spent online on an average school day and on an average weekend day. A Likert response format was used, with $1 = not at all$ to $5 = 5 or more hours$ in regards to time spent online. Students were measured twice throughout their high school careers: Time 1 in early high school (i.e., 9th or 10th grades) and Time 2 in late high school (i.e., 11th or 12th grades). Results indicated students averaged 1.5 hours online per day across both time periods. Time 1 showed no difference between boys and girls in frequency of time spent online each day. During Time 2, though, boys reported slightly, yet significantly, more time online than

did girls. The more accessible the Internet was, the more it was used. Teens who reported having more computers in the home reported more Internet use than teens with fewer computers in the home. One limitation to this research is the response format used in measurement of time spent online (i.e., $1 = \text{not at all}$ to $5 = 5 \text{ or more hours}$). Providing participants with response choices limits the variability of their responses. The main issue, though, is that the authors did not report the mid-section labels of their Likert scale (i.e., did not report what 2, 3, and 4 on the Likert scale represents), making interpretation of some of the mean values reported in the study difficult and unclear. The researchers would have benefitted from having participants estimate the average amount of time they spend online each day, or to report the amount of time they spent online the previous day. Additionally, when using and reporting Likert-type scales, it is important to report scale midpoints to maximize readers' understanding of the research.

A subsample ($n = 7,888$) of a large-scale Dutch study ($n = 16,925$) conducted online in 2003 and 2004 examined adolescent Internet use and well-being. Participants were recruited for the study through advertisements via other media, such as radio, television, and newspaper. The subsample included 77% male ($n = 6,081$) Dutch adolescents ages 11 to 21 years (average age = 17, $SD = 2.22$; van der Aa, Overbeek, Engels, Scholte, Meerkerk, & van den Eijnden, 2009). Time online was measured using a Likert-type format, with $1 = \text{less than one hour per day}$ to $8 = 7 \text{ or more hours per day}$ ($M = 3.64$, $SD = 1.82$; scale mid-points not indicated). Researchers found participants spent an average of 2 hours online per day. Boys ($M = 3.76$, $SD = 1.81$) reported

spending significantly more time online per day than did girls ($M = 3.22$, $SD = 1.79$) after running an analysis of variance, $F(1, 7885) = 126.95$, $p < .001$. This study was limited in that participants did not fill-in the amount of time they spent online per day but answered Likert-type responses; additionally, the mid-points of the scale were not reported, making interpretation difficult (van der Aa et al., 2009).

Lin and Yu (2008) examined gender differences in adolescent internet use among 634 (55% boys) Taiwanese fifth ($n = 337$) and sixth ($n = 290$) graders. Ten schools in Taipei City, Taiwan, were randomly selected to participate in the study; each school had one fifth and one sixth grade class as the school's study participants. Ninety percent of student participants reported having Internet access at home. Forty-two percent of participants used the internet for two years minimum compared to 35% with under one year experience; this is likely due to the Taiwanese schools providing computer usage to children around the fifth grade. Boys spent more time online per week than girls (mean values not reported; $\chi^2(3, N = 629) = 8.83$, $p < .05$). About 40% of boys and 48% of girls reported spending less than an hour online each week; 41% of boys indicated spending approximately 1 to 5 hours online per week as did 39% of girls. About 9% of boys and 8.9% of girls reported spending 5 to 10 hours online per week. Approximately 11% of boys spent over 10 hours online per week, with only 5% of girls online more than 10 hours per week (Lin & Yu, 2008).

Holtz and Appel (2010) examined internet use in Austrian children 10 through 14 years old (average age = 12.71, $SD = 1.01$). Time spent on the Internet per day was

reported in 30-minute increments ranging from $0 = no\ internet$ to $7 = 4\ hours\ or\ more\ per\ day$. Participants ($N = 205$, 51% female) reported spending an average of 1 to 1.5 hours online each day ($M = 2.42$, $SD = 1.63$). There were no differences between average time spent online between boys and girls, $t(203) = -0.90$, $p = .34$. Subrahmanyam and Lin (2007) surveyed 156 (50% male) adolescents between 15 and 18 years old ($M = 16.50$) attending a private high school in Los Angeles County. Students reported spending an average of 1 hour 25 minutes (85 minutes) online each day and approximately 10 hours (9.75) online per week. No gender differences in time spent online per day or week were found (Subrahmanyam & Lin, 2007).

Comer, Furr, Beidas, Babyar, and Kendall (2008) found a sample of 90 children (average age = 10.78, $SD = 2.00$, range = 7 to 13) spent an average of 7.58 ($SD = 11.93$) hours on the Internet each week, averaging a little over one hour online each day. Participants included 52% boys, 47.8% Caucasian, 47.8% African American, and 4.4% other ethnicity. A study of 3,975 Turkish adolescents in sixth through twelfth grades (12 to 18 years old, 50.7% male, average age = 14.80, $SD = 1.50$) found that nearly 45% ($n = 1,722$) of these students spent 1 to 2 hours on the Internet per week (Tahiroglu, Celik, Uzel, Ozcan, & Avci, 2008). Twenty percent of participants ($n = 798$) reported spending 3 to 4 hours online per week, 14.6% ($n = 582$) spent 5 to 8 hours online per week, 7.5% ($n = 299$) spent 9 to 12 hours online per week, and 7.6% ($n = 302$) spent more than 12 hours online per week. Authors suggested that anything above 12 hours of Internet use per week was excessive, or problematic, use of the Internet (Tahiroglu et al., 2008).

A sample of 9th and 11th graders, averaging 14 and 16 years old, respectively, ($N = 614$, 56% boys) spent an average of 2.17 hours ($SD = 0.88$) online per day. Participants reported spending an average of 2.24 hours ($SD = 0.83$) online each day on weekend days compared to 2.09 hours ($SD = 0.93$) online per day on weekdays. Almost 50% of participants reported spending about 1 to 2 hours online during the week, with 28% spending over 2 hours online during the week. On weekend days, 37% of participants reported spending about 1 to 2 hours online whereas 40% reported spending over 2 hours online on any given weekend day (Windham, 2008).

Roberts, Foehr, and Rideout (2005) examined a nationally representative group of children and adolescents ages 8 through 18 years ($N = 2,032$), finding significant differences in the average time students spent online each day among three age groups (e.g., 8-10 years, 11-14 years, and 15-18 years). All students spent approximately an hour online daily (1:02; 54% of all students engaged in computer/internet use the previous day before the survey was completed). Children 8 to 10 years old reported spending 37 minutes online each day (42% used the Internet the previous day), significantly less than both 11 to 14 year olds and 15 to 18 year olds. Adolescents aged 11 to 14 years were also significantly different from both other age groups, averaging 1 hour, 2 minutes online per day (55% used the Internet the previous day), with these adolescents spending more time online than 8 to 10 year olds and less time than 15 to 18 year olds. Students 15 to 18 years old averaged 1 hour, 22 minutes online each day (61% online the previous day). There were no significant differences between boys' and girls' overall computer use.

Belanger, Akre, Berchtold, and Michaud (2011) utilized data from the 2002 Swiss Multicenter Adolescent Survey on Health, including 7,211 Swiss adolescents ages 16 to 20 years. Levels of Internet use were determined based on the amount of time participants spent online. Belanger et al. (2011) identified participants spending at least 2 hours online per day as Heavy Internet Users (HIUs). Regular Internet Users (RIUs) were classified as spending less than 2 hours online per day coupled with use of the internet several days per week. Occasional Internet Users (OIUs) spent about one hour online each week, and Non Internet Users (NIUs) reported no internet use in the previous 30 days. Findings suggested that participants reporting moderate internet usage (the combination of occasional and regular internet users) reported less problems with mental and physical health than did participants reporting both lower internet use (non-users) and excessive internet use (heavy users). Approximately 43% of participants were identified as Regular Internet Users ($n = 3,122$), 35% as Occasional users, about 16% as Non-Internet Users, and 5% reported being Heavy Internet users.

Summary of Time Spent Online

Studies examining time online (Comer et al., 2008; Holtz & Appel, 2010; Lin & Yu, 2008; Subrahmanyam & Lin, 2008; Tsitsika et al., 2009; Windham, 2008) identified the average time spent online for most adolescents as between one and two hours each day. This approximation could easily lead to adolescents spending up to 14 hours online per week. This time spent online each week is representative of the reliance the current population of adolescents devotes to the Internet as part of everyday educational,

business, and recreational routines. Additionally, what once may have been considered an excessive amount of time spent online does not necessarily cause problems or trouble in a person's life as suggested by past research on problematic internet use or internet addiction (Belanger et al., 2011; Young, 1998a,b).

High Internet Use

Due to its popularity and commonality in everyday life, more and more adolescents use the internet for longer periods than they have in the past (Rideout et al., 2010). Recent research on internet use has suggested examining internet use on a continuum due to the possibility of the internet being problematic for some people in ways that it is not problematic for others (Belanger et al., 2011). Time spent online has been identified by asking participants the amount of time in hours they spend on the internet, sometimes per week or per day, with some studies providing just a Likert-type scale with days and hours to choose from. Heavy Internet users have been classified in many different ways, with various names and amounts of time constituting the definition of heavy, excessive, or problematic internet use (to list a few of the names given to those spending 'high' amounts of time online). This study did not characterize any participants as Internet addicts or as pathological, problematic, excessive, or addicted internet users. It did, however, discuss what has been suggested to be high Internet usage.

Belanger and colleagues (2011) grouped participants by the amount of time they spent online; however they used time spent online coupled with days online per week as parameters of their categories. Tahiroglu, Celik, Uzel, Ozcan, and Avci (2008)

considered 12 or more hours per week on the Internet to be excessive, with a little over 7% of Turkish adolescents indicating spending 12 or more hours online per week, about 1.7 hours online per day. Other studies identified excessive internet use as spending more than 20 hours online per week, or 2.9, almost 3 hours, online per day (Morahan-Martin & Schumacher, 2000; Tsitsika et al., 2009). Tsitsika et al. (2009) also suggested that high internet users might spend approximately 11 to 20 hours per week online; those participants with over 20 hours spent online per week are considered excessive users. Additionally, Roberts et al. (2005) as well as Belanger et al. (2011) suggested spending more than 2 hours online each day to be considered excessive, or heavy, internet use. Kelleci and Inal (2010), alternatively, consider excessive Internet use as spending more than 5 hours online per day, unlike the majority of the research discussed above.

