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# The Relationship Between Adolescents' Use of Internet-enabled Mobile Devices and Engaging in Problematic Digital Behaviors

Ryan Atwood

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THE RELATIONSHIP BETWEEN ADOLESCENTS' USE OF INTERNET-ENABLED  
MOBILE DEVICES AND ENGAGING IN PROBLEMATIC DIGITAL BEHAVIORS

by

Ryan Atwood

A dissertation submitted in partial fulfillment  
of the requirements of the degree

of

DOCTOR OF PHILOSOPHY

in

Family and Human Development

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2016

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## ABSTRACT

The Relationship Between Adolescents' Use of Internet-enabled Mobile Devices and  
Engaging in Problematic Digital Behaviors

by

Ryan Atwood, Doctor of Philosophy

Utah State University, 2016

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Department: Family, Consumer, and Human Development

The purpose of this study was to examine the relationship between teenagers' use of mobile Internet devices and their involvement in risky digital behaviors, including problematic Internet use, exposure to pornography, and participation in sexting. A cross-sectional correlational design using a sample ( $N = 97$ ) of teens aged 13-18 was used.

Linear regression analyses revealed that teens using smartphones as their primary source of Internet access were most likely to receive sexting requests, while teens using computers to access the Internet were most likely to intentionally view pornography. Additionally, teens who used multiple mobile devices to connect to the Internet and teens who had owned at least one mobile Internet device for longer periods of time were most likely to have higher levels of problematic Internet use.

Contextual factors such as age, gender, family structure, religious commitment, attachment to parents, and parental monitoring of online activities were also examined to determine their relationship to the aforementioned outcomes. Consistent with adolescent

developmental trajectories, older teens reported higher rates of pornography exposure and sexting requests, and indicated a greater willingness to participate in sexting. However, younger teens who used smartphones as their primary source of Internet access were just as likely as older teens to have received requests to sext. Males had higher rates of pornography exposure and were more willing than females to send sexual messages to their significant other. Females, on other hand, were asked to sext more frequently. Teens with high levels of religious commitment had the lowest levels of pornography exposure and participation in sexting.

Among the parental variables examined, teens' attachment to their parents was most significantly related to the studies' outcomes. Strongly attached teens had lower levels of problematic Internet use, pornography exposure, and participation in sexting than their peers who were not as strongly attached to their parents.

## PUBLIC ABSTRACT

The Relationship Between Adolescents' Use of Internet-enabled Mobile Devices and  
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Ryan Atwood

The purpose of this study was to examine the relationship between teenagers' use of mobile Internet devices and their involvement in risky digital behaviors, including problematic Internet use, exposure to pornography, and participation in sexting. A sample of teens between the ages of 13-18 was used for this study.

It was found that teens who used smartphones as their primary source of Internet access were most likely to receive sexting requests, while teens using computers to access the Internet were most likely to intentionally view pornography. Additionally, teens who used multiple mobile devices to connect to the Internet and teens who had owned at least one mobile Internet device for longer periods of time were most likely to have higher levels of problematic Internet use.

While older teens predictably had higher rates of pornography exposure and requests to sext, along with a greater willingness to participate in sexting than younger teens, an important finding from this study was that younger teens who used smartphones as their primary source of Internet access were just as likely as older teens to have received requests to sext.

Parental factors such as monitoring teens' use of the Internet and parent-child relationships were also examined in this study. It was found that teens who reported strong relationships with their parents were less likely to struggle with problematic

Internet use and had lower rates of pornography exposure and participation in sexting.

This finding underscores the important role that parents can play in guiding their teens to make healthy online choices.

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Ryan Atwood

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## **CHAPTER I**

### **INTRODUCTION**

Young people in America have unprecedented access to technology. Research conducted in 2015 found that American teenagers between the ages of 13 and 18 average about nine hours per day using entertainment media, including television, video games, social media, music, print, and the Internet (Rideout, 2015). When accounting for occurrences of using multiple devices at the same time—known as media-multitasking—research conducted in 2009 estimated that young people are exposed to about 10.75 hours of media daily (Rideout, Foehr, & Roberts, 2010). While it is difficult to ascertain exactly how much time teens spend with media each day, it is clear that most teens spend a significant portion of their waking hours using technology.

Because of recent advances in technology, teens are often connected to the Internet while using electronic devices. The Internet plays a predominant role in the lives of many young people by providing means to access many traditional forms of media in digital formats, such as TV shows, books, music, and movies, as well as more recent forms of interactive communication such as blogs, chat, instant messaging, and social networking sites (Brown & Bobkowski, 2011; Rideout, 2015). For many teens, the amount of time spent online is beginning to overtake the time they spend watching television (Ofcom, 2014). In fact, Rideout (2015) found that televisions are only the third-most commonly used device among teens, trailing both smartphones and computers.

Since 2006, the percentage of teens who go online at least occasionally has held constant at around 95%, but the devices which they use to access the Internet have

changed dramatically in recent years as Internet access is becoming increasingly more mobile (Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013). American teens spend nearly two-thirds of their screen time on a mobile device (Rideout, 2015). The percentage of adolescents who own a mobile phone has increased from 45% in 2004 (Madden et al., 2013) to 88% in 2014 (Lenhart, 2015). Ninety-two percent of youth between the ages of 13-17 reported that they access the Internet on a mobile device such as a smartphone or tablet at least occasionally (Lenhart, 2015), and the percentage of teens who have access to a smartphone has increased from 37% in 2012 (Lenhart, 2015) to 84% in 2015, with 67% of teens reporting that they own their own smartphone (Rideout, 2015). These percentages represent conservative estimates, as the trends in the literature have shown consistent and marked increases in teens' use of technology from year to year.

Internet-enabled mobile devices make it easy to connect to the Internet, which likely results in more time spent online. Many of the popular social media applications for mobile devices in 2016 such as Facebook, Twitter, Snapchat, and Instagram provide users with the option to be instantly notified about new information that has been posted by the people whom users are following. Lenhart (2015) reported that over 75% of teens have an account on a social networking site, and Rideout (2015) found that 58% of teens reported consistently using social media. The real-time updates found on these applications can compel many users to frequently check their mobile device in order to stay up to date on the newest information.

Many parents are uncertain about how much access their teens should have to Internet-enabled mobile devices due to difficulties associated with regulating and

monitoring their use, as well as concerns about outcomes that might be associated with the use of those devices. Existing research provides mixed results about the impact that online mobile activities can have on teens. Many young people use Internet-enabled mobile devices in positive ways, including to learn more about the world, assist in school work, enhance their social lives, express themselves, become more organized, find age-appropriate entertainment, and create content for other people to use and enjoy (Common Sense Media, 2012; Guan & Subrahmanyam, 2009; Livingstone, 2008; Rideout, 2015).

Others, however, can use mobile technologies in potentially problematic ways. Many adolescents report using their mobile devices to communicate with friends via social media or text messaging after the lights have gone out, resulting in sleep disturbance (Lemola, Perkinson-Gloor, Brand, Dewald-Kaufmann, & Grob, 2015; Munezawa et al., 2011). Some teens become excessive users (van den Eijnden, Meerkerk, Vermulst, Spijkerman, & Engels, 2008), cutting themselves off from face-to-face social experiences and interactions as a result (Common Sense Media, 2012; Sinkkonen, Puhakka, & Meriläinen, 2014). And there are also teens who use their mobile devices to access adult content, such as pornographic media, or to participate in sexting (Ybarra & Mitchell, 2014). Using mobile devices can also increase the odds of teens becoming victims of cyberbullying or receiving unwanted sexual solicitations (Common Sense Media, 2012; Lenhart et al., 2011). Some young people even place themselves or others in danger when they divulge personal information to online strangers (Common Sense Media, 2012; Guan & Subrahmanyam, 2009).

It is important to understand the factors that are related both positive and negative outcomes that are related to teens' use of mobile devices. In his bioecological model of human development, Bronfenbrenner noted that the level of impact that environmental influences can have on an individual will depend on four interrelated factors: proximal processes, personal and biological characteristics, contextual influences, and the element of time (Bronfenbrenner & Morris, 1998). Known as the Process-Person-Context-Time (PPCT) model, these interactions combine to produce complex developmental outcomes and help to explain the diversity of effects that can result from shared experiences (Bronfenbrenner & Morris, 1998).

The PPCT model provides utility in offering potential explanations for why some teens have overall positive experiences that stem from their use of electronics while others use digital devices to engage in problematic or risky online behaviors. The use of various devices to access the Internet (proximal processes); age, gender, and temperament (personal characteristics); levels of parental monitoring or regulations for teens' media use, family structure, and religious commitment (contextual influences); and the amount of daily time that teens spend online or how long they have been using their electronic devices (time) all fall within the classifications of the PPCT model and contribute, with a host of other PPCT factors, to influence the outcome of one's experience with digital devices. Because no two individuals share exactly the same processes, personal characteristics, contextual influences, and time-related factors, differing outcomes exist.

An example of a factor from the PPCT model that contributes to varying outcomes of teenage mobile device use is the level of parental monitoring of media use that a teen experiences. Parental monitoring of media use, which is commonly referred to as parental mediation in the literature (Nathanson, 2001), is an important contextual influence for teenagers. Parents can help to reduce media exposure's negative effects on children through restricting access to certain types of technologies or media, establishing rules and expectations for media use, and checking to see what their children are viewing (Gentile, Nathanson, Rasmussen, Reimer, & Walsh, 2012). On the other hand, teens who do not have their media use monitored by parents are more likely to engage in potentially problematic digital behaviors (van den Eijnden, Spijkerman, Vermulst, van Rooij, & Engels, 2009; Williams & Merten, 2011).

The occurrence and the effectiveness of parental mediation are influenced by other PPCT factors. For example, with the likelihood of teens owning an Internet-enabled mobile device increasing as they age (Lenhart, 2015; Madden et al., 2013), the proximal processes that teens engage in on their mobile devices make parental mediation more difficult than when they use a family shared computer. In fact, many teens report that they use mobile devices to establish boundaries between themselves and their parents, and that they enjoy the freedom that these devices give them to communicate with friends directly without any filtering or monitoring from parents or others (Subrahmanyam & Greenfield, 2008). However, parents who are securely attached to their children are more likely to use mediation strategies to regulate and monitor their children's use of the

Internet (Khurana, Bleakley, Jordan, & Romer, 2015), possibly because strongly attached teens are more receptive to these attempts.

In summary, advances in technology have led teenagers to have more access to and higher levels of media use than ever before, including access to the Internet on mobile devices. While increased access has been a positive thing for many teens, others have experienced negative outcomes from their use of technology. To what extent these forms of technology can impact teens in both positive and negative ways is dependent upon a host of process, personal, contextual, and time-related factors that are interacting in the life of the user.

The purpose of this study was to examine the relationship between teenagers' use of mobile Internet devices and their involvement in risky digital behaviors. While positive aspects of mobile Internet use were recognized, this study primarily focused on three specific problematic digital behaviors: excessive use of the Internet, pornography use, and sexting.

## CHAPTER II

### LITERATURE REVIEW

American teenagers have experienced a dramatic increase in their access to the Internet over the past decade. Whereas teens in the past used their mobile devices primarily for communicating via phone calls and text messaging, mobile devices in 2016 are often connected to the Internet, giving teens a vast array of activities to choose from beyond phone calls and text messages, including full Internet content and access to games, music, videos, and social media platforms such as Facebook, Twitter, Snapchat, and Instagram.

It is becoming increasingly common for teens to use a mobile device as their primary means of accessing the Internet. About 25% of a nationally representative sample of youth aged 12-17 reported that they mostly went online using their phone, with the percentage jumping up to 50% among smartphone users (Madden et al., 2013). Teens who live in lower-income or less-educated households are not as likely to have the same access to smartphones as their peers from higher socioeconomic status families (Rideout, 2015). However, teens in lower SES households that do own smartphones are just as likely as higher SES teens to primarily access the Internet from their mobile device (Madden et al., 2013), and they spend more time using them than their higher SES peers (Rideout, 2015).

A number of advantages are associated with having high levels of access to the Internet. Most teenagers frequently use the Internet to assist with school and homework (Jackson, von Eye, Witt, Zhao, & Fitzgerald, 2011; Rideout, 2015), and researchers have

found that Internet use can improve reading skills for teens who are below average in academic performance (Jackson et al., 2011). The Internet can also serve as an educator for teens who are seeking information about topics that may be difficult for them to discuss in face-to-face situations, such as health concerns or questions about puberty or sex (Guan & Subrahmanyam, 2009).

With communication activities having long been an attractive online option for teens (van den Eijnden et al., 2009), the advent of social media has given young people more opportunities to communicate with their peers and other online associates from around the world. Using self-reported data from a nationally representative sample of 1,399 teens aged 13-18, Rideout (2015) found that 58% of teens reported using social media, and estimated that they spent about 2 hours per day doing so. As of 2012, about one-third of teens reported visiting their main social network site (SNS) several times per day and 23% reported visiting at least two SNS sites daily (Common Sense Media, 2012).

Although social media has become a staple for many young people, particularly females (Rideout, 2015), it has not been universally embraced by all teens, as 42% of American teens reported not using any social media (Rideout, 2015). But for teens who place a high level of importance on communication, social media can be an important way to build social capital (Ellison, Steinfield, & Lampe, 2007), and is used by many young people as a way to make new friends, improve relationships with others, and stay connected with a variety of people (Common Sense Media, 2012).

Despite the many advantages afforded to teens by increased online access, some teens use the Internet and mobile devices to engage in problematic or risky digital

behaviors. A number of concerns that are beyond the scope of this study have arisen relating to teens' use of the Internet or mobile devices, including cyberbullying, invasion of online privacy, and reduction in self-esteem.

In this chapter, literature was reviewed regarding three other specific, problematic, or risky digital behaviors: problematic Internet use, accessing pornography, and sexting. Literature regarding parents' attempts to monitor their children's online use through active and restrictive mediation strategies was also reviewed, along with an examination of literature related to the role that parent-child attachment plays in parents' effectively monitoring their teens Internet use. Finally, Bronfenbrenner's PPCT model was used as a theoretical perspective to offer possible explanations for differing outcomes that existed in the literature related to teens' use of Internet-enabled mobile devices and their participation in the risky digital behaviors examined in this study.

### **Problematic Internet Use**

A variety of terms have been used in the research to represent the excessive use of the Internet; the three most common are problematic Internet use (Beard & Wolfe, 2001; Caplan, 2002), Internet addiction (Young, 1998), and compulsive Internet use (Chou & Hsiao, 2000; Meerkerk, van den Eijnden, & Garretsen, 2006). Although these terms are often used interchangeably, the term used in the present study is problematic Internet use. Researchers conceptualize problematic Internet use (PIU) as compulsive use of the Internet that interferes with normal daily life activities (Caplan, 2010). Common behaviors exhibited by problematic Internet users include preferring online social interaction over face-to-face interactions, spending time online for mood regulation,

experiencing cognitive preoccupation involving Internet use, and the inability to regulate or adjust personal Internet use (Caplan, 2010).

### **Prevalence of Problematic Internet Use among Teenagers**

The lack of uniformity in approaches used to measure PIU, or other similar constructs, has created inconsistencies in its estimated prevalence amongst teens (Jelenchick et al., 2014). Most recent studies of both older and younger adolescents estimate that only about 4% of teens in Western countries can be classified as “addicted” to the Internet (Jelenchick et al., 2014). Higher rates of Internet addiction (8-11%) have been reported in Southeast Asian countries such as Taiwan, South Korea, and China (Kuss, van Rooij, Shorter, Griffiths, & van de Mheen, 2013).

When considering problematic forms of Internet use that do not necessarily reach the distinction of “addiction,” the percentage of teens affected becomes much higher. Young’s (1998) Internet Addiction (IA) Test is a psychometrically valid (Widyanto & McMurrin, 2004; Young, 2007) and commonly used scale, consisting of 20 Likert-type (1-5) items to measure Internet addiction, a construct that is highly comparable to PIU (Jelenchick et al., 2014). The items for this test are summed and cutoff scores are used to classify users as being normal Internet users (30 or below), mild over-users (31-49), moderately addicted (50-79), or seriously addicted (80 or more; Young, 1998, 2007). In a study using the Internet Addiction Test (Young, 1998) on a sample of 475 Finnish teens aged 15-19, Sinkkonen et al. (2014) found that 14.3% of the respondents were normal users, 61.5% were mild over-users, 22.9% were moderately addicted, and 1.3% were seriously addicted.

### **Risk and Protective Factors Associated with Problematic Internet Use**

A number of personal characteristics, internalizing behaviors, and contextual influences have been associated with PIU. Some of these have been identified as potential risk factors for engaging in PIU, while others are associated with lower occurrences of PIU. For example, older, male adolescents are more likely to compulsively use the Internet than younger teens and females (Durak & Senol-Durak, 2014). Other factors that have been associated with higher levels of PIU include high levels of anxiety (Shapira, Goldsmith, Keck, Khosla, & McElroy, 2000), low self-esteem (Caplan, 2002), poor social skills (Meerkerk, van den Eijnden, Franken, & Garretsen, 2010), and higher levels of shyness (Caplan, 2002).