The current study determined the categories of high and low time spent online based on the study's variable of hours spent online per day. The sample distribution of hours spent online was examined, with the top 15% and bottom 15% (approximately) of participants grouped as high and low time spent online, respectively. The time spent online that was indicative of high time online was defined as greater than 2 hours online per day. Low time spent online was defined as more than 0.5 hours online per day. Participants reporting between 0.50 and 2 hours (0.50 to 2 hours) online per day were categorized as average internet users (or average time spent online).

Summary

Most studies reported children and adolescents to spend an average of 1 to 2 hours online each day and approximately 7 to 10 hours online per week (Holtz & Appel, 2010; Kelleci & Inal, 2010; Lin & Yu, 2008; Subrahmanyam & Lin, 2007; Willoughby, 2008; van den Eijnden et al., 2008; van der Aa et al., 2009). Measurement of time spent online has been inconsistent among these studies, with some researchers asking participants to report how many days they spend online per week and others asking how many hours participants spend online each day. Additionally, some researchers have used Likert-type response formats to examine time online whereas other studies have left the responses open for the participant to fill in the amount of time. It is important to examine differences in self-control based on one's time spent online due to the increased popularity and usage of the internet in today's society.

Problems in the Self-Control of Internet Use

Internet Self-Control

Internet self-control is defined as one's ability to control his/her use of the Internet (Caplan, 2002, 2003, 2005; LaRose, Lin, & Eastin, 2003; Lee & LaRose, 2007; Tokunaga & Rains, 2010). Behavioral self-control represents a person's ability to exert control over behavior(s); Internet self-control represents the specific behavior, also considered a type of content-specific self-control (Tsukayama et al., 2011). Internet self-control is an opposing form of deficient self-regulation. Deficient self-regulation is defined as a conscious internal struggle to monitor, judge (self-evaluate) and modify

one's behavior(s), applying self-consequences to facilitate behavior change if necessary. Similarly, habit behaviors are defined as unconscious actions or behaviors that develop based on poor self-monitoring of that behavior; moreover, habitual behavior is the repetitive nature and automaticity of these behaviors (i.e., habits). In both cases, there would be an increase in time spent online due to either habitual behavior (i.e., inability to monitor one's time spent online) or deficient self-regulation (i.e., inability to judge and modify one's time spent online; LaRose & Eastin, 2004).

Self-monitoring is a person's ability to judge and subjectively interpret the amount of time s/he spends on an activity or engaged in a behavior. A failure to self-monitor behavior may lead to failures in self-evaluation and self-consequation (Bandura, 1991; LaRose & Eastin, 2004). For example, a nine-year-old old boy may have only an elementary ability to observe and direct his behavior (i.e., the behavior of internet use, or time spent online). Because of the boy's inability to stay in control of his internet use, he may lose track of time and spend more time online than he intended, resulting with some consequence upon realization that his time on the internet was overextended. If one is unable to monitor one's own behavior, it is unlikely that s/he could also evaluate the effectiveness of such behavior, much less modify such behavior (Duckworth & Kern, 2011).

LaRose and Eastin (2004) found a moderate positive relationship ($r = .47, p < .001$) between time online and deficient self-regulation in a study including adults and college students. They also found habit strength to be moderately positively related to

internet usage ($r = .49, p < .001$), suggesting an indirect relationship between habitual behavior and deficient self-regulation. The sample in LaRose and Eastin, though, was comprised of adults with an average age of 52, not comparable to the sample of children examined in the current study. Because of the differences in samples, the relationships between the underlying variables of deficient self-regulation and habit strength, though both good initial representations of Internet self-control, may not necessarily be completely reliable and comparable due to demographic differences between samples (LaRose & Eastin, 2004).

Baumeister and Vohs (2007) note that self-control requires effort, or motivation; however, as mentioned above, self-control also requires an ability to self-monitor behavior. If a child lacks interest and/or motivation to get off the Internet compounded with a lack of supervision, then why should that child expend the effort to stop using the Internet? The child must first be motivated to engage in another activity besides using the Internet (or whatever the current activity/behavior in question is; Baumeister & Vohs, 2007), otherwise s/he is more likely to continue with the current behavior (e.g., using the internet). If a child is unaware of his/her behavior, s/he will not judge such behavior in relation to social standards nor will s/he identify enticements (or motivation) to modify the behavior (LaRose & Eastin, 2004).

Tokunaga and Rains (2010) differentiate between a pathology model and deficient self-regulation model of problematic Internet use in a meta-analysis. The pathology perspective predicts problematic internet use from time spent online, which is initially

predicted from psychosocial issues. The pathology perspective suggests psychosocial issues influence the time a person spends online, which in turn intensifies his/her problematic internet use. In contrast, the deficient self-regulation model predicts time spent online from problematic internet use, originally predicted from psychosocial issues. The deficient self-regulation model suggests psychosocial issues predict problematic internet use, which then predicts time online. The pathology model views problematic internet use similarly to that of a behavioral addiction, where a person may lose control of his/her time spent online, with possible negative outcomes (Shapira, Goldsmith, Keck, Kholza, & McElroy, 2000). The deficient self-regulation model views problematic internet use as on a continuum of internet use behaviors (specifically, time spent online, or an inability to control one's time spent online) that the user can control. This continuum of deficient self-regulation of Internet use, or Internet self-control (as referred to and termed in this study), ranges from an inability to control one's time online to a complete ability to control one's time online.

After estimating correlation coefficients of the variables included in both models, path analyses showed the deficient self-regulation perspective provided a better explanation for the relationships among psychosocial problems, time spent online and problematic internet use than did the pathology model (Tokunaga & Rains, 2010). Findings show that problematic internet use can result from a person wanting to use the Internet to drown out negative feelings (e.g., depression, anxiety, loneliness, etc.), which can ultimately relate to increased time spent online (i.e., the deficient self-regulation

model). While the psychosocial aspects examined in Tokunaga and Rains are not relevant to the current study, the authors support the concept of Internet self-control due to its similar conceptualization to deficient self-regulation. Internet self-control is one's ability to control his/her internet use or time spent online, whereas deficient self-regulation is a lack of ability to regulate one's use of a behavior in general. Internet self-control specifies a behavior (e.g., internet use or time spent online) whereas deficient self-regulation describes only a person's inability to self-regulate, not necessarily identifying any behavior.

Summary of Internet Self-Control

Internet self-control is a person's ability to maintain control over the time s/he spends on the Internet, known generally as content-specific self-control (e.g., Tsukayama et al., 2011). Exerting control over one's use of the Internet is an important topic due to the amount of people using the Internet, and previous research suggesting problems in the self-control of one's internet use (LaRose et al., 2003). Measurement of Internet self-control includes aspects of internet use combined with the ability to control one's behavior, specifically, one's use of the Internet.

Measurement of Internet Self-Control

The inconsistency of the measurement criteria among varying scales of Internet use called for the need of a psychometrically sound scale measuring a person's ability to control his/her Internet use. The Internet Self-Control Scale (ISCS) is a domain/content-specific self-control scale developed for use in children and adolescents. It focuses on a

person's ability to control his/her Internet use. Internet self-control is distinguishable from other definitions of problems in the self-control of internet use in that it does not identify one's internet use as problematic; rather it measures internet use on a continuum of self-control abilities. A test developed specifically from the Internet and self-control literature was ideal for accurate measurement of the construct of internet self-control. Previous scales measuring what researchers termed 'internet addiction' behaviors (i.e., Internet Addiction Scale, Nichols & Nicki, 2004; Internet Addiction Test, Young, 1998b) were based on criteria for other types of behavioral problems (i.e., substance abuse disorder and pathological gambling; Young, 1998b). These reasons led researchers to develop the Internet Self-Control Scale to examine children's abilities to control the amount of time they spend online without the construct of substance use or addiction influencing overall findings.

The 42-item Internet Compulsion Inventory (ICI; Barry & Reynolds, 2008) was the basis for the development of the brief, child-appropriate Internet Self-Control Scale (ISCS). The ICI utilizes definitions of Internet addiction combined with deficient self-regulation, excessive internet use, and time spent online to measure college students' compulsive use of the Internet. Alternatively, the 11-item ISCS focused on a person's ability to control his/her use of the Internet. The ICI was used in a pilot study to examine its psychometric properties (e.g., reliability and validity) prior to using the measure as a foundation for the ISCS. The sample consisted of 106 college students with an average age of 20 years old and 69% women. Eleven items were selected from the ICI with minor

revisions for comprehension in children and adolescents (i.e., changes made in only two items), and titled the Internet Self-Control Scale (ISCS; Barry & Reynolds, 2009). Both the ICI and the ISCS are measured on a 4-point Likert scale, with 1 = *strongly agree*, 2 = *agree*, 3 = *disagree*, and 4 = *strongly disagree*, recoded so high scores represent higher levels of internet self-control.

The ICI showed excellent internal consistency, with $\alpha = .97$. The pilot study showed excellent internal reliability of the 11-item ISCS, with $\alpha = .93$ ($n = 106$), with item-total correlations ranging from .61 to .75. Other relationships among the pilot college student population supporting the development of the ISCS included a small to moderate negative relationship between the ISCS and hours per day a person spends online ($r = -.33$, $p = .001$). Higher scores represent higher levels of Internet self-control whereas lower scores represent lower levels of Internet self-control on the ISCS, indicating that the more time a person spends on the Internet, the less Internet self-control s/he will then exhibit. Criterion-related validity was shown through a relationship of $r = -.96$, $p < .001$ between the ISCS and the ICI, suggesting that more internet self-control was related to less Internet compulsion. Convergent validity was shown through the relationship of the ICI with the Short Self-Regulation Questionnaire (SSRQ; Carey, Neil, & Collins, 2004), $r = -.35$, $p < .001$, and the ISCS with the SSRQ, $r = .38$, $p < .001$, indicating that people with higher levels of Internet self-control reported higher levels of self-regulation, and those reporting higher levels of internet compulsion reported lower self-regulatory abilities.

Summary of Measurement of Internet Self-Control

The Internet Self-Control Scale is an 11-item measure of a person's ability to exert control over his/her internet use. It was developed based on a 42-item scale on compulsive Internet use in college students. The development of the ISCS included removal of compulsion-based items and instead inclusion of descriptions of problems in controlling one's behavior, particularly one's use of the Internet. The scale was valid and reliable for use in measuring child and adolescent ability to control his/her internet use.

Summary and Conclusions

The present study examined differences in behavioral self-control and Internet self-control based on the amount of time children in grades four through six spent online. The study focused on behavioral self-control, which concentrates on one's ability to monitor, evaluate, and modify one's behaviors. Similarly, Internet self-control is a content-specific type of behavioral self-control, focusing on a person's ability to control his/her time spent on the Internet. Research on deficient self-regulation, internet addiction, problematic internet use, and content-specific self-control (i.e., internet self-control) assisted with the development and understanding of the concept of internet self-control.

Behavioral and internet self-control are interrelated due to overlap in measurement and theoretical background between regular and content-specific self-control (i.e., Internet self-control). Internet self-control is an opposite form of deficient self-regulation, with higher scores on the ISCS representing a person's ability to control

his/her time spent online and lower scores indicative of lower internet self-control abilities. Alternatively, deficient self-regulation represents a person's inability to engage in this behavior (or other behaviors examined). The Internet Self-Control Scale was developed for use in children and adolescents, and based on a previously studied and validated survey (Internet Compulsion Inventory; e.g., Barry Highfield & Reynolds, 2008, 2009). Previous research focused on problems in the self-control of one's use of the Internet; alternatively, this study focused on the amount of time spent online and its relationship with both behavioral and internet self-control.

CHAPTER III

STATEMENT OF THE PROBLEM

Self-control is a vital part of a person's development and everyday life (Baumeister & Vohs, 2007; LaRose et al., 2003; Tangney et al., 2004). Likewise, Internet use has become a basic activity for many people (Lenhart, 2008; Tokunaga & Rains, 2010; van den Eijnden et al., 2008; van Rooij et al., 2010). Certain aspects of Internet use are especially important to children and teenagers, such as the use of social networking, e-mail, instant messaging, and other online communication media (Rideout et al., 2010; van der Aa et al., 2009). This study examined the general aspect of Internet use as measured by hours spent online per day. Specifically, the study examined differences among behavioral and Internet-specific self-control based on hours spent online per day (broken into high and low groups) in children in grades four through six. Time spent online in the current study included all Internet activities rather than examining activities individually. Some previous studies examined the relationship between specific online activities (e.g., shopping, gambling, social networking, etc.) and self-control (LaRose & Eastin, 2004; LaRose et al., 2003; van den Eijnden et al., 2008; Tsukayama et al., 2011); however, few of them report average time spent online and its overall relationship to aspects of self-control. The current study adds to the previous research by its examination of self-control in relation to time spent online. Additionally, Internet self-control was presented as a novel psychometrically viable construct and type of self-control.

Children and adolescents 8 through 18 years old spend approximately 1.5 hours online in an average day (Belanger et al., 2011; Rideout et al., 2010). Children and adolescents are transitioning from reliance upon others (i.e., parents, teachers) for direction and activity modulation to autonomous regulation and control of their own behaviors (Bandura, 1991). This gradual growth of independent consumption of recreational media activities may help teach children self-reliance in and moderation of self-regulatory abilities (Duckworth & Seligman, 2005; Hill, Hartmann, Yilmaz, & LaRose, 2010; Wills et al., 2010). However, not all children develop the ability to self-control at the same rate, and some experience difficulty with its initial stages (Bandura, 1991; Kopp, 1982; Rueda et al., 2005). Despite individual differences in the development of self-control, most children are at an elementary level of self-regulatory ability where they are just learning how to take control of and direct their behavior.

The current study introduced the concept of Internet self-control, which focused on the relationship between time spent online per day as measured in hours and behavioral and internet self-control. Internet self-control is a type of content-specific self-control, where a specific behavior is the focus of the type of self-control performed. Internet self-control focuses on a person's ability to maintain and exert force over his/her internet use and regulate the time s/he spends online. Behavioral self-control is a subtype of general self-control, examining peoples' ability to engage in and control behavior(s). Some children or adolescents may exhibit reasonable behavioral self-control; however, when using the Internet, they may be unable to control the amount of time they spend

online (LaRose & Eastin, 2004; LaRose et al., 2003; Lee & LaRose, 2007; Tokunaga & Rains, 2010). It may also be where a person shows good self-control online, yet poor self-control in other real-life situations.

The current study examined high and low time spent online in relation to internet and behavioral self-control. High internet users (high time online, defined as greater than 2 hours online per day) were expected to report less behavioral and internet self-control than low internet users (defined as less than 0.5 hours online per day), whereas low users (low time online) were expected to report more behavioral and internet self-control than high users (high time online). A moderate positive relationship was expected between internet and behavioral self-control. The study also examined whether internet self-control added any additional explanatory value to differences in time spent online over that of behavioral self-control. Behavioral self-control was controlled for utilizing statistical analyses (e.g., ANCOVA). The following hypotheses detail what this study expected to find.

Primary Research Hypotheses and Rationale

Hypothesis One: Internet and Behavioral Self-Control

It was hypothesized that children reporting greater levels of behavioral self-control would report significantly greater levels of Internet self-control. Internet self-control was expected to show a moderate positive relationship ($r = .40$ to $.50$, $\alpha \leq .05$) with behavioral self-control.

Rationale. Tsukayama, Duckworth, and Kim's (2011) findings of how people's decision-making abilities vary in relation to the type of temptation in which they are confronted support the projected moderate positive relationship between behavioral self-control and Internet-specific self-control. Some people may be better than others at controlling a specific behavior, such as the amount of food they consume, money they spend, games they play, television they watch, or Internet they use. They found behavioral self-control and different types of content-specific self-control (e.g., work ethic, drug use, media use, financial) to range from low to moderate ($r = -.26$ to $-.69$) negative relationships. Specifically relevant to the current hypothesis, they report the relationship between surfing the Internet (a specific content-type of self-control) and general behavioral self-control to be small and negative, $r(293) = -.20, p < .01$. Children with good behavioral self-control are expected to also exhibit good self-control in online environments, supporting the hypothesis that behavioral and internet self-control will be moderately related. Other studies have also shown relationships between different content areas of self-control, lending support to the hypothesized relationship (e.g., Duckworth & Kern, 2011; Duckworth, Quinn, & Tsukayama, 2012).

Hypothesis Two: Time Online and Behavioral Self-Control

It was hypothesized that children reporting high time spent online would report significantly lower behavioral self-control than those reporting low time spent online.

Rationale. Self-control can be a difficult task for children developing the ability to monitor and direct their own behavior (Raffaelli et al., 2005). To control one's

behavior, a person must be aware of and able to monitor such behavior, therefore expending effort to attend to one's actions, which can then lead to modifications of undesired behavior (Finkenauer et al., 2005). Children spending high time online were expected to have low behavioral self-control, suggesting a lack of ability to regulate their own behaviors.

Hypothesis Three: Time Online and Internet Self-Control

It was hypothesized that children reporting high time spent online would report significantly less Internet self-control than children reporting low time spent online.

Rationale. Children spending more time online were expected to report less Internet self-control. Children with lower levels of Internet self-control have limited abilities to control their internet use, which may relate to increased amounts of time spent online (LaRose et al., 2003; Tsukayama et al., 2011). Internet self-control measures aspects of control and time, concluding whether the person can control his/her own internet use.

Hypothesis Four: Time Online, Behavioral Self-Control & Internet Self-Control

It was hypothesized that children reporting high time online would report significantly lower internet self-control than children reporting low time online when controlling for behavioral self-control.

Rationale. To examine whether internet self-control is a unique, viable construct, the differences among levels of time spent online and internet self-control were examined while controlling for behavioral self-control. The important question asked is

whether or not internet self-control added any additional explainable variance beyond that of behavioral self-control. If not unique, it is possible that internet self-control could be another measurement device for behavioral self-control rather than a content-specific measure for Internet self-control.

Supplementary Research Questions

Are there differences among time online groups of low, average, and high in both internet and behavioral self-control?

Does gender interact with time online groups when examining internet self-control while controlling for behavioral self-control?

CHAPTER IV

METHODOLOGY

Participants

Participants were 280 children in fourth through sixth grades attending six different public elementary and middle schools through rural Northern California's Humboldt, Trinity, and Tehama Counties. Fifty-six percent of students ($n = 157$) were female and 44% ($n = 122$) were male, with one student not reporting gender. The average age was 10.90 ($SD = 0.91$), with students ranging from 9 to 13 years old. Fifty-eight students reported to be in the 4th grade, 108 in the 5th grade, and 114 in the 6th grade. Nearly 68% of students reported to be White ($n = 189$). Other ethnicities included Asian ($n = 18$), Hispanic ($n = 26$), African American ($n = 7$), Native American ($n = 5$), Pacific Islander ($n = 2$), biracial ($n = 27$) and other ($n = 2$). Four students did not indicate their ethnicity. See Table 1 for descriptive statistics of sample characteristics by gender.

Instrumentation

Time Online

Time spent online was measured by one open-ended question asking participants to estimate the number of hours they spent on the Internet each day (i.e., *How many hours a day do you usually spend using the Internet?*). Research shows children and adolescent ability to estimate time spent online to be reasonably reliable and valid with the child providing a fairly accurate ability to estimate, or self-monitor, the hours s/he spends online (Bandura, 1991; Duckworth & Kern, 2011; LaRose & Eastin, 2004).