Spending large amounts of time online to communicate and to view pornography has also been associated with becoming a problematic Internet user. Using two-wave longitudinal data from 663 teens aged 12-15 from the Netherlands, van den Eijnden et al. (2008) found a positive correlation between the use of Internet applications in which real-time conversations can take place, such as instant messenger and chat rooms, and compulsive Internet use six months later ( $\beta = .09, p < .05$ ). In a two-wave longitudinal study examining Dutch adults, Meerkerk et al. (2006) found that Internet users who spent large amounts of time searching for sexual stimuli online were more likely to be compulsive Internet users one year later than those who did not ( $\beta = .13, p < .05$ ). The association between using pornography and excessive Internet use may apply to teens as well (Tsitsika et al., 2009).

Researchers have found that several family-related influences are related to teenage PIU. In a cross-sectional study examining 555 Taiwanese adolescents, Liu and Kuo (2007) found that teens who had higher-quality relationships with their parents were less likely to engage in PIU ( $\beta = -.13, p < .01$ ). Other studies have found PIU to be positively associated with levels of parent-adolescent conflict (Yen, Yen, Chen, Chen, & Ko, 2007), and negatively associated with quality parent-teen communications about Internet use (van den Eijnden et al., 2009).

### **Negative Outcomes Associated with Problematic Internet Use**

For teens unable to regulate their online activities, use of technologies that are normally used to enhance productivity in many aspects of life can lead to adverse effects on psychological well-being, school performance, sleep quality, and quality of family and social relationships (Siciliano et al., 2015). In a cross-sectional correlational study using self-report questionnaires from 475 Finnish teens, Sinkkonen et al. (2014) found that as Internet use increased among teens—whether they were classified as normal Internet users or mild, moderate, or severe over-users—their reliance on online life and neglect of schoolwork also increased, while self-control and preference for real-life relationships decreased.

Gámez-Guadix, Villa-George, and Calvete (2012) used a cross-sectional correlational study with self-report questionnaires given to 1,491 adolescents from Mexico. These authors found a significant correlation between teens' use of the Internet for mood regulation and reports of deficient self-regulation—which includes compulsive

Internet use and cognitive preoccupations with Internet use ( $r = .52, p < .001$ ). Deficient self-regulation was, in turn, significantly associated with negative life outcomes, such as difficulty managing daily life due to Internet use ( $r = .66, p < .001$ ).

### **Problematic Internet Use and Mobile Internet Devices**

One of the hallmarks of PIU is the inability to regulate the time that one spends using the Internet (Caplan, 2010). With development that occurs during adolescence of the frontal cortices and striatum of the brain often associated with teens exhibiting lower levels of executive control and regulative behaviors when compared with adults (Alvarez & Emory, 2006; Domenech & Koechlin, 2015; Owens, Behun, Manning, & Reid, 2012; Yurgelun-Todd, 2007), it is possible that teens are at a higher risk for engaging in PIU. Some teenage owners of mobile Internet devices may have difficulties regulating their use of the Internet, since they could theoretically be engaging in online activities on their mobile device at any time. With a growing number of teens owning Internet-enabled mobile devices, and about 25% reporting that they go online almost constantly (Lenhart, 2015), it is important to understand the relationship between having nearly constant access to the Internet and problematic Internet use.

Although the body of research examining the relationship between young people's use of mobile Internet devices and PIU is sparse, researchers are beginning to see relationships between teens' use of mobile devices and the time they spend online. For example, Lemola et al. (2015) used a cross-sectional correlational study of 362 Swiss adolescents aged 12-17 to compare smartphone owners with those who use conventional

mobile phones and found that smartphone owners spent more time online per day (two hours) than their peers with conventional mobile phones (1.13 hours;  $F = 12.36$ ,  $p < .001$ ).

### **Pornography**

One potentially problematic use of the Internet for teens is the consumption of online pornography. While teens' use of pornography could be labeled as just another form of PIU, it will be discussed in greater detail in this section due to its prevalence, potential influence on teens, and the possible relationship between teens using Internet-enabled mobile devices and accessing pornography.

The Internet is considered a highly sexualized environment relative to other forms of media (Owens et al., 2012; Peter & Valkenburg, 2008a), and online pornography is a thriving industry, with distributors making substantial revenues from producing and selling sexually explicit content (D'Orlando, 2011; Vanden Abeele, Campbell, Eggermont, & Roe, 2014). The Internet has surpassed traditional venues such as magazines, DVDs, and VHSs as the most popular means to access pornographic media (Chen, Leung, Chen, & Yang, 2013). This is likely attributable to the increased prevalence of the Internet, along with the anonymity and ease of access with which it is accompanied (Chen et al., 2013).

Pornography can generally be defined as sexually explicit content that is intended to sexually arouse its users (Malamuth & Impett, 2001). Teens who seek out pornographic media do so for a variety of reasons, including curiosity, to obtain information about sex, as a means to satisfy sexual desires, for excitement or

entertainment, or because of peer influences (Chen et al., 2013; Owens et al., 2012). In many respects, teens' exposure to pornographic materials is viewed as a normative experience as they are following traditional developmental trajectories regarding sexual curiosity (Owens et al., 2012).

### **Prevalence of Teenage Pornography Use**

Although pornography use and its effects have been researched for a number of years, the prevalence of pornography use among adolescents in the United States is somewhat unclear due to methodological and sample variations in the existing literature (Peter & Valkenburg, 2011). Although nearly a decade old, it appears that the most recent research using a nationally representative sample to examine the prevalence of American adolescents' exposure to pornography was conducted by Wolak, Mitchell, and Finkelhor (2007). These authors found that 42% of a sample of 1,500 youth aged 10-17 reported having been exposed to online pornography in the past year, 66% of whom reported only unwanted exposure. Major variations were also found in age and gender, with older, male teens being much more likely to have deliberately viewed pornography than younger teens and females (Wolak et al., 2007). These variations in age and gender are supported in other research using international samples (Chen et al., 2013; Flood, 2007; Vanden Abeele et al., 2014).

### **Outcomes Associated with Teenage Pornography Use**

While teens often use sexually explicit media to satisfy curiosity and learn more about sex, researchers have found that excessively viewing pornography can distort

teens' views about sexuality (Hägström-Nordin, Sandberg, Hanson, & Tydén, 2006; Tsitsika et al., 2009). Peter and Valkenburg (2008a) noted that common messages portrayed in pornographic content—such as male dominance, objectification of women, and uncommitted sex—are often in conflict with teens' previously held beliefs about sex that have been instilled through families and schools.

Because teens generally have limited experience with sex, the sexual ideals communicated through pornographic media can have a disproportionate amount of influence on teenage beliefs and ideals about sex (Peter & Valkenburg, 2008a; Strasburger, Jordan, & Donnerstein, 2010). For example, in a three-wave longitudinal study examining 962 Dutch youths aged 13-20, Peter and Valkenburg (2008a) found that young people who reported having viewed online pornography during wave 1 were more likely to report behaviors related to sexual preoccupation at wave 3 than those who reported having not viewed online pornography ( $r = 0.30, p < .001$ ). In a cross-sectional correlational study examining 2,343 Dutch adolescents aged 13-20, Peter and Valkenburg (2008b) found a relationship between pornography use and positive attitudes toward casual and uncommitted sex ( $\beta = 0.12, p < .001$ ).

Brown and L'Engle (2009) used a longitudinal study to examine an ethnically diverse sample of 967 middle school students from the Southeastern United States. The authors found that males who had been exposed to pornography were more likely, two years later, to have permissive sexual norms ( $r = 0.46, p < .001$ ), perpetrate sexual harassment ( $r = 0.26, p < .001$ ), to have engaged in sexual intercourse ( $r = 0.35, p < .001$ )

than their peers who did not use pornography. These findings have been replicated in other research (Braun-Courville & Rojas; 2009; Svedin, Åkerman, & Priebe, 2011).

### **Pornography Use and Mobile Internet Devices**

Very little research has focused on teens accessing pornographic media via mobile devices. The fact that teens have more access to the Internet—the most popular venue for accessing pornography—than ever before through both stationary and mobile devices implies that they potentially have more access and greater opportunities to view pornographic materials (D’Orlando, 2011; Hardy, Steelman, Coyne, & Ridge, 2013).

One of the reasons many teens prefer to connect to the Internet with mobile devices rather than stationary computers is that the privacy afforded by mobile devices allows them to view content that, in many cases, is not monitored by authority figures such as parents and teachers (Vanden Abeele et al., 2014). It is possible that one of the byproducts of teens owning devices that can connect to the Internet is that they have an increased likelihood of encountering, consuming, and distributing pornographic content (Owens et al., 2012), an assertion that requires empirical examination.

### **Sexting**

“Sexting” represents another potentially problematic teen use of mobile devices, which involves using digital devices to send nude or nearly nude images of oneself to others (Lenhart, 2009), or exchanging sexually explicit verbal messages with others (Ringrose, Gill, Livingstone, & Harvey, 2012). This section will discuss sexting beyond

the context of problematic Internet use in order to identify its prevalence, potential impact on teens, and role in teens' use of interactive mobile devices.

Teens engage in sexting for a variety of reasons, including as a means of enhancing romantic relationships, gaining attention from others, experimenting with sexuality when not yet sexually active, showing interest in potential romantic partners during the flirtation stage, or as a joke among friends of the same gender (Walrave, Heirman, & Hallam, 2014). A number of teens, however, view sexting in a more negative light, feeling immense pressure to participate in sexting in order to maintain or achieve popularity among their peers (Ringrose et al., 2012; Vanden Abeele et al., 2014; Walker, Sancu, & Temple-Smith, 2013; Walrave et al., 2014). Many female teens admit that they send sexts out of a desire for male approval, and that it is an objectionable price to pay for a romantic relationship (Walrave et al., 2014). This is particularly true among teens who feel the need to be perceived as popular or the center of attention among their peers (Ferguson, 2011; Vanden Abeele et al., 2014).

### **Prevalence of Teenage Sexting**

Recent research suggests that sexting is not an extremely common practice among American teens. Using self-report questionnaires on a nationally representative sample of 3,715 American adolescents aged 13-17, Ybarra and Mitchell (2014) found that 7% of the participants reported sending a nude or nearly nude picture of themselves via the Internet, text message, or in person in the past year. Researchers using regional samples of teens in the United States have found much higher self-reported rates, with approximately 15-28% of high-school aged teens in such samples reporting that they

have sent a sexual picture of themselves to others (Rice et al., 2012; Strassberg, McKinnon, Sustaíta, & Rullo, 2013; Temple et al., 2012). The reasons for such differences likely have to do with sample variations and differences in the specificity of the questions being asked to the respondents (Lounsbury, Mitchell, & Finkelhor, 2011; Ybarra & Mitchell, 2014).

Researchers using both national and regional samples have found that it is much more common for teens to receive sexts than to send them. Lenhart (2009) found that 15% of a nationally representative sample of 800 American 12-17-year-olds using self-report questionnaires had received sexually suggestive nude or nearly-nude images of someone they know, compared with only 4% who reported sending such images. Similarly, Strassberg et al. (2013) reported that 41% of a sample of 602 high school teens in the southwestern United States reported having received sexual messages, compared with almost 18% who reported having sent them. Data from the EU Kids Online Survey (Livingstone, Haddon, Görzig, & Ólafsson, 2011), using a sample of nearly 19,000 youth from 25 European countries, indicated that 15% of 11-16-year-olds reported having received sexual messages from peers in the past 12 months, with only 3% reporting that that they have sent such messages.

A second consistent theme in the research is that older teens are more likely to participate in both sending and receiving sexual messages than younger teens, and that females are more likely to send sexts than males. Lenhart (2009) found that 4% of 12-year-olds reported receiving sexual messages from peers, compared with 20% of 16-year-olds and 30% of 17-year-olds. Ybarra and Mitchell (2014) reported that teens aged 16-18

were about three times more likely than teens who were between 13-15 years old to share nude or nearly nude photos of themselves, and that females were significantly more likely than males to send sexual images. Livingstone et al. (2011) also found clear differences between age groups, with 7% of 11-12-year-olds, 14% of 13-14-year-olds, and 22% of 15-16-year-olds reporting that they have received sexual messages from a peer in the past 12 months.

### **Outcomes Associated with Teenage Sexting**

A number of internalizing and externalizing behaviors have been associated with the practice of sexting. Using a cross-sectional correlational design, Temple et al. (2012) used self-report questionnaires to examine a sample of 937 ethnically diverse teens aged 14-18. The authors found that teens who had sent sexts were more likely to have higher rates of substance use ( $O.R. = 2.14, p < .001$ ) and impulsivity ( $O.R. = 1.07, p < .05$ ) than teens who had not. Van Ouytsel, Van Gool, Ponnet, and Walrave (2014) used self-report questionnaires on a sample of 1,028 Belgian teens between the ages of 15-18 and found sexting to be highly associated with depression ( $\beta = 1.65, p < .001$ ), a finding that has also been supported in research using American teens (Ybarra & Mitchell, 2014).

Sexting often occurs as part of a larger pattern of sexual behaviors engaged in by teens. Using data that were collected in 2010 and 2011 from a randomly selected and nationally representative sample of 3,715 American teens aged 13-18, Ybarra and Mitchell (2014) found that teens who shared sexual photos of themselves with others were more likely to have had sex in the past 12 months (male  $O.R. = 5.6, p < .001$ ; female  $O.R. = 11.4, p < .001$ ) and to have engaged in risky sexual behaviors such as

having multiple sexual partners in the past year (male *O.R.* = 1.1,  $p < .05$ ; female *O.R.* = 1.4,  $p < .001$ ). Other researchers have also found an association between sexting and sexual activity (Rice et al., 2012; Temple et al., 2012).

### **Teenage Sexting and Mobile Internet Devices**

Comparing studies that use nationally representative samples and similar definitions of sexting, it appears from the most recent research that the prevalence of teens sending nude or nearly nude pictures of themselves is on the rise. The finding from Ybarra and Mitchell (2014) that 7% of teens reported having sent a sexual picture of themselves in the past year is about twice the percentage that was reported in the research of Lenhart (2009), a study that used similar questions.

Although sexting is a relatively new practice among teens, it is possible that recent technological advances in the communication technologies that are available to teens are creating an environment in which sexting can more easily take place. For example, 41% of teens aged 13-17 recently reported that they used Snapchat (Lenhart, 2015), a photo messaging mobile application that allows users to send seemingly self-destructive pictures or videos of themselves that are automatically erased shortly after being viewed by the recipient (Poltash, 2013). These types of apps, along with enhanced cameras available on mobile devices, may provide an attractive pathway for teens who are interested in sexting to do so by using Internet enabled mobile devices.

### **Parental Mediation of Teenage Media Use**

Many parents have felt compelled to use proactive means to safeguard their children and adolescents from what they perceive to be negative media influences (Padilla-Walker & Coyne, 2011). Researchers refer to parents' attempts to monitor their children's media use as parental mediation (Gentile et al., 2012). Three common strategies that parents have traditionally used to mediate traditional forms of media, such as television use, are active mediation, co-viewing, and restrictive mediation (Nathanson, 2001). Active mediation involves parents and children having conversations about the media that they are viewing (Gentile et al., 2012), with parents educating their children or providing opinions about various aspects of questionable content that has been viewed (Padilla-Walker & Coyne, 2011). Co-viewing occurs when the parent remains present while the child is viewing the media (Gentile et al., 2012). Restrictive mediation occurs when parents set rules or limits on children's exposure to the media (Gentile et al., 2012).

Parents also use these strategies when mediating their children's Internet use, although co-viewing is less common with newer forms of technology, such as mobile devices (Valkenburg, Piotrowski, Hermanns, & de Leeuw, 2013). Internet-related mediation strategies include setting limits on the amount of time that is spent using various electronic devices, the content of the media being viewed, and the physical location from which media can be accessed (Khurana et al., 2015; Padilla-Walker & Coyne, 2011). It also involves monitoring the content that children have been accessing online through conversation or parental controls such as monitoring or tracking software (Sasson & Mesch, 2014; Vaterlaus, Beckert, Tulane, & Bird, 2014).

Restrictive mediation is the most common strategy that parents use to mediate their children's online activities (Lee, 2012), although it is more commonly used with younger children (Nathanson & Yang, 2003). As children grow older and are seeking autonomy, teens often resist parents' attempts to monitor or restrict their digital behavior (Nathanson, 2001).

### **Factors Related to Parental Mediation**

A number of child- and parent-related factors, including marital status and parenting styles, are associated with parental mediation of their children's Internet use. Children who belong to two-parent families are much more likely to have their media use monitored (Barkin et al., 2006), presumably because having two parents in the home creates more opportunities and time for parents to monitor their children's use when compared with single parents (Gentile et al., 2012).

Parents are much more likely to use both active and restrictive mediation to monitor the media use of younger than older children (Gentile et al., 2012). This may be because they feel that their older children have higher levels of self-control (Lee, 2012) and are more capable of resisting negative media influences (Wang, Bianchi, & Raley, 2005), thus feeling a greater need to protect their younger children from being exposed to inappropriate content (Gentile et al., 2012). Additionally, as children age, they spend less time at home, likely reducing the number of opportunities for parents to supervise their older children's online behavior. However, Davies and Gentile (2012) found that while families with teens typically engage in less restrictive mediation than families with younger children, teens engage in less healthy media habits than younger children,

including an increase of screen time. This implies that older children may still benefit from parents' efforts to monitor and regulate their teens' media use in order to help them to maintain healthier media habits (Vaterlaus, Beckert, & Bird, 2015).