Defining Groups of High, Average, and Low Time Spent Online

Groups were determined by examining the distribution of the continuous variable hours spent online per day. High, low, and average groups were developed based on artificial dichotomization of the variable of hours spent online. The distribution of hours spent online was positively skewed, with three students reporting the highest usage of 8 hours spent online each day. Approximately 17% of the distribution fell below 0.50 hours online per day, representing the group of low time online. High time online included exactly 15% of the distribution, and was represented by greater than two hours of time spent online each day. Average internet use was defined as between 0.5 and 2 hours online per day, and contained approximately 68% of the sample. The variable's distribution was used to determine cut-off points for the groups, using previous research and average time online as a basis. The majority of the sample fell in between low and high time spent online (the average group), similar to previous research suggesting that high and low groups should be approximately half of the average group. The average group of hours spent online is utilized in supplementary analyses.

Brief Self-Control Scale

Behavioral self-control was measured by the Brief Self-Control Scale (BSCS; Tangney et al., 2004; Appendix A), a 14-item version of the original 36-item Self-Control Scale (SCS) developed by Tangney et al. (2004). The BSCS is a self-report questionnaire measuring an adolescents' ability to control his or her thoughts, impulses, performances, and habits (i.e., behavioral self-control; Tangney et al., 2004). The current study added an

additional scale item to the original 13-item BSCS (i.e., *I never allow myself to lose control*). The scale uses a 5-point Likert response format, where 1 = *not at all like me* and 5 = *very much like me*, with higher scores representing higher levels of self-control. Ten items are reverse-scored (items 1, 2, 3, 4, 5, 7, 9, 10, 11, 13). The original studies reported Cronbach's α 's of .83 and .85 on the BSCS across two studies (Tangney et al., 2004). Example scale items include: *Sometimes I can't stop myself from doing something even if I know it is wrong* and *I am able to work well toward long-term goals*. Three items on the BSCS were modified for the current study to increase levels of comprehension for younger adolescents (*I say inappropriate things* changed to *I say wrong things*; *I wish I had more self-discipline* changed to *I wish I had more will power*; *People would say that I have iron self-discipline* changed to *People would say that I have strong will power*). See Appendix A for the entire scale.

Table 1

Descriptive Statistics of Sample Characteristics by Gender

			Total	Boys	Girls
			(<i>n</i> = 279)	(<i>n</i> = 122)	(<i>n</i> = 157)
Age		<i>M</i>	10.86	10.82	10.90
		<i>SD</i>	0.91	0.89	0.93
Grade	4th	<i>n</i>	58	26	32
		%	20.8%	21.3%	11.5%
	5th	<i>n</i>	107	53	54
		%	38.4%	43.4%	19.4%
	6th	<i>n</i>	114	43	71
		%	40.9%	35.2%	56.3%
Ethnicity	Total	<i>n</i>	275	120	155
		%	98.2%	43.6%	56.4%
	White	<i>n</i>	189	83	106
		%	68.7%	68.0%	38.5%
	Asian	<i>n</i>	18	6	12
		%	6.5%	5.0%	7.7%
	African American	<i>n</i>	7	4	3
		%	2.5%	3.3%	1.9%
	Native American	<i>n</i>	5	1	4
		%			

		%	1.8%	0.8%	2.6%
	Hispanic	<i>n</i>	26	13	13
		%	9.5%	8.4%	10.8%
	Biracial	<i>n</i>	27	11	16
		%	9.8%	9.2%	10.3%
	Pacific Islander	<i>n</i>	1	0	1
		%	0.4%	0.0%	0.6%
	Other	<i>n</i>	2	2	0
		%	0.7%	0.7%	0.0%
Time Online Group	Low	<i>n</i>	46	18	28
		%	16.5%	14.8%	17.8%
	Average	<i>n</i>	191	87	104
		%	68.4%	71.3%	66.2%
	High	<i>n</i>	42	17	25
		%	15.1%	13.9%	15.9%

Note. Percentages are taken out of $N = 279$, the number of respondents who reported gender. Percentages for boys and girls are taken out of the total n in that gender.

Internet Self-Control Scale

The Internet Self-Control Scale (ISCS) is an 11-item scale measuring a person's ability to control the amount of time s/he spends on the Internet. It is based on the 42-item Internet Compulsion Inventory (discussed in more detail in the Internet Self-Control section in Chapter 2; Barry Highfield & Reynolds, 2008, 2009). Reading level was an important factor in developing this scale, as children and adolescents were the intended subjects, therefore had to be able to read the questions with ease. The Flesch-Kincaid Reading Grade Level as reported in Microsoft Word 2007 is 1.9; the Flesch Reading Ease was reported to be 95.3. These numbers indicate that about a second grade reading level was needed to easily read the questions.

Items making up the ISCS focus on how time spent online might interfere with everyday life and/or how time spent online might become problematic or uncontrollable (e.g., losing track of time, etc.). The ISCS is measured on a 4-point Likert response format, where *1 = strongly agree*, *2 = agree*, *3 = disagree*, and *4 = strongly disagree*. Higher scores on the ISCS are indicative of higher levels of Internet self-control; however, the total score of the ISCS must be reversed for accurate interpretation. Initial reliability of the ISCS from the pilot study conducted in fall 2008 with college students indicated the ISCS has excellent internal consistency ($\alpha = .93$; Barry Highfield & Reynolds, 2009). Sample items from the ISCS include: *I feel that I spend too much time on the Internet* and *I can't control my need to be online*. See Appendix B for all ISCS items.

Procedure

Data was obtained from a large survey study of student internet use and social and emotional well-being conducted in May and June of 2009. Humboldt State University's Institutional Review Board (IRB # 08-102) approved the study after an expedited review. Researchers contacted principals, superintendents, and school psychologists from approximately 25 to 30 Northern California elementary and middle schools in Humboldt, Trinity, and Tehama Counties by phone and e-mail to request participation in the study. School officials from seven elementary and middle schools (23 percent) gave permission to conduct the study on their campuses (see Appendix C for study description). Schools will remain anonymous and will be identified and differentiated by letters (i.e., A, B, C, D, E, F). Each teacher received a packet with detailed instructions for distributing and collecting consent forms, and enough consent forms for each student (see Appendix D for Teacher Letter). Each student was asked to return a consent form signed by his or her parent/guardian for eligibility to participate in the study. Only students returning these forms to their teachers with granted consent by their parent/guardian participated in the study (see Appendix E for parent consent letter and Appendix F for consent form sent home to parents/guardians). At some schools, the classroom who returned the most consent forms, regardless of whether the student was granted consent or not, earned a pizza party.

Data collection times and locations were set up separately with each school site. Graduate students and research assistants were present at the school site to facilitate data

collection on the scheduled day of collection. Data was collected in classrooms at most sites; however, some sites required a larger gymnasium setting and staggered data collection periods to avoid over-crowdedness. Students completed a survey packet including several other self-report questionnaires other than the ones used in the current study. Instructions were read to all students prior to them filling out the surveys, informing them of the study's purpose, that there was no right or wrong answers, and that they have the right to withdraw from the study without penalty at any time. Students were also informed that questionnaires would be kept anonymous and confidential. The survey packet took approximately 50 minutes to complete.

Data Analysis

Preliminary Analyses

Reliability analyses of each self-control measure used Cronbach's alpha to provide each measure with a degree of accuracy. Total scores were calculated for the Internet Self-Control Scale (ISCS) and the Brief Self-Control Scale (BSCS) as were descriptive statistics. A frequency distribution of the amount of time spent online was used to determine cutoff points for high and low groups of time spent online per day. Additional descriptive statistics were used to describe the amount of time spent online (e.g., mean, standard deviation, etc.). Independent samples t-tests were used to examine gender differences in BSCS and ISCS scores and for hours spent online per day. Chi-squared analyses examined gender differences in relation to grade in school (4th, 5th,

6th) and time online group (high, middle, low). A Factorial ANOVA examined group (high/low time online) by grade level (4, 5, 6).

Analyses for Primary Hypotheses

Hypothesis One. The relationship between behavioral self-control and Internet self-control was measured with a Pearson's correlation coefficient, with expectations of a moderate positive relationship ($r = .40$ to $.50$). The 99% confidence interval around the correlation was calculated and reported in order to present a more precise outcome of the relationship between the variables (e.g., Steiger, 1980; see Primary Analyses Hypothesis 1 in Results section). Significance was determined using a one-tailed $\alpha = .01$. In order to calculate and report the confidence interval, the Fisher's Z test transformed the correlation into a standardized score. This standardized score allowed for easier and more accurate comparisons when doing calculations, however required transformation back to correlation coefficients once the interval was determined.

Hypotheses 2 and 3. Two independent t-tests examined the differences in behavioral and internet self-control based on high and low time spent online groups. The independent variable was time spent online with factors of high and low time spent online; the dependent variables were behavioral self-control and Internet self-control, measured with separate t-tests. A Bonferroni correction adjusted for alpha inflation due to the use of multiple t-tests with the same independent variable. The unequal variances/pooled variances were used when interpreting the t-tests. The $\alpha = .05$ was

divided by the number of tests being completed (i.e., two), leaving $\alpha = .025$ used to detect and determine significant differences.

Hypothesis 4. An analysis of covariance (ANCOVA) used time online as the independent variable (using high and low groups only), internet self control as the dependent variable, and behavioral self-control as the covariate. Data met the assumption of homogeneity of regression for use of ANCOVA (i.e., no interaction between the independent variable High/Low time online and the covariate behavioral self-control). The ANCOVA examined differences in internet self-control in high and low internet users after adjusting for behavioral self-control. The means presented for the dependent variable, internet self-control, were adjusted for the influence of the covariate, behavioral self-control.

Supplementary Analyses

Similar to the analysis for hypothesis 4, an ANCOVA examined differences in internet self-control, controlling for behavioral self-control using the variable of time spent online, with all 3 internet use groups (low, average, high), as the independent variable. An ANCOVA was also run with both time online groups and gender as the independent variable, internet self-control as the dependent variable, and behavioral self-control as the covariate.

Benefits and Potential Risks

Benefits

This research contributes a new concept, Internet Self-Control, to the literature on child Internet use; this concept can also be broadened for use in adult and college student samples.

Potential Risks & Risk Management

There were no potential risks related to this study because it is based on data that has been already collected. All data were collected anonymously. Names cannot be linked to any survey, nor can surveys be linked to specific school sites. The data set excludes school site and all identifying information about the participants. Because there were no expected risks in this study, no risk management strategies were necessary.

CHAPTER V

RESULTS

Preliminary Analyses**Descriptive Statistics**

The Internet Self-Control Scale total scores ranged from 11 to 44 with a mean score of 36.5 ($SD = 7.35$); actual scores also ranged from 11 to 44. The Brief Self-Control Scale had a mean of 50.89 ($SD = 9.18$) and scores ranging from 14 to 70 on the scale; actual scores reported by students ranged from 24 to 70 on the BSCS. Participants reported spending an average of 1.35 hours online per day ($SD = 1.41$). Table 2 presents the means and standard deviations of both scales and average time online per day for the entire sample, by gender, along with reliability estimates of the ISCS ($\alpha = .93$) and the BSCS ($\alpha = .77$).

There were no gender differences in hours spent online, $t(277) = 1.12, p = .27$; the BSCS, $t(277) = -1.11, p = .27$; or the ISCS, $t(277) = -1.02, p = .31$ after running two independent samples t-tests. No gender differences were found by time online group, $\chi^2(df = 2) = 0.83, p = .66$. Chi-square analyses showed no gender differences by grade level, $\chi^2(df = 2) = 3.17, p = .21$. Analyses of variance (ANOVAs) showed no differences in Internet Self-Control, $F(2, 277) = 2.12, p = .12, \eta^2 = .015$, or Behavioral Self-Control, $F(2, 277) = 0.82, p = .44, \eta^2 = .006$, by grade level (see Table 3), or hours spent online by grade level, $F(2, 277) = 0.31, p = .73, \eta^2 = .002$.

A factorial ANOVA was run with time spent online (high/low groups) and grade in school (4th, 5th, 6th) as the independent variables, and ISCS and BSCS as the dependent variables, in two separate analyses. A Bonferroni correction of .025 was used to detect significance due to using the same independent variables in two statistical tests.

On the BSCS, there was no main effect for grade level, $F(2, 83) = 0.099, p = .91, \eta^2 = .002$, and no interaction between grade level and time online group (high/low), $F(2, 83) = 0.251, p = .78, \eta^2 = .006$. There was a main effect for time online group, $F(1, 83) = 8.35, p = .005, \eta^2 = .09$, with low time online users ($M = 52.15, SD = 8.22$) reporting significantly greater BSCS scores than high time online users ($M = 46.31; SD = 9.95$). Both standard deviations are high indicating high variability between both the BSCS and ISCS scores. Results were similar for the ISCS; no main effect for grade level ($F(2, 83) = 0.22, p = .81, \eta^2 = .005$), nor was there a significant interaction ($F(2, 83) = 0.18, p = .84, \eta^2 = .004$) between grade level and time online group. There was a significant main effect for time online group, $F(1, 83) = 40.81, p < .001, \eta^2 = .33$, suggesting that students spending low time online ($M = 39.98, SD = 4.99$) reported higher internet self-control than those reporting high time online ($M = 29.67, SD = 8.45$). Both of these mean values suggest average to high internet self-control, as does the mean value of 36.5 ($SD = 7.35$), as all values are based on the ISCS and its total possible score of 44.

Study variables were also examined by the different schools that participated in data collection. Table 4 presents means and standard deviations of hours online, the ISCS, and the BSCS by school. Additionally, these tables show the confidence intervals

to the study variables and analyses for more detailed statistical understanding. Three separate ANOVAs were run with school as the independent variable (with six levels/schools) and the ISCS, BSCS, and time spent online as the dependent variables to examine differences among schools. An $\alpha = .017$ ($\alpha = \frac{.05}{3}$) was used to determine significance. The ANOVAs examined differences among schools and were non-significant for both the BSCS, $F(2, 274) = 1.597, p = .16, \eta^2 = .028$, and time spent online, $F(2, 274) = 1.68, p = .14, \eta^2 = .03$. The ANOVA examining the ISCS was significant, $F(2, 274) = 3.10, p = .01, \eta^2 = .05$. Multiple comparison tests were run to determine what ISCS mean values significantly differed. Because 15 different comparisons were performed among the six schools, an $\alpha = .003$ ($\alpha = \frac{.05}{15}$) was used to determine significance. Both Bonferroni's and Tukey's multiple comparison tests did not show significance at the .003 level among any of the mean values.

The correlation between hours spent online per day as a continuous variable and the ISCS was $r(280) = .43, p < .001, 95\% \text{ CI } [.32, .52]$. Time spent online and the BSCS showed a correlation of $r(280) = .17, p = .004, 95\% \text{ CI } [.06, .28]$.

Table 2

Means and Standard Deviations of Hours Spent Online, Internet Self-Control Scale, and Behavioral Self-Control Scale by Gender

		Total	Boys	Girls
<i>N</i>		280	122	157
%		100%	43.7%	56.3%
Hours Online	<i>M</i>	1.35	1.46	1.27
	<i>SD</i>	1.41	1.67	1.17
BSCS ^a	<i>M</i>	50.89	50.27	51.49
	<i>SD</i>	9.18	9.74	8.63
	α	.77	.79	.75
ISCS ^b	<i>M</i>	36.50	36.98	36.08
	<i>SD</i>	7.35	6.89	7.70
	α	.93	.92	.94

Note. Total *N* = 280. BSCS scores are higher than the original study's because we added an extra item to the scale, making 14 items total vs. 13 items in the original.

^a Range of possible scores for the BSCS is 14 to 70; actual scores ranged from 24 to 70.

^b Range of possible scores for the ISCS is 11 to 44; actual scores ranged from 11 to 44.

Table 3

Descriptive Statistics for Hours Online, the Internet Self-Control Scale and Behavioral Self-Control Scale by Grade Level

	ISCS ^a			BSCS ^b		Hours Online ^c	
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Grade							
4th	58	35.05	7.99	51.64	8.27	1.31	1.25
5th	108	37.47	6.39	51.38	9.68	1.29	1.41
6th	114	36.32	7.79	50.05	9.16	1.43	1.49

^aSkewness = -1.204

^bSkewness = -0.398

^cSkewness = 2.304

Note. Standard Error of Skewness = 0.146.

Note. ISCS possible scores range from 11 - 44; BSCS possible scores range from 14 - 70.

Table 4

Descriptive Statistics of Hours Online, Internet Self-Control Scale and Behavioral Self-Control Scale by School

School	<i>n</i>	ISCS		BSCS		Hours Online	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
A	28	38.46	5.43	51.86	10.8	1.64	1.68
B	20	38.20	8.30	52.90	9.98	1.54	2.20
C	65	38.32	6.38	53.02	7.77	0.93	0.77
D	39	35.62	7.14	49.74	8.75	1.36	1.29
E	77	36.07	7.47	49.36	9.88	1.41	1.48
F	51	33.77	8.23	50.06	8.52	1.54	1.43
Total	280	36.50	7.35	50.89	9.18	1.35	1.41

Note. ISCS possible scores range from 11 - 44; BSCS possible scores range from 14 - 70.

Reliability & Validity

The ISCS had good internal consistency ($\alpha = .93$). The BSCS had adequate internal consistency ($\alpha = .77$), slightly lower than original α 's from Tangney et al. (2004; e.g., .83 and .85 for the BSCS), and similar to $\alpha = .74$ using the BSCS with children (Duckworth et al., 2012).

Primary Analyses

Hypothesis 1

Hypothesis 1 stated that there would be a moderate positive relationship between the ISCS & the BSCS.

To test this hypothesis, a Pearson's correlation examined the relationship between the ISCS and the BSCS, which was moderate, $r(278) = .46$, $t(278) = 8.33$, $p < .001$, with the 99% confidence interval ranging from $.34 \leq \rho \leq .56$. Hypothesis 1 is supported as the relationship between the variables ISCS and BSCS was moderately positive, as predicted.

Hypothesis 2

Hypothesis 2 stated that children reporting high time spent online would report lower behavioral self-control than children reporting low time spent online.

This hypothesis was supported in that children spending high amounts of time online reported significantly lower behavioral self-control than did those spending low amounts of time online, $t(87) = 3.03$, $p = .003$, $d = 0.64$, 95% CI [.21, 1.07]. Children in the low time online group ($n = 47$) reported a mean of 52.15 ($SD = 8.22$) on the BSCS compared to children in the high time online group ($n = 42$), who reported a mean of

46.31 ($SD = 9.95$) on the BSCS. Results were similar using the pooled variance technique for interpreting the independent samples t-test (e.g., equal variances not assumed in SPSS), $t(79.83) = 2.998$, $p = .004$, $d = 0.64$, 95% CI [.21, 1.07]. See Table 5 for descriptive statistics of the Behavioral Self-Control Scale (BSCS) for time online groups.

Hypothesis 3

Hypothesis 3 stated that children spending high time online would report lower Internet self-control than children spending low time online.

Hypothesis 3 was supported in that children spending high amounts of time online reported significantly lower Internet self-control (as reported by the ISCS) than did those spending low amounts of time online, $t(87) = 7.09$, $p < .001$, $d = 1.49$, 95% CI [1.02, 1.96]. The t-test was ran with both transformed and untransformed variables, with similar results for both. Additionally, the t-test was run with and without pooled variances (i.e., equal variances not assumed in SPSS; $t(64.896) = 6.90$, $p < .001$, $d = 1.49$, 95% CI [1.02, 1.96]), with similar findings for both. See Table 6 for descriptive statistics of the Internet Self-Control Scale (ISCS) for high and low time spent online groups.

Hypothesis 4

Hypothesis 4 stated that children spending high time online would report lower internet self-control than children spending low time online when controlling for behavioral self-control.