### **Outcomes Associated with Parental Mediation**

In general, parental mediation of children's online use is associated with positive outcomes. Teens who report higher levels of restrictive parental mediation typically experience less exposure to violent media, better academic performance (Gentile et al., 2012), less contact with online strangers (Williams & Merten, 2011), and reduced rates of online harassment (Khurana et al., 2015). Associations have also been found between parents' use of active mediation and teens' critical thinking skills (Shin, Huh, & Faber, 2012), as well as higher rates of using the Internet for educational purposes (Lee & Chae, 2007).

While researchers have pointed to the positive impact that parental mediation can have on children's mobile device use and the subsequent outcomes, not all parents monitor their children with the same frequency or effectiveness (Hodge et al., 2012). Past research, using surveys from nationally representative samples, indicate that the vast majority of parents reported using at least one parental mediation strategy (Lenhart et al., 2011). However, discrepancies commonly exist between parent-reported and teen-reported levels of parental mediation, with roughly between one-third (Wang et al., 2005) and half (Rideout et al., 2010) of teens reporting that their online use was mediated by their parents. Gentile et al. (2012) found that child reports tended to be better predictors

of actual parental mediation practices than parent reports, and posited that parents may report higher levels of mediation due to social desirability concerns.

### **Parental Mediation of Mobile Internet Devices**

As teenagers become exposed to larger numbers of pictures, videos, sounds, and messages through their use of Internet-enabled mobile devices, growing concern exists among many parents about the content that is being viewed by their children (Padilla-Walker & Coyne, 2011). Adding a layer of difficulty is the private nature of mobile devices, which can make it challenging for parents to know what their children are seeing or disseminating on their phones (Vaterlaus et al., 2014). Teens often prefer using mobile devices to communicate with friends or access the Internet because they feel that parents are less likely to monitor their behavior on mobile devices than they would on shared computers (Ringrose et al., 2012).

Parents frequently feel unequipped to mediate their children's mobile phone use because they feel that their children are more capable of adapting to and becoming proficient users of new technologies (Vaterlaus et al., 2014). With teens commonly functioning as the resident expert for using the Internet (Livingstone, 2003) and cell phones (Oksman & Turtiainen, 2004) in their homes, teens are often left unsupervised by their less technologically proficient parents (Vaterlaus et al., 2014). Parents, however, hold a key position of power, in that generally they are able to provide or restrict access to different types of technology (Vaterlaus et al., 2014).

It seems likely that most of the strategies that parents have used to mediate their children's use of traditional media would also be effective when used to mediate teens' use of newer forms of technology, such as mobile Internet devices. In a qualitative study examining a sample of 80 teens aged 16-18 and their parents, Vaterlaus et al. (2014) asked teens what they felt was the most effective strategy that their parents could use to mediate their use of the Internet and mobile phones. Monitoring usage and content (33%) was the most common answer, with teens suggesting that parents conduct random searches of their text messages or Internet history. Other mediation strategies that teens commonly suggested that parents should use include active mediation (26%), such as being friends with children on Facebook or asking questions about what they are seeing online; rule-setting (18%), such as setting limits for time spent using cell phones and Internet; and restrictive mediation (15%), such as restricting where teens can use their devices and using parental controls or Internet filters (Vaterlaus et al., 2014).

### **Parental Attachment**

The effectiveness of parental mediation varies depending on a number of factors, including the level and type of attachment between the parent and the child (Khurana et al., 2015). Feelings of security, trust, and mutual understanding are hallmarks of strong parent-child attachment during adolescence (Lei & Wu, 2007). A number of positive outcomes are associated with teens feeling close to their parents, including higher levels of self-esteem, higher academic achievement, higher levels of autonomy, better peer

relations, and fewer behavioral or emotional problems (Allen, Porter, McFarland, McElhaney, & Marsh, 2007; Egeland & Carlson, 2004).

A strong attachment between teens and their parents has been linked to lower occurrences of teens engaging in risky online behaviors. For example, Sasson and Mesch (2014) used questionnaires in a cross-sectional correlational study to examine 495 Israeli youths aged 10-18, and found that young people who reported higher levels of family cohesion were less likely to engage in risky online behaviors such as cyberbullying and posting personal details about themselves ( $\beta = -0.26, p < .001$ ). Additionally, in a cross-sectional study using questionnaires on a nationally representative sample of 1,501 US youth aged 10-17, Ybarra and Mitchell (2005) found that teenagers who had lower levels of parental bonding were twice as likely to seek out online pornography as teens who had a strong emotional bond.

Parent-child attachment levels have also been found to be negatively correlated with excessive Internet use. In a cross-sectional study using questionnaires on a sample of 1,808 Taiwanese junior high school students, Chang et al. (2015) found that teens with lower levels of attachment to their parents were more likely to experience Internet addiction ( $O.R. = 0.74, p < .001$ ). Lei and Wu (2007) found similar results in a cross-sectional study using questionnaires on a sample of 712 Chinese youth aged 11-19. These authors found PIU to be negatively associated paternal trust ( $r = -0.23, p < .001$ ), and positively associated father-adolescent alienation ( $r = 0.30, p < .001$ ).

Strong parent-child relationships appear to be an important factor related to healthier media habits for young people, and may contribute to teens being receptive to

parental mediation attempts. With more teens than ever connecting to the Internet via mobile devices which can make it difficult for parents to know what their children are doing online, it seems that parents should place building and maintaining strong relationships with their teenage children as just as high of a priority as their attempts to use employ restrictive or active parental mediation strategies.

### **Mobile Devices Through the Lens of Bronfenbrenner's Bioecological Model**

In his bioecological model of human development, Bronfenbrenner emphasized the role of reciprocal interactions that take place between humans and other persons, objects, and symbols in their immediate external environment (Bronfenbrenner & Morris, 1998). By engaging in these activities and interactions, defined as proximal processes, individuals come to make sense of the world around them and construct their place in it. The reciprocal nature of these interactions means that humans are not only shaped by their interactions with contextual influences, but actively play a part in contributing to and changing the prevailing order of their environment (Tudge, Mokrova, Hatfield, & Karnik, 2009).

Bronfenbrenner's Process-Person-Context-Time (PPCT) model describes the complex interactions that take place between proximal processes, personal and biological characteristics, contextual influences, and the element of time. These interactions combine to produce complex developmental outcomes and help to explain the diversity of outcomes that can result from shared experiences (Bronfenbrenner & Morris, 1998). The PPCT model is useful for understanding how variations of outcomes exist related to

mobile device use. Below is a brief description of each element of the PPCT model, along with an explanation of how it relates to outcomes of teenage mobile device use.

### **Proximal Processes**

The idea of *proximal processes* constitutes the core of Bronfenbrenner's PPCT model (Bronfenbrenner & Morris, 1998). This construct encompasses the interactions that take place between an individual and persons, objects, or symbols in his or her environment that operate over time and are the primary mechanisms whereby human development occurs. The power of these processes to stimulate development within an individual is dependent upon the other three aspects of the PPCT model: characteristics of the developing person, the immediate and more remote environmental contexts, and the duration and time frame in which the proximal processes take place (Bronfenbrenner & Morris, 1998).

In the proximal process of teens using mobile devices, the type of devices that teens use in conjunction with their personal characteristics, contextual influences, and elements of time seem to influence the ways in which teens are shaped by their use of mobile devices. For example, teens spend more time online per day than they did in the past (Siciliano et al., 2015), which is likely, at least partially, a product of the growing number of teens who use Internet-enabled mobile devices (Lemola et al., 2015; Lenhart, 2015). With many of the activities that have been associated with PIU—such as gaming, instant communication, and sexual stimuli (Kuss et al., 2013; Meerkerk et al., 2006; van den Eijnden et al., 2008)—available on Internet-enabled mobile devices, it seems

possible that using these types of devices, as opposed to conventional mobile phones, may place teens at higher risk for engaging in PIU.

### **Person**

Bronfenbrenner and Morris (1998) defined the *person* aspect of PPCT as the personal characteristics of the developing individual. Among the personal characteristics described by Bronfenbrenner are demand, resource, and force characteristics. Demand characteristics are those which act as an immediate stimulus to another person such as age, gender, skin color, and physical appearance. Resource characteristics are those which relate to mental, emotional, social, and material resources available to a person, such as past experiences, skills, intelligence, and access to good food. Force characteristics have to do with differences of temperament, motivation, persistence, and other internal characteristics (Tudge et al., 2009).

Researchers in the field of neuroscience have found differences between adults and teens in the frontal cortices and striatum of the brain (Owens et al., 2012), with these regions being sporadic and undergoing changes during the adolescent years. These regions are generally presumed to be associated with executive control, regulative behaviors, and decision making (Alvarez & Emory, 2006; Domenech & Koechlin, 2015; Yurgelun-Todd, 2007). It is possible that the lack of executive control and self-regulation demonstrated by many teens, combined with the autonomy afforded to teens by Internet-enabled mobile devices, places teens at risk for engaging in problematic or risky digital behaviors such as PIU, pornography, or sexting.

A number of personal characteristics have been shown to be related to the level of influence that mobile devices have on teens. The most basic example of this is in the ownership statistics. While teens of all ages have experienced increases in mobile device ownership over the past decade, it is much more common for older teens to own Internet-enabled mobile devices (Lenhart, 2015). Older teens are also more likely to become excessive Internet users (Durak & Senol-Durak, 2014), view pornography (Wolak et al., 2007), and participate in sexting (Livingstone et al., 2011) than younger teens. Personality factors such as depression, self-esteem, social skills, and extraversion are also elements that influence how mobile devices influence teens. Teens who are outgoing and have low levels of depression tend to use the Internet in less problematic ways than those who are shy or depressed (Caplan, 2002; Kuss et al., 2013). Teens who are depressed are also more likely to view online pornography (Wolak et al., 2007).

### **Contextual Influences**

Bronfenbrenner (1979) theorized that both proximal and distal contexts influence a person's development, including the microsystem, mesosystem, exosystem, and macrosystem. The microsystem refers to activities, roles, and relationships experienced in face-to-face settings; thus, home, school, church, and peer groups are important microsystems. The mesosystem refers to the linkages and interrelations that exist between microsystems, such as the interaction between a child's school, peer groups, and his or her parents' value systems. The exosystem refers to broader contexts where the developing person is not actually situated, but which still indirectly influence his development. The macrosystem is the overarching pattern of micro, meso, and

exosystems characteristic of a given culture, subculture, or broader social context. This includes belief systems, resources, and lifestyles. The macrosystem is a cultural blueprint that helps to design the social structures in which a person will be living or participating.

There are also contextual influences that play a role in the degree of relationship that electronic devices have with the lives of adolescents. From a macro-level, it seems that teens who live in more technologically advanced countries, particularly those in Southeast Asia, are particularly at risk for using the Internet excessively (Kuss et al., 2013). Additionally, many interactions that take place within a teen's microsystem, particularly between the teen and the parent, seem to be related to electronic device use. For example, a strong parent-child attachment seems to protect teens from engaging in PIU (Liu & Kuo, 2007; van den Eijnden et al., 2009) and from accessing pornography (Ybarra & Mitchell, 2005).

Also within the microsystem of the family are dynamics such as parents' marital status, technological abilities, income, education, and parenting styles that influence the parental monitoring strategies that will be employed, along with their frequency and effectiveness (Brown & L'Engle, 2009; Gentile et al., 2012; Padilla-Walker & Coyne, 2011). An additional microsystem influence that impacts teens' online behavior is religious involvement, with religiosity acting as a protective factor from intentional and accidental exposure to pornography (Hardy et al., 2013).

## **Time**

The *time* aspect of the PPCT model has three different dimensions: microtime, mesotime, and macrotime (Bronfenbrenner & Morris, 1998). Microtime refers to the

continuity or discontinuity that takes place during ongoing proximal processes, or in other words, what is happening during those proximal processes. Mesotime is the extent to which activities or interactions occur across broader time levels, such as days, weeks, and years. Macrotime focuses on the changing expectations and events in the larger society. This can also be referred to as the chronosystem, and accounts for the fact that processes vary according to specific historical events that are occurring during a given time (Tudge et al., 2009).

The amount of time that teens spend using mobile devices plays a role on the impact that mobile devices will have. It seems likely that teens who spend less time on their devices, or who engage in activities that are not associated with excessive use, will have a lower risk of becoming problematic users and engaging in risky digital behaviors than teens who spend more time online. Additionally, the length of time that teens have owned mobile devices that can connect to the Internet may be a factor that impacts how susceptible teens are to engaging in PIU or other risky digital behaviors.

From a macro-level, it may be easier for teens who live in 2016 to experience addictions or problems related to their use of technology than teens who lived 10, 20, and 50 years ago because of the increase in options that today's users of mobile devices have at their disposal. Having more access to the Internet than teens in the past means that today's adolescents often have more opportunities for learning and other positive functions of the Internet (Gámez-Guadix et al., 2012), but also that they have more opportunities to be exposed to negative content such as pornography (D'Orlando, 2011).

## Summary

Recent advances in mobile technology have made mobile Internet devices more accessible, with an increasing percentage of teens now owning mobile devices that can connect to the Internet (Lenhart, 2015; Rideout, 2015). Although in many instances, increased access to the Internet can be advantageous to teens in that it provides them with more opportunities to learn and communicate, having near-constant access to the Internet may put some teens at risk for engaging in problematic Internet use and other risky digital behaviors such as pornography exposure and participation in sexting.

Many parents are concerned about providing their teens with mobile devices that make it difficult to monitor their children's online activities, and wonder what outcomes might be associated with doing so. Bronfenbrenner's PPCT model (Bronfenbrenner & Morris, 1998) helps to explain, theoretically, why some teens encounter difficulties associated with their mobile device use while others do not. The interrelated factors of proximal processes, personal characteristics, contextual influences, and time all work together to produce outcomes related to teens' use of mobile devices.

The literature introduced above outlines some of the outcomes that have been associated with teenage Internet and mobile device use. But most of the current research does not focus on newer forms of technology, such as Internet-enabled mobile devices. In relation to PIU, pornography, and sexting, very little is known about the impact of teens using the Internet on mobile devices. Internet-enabled mobile devices contain many of the features that have been associated in the literature with problematic use, such as enhanced online privacy and real-time communication applications, so it is possible that

teens who use mobile Internet devices are at a greater risk for engaging in problematic behaviors.

The purpose of this study was to examine the relationship between teenagers' use of mobile Internet devices and their involvement in risky digital behaviors. Specifically, the following research questions were examined:

- (1) What are the characteristics of Internet use and mobile device ownership for teens in this study?
- (2) What is the relationship between teens' primary source of Internet access and their daily time spent using the Internet, prevalence of PIU, unintentional and intentional pornography use, and sexting behaviors?
- (3) To what extent do teen-reported levels of active and restrictive parental monitoring of technology and levels of attachment of teens to parents moderate potential relationships that exist between teens' primary source of Internet access and teen-reported daily Internet use, PIU, unintentional and intentional pornography use, and sexting behaviors?
- (4) What relationships exist between teen-reported levels of parental attachment and teen-reported levels of active and restrictive parental mediation of media use?
- (5) To what extent does teens' length of ownership of at least one mobile Internet device or the number of mobile Internet devices owned by teens moderate potential relationships that exist between teens' primary source of Internet access and teen-reported daily Internet use, PIU, unintentional and intentional pornography use, and sexting behaviors?

## CHAPTER III

### METHODS

#### Research Design

Because Internet-enabled mobile devices are a relatively new form of technology, little is known about their impact on teenage behavior or how effectively parents monitor their use. To investigate teens' use of the Internet and mobile devices, along with whether a relationship exists between mobile Internet device use and problematic Internet use, pornography exposure, and sexting behaviors, a cross-sectional correlational design was used. Data were collected at one point in time using an online questionnaire.

#### Subjects

The participants for this study were recruited using a nonprobability purposive sampling approach. This sampling method was chosen as a way to efficiently recruit an adequate sample of teenage Internet users, a population that can be somewhat difficult to reach without using school districts or expensive recruiting methods. A written explanation describing the purpose of the study was distributed to personal contacts of the researcher, with a request that it be forwarded to those in their social networks who met the inclusion criteria (teenage Internet users in grades 7-12).

A statistical power analysis revealed that a sample of  $N = 100$  needed to be obtained in order to reach a statistical power level of .80 ( $\alpha = .05$ , effect size = .30). Given some of the challenges associated with recruiting a sample of this size, a smaller sample was a realistic possibility. Overall, 109 teens agreed to participate in the survey

and were given parental consent to do so. After reviewing the responses, 12 participants were dropped from the analyses. Nine of these participants were dropped due to large amounts of missing data, and the remaining three were dropped because they did not fit within the specified age range. These exclusions resulted in a final sample of  $N = 97$ . Selected sample characteristics are found in Table 1.

### **Procedures**

Due to restrictions that prevented the researcher from directly contacting potential participants, a parent-based approach was used. This approach involved parents or guardians of potential participants being recruited via both email/direct message and social media advertising. Parents who were contacted included personal contacts of the researcher, parents who had been referred to the researcher by other personal contacts of the researcher, and parents who were found via social media advertisements and searches.