Hypothesis 4 was supported through analysis of covariance (ANCOVA), using participants who were high or low on time spent online per day. Data met the assumption

of homogeneity of regression for use of ANCOVA (i.e., no interaction between the independent variable of time online and the covariate of behavioral self-control). Time online showed significant differences in internet self-control after controlling for behavioral self-control, $F(1, 86) = 37.10, p < .001, \eta^2 = .30$, indicating that internet self-control explains above and beyond what that of behavioral self-control explains. The covariate, behavioral self-control, significantly predicted the dependent variable, internet self-control, $F(1, 86) = 27.98, p < .001, \eta^2 = .25$. See Table 6 for group means in addition to the adjusted group means.

Table 5

Descriptive Statistics of the Behavioral Self-Control Scale by Low and High Time Online Groups

	BSCS ^a				95% CIs around mean	
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SEM</i>	<i>LL</i>	<i>UL</i>
Time Online Groups						
Low Time Online	47	52.15	8.22	1.19	49.74	54.56
High Time Online	42	46.31	9.95	1.54	43.21	49.41

^a BSCS = Behavioral Self-Control Scale.

Note. The BSCS had a minimum score of 14 and maximum score of 70; it's actual range was 24 - 70 in the current study.

Table 6

Descriptive Statistics of the Internet Self-Control Scale by Low and High Time Online Groups

	ISCS ^a				95% CIs around mean	
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SEM</i>	<i>LL</i>	<i>UL</i>
Time Online Groups						
Low Time Online	47	39.98	4.99	0.73	38.51	41.44
High Time Online	42	29.67	8.45	1.30	27.03	32.30
Adjusted Means ^b						
Low Time Online	47	38.95	--	0.89	37.17	40.73
High Time Online	42	30.82	--	0.56	28.93	32.70

^a ISCS = Internet Self-Control Scale.

^b Adjusted means after controlling for BSCS.

Note. The ISCS had a minimum score of 11 and maximum score of 44. It also had an actual range of 11 - 44 in the current study.

Supplementary Analysis

An ANCOVA tested differences in the ISCS based on three time online groups (low, average, high) after controlling for the BSCS. Time online groups showed significant differences on the Internet self-control scale scores after controlling for behavioral self-control, $F(2, 276) = 21.98, p < .001, \eta^2 = .14$. The covariate, behavioral self-control, also significantly predicted internet self-control, $F(1, 276) = 60.02, p < .001, \eta^2 = .18$.

Follow up multiple comparison tests using the Bonferroni correction (α divided by number of tests used, 3 for all groups; using $\alpha = .017$) found significant differences among all three groups in the ISCS when controlling for the BSCS. Participants reporting low time online reported significantly higher internet self-control (as measured by the ISCS) when controlling for the BSCS than both average ($p = .02$) and high ($p < .001$) time online, though high time online showed to have a larger difference from low time online on the ISCS. Additionally, participants reporting average time online ($p < .001$) reported higher scores on the ISCS than did participants spending high time online (see Table 7).

A factorial ANCOVA was conducted with gender and time online groups as the independent variables, the BSCS as the covariate, and the ISCS as the dependent variable. There was a significant main effect for time spent online on the ISCS when controlling for the BSCS, $F(2, 272) = 19.89, p < .001, \eta^2 = .13$. Participants reporting high time online reported lower internet self-control after controlling for behavioral self-

control than both average and low time spent online groups (see Table 7 for means and standard deviations). The main effect for gender was not significant, $F(1, 272) = 1.28, p = .26, \eta^2 = .005$, nor was the interaction among gender and time spent online groups, $F(2, 272) = 0.07, p = .94, \eta^2 < .01$. The relationship between the covariate and the independent variable was significant, $F(1, 272) = 63.88, p < .001, \eta^2 = .19$, with higher levels of internet self-control predictive of higher levels of behavioral self-control.

Table 7

Descriptive Statistics of the ISCS and the BSCS by Low, Average, and High Time Online

	ISCS ^a			BSCS ^b	
	<i>M</i>	Adjusted <i>M</i> ^c	<i>SD</i>	<i>M</i>	<i>SD</i>
Time Online Groups					
Low Time Online ¹	39.98	39.58	4.99	52.15	8.22
Average Time Online ²	37.15	36.93	6.65	51.59	8.98
High Time Online ³	29.67	31.11	8.45	46.31	9.95

¹*n* = 47. ²*n* = 191. ³*n* = 42.^a ISCS = Internet Self-Control Scale, ^b BSCS = Behavioral Self-Control Scale.^c Mean adjusted for total BSCS score of 50.89.

CHAPTER VI

DISCUSSION

The internet has expanded throughout the past decade, and especially in the last few years as technological advances such as smart phones and tablets with wireless internet connections have come to be nearly as popular as home internet use. The internet has become an important and attractive tool for ordinary people's everyday use, whether they are searching for information, e-mailing, or chatting using one of the many instant messaging applications. Because of the increased use of the internet, children and teenage internet use has become an important topic of study. Being aware of the average amount of time children are spending online is just as pertinent as knowledge of other activities (e.g., homework completion, socializing with friends, school attendance, shopping, spending, etc.).

The current study examined middle school students in grades 4 through 6 time spent online in relation to internet and behavioral self-control. Research on the average time spent online per day by middle school students reports an average of one to two hours of Internet use per day (i.e., Holtz & Appel, 2009; O'Neill et al., 2011; Rideout et al., 2010). Self-monitoring, self-evaluation, and self-consequation all continue to influence each domain of self-control (Tsukayama et al., 2011). The focus here, though, is on a specific type of behavior, internet self-control, examining whether or not a person is able to apply aspects of behavioral self-control to the domain of the internet.

Time Spent Online

Average Time Spent Online

The amount of hours children reported to spend online per day in the current study was similar to other research examining time spent online (e.g., Belanger et al., 2011; Rideout et al., 2010; Roberts et al., 2010; Tsitsika et al., 2009). Approximately 40% ($n = 111$) of children in the current study reported spending one hour online per day. The total sample of students reported to spend an average of 1.35 hours online per day ($SD = 1.41$). Previous research supports this study's finding of average time online in middle school students. Other researchers found average time spent online to range between approximately 45 minutes to 1.50 hours each day (Holtz & Appel, 2009; O'Neill et al., 2011; Rideout et al., 2010; Tsitsika et al., 2009; Windham, 2008). O'Neill et al. (2011) found 9 and 10 year olds averaged 45 minutes online per day. These researchers found their participants (i.e., including 15 & 16 year old average of 1 hour, 20 minutes online per day) to have an average of 61 minutes online per day. Rideout et al. (2010) reported an average of 1.3 hours spent online each day in children ranging from 8 to 18 years old. Tsitsika et al. (2009) categorized the majority of these reports of time online as medium internet use (or 4 to 10 hours online per week), similar to the current study's average of 9 hours online per week.

It is interesting to note that 16 students reported to have spent no time online in the past month, however they all reported having internet access at home. It is unclear as to why these students had not used the internet, and if more information were available, it

would be interesting to examine these reasons as to why they had not engaged in internet use (again, though, this is outside the scope of this study).

High and Low Time Spent Online

Approximately 17% of middle school students spent greater than 2 hours online per day, or high time online, with three students reporting the maximum of 8 hours online per day. Twenty-nine students (10.4%) spent 2 hours online per day and 21 students (7.5%) spent 3 hours online per day. Approximately 15% of students spent low time online (less than half-an-hour online per day), with 11% of children spending no time online per day. Sixteen students who spent no time online also reported not having used a computer in the past month, though they all reported having home internet access.

Similar to this study's grouping of high time online per day (i.e., 2 or more hours per day; about 14 hours per week), Tsitsika et al. (2009) identified high users as those spending 11 to 20 hours online per week (i.e., approximately 2.2 hours online per day). Similarly, Roberts et al. (2005) and Belanger et al. (2011) identified 2 or more hours online per day as being high. Both Belanger and Tsitsika also included low time online in their studies. Tsitsika identified low time online as spending 1 to 3 hours online per week. Belanger identified "occasional users" as spending 1 hour or less online per week, and "non-Internet users" as spending no time online in the previous month.

Children reported a low amount of time spent online due to varying reasons, sometimes related to not having a computer at home (4 students) or not having internet access at home (11 students). Those children reporting no home internet access reported

to spend a range of 1 through 3 hours online per day, with an average of 1.32 hours online per day. This average level of time online per day could be related to the finding that all of the children reporting no home internet access reported having internet access on their cell phones, providing them with access to the internet. Similar to these findings, Willoughby (2008) found that the more accessible the Internet was, the more it was used. Teens who reported having more computers in the home reported more Internet use than teens with fewer computers in the home. Additionally, Willoughby found that having multiple computers at home or having a smart phone, for example, contributed to higher internet use.

Gender and Grade in Time Spent Online

Neither grade nor gender had significant main effects on time online (similar to Holtz & Appel, 2009; Livingstone et al., 2010), suggesting time spent online as a common theme among boys and girls and throughout grade levels.

Internet Self-Control

As a new concept, Internet self-control was shown to be a unique and understandable construct representing one's lack of ability to control his/her time spent on the Internet. The concept of internet self-control is similar to that of behavioral self-control, or self-control in general (Tsukayama et al., 2011) in that it suggests personal monitoring and modification of a specific behavior (i.e., internet use, or time spent online). However, the ANCOVA in hypothesis 4 (discussed below) showed that there were significant differences in ISCS scores on levels of time spent online, even after

controlling for behavioral self-control, suggesting that the ISCS tells us something over that of BSCS.

The internet is a very self-controlled environment, as most people use the internet by themselves or on different computers if in the same area. This leaves room for people to spend little to very generous amounts of time online. Due to the prevalence of the internet in peoples' everyday lives, it is important to have a measurement device that includes aspects of self-control as they are specifically related to one's internet use. Unlike the BSCS, the ISCS examines specific aspects of a specific behavior of internet use. The BSCS focuses on behavior in general; similarly do other domain-specific measures of self-control, such as those for eating disorders, gambling, etc. The difference with the internet is suggested to lie within its "invisibility", accessibility, and self-regulatory abilities. One's self-control on the internet is going to be different from one's self-control related to one's eating habits due to the different types of domains and the different abilities required for these different domains or types of self-control.

Another reason internet self-control, or internet use in general, is an important topic is that children are able to access the internet at almost any given time or place. Kids can easily become awed or obsessed with the internet, resulting in an overabundance of time spent online. This study's current measurement of self-control (i.e., ISCS) allows researchers and parents to be able to see how their child's internet use may relate to his/her ability to self-control in the domain of internet use, as well as in other domains. Another important reason for studying internet self-control and internet

use is to know when internet use could potentially turn into problematic, compulsive, or addictive internet use in order to organize research efforts to help educate and prevent such problematic internet usage.

Hypotheses

Hypothesis 1

Internet self-control and behavioral self-control showed a moderate positive relationship, as expected. The moderate positive relationship ($r = .46$, $r^2 = .21$, $p < .001$) between the ISCS and the BSCS was expected due to the overlap of the self-control constructs. The relationship suggests that children with better general abilities of controlling their behavior are more likely to have better abilities of controlling their internet use.

This relationship is similar in magnitude to those of self-control and other content/domain specific measures of self-control. Tsukayama et al. (2011) found a variety of moderate relationships among differing domains of self-control (e.g., drug use, media use, work ethic, etc.; r 's ranges from $-.26$ to $-.69$; Tsukayama et al., 2011). The correlational findings among behavioral self-control and other domain-specific variables supports the hypothesized relationship between Internet self control and behavioral self-control. The varying magnitudes of the relationships also suggest that the different types of self-control are unique in their measurement criteria and do not just measure general behavioral self-control (Duckworth & Kern, 2011; Tsukayama et al., 2011).

Hypothesis 2

This hypothesis suggested that children who spend lower time online report better behavioral self-control than do children spending high time online. Children in the low time online group reported a mean of 52.15 ($SD = 8.22$; out of 70) on the BSCS compared to children in the high time online group, who reported a mean of 46.31 ($SD = 9.95$). Results were consistent with the hypothesis that participants reporting high time online would report lower behavioral self-control than those spending low time online. This can be attributed to many things, including the child's ability to self-monitor his/her behavior, to evaluate the behavior, or to make wise decisions about his/her behavior (e.g., getting off the internet in a timely manner). Behavioral self-control as measured here focused on general aspects of behavior and was not specific to internet use. It is important to note that just because those spending high time online reported less behavioral self-control than those spending low time online does not necessarily mean these participants are using the internet excessively or have problems with the use of the internet.

The Cohen's d of 0.64 indicates a moderate effect, suggesting a moderately sized, significant difference between high and low time online groups on the BSCS. The differences between the two groups (high and low) is small (about 6 points), indicating a small difference in scores across both groups. This suggests that behavioral self-control is not largely different between those spending high and low time online; though the low time online group reported a high mean, suggesting high levels of behavioral self-control. The high time online group reported average behavioral self-control, as the mean score

for the high group is 46, more than half of the maximum score of 70 on the scale and slightly lower than the mean value for the BSCS ($M = 50.89$, $SD = 9.18$).

Hypothesis 3

Findings supported this hypothesis, with children spending low time online reporting better internet self-control than children spending high time online. Children spending low time online reported a mean of 39.98 ($SD = 4.99$) on the ISCS compared to children spending high time online, who reported a mean of 29.67 ($SD = 8.45$). The Cohen's d of 1.49 indicates a large effect size, suggesting that the difference between high and low time online on the ISCS is relatively large. This suggests that children spending less than a half-hour online each day have a better ability to manage and control (i.e., regulate) the amount of time they spend online than do children spending greater than 2 hours online per day.

Those reporting high time online reported an average score of 29.67 ($SD = 8.45$). This is lower internet self-control than those spending low time online, however not necessarily low in regards to the ISCS. The ISCS has a mean of 36.5 ($SD = 7.35$), which is larger than the high time online group on internet self-control (29). However, the mean value of the ISCS at 36.5 is less than 10 points away from the high score of 44. Additionally, the low time online group had a mean of about 40 on the ISCS ($SD = 4.99$), suggesting that the majority of students reported high levels of ISCS, also resulting with a high mean. The high time online group scored about a 30 on the ISCS. All of these results suggest that there was some sort of ceiling effect occurring with this scale, with

16% ($n = 46$) of students scoring 44, the highest possible score on the ISCS. It additionally suggests that most users reported a good ability to control their time online as indicated by scores on the ISCS. The lowest possible score on the ISCS is 11. Those students spending high time online reported a mean on the ISCS that was about 2.5 times the lowest score ($M = 30$), indicating an almost-average ($M_{\text{ISCS}} = 36.5$) level of internet self-control (ISCS). There is still a good amount of internet self-control displayed in those spending high time online, though less self-control than are those students spending low time online.

Hypothesis 4

High and low time online differed significantly in levels of internet self-control after controlling for behavioral self-control ($\eta^2 = .30$). This suggests that internet self-control is a unique construct in that differences in high and low time online groups remained significant when removing effects of behavioral self-control. The construct of internet self-control is similar to other domain-specific constructs or scales. The large difference between high and low time spent online groups indicated that even while controlling for behavioral self-control, students spending high and low time online were largely different from each other in their level of internet self-control. These findings are consistent with this hypothesis, suggesting that high users report lower levels of internet self-control when compared to those spending low time online, both with and without the effects of behavioral self-control.

Supplementary Analyses

Supplementary analyses examined three time online groups (i.e., low, average, high) on measures of behavioral and internet self-control. Higher levels of internet self-control predicted higher levels of behavioral self-control, consistent with hypothesis one. All three time spent online groups (i.e., high, average, low) differed in levels of internet self-control, both before and after controlling for behavioral self-control. Participants reporting high time online also reported lower internet self-control than both average and low time online groups, before and after controlling for the covariate of behavioral self-control (see Table 7 for means and standard deviations). These findings suggest that children who spend high time online are more likely to report lower internet and behavioral self-control than both low and average time online groups. Those spending high time online report the lowest levels of internet self-control, suggesting that children spending high time online may have trouble with the monitoring of their internet use, thus reporting the lowest levels of internet self-control.

Differences in internet and behavioral self-control between low and average time spent online groups are smaller than are the differences between high and average time spent online on the same variables (see Table 7). Findings suggest that children spending high time online may have less motivation to change or stop their behavior in general (i.e., lower behavioral self-control), as well as their specific behavior of internet use (i.e., lower internet self-control; Baumeister & Vohs, 2004, 2007), thus resulting in higher levels of internet use.

The current study suggests that when online, low internet users are able to identify and make changes to their behavior (Baumeister & Vohs, 2004, 2007) better than both average and high time online users. This proposes that self-control is important and related to behaviors and internet behaviors specifically, with the research showing better self-control is related to less time spent online.

Limitations

The current study was conducted in May and June of 2009, when cell phone internet usage was not as popular at this time; only 11 students (4%) in this study reported internet access on their cell phones. Technology today has changed and increased since the conduction of the study. An additional limitation to this study is its' rural sample, including a three-county spread of approximately 300 students in Northern California.

Authors of the BSCS note that moderate positive relationships ($r = .54$ and $.60$) were found between social desirability and the SCS and BSCS, respectively, suggesting the possibility that answers to the scale items may be influenced by what the participant believed to be socially desirable. Reports of time spent online may not necessarily be valid, especially if children are reporting low behavioral self-control. Low behavioral self-control may contribute to an inaccurate report of the estimated time spent online per day. The amount of time a child spends online may be under or overstated because the child may or may not be actively self-monitoring the time s/he spends online. Children in grades four through six are continuing to develop skills used to regulate behaviors;

because of this, they should not be considered maladaptive or dysfunctional self-regulators if unable to provide totally accurate estimations of time. Inconsistency of behavioral control is developmentally appropriate for this age group.

Children with poor self-regulation may provide inaccurate estimations of the amount of time they spend online because they have limited abilities of self-monitoring (Tangney et al., 2004). Estimates in the overall time spent online may vary due to the difficulty young children have in measuring specific amounts of time. Livingstone et al. (2010) suggest that any sort of estimation is difficult for young children due to their currently developing cognitive abilities (discussion of which is outside the scope of this study). Internet use, or time spent online, can be difficult for youngsters to estimate because of their tendency to multitask and participate in internet use (Livingstone et al., 2010) and other activities simultaneously (i.e., talking on the phone, doing homework, eating, etc.). The way in which self-control is measured can also affect the outcome of the research (e.g., Billieux & van der Linden, 2012; Tsukayama et al., 2011).

An issue related to the measurement of self-control is the attenuation of responses. The relationships including the self-control variables are likely lessened because the poor self-control of the participant related to less accurate reporting of one's time spent online. For example, if a child does not have good self-control abilities, it may be difficult for him/her to report accurate levels of self-control in addition to reporting accurate estimates of time spent online. Paying attention to the amount of time one spends on the Internet is a form of self-monitoring. Self-monitoring is a person's ability

to identify and pay attention to the activity at hand and the amount of time spent participating in such an activity. Children and adolescents are still developing their ability to self-monitor their behavior (Bandura, 1991; Billieux & van der Linden, 2012; Duckworth & Seligman, 2005, 2006), therefore may have trouble reporting accurate amounts of time estimates, as well as difficulty in identifying behavior as socially acceptable or not (the second part of self-regulation: self-evaluation; Bandura, 1991).

Using all three groups (i.e., high, low, average) in the supplementary analysis reduces the power, thus the effect size, of the test. The addition of the average group did not add any additional explanation to the current study.

The Internet Self-Control Scale results showed a ceiling effect, with about 16% of students reporting the highest score possible (i.e., 44), suggesting very good internet self-control. It may be useful to edit the response format of the scale, or examine the questionnaire thoroughly.

An additional limitation is that because the children in this study are young, it is possible that parental monitoring played a role in the amount of time the child spent online. However, this concept was outside of the scope of this study.

Future Research

Future research should examine the relationship of Internet self-control with differing applications used by children and teenagers, such as social networking, e-mailing, gaming, and shopping. This information will help inform parents, teachers, and researchers of the amount of time children are spending on specific applications. Cell

phone internet usage has become a topic of interest in the internet research (Billieux & van der Linden, 2012). It would be interesting to examine cell phone usage in relation to internet self-control as well as behavioral self-control to see how children are using their cellular devices. Future research should replicate findings of this study and re-examine both the ISCS and the BSCS in both similar and differing samples to expand knowledge on internet use and time spent online.