These parents were contacted via email or direct message, and were given a brief explanation of the study (Appendix A) which included instructions to follow a link to access the informed consent document (Appendix B). Adult personal contacts of the researcher, as well as parents of participants in the study were asked to post a picture advertisement (Appendix C) to their social media accounts. This advertisement contained a web address for parents to follow, which provided access to the informed consent document. Because of the potential for teens to see the advertisement on social media and follow the link listed, a separate link was created for teens to follow, which led them to a webpage that contained instructions to have their parents contact the researcher if they were interested in participating (Appendix D).

Table 1

*Demographic Variables: Descriptive Statistics (N = 97)*

Variable	%	<i>M</i>	<i>SD</i>
Age		15.08	1.53
13	19.8		
14	20.8		
15	19.8		
16	13.5		
17	22.9		
18	3.1		
Gender			
Female	53.1		
Male	46.9		
Lives with married mother and father			
Yes	87.5		
No	12.5		
Religion			
Mormon	77.1		
Protestant Christian	6.3		
Nothing in particular	5.2		
Other	4.2		
Roman Catholic	4.2		
Atheist	3.1		
Religious commitment		3.97	1.22
Very committed	45.8		
Mostly committed	26.0		
Moderately committed	12.5		
Somewhat committed	10.4		
Not at all committed	5.2		

*Note.* Percentages may not add up to 100 due to rounding.

The informed consent document provided parents or guardians with specific details of the study. Parents or guardians who gave permission for their child to participate were instructed to contact the researcher via email with a statement expressing that they had read the informed consent document and that they consented to their child

to participating in the study. Upon reception of this email, the researcher then provided a link to the survey that the parent was instructed to pass on to his or her child.

The first page of the online survey contained the participants' assent form (Appendix E). Participants were informed that the questionnaire would not ask for their name or other identifying information, but would address questions about their use of technology, including questions that might be of a sensitive nature, such as the kinds of activities they engage in on their digital devices and what kind of phone and other personal technological devices they own. Participants were encouraged to take the survey in a private place where others would not be able to see their answers, and were assured that participation was optional and that every effort would be made to keep the information provided on the questionnaire confidential.

### **Measures**

The questionnaire (Appendix F) consisted of four measurement scales, along with a number of items that were used to assess demographic information, the types and number of mobile devices that the participants own, the estimated duration and purpose for using their devices, Internet content sought, sexting behaviors, levels of parental mediation, and levels of parental attachment.

#### **Short Problematic Internet Use Test (SPIUT)**

The SPIUT (Siciliano et al., 2015), a shortened version of the Compulsive Internet Use Scale (CIUS) used by Meerkerk, van den Eijnden, Vermulst, and Garretsen (2009), consists of six questions with a five-point Likert scale (0 = never, 4 = very often)

to measure key factors of Problematic Internet Use (PIU): loss of control, preoccupation and salience, conflict, withdrawal symptoms, and coping, with composite scores being used to determine levels of PIU. Scores from the SPIUT were shown to be both reliable (Cronbach's  $\alpha = 0.83$ ) and valid using two large cross-sectional samples of Italian Internet users aged 15-19. Construct validity was estimated using Principal Component Analysis (PCA), which revealed unidimensionality among the items in the SPIUT. Concurrent validity was tested using the CIUS as a concurrent scale, with the correlation between the SPIUT and CIUS of  $r = 0.70$  ( $p < .001$ ).

Questions asked on the SPIUT include: (a) "Do you find that you are staying online longer than you intended?" (b) "Have you neglected homework because you are spending more time online?" (c) "Have you been reprimanded by your parents or your friends about how much time you spend online?" (d) "Have you lost sleep due to being online late at night?" (e) "Do you feel nervous when you are offline and is that feeling relieved when you go back online?" and (f) "Have you chosen to spend more time online rather than going out with your friends?" (Siciliano et al., 2015, p. 81). Terms that may have been ambiguous to participants, such as "online," were clarified on the questionnaire. Upon the completion of the current study, reliability analysis was conducted for the six items on the SPIUT, and the scale was found to be reliable for the participants' scores in the present study (Cronbach's  $\alpha = .78$ ).

### **Adolescent Attachment Questionnaire (AAQ)**

The Adolescent Attachment Questionnaire (AAQ; West, Rose, Spreng, Sheldon-Keller, & Adam, 1998) consists of three subscales with three items each, and uses a five-

point Likert scale (1 = strongly disagree, 5 = strongly agree) to measure adolescents' perceptions of attachment to their primary caregiver. The three subscales focus on components of attachment that have been identified by Bowlby (1973): availability, angry distress, and goal-corrected partnership. In a study using a school-based sample of 619 Canadian teens aged 12-19, West et al. (1998) found that the Cronbach's alpha for scores related to each subscale were as follows: availability = .80, angry distress = .62, goal-corrected partnership = .74.

West et al. (1998) tested the convergent validity of the AAQ by using a clinical sample of 133 teens to examine the correspondence between the AAQ and the three classifications of attachment (secure, preoccupied, and dismissing) used on the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1984). These authors found that teens who were classified as securely attached on the AAI reported higher levels of available responsiveness and goal-corrected responsiveness on the AAQ, and teens who were classified on the AAI as insecurely attached reported lower levels of goal-corrected partnership and higher levels of angry distress on the AAQ.

In answering these questions, participants were asked to refer to the person in their life who they perceived took care of them the most from the time they were born until age 5 (West et al., 1998). The items within the *availability* subscale are (a) "I am confident that my parent will listen to me," (b) "I am confident that my parent will try to understand my feelings," and (c) "I talk things over with my parent." The *angry distress* items are (a) "My parent only seems to notice me when I am angry," (b) "I often feel angry with my parent without knowing why," and (c) "I get annoyed at my parent

because it seems I have to demand his or her care and support.” The items for the *goal-corrected partnership* are (a) “I enjoy helping my parent whenever I can,” (b) “I feel for my parent when he or she is upset,” and (c) “It makes me feel good to be able to do things for my parent”. Item scores for each subscale were averaged, with the *angry distress* items reverse-coded, and an overall score was summed, with higher scores reflecting secure attachment.

Reliability analyses were conducted for the three AAQ subscales using data from participants in the present study, and Cronbach’s alpha scores were as follows: availability = .90, angry distress = .77, goal-corrected partnership = .81. These alpha scores demonstrate greater reliability than the scores reported by West et al. (1998) and justify the use of this measure in the current study.

### **Pornography Use**

Unintentional and intentional exposure to pornography were measured with a 12-item scale created by Hardy et al. (2013), with pornography being defined as “images or videos of people naked or having sex which are intended to cause sexual arousal” (p. 135). Using a Likert scale (0 = not at all, 5 = several times per day), participants were asked how frequently they have both accidentally and intentionally viewed pornography in the past six months in following situations: on a cell phone, in books or magazines, while using email or other forms of online communication, on television or in movies, while searching the Internet, or from media saved to their computer. In a study of 419 teens aged 15-18, the Cronbach’s alpha for scores of items of unintentional pornography

exposure items was 0.83, and for the intentional pornography exposure items was 0.85 (Hardy et al., 2013).

Reliability scores were also measured upon the completion of the current study. Cronbach's alpha was .76 for both the unintentional pornography and intentional pornography subscales, which was less reliable than those reported by Hardy et al. (2013), but still acceptable scores (Henson, 2001).

### **Sexting Behaviors**

Drawing from the definitions used by Lenhart et al. (2011), Ringrose et al. (2012), and Ybarra and Mitchell (2014), sexting was defined for the participants as digitally sending or showing sexual pictures or videos of yourself where you were nude or nearly nude, or exchanging sexually explicit verbal messages. Due to IRB restrictions which prohibited asking participants about their direct involvement in sending and receiving sexts, participants were asked to estimate the occurrence and frequency of others participating in sexting, as well as the frequency of sexting requests received by the participants and their likelihood of participating in sexting if asked by a stranger, a friend, and a significant other.

The number of times that teens had been asked by another teen to digitally send or show a sexual picture of themselves was measured using a six-point Likert scale (0 = not at all, 5 = daily). Five-point Likert scales were used to measure the following variables: (a) estimates of other teens' participation in sexting (1 = very few, 5 = nearly all), (b) the estimated frequency of other teens sending sexts (1 = never, 5 = very often), and (c) the

likelihood of participants sending sexts to strangers, friends, and a boyfriend/girlfriend (1 = very unlikely, 5 = very likely).

### **Parental Mediation**

A three-item scale that was originally used by Khurana et al. (2015) was used to measure participants' perceptions of their parent using restrictive mediation. Using a five-point Likert scale (1 = never, 5 = very often), participants were asked how frequently in the past six months a parent or guardian has (a) forbidden or blocked certain websites or apps that the participant might use, (b) restricted the amount of time the participants have spent online or on their mobile device, and (c) monitored or tracked what the participants were doing online, such as tracking their Facebook page or checking their search history.

Using confirmatory factor analysis, Khurana et al. (2015) found that these three items loaded onto one latent factor, with a Spearman's rank correlation coefficient of 0.81. Reliability analysis was performed for these three items upon the completion of the current study, and Cronbach's alpha was acceptable .75 (Henson, 2001).

Because active mediation is also an important part of parental mediation, participants were also asked how frequently in the past six months a parent or guardian has (a) talked to the participant about what is appropriate and inappropriate to view on the Internet and mobile devices, (b) talked to the participant about how to behave with people online or on their mobile devices, and (c) talked to the participant about things they have seen on the Internet or on their mobile devices. A five-point Likert scale (1 = never, 5 = very often) was used for the three items on the scale. Scores from the current study showed good reliability (Cronbach's  $\alpha = .88$ ).

**Device Information**

Participants were asked if they owned a mobile phone, and if so, whether their mobile phone was a smartphone. Questions were also asked to determine how many Internet-enabled mobile devices the participants owned and how long they had owned at least one mobile device that connects to the Internet.

**Time and Usage Information**

Participants were asked what type of device they most frequently used to access the Internet, with options including traditional devices such as desktop or laptop computers, as well as newer forms of technology, such as smartphones, tablets, or mp3 players. Participants were also asked to estimate how much time, on average, they spent online per day on various devices. Internet use was defined for the participants as any activity where you are connected to the Internet, including Google and other websites, as well as any apps that you can download to your mobile or tablet devices, such as Facebook, Instagram, Snapchat, Twitter, Netflix, or YouTube.

**Demographic Information**

Demographic information that was included as control variables were age, grade in school, gender, family structure, religious denomination, and commitment to religion in order to examine differences between personal characteristics in the outcomes that were examined in this study.

**Ethical Considerations**

The Institutional Review Board (IRB) of Utah State University approved this project (Appendix G). Questionnaires were anonymous, and participants were informed that their participation was voluntary and that they could withdraw from the study at any point. Because some of the questions asked on the survey were of a sensitive nature, extra steps were taken in order to maximize participants' confidentiality and safety. First, no identifying information about participants was collected on the survey. In addition, the researcher only had direct contact with parents, preventing the researcher from knowing who participated in the study.

Second, safeguards were enabled in Qualtrics, the online survey software used for this study, to prevent unauthorized teens from accessing the survey. These safeguards required participants to access the survey via a unique URL that could only be accessed by one person. This URL was sent by the researcher to parents after informed consent was received, and then passed on to the participants by parents. Additionally, all responses were made anonymous in Qualtrics, preventing the researcher from seeing or having access to the user's IP address.

## CHAPTER IV

### RESULTS

The data were compiled, cleaned, and analyzed in SPSS version 23 (IBM, 2015). They were then examined for central tendency, variability, and the amount/type of missing data. Missing data were coded and responses with missing data relevant to the particular analysis were excluded. There were high levels of skewness for the variables of length of time owning at least one mobile Internet device, family structure, primary source of Internet access, daily time spent using the Internet, intentional pornography use, requests to sext, and willingness to sext others. Square root transformations were used on these variables, allowing for an assumption of normality for each variable.

Descriptive statistics were obtained for ownership of mobile devices, problematic Internet use, unintentional and intentional exposure to pornography, and sexting attitudes and behaviors. Because age and gender are key components in developmental studies, and because past research related to ownership and use of mobile devices has shown age and gender differences, preliminary analyses divided the results by age and gender to examine significant differences. Participants in school grades 7-9 ( $n = 40$ ) were classified as younger teens and participants in grades 10-12 ( $n = 57$ ) were classified as older teens.

#### **Internet Use Characteristics**

##### **Mobile Device Ownership**

As seen in Table 2, 88.7% of all participants reported owning a mobile phone. Females (94.1%) were more likely to report owning their own mobile phone than males

(82.6%), and older teens (94.7%) were more likely to have their own mobile phone than younger teens (80.0%). When focusing specifically on smartphone ownership, 74.2% of the participants reported owning a smartphone (a mobile phone capable of accessing the Internet), with females (86.3%) and older teens (84.2%) reporting higher rates of smartphone ownership than males (60.9%) and younger teens (60.0%; see Table 2).

Conversely, males (32.6%) were more likely to use a desktop or laptop computer as their primary Internet source than females (11.8%). This was particularly true among older males in this study (not listed in Table 2), who were just as likely to use a computer as a smartphone (44.0% for both) for their primary source of Internet access. Younger teens (35.0%) were much more likely than older teens (10.5%) to use a tablet, mp3 player, or “other” as their primary source of Internet.

### **Problematic Internet Use**

Using categories and corresponding cutoff points common with similar scales that have been used to examine problematic Internet use (see Sinkkonen et al., 2014), participants were placed in one of four categories of Internet use (see Table 3) according to their score on the Short Problematic Internet Use Test (SPIUT): normal users (17.5%), mild over-users (45.4%), moderately addicted users (35.1%), and seriously addicted users (2.1%).

Older teens had slightly higher levels of problematic use than younger teens. Among older teens, 40.4% were classified as either moderately or seriously addicted users, compared with 32.5% of younger teens. There were no differences in problematic Internet use between males and females until accounting for age (not listed in Table 3),

where older females (50.0%) were much more likely to be moderately or seriously addicted than older males (28.0%), and younger males (47.6%) were much more likely to be moderately or seriously addicted than younger females (15.8%).

Table 2

*Mobile Device Ownership Percentages Categorized by Age and Gender*

Variables	Younger teens % (n = 40)	Older teens % (n = 57)	Male % (n = 46)	Female % (n = 51)	Overall % (N = 97)
Own mobile phone					
Yes	80.0	94.7	82.6	94.1	88.7
No	20.0	5.3	17.4	5.9	11.3
Own smartphone					
Yes	60.0	84.2	60.9	86.3	74.2
No	40.0	15.8	39.1	13.7	25.8
Number of mobile Internet devices					
0	15.0	7.0	15.2	5.9	10.3
1	35.0	26.3	23.9	35.3	29.9
2	30.0	29.8	32.6	27.5	29.9
3	10.0	21.1	13.0	19.6	16.5
4 or more	10.0	15.8	15.2	11.8	13.4
Time owning at least one mobile Internet device					
Never	15.0	7.0	15.2	5.9	10.3
0-1 years	25.0	14.0	13.0	23.5	18.5
2-4 years	55.0	63.2	63.0	56.9	59.8
5 or more years	5.0	15.8	8.7	13.7	11.3
Device most frequently used to connect to Internet					
Smartphone	45.0	66.7	39.1	74.5	57.7
Desktop/laptop	20.0	22.8	32.6	11.8	21.6
Mp3 player	12.5	7.0	6.5	11.8	9.3
Tablet	12.5	3.5	13.0	2.0	7.2
Other	10.0	0.0	8.7	0.0	4.1

*Note.* Younger teens were in school grades 7-9 and older teens were in grades 10-12. Percentages may not add up to 100 due to rounding.

Table 3

*Problematic Internet Use Percentages Categorized by Age and Gender*

Variables	Younger teens % ( <i>n</i> = 40)	Older teens % ( <i>n</i> = 57)	Male % ( <i>n</i> = 46)	Female % ( <i>n</i> = 51)	Overall % ( <i>N</i> = 97)
Problematic Internet use scale category					
Normal	22.5	14.0	17.4	17.6	17.5
Mild over-users	45.0	45.6	45.7	45.1	45.4
Moderately addicted	30.0	38.6	37.0	33.3	35.1
Seriously addicted	2.5	1.8	0.0	3.9	2.1

*Note.* Younger teens were in school grades 7-9 and older teens were in grades 10-12. Percentages may not add up to 100 due to rounding.

**Unintentional and Intentional Pornography Use**

Participants reported much more unintentional exposure to pornography than intentional exposure. Overall, 77.3% of respondents reported unintentional exposure to pornography at least once in the past year, compared with 35.4% who reported intentional exposure at least once in the past year. The most common response given for frequency of unintentional pornography exposure was “a few times” (41.2%).

Table 4 provides a breakdown of unintentional and intentional pornography response percentages categorized by age and gender. Older teens reported higher occurrences of unintentional and intentional pornography exposure than younger teens. For example, 31.6% of older teens reported unintentional pornography exposure at least monthly, compared to 2.5% of younger teens. Similarly, 22.8% of older teens reported at least monthly intentional pornography exposure, compared to 7.7% of younger teens.

Males and females reported similar occurrences of unintentional pornography exposure. For example, 19.5% of males and 19.6% of females reported unintentional

exposure to pornography at least 1-2 times per month. Younger females were least likely to report unintentional exposure. Although not displayed in Table 4, it was found that 42.1% of younger females reported that they had never unintentionally been exposed to pornography. Males had moderately higher rates of intentional pornography exposure than females. For example, 22.2% of males reported at least monthly intentional exposure to pornography, compared with 11.8% of females. Furthermore, 78.4% of females reported never having been intentionally exposed to pornography, compared with 48.9% of males.

Table 4

*Unintentional and Intentional Pornography Percentages by Age and Gender*

Variables	Younger teens % (n = 40)	Older teens % (n = 57)	Male % (n = 46)	Female % (n = 51)	Overall % (N = 97)
Unintentional pornography exposure in past 12 months					
Never	30.0	17.5	19.6	25.5	22.7
Once	15.0	17.5	13.0	19.6	16.5
A few times	52.5	33.3	47.8	35.3	41.2
1-2 times per month	2.5	12.3	6.5	9.8	8.2
1-2 times per week	0.0	8.8	6.5	3.9	5.2
Several times per day	0.0	10.5	6.5	5.9	6.2
Intentional pornography exposure in past 12 months					
	(n = 39)		(n = 45)		(N = 96)
Never	74.4	57.9	48.9	78.4	64.6
Once	7.7	1.8	4.4	3.9	4.2
A few times	10.3	17.5	24.4	5.9	14.6
1-2 times per month	2.6	3.5	4.4	2.0	3.1
1-2 times per week	5.1	14.0	13.3	7.8	10.4
Several times per day	0.0	5.3	4.4	2.0	3.1

*Note.* Younger teens were in school grades 7-9 and older teens were in grades 10-12. Percentages may not add up to 100 due to rounding.

Table 5

*Unintentional and Intentional Pornography Percentages by Primary Source of Internet*

Variables	Primary source of Internet access			Overall % (N = 97)
	Smartphone % (n = 56)	Computer % (n = 21)	Other % (n = 20)	
Unintentional pornography exposure in past 12 months				
Never	21.4	23.8	25.0	22.7
Once	19.6	9.5	15.0	16.5
A few times	35.7	42.9	55.0	41.2
1-2 times per month	10.7	9.5	0.0	8.2
1-2 times per week	3.6	9.5	5.0	5.2
Several times per day	8.9	4.8	0.0	6.2
Intentional pornography exposure in past 12 months				
		(n = 20)		(N = 96)
Never	69.6	40.0	75.0	64.6
Once	3.6	0.0	10.0	4.2
A few times	12.5	25.0	10.0	14.6
1-2 times per month	1.8	5.0	5.0	3.1
1-2 times per week	8.9	25.0	0.0	10.4
Several times per day	3.6	5.0	0.0	3.1

*Note.* Percentages may not add up to 100 due to rounding.

Table 5 shows percentages of both unintentional and intentional pornography exposure according to the device that teens used as their primary source of Internet. Teens who used something other than a computer or smartphone as their primary source of Internet access, such as a tablet, mp3 player, or other Internet connected device, reported the lowest amounts of both unintentional and intentional exposure to pornography, with only 5.0% reporting both unintentional and intentional exposure at least once per month. Thirty-five percent of teens who used computers as their primary

source of Internet reported intentionally viewing pornography at least once per month, compared to 14.3% of teens who used smartphones as their primary Internet source.

### **Sexting**

Because IRB restrictions limited direct questioning of sexting activity, participants were asked about their perceptions of other teens' sexting habits (see Table 6). On average, participants estimated that about 25-50% of teens participate in sexting, and that sexting occurs rarely or from time to time among those who do so. Snapchat (57.9%) was assumed to be the most common medium used by sexters, followed by text messaging (23.2%). Older participants had higher estimates of other teens' sexting behaviors than their younger peers, as 64.3% of older teens estimated that at least half of their peers participate in sexting, compared with 17.6% of younger teens.

Table 7 shows data for participants' attitudes and behaviors related to sexting. A relatively large percentage of respondents reported a belief that many of their peers participate in sexting, but the actual numbers reported by teens themselves was much lower. Seventy-six percent of teens reported that they had never been asked to sext, and only 13.5% said that they had been asked a few times or more in the past year. Almost 79% of teens reported that they would be very unlikely to sext a boyfriend or girlfriend

Older teens and females were more likely to report being asked to sext, as 19.3% of older teens and 22.0% of females said that they had been asked a few times or more, compared with 5.1% of younger teens and 4.4% of males. Additionally, 21.4% of older teens and 16.0% of females reported that they would be between neutral and very likely to sext a significant other, compared with 5.1% of younger teens and 13.3% of males.

Table 6

*Response Percentages Related to Other Teens' Sexting*

Variables	Younger teens % ( <i>n</i> = 39)	Older teens % ( <i>n</i> = 56)	Male % ( <i>n</i> = 45)	Female % ( <i>n</i> = 50)	Overall % ( <i>N</i> = 95)
Estimated percentage of other teens who participate in sexting					
Very few	23.1	7.1	17.4	10.2	13.7
About 25%	59.0	28.6	43.5	38.8	41.1
About 50%	15.0	46.4	28.3	38.8	33.7
About 75%	2.6	12.5	8.7	8.2	8.4
Nearly all	0.0	5.4	2.2	4.1	3.2
Estimated frequency of other teens participating in sexting					
Never	2.6	5.4	4.3	4.1	4.2
Rarely	43.6	21.4	32.6	28.6	30.5
From time to time	46.2	50.0	50.0	46.9	48.4
Quite often	7.7	17.9	10.9	16.3	13.7
Very often	0.0	5.4	2.2	4.1	3.2
Technology most likely used to sext by other teens					
Text or iMessage	35.9	14.3	26.1	20.4	23.2
Email or direct message	5.1	1.8	4.3	2.0	3.2
Snapchat or other photo sharing apps	43.6	67.9	45.7	69.4	57.9
Video chat services (e.g., Facetime, Skype)	2.6	7.1	8.7	2.0	5.3
Other	12.8	3.6	2.2	2.0	2.1
Don't know	0.0	5.4	13.0	4.1	8.4

*Note.* Younger teens were in school grades 7-9 and older teens were in grades 10-12. Percentages may not add up to 100 due to rounding.

A number of differences also existed between teens who used different devices for their primary source of Internet access (see Table 8) as it related to sexting. Ninety-five percent of teens who used "other" and 90.5% of teens who used computers as their

Table 7

*Response Percentages Related to Participants' Sexting Attitudes and Behaviors*

Variables	Younger teens % (n = 39)	Older teens % (n = 56)	Male % (n = 45)	Female % (n = 50)	Overall % (N = 95)
Number of requests to sext in past year					
Never	87.2	68.4	87.0	66.0	76.0
Once	7.7	12.3	8.7	12.0	10.4
A few times	5.1	10.5	2.2	14.0	8.3
1-2 times per month	0.0	5.3	2.2	4.0	3.1
1-2 times per week	0.0	3.5	0.0	4.0	2.1
Likelihood of sexting a friend/acquaintance if asked					
Very unlikely	97.4	83.9	88.9	90.0	89.5
Unlikely	2.6	8.9	6.7	6.0	6.3
Neutral	0.0	7.1	4.4	4.0	4.2
Likely	0.0	0.0	0.0	0.0	0.0
Very likely	0.0	0.0	0.0	0.0	0.0
Likelihood of sexting a boyfriend/girlfriend if asked					
Very unlikely	92.3	69.6	75.6	82.0	78.9
Unlikely	2.6	8.9	11.1	2.0	6.3
Neutral	5.1	12.5	8.9	10.0	9.5
Likely	0.0	7.1	4.4	4.0	4.2
Very Likely	0.0	1.8	0.0	2.0	1.1

*Note.* Younger teens were in school grades 7-9 and older teens were in grades 10-12.  
Percentages may not add up to 100 due to rounding.

primary source of Internet access reported that they had never been asked to sext, while 63.6% of teens who used smartphones as their primary source of Internet reported that they had never been asked to sext. Furthermore, 9.1% of primary smartphone users reported that they had been asked to sext at least once per month. Primary smartphone users also reported more willingness to sext a significant other, with 20.5% of these users

Table 8

*Response Percentages Related to Participants' Sexting Attitudes and Behaviors by Device Ownership*

Variables	Primary source of Internet access			Overall % (N = 95)
	Smartphone % (n = 54)	Computer % (n = 21)	Other % (n = 20)	
Number of requests to sext received in past 12 months				
Never	63.6	90.5	95.0	76.0
Once	12.7	9.5	5.0	10.4
A few times	14.5	0.0	0.0	8.3
1-2 times per month	5.5	0.0	0.0	3.1
1-2 times per week	3.6	0.0	0.0	2.1
Likelihood of sexting friend/acquaintance if asked				
Very unlikely	87.0	90.5	95.0	89.5
Unlikely	7.4	4.8	5.0	6.3
Neutral	5.6	4.8	0.0	4.2
Likely	0.0	0.0	0.0	0.0
Very Likely	0.0	0.0	0.0	0.0
Likelihood of sexting boyfriend/girlfriend if asked				
Very unlikely	77.8	71.4	90.0	78.9
Unlikely	1.9	19.0	5.0	6.3
Neutral	13.0	4.8	5.0	9.5
Likely	5.6	4.8	0.0	4.2
Very Likely	1.9	0.0	0.0	1.1

*Note.* Percentages may not add up to 100 due to rounding.

reporting that they would be anywhere from neutral to very willing to sext a significant other, compared with 9.6% of primary computer users and 5.0% of primary “other” users.

Results of the analyses for research question 2-5 are described below. Because these research questions focused on relationships between variables that were measured on an ordinal scale, bivariate correlational analyses were used for the initial analyses on

each question. Linear regression analyses were then used for each research question to further investigate the statistically significant bivariate correlations. In addition to examining all participants with the bivariate correlations, analyses were also conducted separately for males, females, younger teens, and older teens in order to determine whether differences existed among the subgroups. Two-tailed tests were used so that directionality in the relationships could be examined. The a-priori alpha level for each analysis was set at .05.

### **Teens' Primary Source of Internet Access**

The second research question proposed to examine relationships that existed between teens' primary source of Internet access and their daily time spent using the Internet, prevalence of problematic Internet use, unintentional and intentional pornography exposure, and sexting behaviors. Age, gender, family structure, and religious commitment were included as control variables in these analyses.

The main independent variable for this question, teens' primary source of Internet access, originally contained five options: smartphone, computer, tablet, mp3 player, and other. Frequencies were examined upon completion of the survey (see Table 2), and the decision was made to combine the tablet, mp3 player, and other options into one category entitled "other" for the analyses. Each of the three remaining responses (smartphone, computer, and other) was dummy coded and treated on a dichotomous scale.

Age was treated on an interval/ratio scale and included 6 levels, with ages ranging between 13 and 18. Gender included two levels, male and female, and was treated on a

nominal scale, with females being assigned a “0” and males being assigned a “1.” Family structure was treated on a nominal scale with dichotomized levels of two-parents and not two-parents. Religious commitment was treated on an ordinal scale and included 5 levels, with options ranging from 1-5.

Dependent variables that were analyzed in this research question included daily time spent using the Internet, levels of problematic Internet use, unintentional and intentional exposure to pornography, frequency of receiving sexting requests, and willingness to send sexts to others. Each of the dependent variables was treated on an ordinal scale.

Daily time spent using the Internet was measured by asking teens to estimate how much time they spent on average each day using the Internet on the following five devices: desktop or laptop computer, smartphone, tablet, mp3 player, or other Internet-connected devices. Participants answered each question using a six-point Likert scale with options ranging from never to over two hours per day. In order to create meaningful data from these responses, the Likert options were quantified. For example, “never” responses were assigned a 0. Likert options with ranges of times were quantified by using the midpoint of the stated range. For example, the 1-2 hours per day Likert option was quantified as 1.5. The quantified responses were then summed, with summed scores ranging between .15 and 9.75. While these scores do not accurately represent the amount of time that teens spend using the Internet, they do show how participants’ time spent using the Internet compared proportionally with other participants.

Problematic Internet use scores were calculated by summing the six items from the SPIUT scale and included 25 levels, with possible summed scores ranging from 0-24. The unintentional and intentional pornography exposure variables were measured by assigning to participants the highest response that was given from the six scenarios from which they were asked to describe their frequency of viewing pornography. This resulted in six levels being used for measurement, with scores ranging for 0-5 for both unintentional and intentional exposure to pornography.

Receiving sexting requests from other teens originally included 6 levels, with scores ranging between 0-5. However, the large amount of skewness in the resultant data made it necessary to dichotomize the responses so that meaningful analyses could be run. Teens who reported never having been asked to sext were classified in the “0” category, while teens who reported that they had ever been asked to sext in the past 12 months were classified in the “1” category.

Teens’ likelihood of sending sexts to strangers, friends, or a significant other each included 5 levels, with scores ranging from 0-4. Participants’ responses to the three scenarios were combined into one variable, with participants’ highest response among the three questions being used for the analyses. Because of the large amount of skewness that was found in the data, responses were then dichotomized. Teens who reported that they would never be willing to send a sext were classified in the “0” category, while teens who responded with anything else were placed in the “1” category.

### **Analyses for Time Spent Online and Problematic Internet Use**

This research question was first addressed by examining bivariate correlations that existed between the variables described above. The first set of bivariate correlational analyses focused on the relationship between teens' primary source of Internet access, daily time spent using the Internet, and levels of problematic Internet use. Age, gender, religious commitment, and family structure were also included in the analysis. Among all participants in this study (see Table 9), a statistically significant positive correlation was found between age and daily time spent using the Internet ( $r = .24, p < .05$ ). Daily time spent online was also negatively correlated with both religious commitment ( $r = -.28, p < .01$ ) and using a computer as the primary source of Internet ( $r = -.23, p < .05$ ).

To probe this question more deeply, bivariate correlation analyses were also carried out separately by gender (see Table 10) and age (see Table 11). For female participants, using a smartphone as the primary source of Internet access was positively correlated with both daily time spent using the Internet ( $r = .36, p < .01$ ) and problematic Internet use ( $r = .27, p < .05$ ). Additionally, daily time spent online was negatively correlated both with religious commitment ( $r = -.31, p < .05$ ) and using a computer for primary source of Internet access ( $r = -.34, p < .05$ ), and was positively correlated with age ( $r = .35, p < .05$ ) among females.

For younger teens, primarily accessing the Internet with a computer was negatively correlated with daily time spent online ( $r = -.39, p < .05$ ), while living with married parents was negatively correlated with problematic Internet use ( $r = -.34, p < .05$ ). Among older teens, religious commitment was negatively correlated with daily time

Table 9

*Participant Demographic Variables, Primary Source of Internet Access, and Internet Use Characteristics: Correlation Table (N = 97)*

Variables	1	2	3	4	5	6	7	8	9
1. Gender	—								
2. Age	-.06	—							
3. Two-parent family	.04	-.09	—						
4. Religious commitment	.01	-.05	.36**	—					
5. Primary Internet: computer	.25*	.01	.07	.14	—				
6. Primary Internet: smartphone	-.36**	.19	.06	-.23*	-.61**	—			
7. Primary Internet: “other”	.18	-.25*	-.15	.14	-.27**	-.60**	—		
8. Daily time spent using Internet	.01	.24*	-.18	-.28**	-.23*	.20	-.01	—	
9. Problematic Internet use	-.07	.07	.10	-.03	-.03	.09	-.09	.32**	—

*Note.* Females were coded with 0, males with 1.

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

Table 10

*Participant Demographic Variables, Primary Source of Internet Access, and Internet Use Characteristics for all Participants with Males (n = 46) on Bottom Diagonal and Females (n = 51) on Top Diagonal: Correlation Table (N = 97)*

Variables	1	2	3	4	5	6	7	8
1. Age	—	-.12	-.07	-.24	.27	-.12	.35*	.28*
2. Two-parent family	-.04	—	.60**	.16	-.01	-.14	-.19	-.01
3. Religious commitment	-.03	-.01	—	.24	-.29	.14	-.31*	-.08
4. Primary Internet: computer	.25	-.01	.06	—	-.62**	-.15	-.34	-.12
5. Primary Internet: smartphone	.09	.18	-.19	-.56**	—	-.68**	.36**	.27*
6. Primary Internet: “other”	-.36*	-.19	.15	-.44**	-.50**	—	-.13	-.23
7. Daily time spent using Internet	.13	-.17	-.25	-.17	.08	.09	—	.31*
8. Problematic Internet use	-.19	.23	.05	.07	-.12	.06	.32*	—

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

Table 11

*Participant Demographic Variables, Primary Source of Internet Access, and Internet Use Characteristics for all Participants with Younger Teens (n = 40) on Top Diagonal and Older Teens (n = 57) on Bottom Diagonal: Correlation Table (N = 97)*

Variables	1	2	3	4	5	6	7	8
1. Gender	—	.02	-.06	-.03	-.25	.28	.19	.19
2. Two-parent family	.04	—	.35*	.17	-.03	-.11	-.23	-.34*
3. Religious commitment	.05	.36**	—	.20	-.43**	.29	-.22	-.11
4. Primary Internet: computer	.45**	.03	.10	—	-.45**	-.37*	-.39*	-.08
5. Primary Internet: smartphone	-.43**	.16	-.07	-.77**	—	-.66**	.10	-.22
6. Primary Internet: “other”	.04	-.29*	-.03	-.19	-.49**	—	.22	.30
7. Daily time spent using Internet	-.10	-.12	-.34*	-.13	.19	-.12	—	.49**
8. Problematic Internet use	-.22	.34*	.04	.00	.28*	-.42**	.13	—

*Note.* Younger teens were in school grades 7-9 and older teens were in grades 10-12. Females were coded with 0, males with 1.