Additionally, future research should expand the use of the internet self-control concept and scale in adults and college students. This will broaden the construct of internet self-control so it is not just evaluated in children, providing a more solid base of validity for the construct and test. It would be helpful to survey other, larger areas as this study's participant pool was taken from rural areas in Northern California. The ISCS should also be examined in terms of content, item-total correlations, reliability and validity, and overall response format in order to present accurate results related to the control of one's internet use.

Summary

Other research tends to focus on averages of time online rather than high and low, making this study unique as it examines high and low time spent online. Low time online was defined as less than half an hour of internet use per day; average time online was defined as half an hour to 2 hours online per day; and high time online was defined as greater than 2 hours online per day.

Children with high internet self-control appear able to apply self-monitoring skills to their use of the internet, therefore reporting lower time online than children with low internet self-control. Poor self-control can be represented by a lack of consistency and increased variability in levels of both behavioral and Internet self-control. Similar to research on television use, children and adolescents with poor self-control tend to report difficulty regulating other media usage, including internet use and video games (Sharif & Sargent, 2006; Wills et al., 2010; van Rooij et al., 2010). Because a person reports poor self-control in one domain does not necessarily mean s/he has poor self-control in other domains. It is quite possible for that person to have differing levels of self-control in various environments or when performing different activities (i.e., internet use).

This study's findings of differences in high and low internet users among behavioral and internet self-control adds to the research on child internet use, highlighting aspects of self-control in children. This study also offers estimations of children's ideas of the time they spend online, and how they perceive their ability to self-control their use of the internet.

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APPENDIX A

The Brief Self-Control Scale (BSCS)

Brief Self-Control Scale (BSCS)

Please circle the number on the left of each statement indicating how much each statement describes you. Please be as honest as possible.

	Not at all like me	Slightly like me	Moderately like me	Much like me	Very much like me
1. I am good at resisting temptation	1	2	3	4	5
*2. I have a hard time breaking bad habits	1	2	3	4	5
*3. I am lazy	1	2	3	4	5
*4. I say wrong things	1	2	3	4	5
*5. I do certain things that are bad for me, if they are fun.	1	2	3	4	5
6. I refuse things that are bad for me.	1	2	3	4	5
*7. I wish I had more will power.	1	2	3	4	5
8. People would say that I have strong will power.	1	2	3	4	5
*9. Pleasure and fun sometimes keep me from getting my work done	1	2	3	4	5
*10 I often act without thinking through all the alternatives	1	2	3	4	5
*11. Sometimes I can't stop myself from doing something, even if I know it is wrong.	1	2	3	4	5
12. I am able to work well toward long-term goals.	1	2	3	4	5
*13. I have trouble concentrating.	1	2	3	4	5
14. I never allow myself to lose control.	1	2	3	4	5

**Reversed scored items*

APPENDIX B

Internet Self-Control Scale (ISCS)

Internet Self-Control Scale (ISCS)

Please circle the number on the left of each statement indicating how much each statement describes you. Please be as honest as possible.

	Strongly Agree	Agree	Disagree	Strongly Disagree
1. Once I am online, it is hard for me to log off.	1	2	3	4
2. I know I spend too much time on the Internet, but I cannot help myself.	1	2	3	4
3. I don't do things I'm supposed to because I spend so much time on the Internet.	1	2	3	4
4. I ignore my homework because I spend too much time online.	1	2	3	4
5. It takes a lot of will power to log off once I am on the Internet.	1	2	3	4
6. I seem to lose control when I am online.	1	2	3	4
7. I can't control my need to be online.	1	2	3	4
8. I feel that I spend too much time on the Internet.	1	2	3	4
9. My need to be online is overpowering	1	2	3	4
10. My need to be online interferes with my social, school, or work performance.	1	2	3	4
11. It takes a lot of effort to resist going online.	1	2	3	4

Note. With the ISCS, the total score from the scale has to be flipped around in order for higher levels of internet self-control to be indicative of higher scores on the ISCS; as written, higher scores on ISCS = lower internet self-control.

APPENDIX C
STUDY DESCRIPTION

Internet and Cell Phone Use and Social and Personal Well-Being of Young Adolescents**Study Description**

Dr. William Reynolds, Jenna Barry, Brittaini Graham, and Audra Gosvener

Department of Psychology

HUMBOLDT STATE UNIVERSITY

The widespread use of the Internet and its many applications (email, text messaging, networks, websites, blogs, chat rooms, instant messaging, etc.) as well as cell phone use provides numerous avenues for children and adolescents to interact with one another as well as engage in both productive and undesirable activities. bully and harass their peers. Some Internet venues allow for anonymous bullying, or bullying with false identification. Likewise, the opportunity for broad, public humiliation or harassment of peers makes the Internet appealing to some young people. Research on teen and adult Internet use is constantly expanding; however, little information exists on pre- and early adolescent Internet use. It is important that educators and researchers increase their awareness of how students are using the Internet and how such use is related to social and well-being (PEW Internet Study, 2008).

The purpose of the current project is to increase our understanding of pre- and early adolescents' Internet use and how their Internet use relates to social and emotional well-being. This project is being conducted with students in grades 4 through 7. Students for whom parental consent is given will be requested to complete a paper-and-pencil survey that will take about 45 to 50 minutes. The survey will include questions about students' Internet and cell-phone use, bullying behavior including Cyber bullying, and questionnaires related to mood, body esteem, social support, and related aspects of well-being, such as depression. Procedures for the administration of the survey will be determined in consultation with school personnel. This research has been reviewed and approved (#08-102) by the Institutional Review Board at HSU.

At the conclusion of the study, we will provide schools with a summary of the results specific to their school sample.

Please contact Dr. William Reynolds at wr9@humboldt.edu or 707 826-3162 if you have any questions. Thank you.

APPENDIX D
TEACHER LETTER

5/18/09

Internet and Cell Phone Use and Well-Being of Young Adolescents

Dr. William Reynolds, Jenna Barry, Brittaini Graham, and Audra Gosvener

Department of Psychology, Humboldt State University

Dear Teacher:

Thank you for taking the time to assist us with our research project. Your assistance is greatly appreciated and very important to the success of this project. Please give each student in your class a copy of the study information sheet with the attached consent form and ask them to take this home to their parents and return it to the school within the next three days. Please let the office know if you do not have enough forms for your students. Over the next several days, please remind students to return the forms. If students have lost or misplaced their forms, there should be extra forms in the school office. After three days, please ask any students who have not returned forms to do so. Depending on the preference of your school administration, students will return the consent forms to the main office or to you. If you are collecting the forms, we will provide an envelope for you to keep the returned forms as they come in. It would be helpful if you would keep a running count of the number of returned consent forms. Once again, we greatly appreciate your assistance.

APPENDIX E
PARENT LETTER

PARENT LETTER
HUMBOLDT STATE UNIVERSITY
Internet and Cell Phone Use and Social and Personal Well-Being of Young Adolescents
CONSENT TO ACT AS A RESEARCH PARTICIPANT

Dear Parent or Guardian:

We are writing to ask permission for your child to take part in a research project that is being conducted at your child's school. Dr. William Reynolds, Professor of Psychology at Humboldt State University along with graduate students Jenna Barry, Brittaini Graham, and Audra Gosvener are conducting a research project examining pre- and young adolescents' use of the Internet and cell phones and how such use relates to their social and personal well-being. We are also examining bullying and teasing behaviors in students. This project will involve students in grades 4 through 7 who will complete a paper-and-pencil survey. The survey will take about 45-50 minutes and include questions about their internet and cell phone use and surveys of bullying, and social and personal well-being that have been used with other students in school settings. No information collected as part of this study will identify your child or your family. Your child's responses will be completely **anonymous**, which means that your child will never be asked to provide a name or any other identifying information on the survey. The cumulative results of this study may be published. We anticipate that we will provide your child's school with a summary of students' Internet use and related information; although no individual student information will be reported. All data & documentation collected as part of the project will be kept in a secure file at HSU.

We do not anticipate that your child will be exposed to any risks while participating in this study. The survey will include questions about their internet and cell phone use and measures of bullying and social and personal well-being that have been used with students in school settings and there have been no ill effects from answering the questions. Possible risks include mild fatigue or feeling embarrassed. Your child will also be informed that they

may refuse to participate when the survey is administered and that they may stop at any time. Participation is voluntary and there will not be any remuneration for your child's participation. This research has been reviewed and approved (#08-102) by the Institutional Review Board at HSU. It is important that educators and researchers increase their awareness of how students are using the Internet as well as any problematic cell-phone use. The information collected for this study may be beneficial to both local schools as well as a wider group of educators and researchers. If you have any questions about this research you may contact William Reynolds at 707 826-3162, wr9@humboldt.edu or Chris Hopper, Dean of Research & Graduate Studies at 826-3949, cah3@humboldt.edu.

Your child's school administration has reviewed this project and feels that it is of potential value to the school. Please complete the Consent Form on the next page indicating if you will allow your child to participate in this study. If you do not give permission, please note this on the form. We would greatly appreciate it if you would have your child return the attached form to his or her school within the next three days. Forms may be returned to the main school office.

Thank you in advance for considering your child's participation in this project.

APPENDIX F
INFORMED CONSENT

HUMBOLDT STATE UNIVERSITY

*Internet and Cell Phone Use and Social and Personal Well-Being of Young Adolescents***INFORMED CONSENT FORM**

I have read the attached form describing the study on Internet Use in grade 4 through 7 students and I understand that my child's participation in this research is voluntary, and that my child may withdraw from the study at any time without jeopardy.

Please check one of the two options below and have your child return this form to the school within three days:

I give informed consent for my child to participate in this study.

I do not give informed consent for my child to participate in this study.

Child's full name (please print) _____ Grade: _____

Parent/legal guardian's printed name _____

Parent/legal guardian's signature _____ Date _____

Thank you for your consideration of this request. Please have your child return this form to the school office as soon as possible.