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

spent online ( $r = -.34, p < .05$ ). Primarily accessing the Internet from a smartphone ( $r = .28, p < .05$ ) and living with married parents ( $r = .34, p < .05$ ) were positively correlated with problematic Internet use and primarily using “other” to access the Internet was negatively correlated with problematic Internet use ( $r = -.42, p < .01$ ) among older teens.

To understand the significance of the findings listed above, two multiple linear regression analyses were performed: one with daily time spent online as the dependent variable and the other with problematic Internet use as the dependent variable. Teens’ primary source of Internet access was the main independent variable for both analyses, along with age, gender, religious commitment, and family structure, which were included as control variables. The two dummy coded responses for primary source of Internet access that were included in the model were “computer” and “other,” which left “smartphone” as the reference group. Multiple linear regressions provided an effective way to examine potential relationships between the main independent and dependent variables, while also accounting for the other contextual factors that may have influenced participants’ behaviors.

The model examining problematic Internet use as the dependent variable was not statistically significant ( $R^2 = .15, F(6, 90) = .36, p = .90$ ). Statistically significant results from the analysis using daily time spent using the Internet as the dependent variable ( $R^2 = .19, F(6, 89) = 3.41, p < .01$ ) are found in Table 12. Teens who used computers as their primary source of Internet access spent less time each day using the Internet than teens who used smartphones as their primary source of Internet ( $\beta = -.22, p < .05$ ). In addition, this analysis revealed that older teens ( $\beta = .23, p < .05$ ) and teens with lower levels of

Table 12

*Summary of Linear Regression Analysis for Variables Related to Daily Time Spent Using the Internet (n = 97)*

Variables	B	SE B	$\beta$	95% CI for B	
				Lower	Upper
Constant	.68	.60		-.52	1.87
Age	.08*	.60	.23	.01	.16
Gender	.09	.12	.08	-.14	.32
Two-parent family	-.15	.16	-.09	-.48	.18
Religious commitment	-.16*	.07	-.23	-.29	-.02
Primary Internet: computer+	-.29*	.14	-.22	-.57	-.01
Primary Internet: "other"+	.02	.15	.01	.29	.32

*Note.* Females were coded with 0, males with 1.

\* $p < .05$ . \*\* $p < .01$  +Compared with Primary Internet: smartphone

$R^2 = .19$  CI = Confidence Interval

religious commitment ( $\beta = -.23, p < .05$ ) spent slightly more time online each day even after controlling for their primary source of Internet access.

### **Analyses for Pornography Variables**

The second set of bivariate correlational analyses for this research question examined the relationship between teens' primary source of Internet access and both unintentional and intentional exposure to pornography (Table 13). Age, gender, religious commitment, and family structure were also included in the analyses as control variables. Among all participants, age was positively correlated with both unintentional ( $r = .24, p < .05$ ) and intentional ( $r = .28, p < .01$ ) exposure to pornography. Gender was also correlated with intentional pornography exposure, with males being more likely than females to intentionally look at pornography ( $r = .29, p < .01$ ). Religious commitment was negatively correlated with intentional pornography exposure ( $r = -.22, p < .05$ ).

Finally, a positive correlation was found between primarily using a computer to access the Internet and intentional exposure to pornography ( $r = .30, p < .01$ ).

Analyses were also conducted by gender (see Table 14) and age (see Table 15). For males, the correlation between primarily accessing the Internet with a computer and intentional pornography use was higher than in the combined group ( $r = .53, p < .01$ ). For female participants, a positive correlation existed between primarily accessing the Internet with a smartphone and both unintentional ( $r = .31, p < .05$ ) intentional pornography exposure ( $r = .30, p < .05$ ). Additionally, for females, age was positively correlated with both unintentional ( $r = .42, p < .01$ ) and intentional exposure to pornography ( $r = .38, p < .01$ ), while religious commitment ( $r = -.37, p < .01$ ) and having a two-parent family ( $r = -.28, p < .05$ ) were negatively correlated with intentional pornography use.

Gender was correlated with intentional pornography exposure for both younger ( $r = .36, p < .05$ ) and older ( $r = .30, p < .05$ ) teens, with males more likely than females to be intentionally exposed. Religious commitment was also negatively correlated with intentional exposure to pornography among younger teens ( $r = -.34, p < .05$ ). Additionally, primarily accessing the Internet from a computer was positively correlated with intentional exposure to pornography among older teens ( $r = .39, p < .01$ ).

The overall model failed to reach statistical significance when unintentional pornography exposure was used as the dependent variable,  $R^2 = .09, F(6, 90) = 1.41, p = .22$ . Results from the analysis for intentional pornography exposure,  $R^2 = .28, F(6, 89) = 5.69, p < .01$ , are found in Table 16. In this analysis, participants who used computers as

Table 13

*Participant Demographic Variables, Primary Source of Internet Access, and Pornography Variables: Correlation Table (N = 96)*

Variables	1	2	3	4	5	6	7	8	9
1. Gender	—								
2. Age	-.06	—							
3. Two-parent family	.04	-.09	—						
4. Religious commitment	.01	-.05	.36**	—					
5. Primary Internet: computer	.25*	.01	.07	.14	—				
6. Primary Internet: smartphone	-.36**	.19	.06	-.23*	-.61**	—			
7. Primary Internet: “other”	.18	-.25*	-.15	.14	-.27**	-.60**	—		
8. Unintentional pornography	.08	.24*	-.01	-.13	.04	.06	-.11	—	
9. Intentional pornography	.29**	.28**	-.02	-.22*	.30**	-.11	-.16	.42**	—

*Note.* Females were coded with 0, males with 1.

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

Table 14

*Participant Demographic Variables, Primary Source of Internet Access, and Pornography Variables for All Participants with Males (n = 45) on Bottom Diagonal and Females (n = 51) on Top Diagonal: Correlation Table (N = 96)*

Variables	1	2	3	4	5	6	7	8
1. Age	—	-.12	-.07	-.24	.27	-.12	.42**	.38**
2. Two-parent family	-.04	—	.60**	.16	-.01	-.14	.05	-.28*
3. Religious commitment	-.03	-.01	—	.24	-.29*	.14	-.27	-.37**
4. Primary Internet: computer	.25	-.01	.06	—	-.62**	-.15	-.17	-.18
5. Primary Internet: smartphone	.09	.18	-.19	-.56**	—	-.68**	.31*	.30*
6. Primary Internet: “other”	-.36*	-.19	.15	-.44**	-.50**	—	-.23	-.20
7. Unintentional pornography	.04	-.09	.06	.17	-.12	-.05	—	.46**
8. Intentional pornography	.24	.21	-.06	.53**	-.27	-.25	.37*	—

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

Table 15

*Participant Demographic Variables, Primary Source of Internet Access, and Pornography Variables for All Participants with Younger Teens (n = 40) on Top Diagonal and Older Teens (n = 57) on Bottom Diagonal: Correlation Table (N = 97)*

Variables	1	2	3	4	5	6	7	8
1. Gender	—	.02	-.06	-.03	-.25	.28	.28	.36*
2. Two-parent family	.04	—	.35*	.17	-.03	-.11	-.17	-.12
3. Religious commitment	.05	.36**	—	.20	-.43**	.29	-.27	-.34*
4. Primary Internet: computer	.45**	.03	.10	—	-.45**	-.37*	-.01	.09
5. Primary Internet: smartphone	-.43**	.16	-.07	-.77**	—	-.66**	-.11	-.06
6. Primary Internet: “other”	.04	-.29*	-.03	-.19	-.49**	—	.12	.00
7. Unintentional pornography	.04	.09	-.06	.05	.04	-.13	—	.50**
8. Intentional pornography	.30*	.05	-.15	.39**	-.22	-.19	.35**	—

*Note.* Younger teens were in school grades 7-9 and older teens were in grades 10-12. Females were coded with 0, males with 1.  
\* $p < .05$ . \*\* $p < .01$ .

Table 16

*Summary of Linear Regression Analysis for Variables Related to Intentional Pornography Exposure (N = 96)*

Variables	B	SE B	$\beta$	95% CI for B	
				Lower	Upper
Constant	-1.30	.84		-2.96	.36
Age	.14**	.05	.27	.04	.24
Gender	.41**	.16	.25	.09	.72
Two-parent family	.13*	.23	.06	-.33	.59
Religious commitment	-.17**	.07	-.25	-.31	-.04
Primary Internet: computer+	.50*	.20	.25	.10	.90
Primary Internet: "other"+	-.05	.21	-.03	-.47	.37

Note. Females were coded with 0, males with 1.

\* $p < .05$ . \*\* $p < .01$  +Compared with Primary Internet: Smartphone

$R^2 = .28$  CI = Confidence Interval

their primary source of Internet access were significantly more likely to be intentionally exposed to pornography ( $\beta = .25, p < .05$ ) than teens who primarily used smartphones to access the Internet, even after controlling for age, gender, family structure, and religious commitment. In addition, after controlling for teens' primary source of Internet access and the other variables in the model, age ( $\beta = .27, p < .01$ ), gender ( $\beta = .25, p < .01$ ), family structure ( $\beta = .06, p < .05$ ), and religious commitment ( $\beta = -.25, p < .01$ ) were statistically significant factors related to intentional pornography exposure.

### **Analyses for Sexting Variables**

For this research question, a third set of bivariate correlational analyses examined the relationship between participants' primary source of Internet access and both the requests to sext they had received from others and their reported willingness to sext others (see Table 17). Age, gender, religious commitment, and family structure were also included in the analyses. Among all teens, gender was correlated with requests to sext,

with females being more likely than males to receive sexting requests ( $r = .25, p < .05$ ). Age was positively correlated with willingness to sext ( $r = .38, p < .01$ ), while religious commitment was negatively correlated with both requests to sext ( $r = -.37, p < .01$ ) and willingness to sext ( $r = -.51, p < .01$ ). Using a smartphone as the primary source of Internet access was positively correlated with requests to sext ( $r = .34, p < .01$ ).

To further examine this question, bivariate correlation analyses were carried out separately by gender (see Table 18) and age (see Table 19). When only including females in the analysis, the correlation between primarily using a smartphone for Internet access and requests to sext increased to  $r = .43 (p < .01)$ , and for younger teens the correlation was  $r = .44, (p < .01)$ . Using “other” as the primary source of Internet access was negatively correlated with requests to sext ( $r = -.23, p < .05$ ). Also for females, religious commitment was negatively correlated with both requests to sext ( $r = -.44, p < .01$ ) and willingness to sext ( $r = -.59, p < .01$ ).

Finally, a willingness to sext was positively correlated with age ( $r = .40, p < .01$ ) and negatively correlated with having a two-parent family ( $r = -.36, p < .01$ ) among females. For male participants, using a computer as the primary source of Internet access ( $r = .32, p < .05$ ) and age ( $r = .40, p < .01$ ) were positively correlated with willingness to sext, while religious commitment was negatively correlated with both requests to sext ( $r = -.29, p < .05$ ) and willingness to sext ( $r = -.45, p < .01$ ).

For younger teens, gender was correlated with requests to sext, with females being more likely than males to receive requests ( $r = .41, p < .01$ ). Also among younger teens, primarily accessing the Internet from a smartphone was positively correlated with

Table 17

*Participant Demographic Variables, Primary Source of Internet Access, and Sexting Variables: Correlation Table (N = 95)*

Variables	1	2	3	4	5	6	7	8	9
1. Gender	—								
2. Age	-.06	—							
3. Two-parent family	.04	-.09	—						
4. Religious commitment	.01	-.05	.36**	—					
5. Primary Internet: computer	.25*	.01	.07	.14	—				
6. Primary Internet: smartphone	-.36**	.19	.06	-.23*	-.61**	—			
7. Primary Internet: “other”	.18	-.25*	-.15	.14	-.27**	-.60**	—		
8. Requests to sext	-.25*	.18	-.18	-.37**	-.18	.34**	-.23*	—	
9. Willingness to sext	.10	.38**	-.14	-.51**	.14	.00	-.15	.29**	—

*Note.* Females were coded with 0, males with 1.

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

Table 18

*Participant Demographic Variables, Primary Source of Internet Access, and Sexting Variables for All Participants with Males (n = 45) on Bottom Diagonal and Females (n = 50) on Top Diagonal: Correlation Table (N = 95)*

Variables	1	2	3	4	5	6	7	8
1. Age	—	-.12	-.07	-.24	.27	-.12	.13	.40**
2. Two-parent family	-.04	—	.60**	.16	-.01	-.14	-.26	-.36**
3. Religious commitment	-.03	-.01	—	.24	-.29*	.14	-.44**	-.59**
4. Primary Internet: computer	.25	-.01	.06	—	-.62**	-.15	-.27	-.17
5. Primary Internet: smartphone	.09	.18	-.19	-.56**	—	-.68**	.43**	.28
6. Primary Internet: “other”	-.36*	-.19	.15	-.44**	-.50**	—	-.29*	-.19
7. Requests to sext	.22	-.04	-.29*	.01	.09	-.10	—	.32
8. Willingness to sext	.40**	.09	-.45**	.32*	-.16	-.16	.36*	—

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

Table 19

*Participant Demographic Variables, Primary Source of Internet Access, and Sexting Variables for All Participants with Older Teens (n = 56) on Bottom Diagonal and Younger Teens (n = 39) on Top Diagonal: Correlation Table*

Variables	1	2	3	4	5	6	7	8
1. Gender	—	.02	-.06	-.03	-.25	.28	-.41**	.07
2. Two-parent family	.04	—	.35*	.17	-.03	-.11	-.38*	-.22
3. Religious commitment	.05	.36**	—	.20	-.43**	.29	-.33*	-.57**
4. Primary Internet: computer	.45**	.03	.10	—	-.45**	-.37*	-.20	.09
5. Primary Internet: smartphone	-.43**	.16	-.07	-.77**	—	-.66**	.44**	.13
6. Primary Internet: “other”	.04	-.29*	-.03	-.19	-.49**	—	-.29	.22
7. Requests to sext	-.14	-.08	-.40**	-.19	.24	-.11	—	.18
8. Willingness to sext	.18	-.08	-.53**	.17	-.15	.01	.26	—

*Note.* Younger teens were in school grades 7-9 and older teens were in grades 10-12. Females were coded with 0, males with 1.

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

receiving requests to sext ( $r = .44, p < .01$ ), and receiving requests to sext was negatively correlated with living with both parents ( $r = -.38, p < .05$ ) and religious commitment ( $r = -.33, p < .05$ ). Additionally, willingness to sext others was negatively correlated with religious commitment ( $r = -.57, p < .01$ ) among younger teens. For older teens, religious commitment was negatively correlated with both willingness to sext ( $r = -.53, p < .01$ ) and requests to sext ( $r = -.40, p < .01$ ).

Following the bivariate correlational analyses, two binary logistic regression analyses were performed. Binary logistic regressions were used for the sexting variables because the dependent variables of requests to sext and willingness to sext others were both dichotomized, eliminating the possibility of using linear regressions. Teens' primary source of Internet access was used as the main independent variable in these analyses, with participants who primarily used a smartphone compared to nonprimary smartphone users. Requests to sext and willingness to sext were used as dependent variables for separate analyses. Age, gender, religious commitment, and family structure served as control variables.

The logistic regression model for sexting requests was statistically significant,  $\chi^2(5) = 26.61, p < .01$ . Nagelkerke  $R^2$  was .35. Results from this analysis are found in Table 20. Primary smartphone users were much more likely to have been asked to sext ( $O.R. = 4.68, p < .05$ ) than nonsmartphone users, after controlling for age, gender, family structure, and religious commitment. In addition, less religiously committed teens were more likely to have received sexting requests than more religiously committed teens ( $O.R. = .37, p < .01$ ), after controlling for teens' primary source of Internet access.

Table 20

*Summary of Binary Logistic Regression Analysis for Variables Related to Requests to Sext (N = 95)*

Variables	B	SE B	OR	95% CI for	
				Lower	Upper
Constant	-1.95	3.21			
Age	.16	.19	1.18	.81	1.72
Gender	-.97	.63	.38	.11	1.32
Two-parent family	-.52	.83	.60	.12	3.07
Religious commitment	-.98**	.37	.37	.18	.78
Primary Internet: smartphone	1.54*	.76	4.68	1.06	20.59

Note. Females were coded with 0, males with 1.

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

$\chi^2 = 26.61$  Nagelkerke  $R^2 = .35$

CI = Confidence Interval OR = Odds Ratio

A logistic regression model examining teens' willingness to sext (see Table 21) was also statistically significant,  $\chi^2(5) = 48.93, p < .01$ . Nagelkerke  $R^2$  was .62. Teens' primary source of Internet access was not statistically significant in this model ( $O.R. = .31, p = .21$ ). However, after controlling for primary source of Internet access, older teens ( $O.R. = 3.15, p < .01$ ) and teens with lower levels of religious commitment ( $O.R. = .20, p < .01$ ) were more likely to be willing to sext than younger and more religiously committed teens.

### Potential Moderators

The third research question sought to determine moderating influences that levels of parental monitoring (active and restrictive) and levels of teens' attachment to parents might have on the relationships examined in the second research question. Active and restrictive parental mediation levels were treated on an ordinal scale and included 13

levels, with possible summed scores from the parental mediation scales ranging from 0-12. Parental attachment was also treated on an ordinal scale, with possible summed scores from the AAQ ranging from 0-12.

This question was first addressed by examining bivariate correlations that existed between the variables of active and restrictive parental mediation, attachment to parents, daily time spent using the Internet, problematic Internet use, unintentional and intentional pornography exposure, requests to sext, and willingness to sext.

Among all participants (see Table 22), no statistically significant correlations were found for either active or restrictive parental mediation. However, several statistically significant correlations were found for parental attachment. Parental attachment was negatively correlated with both unintentional ( $r = -.22, p < .05$ ) and intentional ( $r = -.25, p < .05$ ) exposure to pornography, along with willingness to sext ( $r = -.36, p < .01$ ).

Table 21

*Summary of Binary Logistic Regression Analysis for Variables Related to Willingness to Sext (N = 95)*

Variables	B	SE B	OR	95% CI for OR	
				Lower	Upper
Constant	-13.91	4.60			
Age	1.15**	.31	3.15	1.72	5.76
Gender	1.06	.92	2.89	.48	17.35
Two-parent family	.87	.99	2.39	.35	16.47
Religious commitment	-1.63**	.38	.20	.09	.41
Primary Internet: smartphone	-1.19	.95	.31	.05	1.97

*Note.* Females were coded with 0, males with 1.

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

$\chi^2 = 48.93$  Nagelkerke  $R^2 = .62$

CI = Confidence Interval OR = Odds Ratio

Table 22

*Parental Mediation and Attachment Variables, Internet Use Characteristics, Pornography and Sexting Variables: Correlation Table (N = 95)*

Variables	1	2	3	4	5	6	7	8	9
1. Active parental mediation	—								
2. Restrictive parental mediation	.40**	—							
3. Attachment to parents	.04	-.34**	—						
4. Daily time spent using Internet	.05	-.06	-.10	—					
5. Problematic Internet use	.06	.07	-.18	.32**	—				
6. Unintentional pornography	.07	.16	-.22*	.09	.29**	—			
7. Intentional pornography	-.17	.06	-.25*	.21*	.28**	.42**	—		
8. Requests to sext	.00	-.06	-.12	.17	.24*	.30**	.14	—	
9. Willingness to sext	-.18	.13	-.36**	.24*	.10	.30**	.53**	.29**	—

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

Table 23

*Parental Mediation and Attachment Variables, Internet Use Characteristics, Pornography and Sexting Variables for All Participants with Males (n = 45) on Bottom Diagonal and Females (n = 51) on Top Diagonal: Correlation Table (N = 96)*

Variables	1	2	3	4	5	6	7	8	9
1. Active parental mediation	—	.38**	.02	.04	-.09	-.03	-.31*	-.07	-.25
2. Restrictive parental mediation	.45**	—	-.33*	-.13	.14	.07	-.05	.01	-.06
3. Attachment to parents	.06	-.31*	—	-.17	-.30*	-.23	-.48**	-.19	-.38
4. Daily time spent using Internet	.06	.02	-.04	—	.31*	.15	.26	.30*	.31*
5. Problematic Internet use	.22	.00	-.07	.32*	—	.34*	.30*	.35*	.17
6. Unintentional pornography	.18	.24	-.19	.03	.25	—	.46**	.43**	.27
7. Intentional pornography	-.03	.08	.01	.17	.31*	.37*	—	.37**	.56**
8. Requests to sext	.08	-.07	-.13	.01	.04	.18	.05	—	.32*
9. Willingness to sext	-.10	.28	-.32*	.18	.05	.31*	.49**	.36*	—

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

Table 24

*Parental Mediation and Attachment Variables, Internet Use Characteristics, Pornography and Sexting Variables for All Participants with Older Teens (n = 57) on Bottom Diagonal and Younger Teens (n = 39) on Top Diagonal: Correlation Table (N = 96)*

Variables	1	2	3	4	5	6	7	8	9
1. Active parental mediation	—	.45**	.05	.32*	-.03	.02	-.03	.12	-.08
2. Restrictive parental mediation	.37**	—	-.39*	.06	.21	.14	-.03	-.15	.02
3. Attachment to parents	.02	-.36**	—	-.14	-.25	-.30	-.09	-.01	-.40*
4. Daily time spent using Internet	-.13	-.06	-.04	—	.49**	.20	.25	.13	.20
5. Problematic Internet use	.12	.02	-.12	.13	—	.30	.32*	.08	.39*
6. Unintentional pornography	.13	.28*	-.15	-.06	.27*	—	.50**	.23	.34*
7. Intentional pornography	-.21	.17	-.30*	.12	.24	.35**	—	.06	.63**
8. Requests to sext	-.03	.04	-.14	.13	.29*	.26*	.12	—	.18
9. Willingness to sext	-.20	.27*	-.32*	.20	-.04	.20	.47**	.26	—

*Note.* Younger teens were in school grades 7-9 and older teens were in grades 10-12.

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

Additional bivariate correlational analyses compared teens by gender (see Table 23) and age (see Table 24). For males, there was a significant negative correlation between parental attachment and willingness to sext ( $r = -.31, p < .05$ ). For females, a negative correlation was found between active parental mediation and intentional exposure to pornography ( $r = -.31, p < .05$ ). Negative correlations were also found between parental attachment and intentional exposure to pornography ( $r = -.48, p < .01$ ) and willingness to sext others ( $r = -.38, p < .01$ ).

Among younger teens, parental attachment and willingness to sext were negatively correlated ( $r = -.40, p < .05$ ). For older teens, restrictive parental mediation was positively correlated with both unintentional exposure to pornography ( $r = .28, p < .05$ ) and willingness to sext others ( $r = .27, p < .05$ ). Attachment to parents was negatively correlated with both intentional exposure to pornography ( $r = -.30, p < .05$ ) and willingness to sext others ( $r = -.32, p < .05$ ) for this group as well.

Linear or binary logistic regression analyses that were used in the second research question found statistically significant relationships between teens' primary source of Internet access and the following dependent variables: daily time spent online, intentional exposure to pornography, and requests to sext. Each of the three potential moderators (active monitoring, restrictive monitoring, and attachment to parents) was placed into these statistically significant regression models from the second research question to test for main effects. None of the potential moderators were statistically significant in any model, which indicates that neither parental monitoring strategies nor attachment to parents moderated the relationships that existed in the second research question.

The three potential moderators were also tested in the statistically significant models from the second research question that examined the relationship between teens' primary source of Internet access and their willingness to sext. Rather than testing for moderation, active parental mediation, restrictive parental mediation, and attachment to parents were only examined as possible predictors of teens' willingness to sext because no statistically significant relationships were found in RQ2 between teens' primary source of Internet and their willingness to sext others.

Neither restrictive nor active parental mediation was statistically significant when added to the model. However, a statistically significant relationship was found between teens' attachment to parents and their willingness to sext (see Table 25). Teens who were less attached to their parents were more willing to sext than more strongly attached participants ( $O.R. = .69, p < .05$ ).

Table 25

*Summary of Binary Logistic Regression Analysis for Variables Related to Willingness to Sext Including Attachment to Parents (N = 95)*

Variables	B	SE B	OR	95% CI for OR	
				Lower	Upper
Constant	-9.79	5.11			
Age	1.20**	.34	3.31	1.71	6.39
Gender	.98	.95	2.66	.42	17.09
Two-parent family	.64	1.03	1.90	.25	14.23
Religious commitment	-1.66**	.42	.19	.08	.44
Primary Internet: smartphone	-1.56	.98	.21	.03	1.42
Attachment to parents	-.34*	.20	.69	.47	1.01

*Note.* Females were coded with 0, males with 1.

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

$\chi^2 = 53.13$  Nagelkerke  $R^2 = .66$

CI = Confidence Interval OR = Odds Ratio

### Relationship amongst Parenting Variables

The fourth research question examined relationships that existed between teens' attachment to their parents and their reported levels of active and restrictive parental mediation of their technology use. This question was first addressed by examining bivariate correlations that existed between these three variables. Demographic variables of age, gender, religious commitment, and family structure were also included in the analysis.

For all participants (see Table 26), attachment to parents was negatively correlated with restrictive parental mediation ( $r = -.29, p < .01$ ) and positively correlated with religious commitment ( $r = .34, p < .01$ ). Similar associations were found when examining each age group and gender separately. No statistically significant correlations were found for attachment with active parental mediation for any of the groups examined.

Upon the completion of bivariate correlational analyses, two linear regression analyses were run, with attachment to parents as the dependent variable in both analyses. Active and restrictive parental mediation were the main independent variables for the separate analyses. Age, gender, religious commitment, and family structure were included as control variables for both analyses.

The overall model for active parental mediation was statistically significant,  $R^2 = .15, F(5, 90) = 3.05, p < .01$ . However, active parental mediation was not a significant predictor of teens' attachment to parents ( $\beta = .01, p = .97$ ). Results from the analysis for restrictive parental mediation,  $R^2 = .21, F(5, 90) = 4.73, p < .01$ , are found in Table 27.

Table 26

*Demographic Variables, Restrictive and Active Parental Mediation, and Attachment to Parents (N = 97)*

Variables	1	2	3	4	5	6	7
1. Age	—						
2. Gender	-.06	—					
3. Two-parent family	-.09	.04	—				
4. Religious commitment	-.05	.01	.36**	—			
5. Restrictive mediation	-.17	.14	.07	-.10	—		
6. Active mediation	-.18	-.03	.04	.06	.41*	—	
7. Attachment to parents	-.10	-.13	.04	.34**	-.29**	.04	—

*Note.* Females were coded with 0, males with 1.

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

Table 27

*Summary of Linear Regression Analysis for Variables Related to Participants' Attachment to their Closest Parent (N = 97)*

Variables	B	SE B	$\beta$	95% CI for B	
				Lower	Upper
Constant	13.64	2.13		9.42	17.86
Age	-.18	.13	-.14	-.43	.07
Gender	-.42	.38	-.11	-1.18	.33
Two-parent family	-.37	.57	-.07	-1.51	.77
Religious commitment	.54**	.17	.32	.20	.87
Restrictive parental mediation	-.46**	.17	-.26	-.80	-.12

*Note.* Females were coded with 0, males with 1.

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

$R^2 = .21$  CI = Confidence Interval

When controlling for age, gender, religious commitment, and family structure, teens who experienced higher levels of restrictive parental mediation were less attached to their parents ( $\beta = -.26, p < .01$ ). It was also found that teens with higher levels of religious commitment were more strongly attached to their parents ( $\beta = .32, p < .01$ ).

### **Device Ownership as Moderator**

The final research question examined whether length of ownership of at least one mobile Internet device or the number of mobile Internet devices owned by teens might act as moderators for the relationships that existed between teens' primary source of Internet access and their daily time spent online, problematic Internet use, unintentional and intentional pornography exposure, requests to sext, and willingness to sext others. Length of mobile Internet device ownership was measured on an interval scale and included four levels, with options ranging from less than one year to more than five

years. Number of mobile Internet devices owned was measured on an interval scale and included six levels, with items ranging from zero to five or more.

This question was first addressed by examining bivariate correlations that existed between the variables examined in this research question. Among all participants (see Table 28), the number of mobile Internet devices owned was positively correlated with both daily time spent online ( $r = .55, p < .01$ ) and problematic Internet use ( $r = .30, p < .01$ ). Time owning at least one mobile Internet device was also positively correlated with daily time spent online ( $r = .36, p < .01$ ) and problematic Internet use ( $r = .38, p < .01$ ).

These analyses were further examined by comparing teens by gender (see Table 29) and age (see Table 30). Among male participants, the number of mobile Internet devices owned was positively correlated with daily time spent using the Internet ( $r = .56, p < .01$ ) and the length of time owning a mobile Internet device was positively correlated with problematic Internet use ( $r = .38, p < .01$ ). For females, the number of mobile Internet devices owned was positively correlated with daily time spent online ( $r = .52, p < .01$ ), problematic Internet use ( $r = .34, p < .05$ ), requests to sext ( $r = .32, p < .05$ ) and willingness to sext others ( $r = .36, p < .05$ ).

Furthermore, among females, the length of time owning at least one mobile Internet device was positively correlated with daily time spent online ( $r = .49, p < .01$ ), problematic Internet use ( $r = .37, p < .01$ ), and unintentional pornography use ( $r = .31, p < .05$ ). A positive correlation existed between time owning a mobile Internet device and problematic Internet use for both younger ( $r = .37, p < .05$ ) and older teens ( $r = .37, p <$

Table 28

*Mobile Device Ownership and Internet Use Characteristics, Pornography and Sexting Variables: Correlation Table (N = 95)*

Variables	1	2	3	4	5	6	7	8
1. Number of mobile Internet devices	—							
2. Time owning mobile Internet device	.54**	—						
3. Daily time spent using Internet	.55**	.36**	—					
4. Problematic Internet use	.30**	.38**	.32**	—				
5. Unintentional pornography	.08	.08	.09	.29**	—			
6. Intentional pornography	.08	.01	.21*	.28**	.42**	—		
7. Requests to sext	.18	.10	.17	.24*	.30**	.14	—	
8. Willingness to sext	.09	-.05	.24*	.10	.30**	.53**	.29**	—

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

Table 29

*Mobile Device Ownership and Internet Use Characteristics, Pornography and Sexting Variables for All Participants with Males (n = 45) on the Bottom Diagonal and Females (n = 50) on the Top Diagonal: Correlation Table (N = 95)*

Variables	1	2	3	4	5	6	7	8
1. Number of mobile Internet devices	—	.43**	.52**	.34*	.06	.22	.32*	.36*
2. Time owning mobile Internet device	.63**	—	.49**	.37**	.31*	.24	.20	.21
3. Daily time spent using Internet	.56**	.24	—	.31*	.25	.26	.30*	.31*
4. Problematic Internet use	.26	.38**	.32*	—	.34*	.30*	.35*	.17
5. Unintentional pornography	.10	-.11	.03	.25	—	.46**	.43**	.27
6. Intentional pornography	-.03	-.13	.17	.31*	.37*	—	.37**	.56**
7. Requests to sext	.01	-.08	.01	.04	.18	.05	—	.32*
8. Willingness to sext	-.14	-.24	.18	.05	.31*	.49**	.36**	—

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

Table 30

*Mobile Device Ownership and Internet Use Characteristics, Pornography and Sexting Variables for All Participants with Older Teens (n = 56) on Bottom Diagonal and Younger Teens (n = 39) on Top Diagonal: Correlation Table (N = 95)*

Variables	1	2	3	4	5	6	7	8
1. Number of mobile Internet devices	—	.63**	.63**	.25	.08	.30	-.04	.06
2. Time owning mobile Internet device	.44**	—	.50**	.37*	.04	.13	.03	.09
3. Daily time spent using Internet	.44**	.16	—	.49**	.20	.25	.13	.20
4. Problematic Internet use	.31*	.37**	.13	—	.30	.32*	.08	.39*
5. Unintentional pornography	.10	.03	-.06	.27*	—	.50**	.23	.34*
6. Intentional pornography	-.08	-.11	.12	.24	.35**	—	.06	.63**
7. Requests to sext	.25	.08	.13	.29*	.26	.12	—	.18
8. Willingness to sext	.03	-.20	.20	-.04	.20	.47**	.26	—

*Note.* Younger teens were in school grades 7-9 and older teens were in grades 10-12.

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

Table 31

*Summary of Linear Regression Analysis for Variables Related to Daily Time Spent Using the Internet with Time owning Mobile Internet Device Added (N = 97)*

Variables	B	SE B	$\beta$	95% CI for B	
				Lower	Upper
Constant	.70	.59		-.47	1.87
Age	.06	.04	.17	-.01	.14
Gender	.10	.11	.09	-.13	.32
Two-parent family	-.19	.17	-.12	-.52	.14
Religious commitment	-.09	.05	-.19	-.19	.10
Primary Internet: computer+	-.16	.15	-.12	-.46	.15
Primary Internet: "other"+	-.01	.15	-.01	-.32	.30
Time owning mobile Internet device	.13*	.06	.25	.02	.24

*Note. Females were coded with 0, males with 1*

\* $p < .05$ . \*\* $p < .01$  +Compared with Primary Internet: Smartphone

$R^2 = .23$  CI = Confidence Interval

.01). Among older teens, the number of mobile Internet devices owned was positively correlated with daily time spent online ( $r = .44, p < .01$ ).

Linear and binary logistic regression models utilized in RQ2 found statistically significant relationships between teens' primary source of Internet access and the following dependent variables: daily time spent online, intentional exposure to pornography, and requests to sext. To test for moderation, both of the potential moderators from this research question (number of mobile Internet devices owned and length of time owning at least one mobile device) were placed into the aforementioned statistically significant models to test for main effects.

Both length of ownership (see Table 31) and number of mobile Internet devices owned (see Table 32) were statistically significant predictors of daily time spent using the Internet when added to the model. However, when adding these variables to the model, teens' primary source of Internet access failed to reach statistical significance. Therefore,

it was not to complete the test for moderation by including the interaction effects in the model.

For the analyses examining intentional exposure to pornography, neither the number of mobile devices owned ( $\beta .03, p = .67$ ) nor the length of time owning a mobile Internet device ( $\beta = .05, p = .54$ ) was statistically significant when included in the model. In the binary logistic regression analysis examining requests to sext as the dependent variable, it was also found that neither the number of mobile devices owned ( $\beta = .05, p = .68$ ) nor the length of time owning a mobile Internet device ( $\beta = -.09, p = .60$ ) was statistically significant when added to the model. These findings indicate that neither the number of Internet-enabled mobile devices owned, nor the length of time teens have owned at least one mobile Internet device moderated any of the relationships that were found for these variables in RQ2.

Table 32

*Summary of Linear Regression Analysis for Variables Related to Daily Time Spent Using the Internet with Number of Mobile Internet Devices Owned Added (N = 97)*

Variables	B	SE B	$\beta$	95% CI for B	
				Lower	Upper
Constant	.33	.54		-.78	1.37
Age	.06	.03	.16	-.01	.13
Gender	.06	.10	.06	-.13	.28
Two-parent family	-.09	.15	-.06	-.38	.21
Religious commitment	-.10	.06	-.15	-.15	.03
Primary Internet: computer+	-.19	.13	-.14	-.45	.06
Primary Internet: "other"+	.00	.14	.00	-.27	.28
Time owning mobile Internet	.19**	.04	.45	.11	.26

Note. Females were coded with 0, males with 1.

\* $p < .05$ . \*\* $p < .01$  +Compared with Primary Internet: Smartphone

$R^2 = .37$  CI = Confidence Interval

Because both the number of mobile Internet devices owned by teens and the length of time they have owned at least one Internet enabled mobile device were strongly correlated with problematic Internet use, linear regression analyses were performed to determine the influence of these variables on problematic Internet use. Initial analyses included age, gender, religious commitment, and two-parent families as control variables. Neither model was statistically significant until religious commitment and two-parent families were removed from the analyses.

Table 33 shows the results of the analysis examining the relationship between number of mobile Internet devices owned by teens and their levels of problematic Internet use. In this analysis, it was found that after controlling for age and gender, teens who owned multiple mobile devices with Internet access had much higher problematic Internet use scores ( $\beta = .28, p < .01$ ) than teens who owned fewer mobile Internet devices.

Results for the linear regression examining the relationship between the length of time teens have owned at least one mobile Internet device and problematic Internet use

Table 33

*Summary of Linear Regression Analysis for Variables Related to Problematic Internet Use with Number of Mobile Internet Devices Owned Added (N = 97)*

Variables	B	SE B	$\beta$	95% CI for B	
				Lower	Upper
Constant	3.46	4.38		-5.24	12.16
Age	.12	.29	.04	-.45	.69
Gender	-.50	.87	-.06	-2.23	1.24
Number of mobile Internet devices	.93**	.33	.28	.28	1.59

*Note.* Females were coded with 0, males with 1.

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

$R^2 = .30$  CI = Confidence Interval

Table 34

*Summary of Linear Regression Analysis for Variables Related to Problematic Internet Use with Length of Time Owning a Mobile Internet Device Added (N = 97)*

Variables	B	SE B	$\beta$	95% CI for B	
				Lower	Upper
Constant	4.11	4.28		-4.38	12.61
Age	.02	.29	.01	-.55	.59
Gender	-.23	.86	-.03	-1.94	1.47
Time owning mobile Internet device	1.37**	.39	.35	.60	2.15

Note. Females were coded with 0, males with 1.

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

$R^2 = .36$  CI = Confidence Interval

are displayed in Table 34. In this analysis, length of time owning a mobile Internet device was highly related to problematic Internet use scores, even after controlling for age and gender ( $\beta = .35, p < .01$ ).

### Summary

Nearly three-quarters of all participants reported that they owned a smartphone. Clear divisions were found according to age and gender, with older teens and females reporting higher rates of smartphone ownership and use. More than half of the participants reported using their smartphone as their primary source of Internet access.

Most teens were classified as mild over-users of the Internet, but about a third were considered moderately addicted. About three-quarters of respondents reported that they had been unintentionally exposed to pornography at least once in the past year, and about one-third said that had intentionally viewed pornography at least once in the same time frame. Teens with the highest rates of intentional pornography use were most likely

to access pornographic material on their computer, as opposed to a smartphone or another electronic device. About 25% of all participants reported being asked to sext at least once in the past year, a number that increased to 47% among teens who primarily use their smartphone to access the Internet and 50% among females.

Linear regression analyses for RQ2 revealed that teens using smartphones as their primary source of Internet were likely to spend more time online than teens using computers, but teens who used computers as their main source of Internet access were more likely than primary smartphone users to intentionally access pornography. A bivariate logistic regression revealed that teens using smartphones as their primary source of Internet were much more likely to receive sexting request than teens using anything else as their primary source of Internet.

Tests for moderation in RQ3 and RQ5 found that none of the potential moderators (active parental mediation, restrictive parental mediation, attachment to parents, length of time owning at least one mobile Internet device, and number of mobile Internet devices owned) moderated relationships that were found in RQ2. Linear regression analyses were used to explore relationships that existed between teens' attachment to parents and both active and restrictive parental mediation in RQ4. It was found that teens reporting higher levels of restrictive parental mediation were less attached to their parents.

## **CHAPTER V**

### **DISCUSSION**

The purpose of this study was to examine relationships that existed between teens' primary source of Internet access and their daily time spent using the Internet, problematic Internet use, exposure to pornography, and participation in sexting. Contextual factors such as age, gender, family structure, religious commitment, attachment to parents, and parental monitoring of online activities were also examined to determine their relationship to the aforementioned outcomes. Results from the study are discussed in this chapter in relation to the research questions, followed by a discussion of implications for parents through the lens of Bronfenbrenner's PPCT model. The chapter concludes with a discussion of limitations of the study and recommendations for future research.

#### **Internet Use Characteristics**

Prior to discussing the results of this study, a quick comparison of the participant characteristics to previous studies is in order. Teens in this study had slightly higher rates of mobile Internet device ownership than previous studies using nationally representative samples. Rideout (2015) found that 67% of a large, nationally representative sample of teens reported owning a smartphone (an Internet-connected mobile phone), compared with 74.2% of respondents in the current study. This difference is likely due to two factors: first, a higher percentage of teens in this study were classified as older (58.8%) than younger (41.2%) teens. While 80% of younger teens from this study reported

owning a cell phone, 60% said that they have their own smartphone, compared with 84.2% of older teens who said they own a smartphone.

Second, based on the sampling method, it is probable that a majority of the participants in this study came from middle-class or upper-middle class families. When accounting for parental income, the percentages found by Rideout (2015) reflect the percentages found in this study. Rideout (2015) found that 69% of teens from middle-income families and 78% of higher income families reported owning a smartphone. It is also possible that the higher rates of smartphone ownership reported in the present study are due to the time-related factors, as smartphone ownership continues to rise from year to year among teens (Lenhart, 2015), and the statistics reported in this study were more recently obtained than those reported in previous research.

### **Daily Time Spent Online**

The methods used to measure daily time spent using the Internet did not produce descriptive statistics that estimated the exact amount of time that teens spent online each day. Thus, the time that teens from this study spent online could not be accurately compared against participants from other studies. It should be noted, however, that an association was found between age and time spent online, with older teens reporting that they spent more time online each day than younger teens. This finding fits with what has been found in previous research (Rideout, 2015).

The primary finding related to daily time spent online in this study was that teens using smartphones as their primary source of Internet access spent more time online than teens using computers, although no statistically significant differences were found

between smartphone users and teens that used something else, such as a tablet or an mp3 player, to access the Internet. This implies that using any mobile devices, not just smartphones, as one's primary source of Internet is associated with teens spending more daily time online.

This finding was further validated when the number of Internet accessible mobile devices owned by participants was including in the analysis. Each subsequent mobile device that teens reported owning was associated with more time spent online each day. Since using a mobile device as one's primary source of Internet likely means that the device will be close by and accessible to teens more often than a stationary computer, it was not surprising that mobile device users reported spending more time online.

### **Problematic Internet Use**

The percentages related to problematic Internet use in this study were similar to those found in past studies that used similar measures. For example, comparing the findings of this study with the research of Sinkkonen et al. (2014), a study that used a similar scale to measure problematic Internet use among 475 Swedish teens aged 15-19, the only noteworthy differences were that more teens in the current study were classified as moderately addicted Internet users (35.1% compared with 22.9%), and less teens in the current study were classified as mild over-users (45.4% compared with 61.4%).

While older teens in this study reported spending more time online each day than younger teens, findings regarding problematic Internet use were relatively stable across age and gender. The biggest differences between younger and older teens were in the categories of normal and moderately addicted users, with a higher percentage of younger

teens being classified as normal users of the Internet (22.5%) than older teens (14.0%), and a higher percentage of older teens (38.6%) being classified as moderately addicted than younger teens (30.0%). For gender, the only substantial difference was among seriously addicted users, with 3.9% of females and no males in this study being classified as seriously addicted.

Overall, the findings from this study and past studies examining teens' problematic Internet use suggest that the typical teen spends at least slightly more time online than would be ideal, as 82.5% of teens in this study were classified as at least mild over-users of the Internet. Although most teens in this study did not report being overly burdened by their Internet use, the high percentage of teens that fall into the over-use categories underscores that Internet overuse is something common in adolescence.

When analyzing the relationship between teens' primary source of Internet access and their levels of problematic Internet use, it was found that problematic Internet use was not associated with primarily accessing the Internet from any certain device. However, significant associations were found between teens' levels of problematic Internet use and the number of mobile devices that participants owned, as well as the amount of time teens have owned at least one mobile Internet device.

Problematic Internet use levels were higher for teens who reported owning multiple mobile Internet devices. The directionality of this finding remains unclear, as it seems just as likely that teens who are more prone to problematic Internet use would seek to own multiple mobile devices to connect to the Internet as it does that having more ways to access to the Internet makes teens more susceptible to problematic Internet use.

Notwithstanding, a case can be made that owning multiple Internet devices may place teens on a pathway to problematic Internet use, as having more ways to access to the Internet makes it seem likely that one would spend more time online, which, in turn, could provide more opportunities for problematic Internet use.

The second key finding related to problematic Internet use was that teens who reported owning at least one mobile Internet device for greater amounts of time experienced higher levels of problematic Internet use, even after controlling for age. This association does not offer assumptions about directionality, but it seems to at least present a possibility that problematic Internet use could be a long-term ramification that comes with teens owning a mobile Internet device, and that it may not manifest itself within short periods of time.

One other interesting finding related to problematic Internet use was its relationship to the other variables examined in this study. Positive correlations were found between levels of problematic Internet use and daily time spent online, unintentional and intentional pornography exposure, and requests to sext. Previous research has also found associations between problematic Internet use and both time spent online and pornography use (Meerkerk et al., 2006; van den Eijnden et al., 2008). The structure of this study makes it difficult to ascertain the directionality of these associations, but it is clear that time spent online, pornography, and sexting are important factors related to problematic Internet use.

## **Pornography Exposure**

Descriptive statistics related to unintentional and intentional exposure to pornography in this study were similar to the findings reported by Wolak et al. (2007), which also asked teens to report unintentional and intentional exposure to pornography in the past year. Unintentional pornography exposure, at least once in the past year, was slightly higher in this study (77.3%) than the 66% reported by Wolak et al., and intentional exposure, at least once in the past year, was slightly lower (35.4%) in this study than the 42% reported by Wolak et al. Age and gender provided clear distinctions for the occurrence of both unintentional and intentional exposure to pornography, with males and older teens being much more likely to encounter both when compared with females and younger teens.

That teens reported higher rates of unintentional exposure to pornography than intentional was not surprising, but it should be noted that it is at least a possibility that social desirability played a role in teens' reporting unintentional exposure at higher rates. With nearly three-quarters of the participants reporting that they were either strongly or mostly committed to the teachings and practices of their religion, and with most religions emphasizing negative moral implications of pornography use, it is not out of the question to consider that what some participants reported as unintentional exposure might have actually been intentional, but was labeled unintentional because it was something that they regretted doing and/or wished to hide.

When examining the relationship between teen's primary source of Internet access and their unintentional exposure to pornography, the findings from this study

suggest that none of the factors related to device ownership were associated with unintentional exposure to pornography. Unintentional pornography exposure was a fairly common occurrence among these teens—more than three-quarters of participants reported unintentionally encountering pornography at least once in the past year and nearly one-quarter reported accidental exposure at least 1-2 times per month—so the finding that no particular device was more highly associated with unintentional exposure than another suggests that unintentional pornography exposure may simply be a product of Internet use, regardless of the capabilities and features of certain technologies that are used to go online.

A relationship was also found between teens' primary source of Internet access and intentional exposure to pornography. Teens who primarily accessed the Internet from a computer had higher rates of intentional pornography exposure than teens using mobile devices or smartphones as their primary source of Internet access, even after controlling for age, gender, and religious commitment. This finding was somewhat surprising considering the seeming advantages related to privacy and convenience that teens wanting to access pornography would have by doing so from a mobile device. It is possible that teens prefer to access pornography from a computer because of the larger screen in relation to mobile devices.

It should be noted that in asking teens if they used a computer as their primary source of Internet, desktop and laptop computers were not differentiated. Teens were also not asked if the computer they used was their own or a shared computer, or if the computer was located in a private place, such as their bedroom. It is possible that much of

the intentional pornography exposure reported by those who primarily used computers to access the Internet took place on a personally owned, privately located computer that would have offered the same privacy benefits as a smartphone, along with the advantage of a larger screen.

### **Sexting**

Percentages related to sexting found in this study were difficult to compare with findings in the literature, as IRB restrictions prevented participants from being asked whether they had actually sent or received sexts. However, asking teens whether they had been asked to sext, and whether they would be willing to sext if they were asked, served as informative replacements. Twenty-five percent of teens in this study reported that they had been asked to sext at least once in the past year and 14.6% of teens reported that they would be at least neutral when asked if they would be willing to sext a significant other.

While these specific questions were not asked in national studies examining teens and sexting, the percentages found in this study indicate that a small but still substantive percentage of teens are most likely involved in sexting, a finding that has been corroborated in past research (Lenhart, 2009; Ybarra & Mitchell, 2014). Also consistent with previous research, older teens and females were more likely than younger teens and males to be asked to sext (Lenhart, 2009; Livingstone et al., 2011; Ybarra & Mitchell, 2014). Additionally, the finding that teens using smartphones have much higher likelihood of both being asked and willing to sext was not surprising considering the number of applications and features available on smartphones that make sexting seem more accessible and private.

The magnitude of the association between teens using smartphones as their primary source of Internet access and the number of sexting requests they received highlights that although computers, tablets, and mp3 players have features that would make sexting from those devices possible, sexting seems to be an activity primarily done on smartphones. Smartphone applications, such as Snapchat, that allow teenagers to send self-destructing messages, images, and videos, appear to make smartphones the logical and preferred medium for sending and receiving sexts. More than half of the participants in this study estimated that Snapchat was the most common application used for sexting when asked about other teens' sexting behaviors.

Religious commitment was significantly related to teens' involvement in sexting. Less religiously committed teens were more likely to report receiving requests to sext and expressed more willingness to sext others than their more religiously committed counterparts. Most religions frown on premarital sexual activity of any kind, so it seems understandable that teens who adhere to their religious teachings and values would likely seek to avoid a practice, such as sexting, that goes against those values.

Age was significantly related to teens' willingness to sext, and was even a statistically significant factor after controlling for teens' primary source of Internet access. Based on the developmental literature on sexual activity, there is a clear linear relationship between age and sexual intercourse (Copen, Chandra, & Martinez, 2012). The literature is also clear that older teens are more likely to be involved in sending sexts than younger teens (Ybarra & Mitchell, 2014), so it was not surprising that older teens reported being more willing to sext than younger teens.

It is important to note, however, that age was not a statistically significant factor in the relationship between teens' primary source of Internet access and the number of requests to sext they received. The relationship between age and sexual behavior is not as clear among trend sexual behaviors such as oral sex, which, in more modern cohorts, occurs at younger ages (Copen et al., 2012), so it is possible that the higher occurrences of requests to sext among younger teens in this study could also be classified as a trend in sexual behavior that occurs at younger ages. Or, it could be that sexting-friendly apps available on smartphones provide an environment where all teens—young and old—are more prone to be asked to sext. In any case, the findings from this study indicate that the device that teens use to access the Internet is an important factor that is related to teens receiving requests to sext.

### **Parent-Child Factors as Potential Moderators**

The relationship of three potential moderators on the same Internet relationships was also examined. These potential moderators included active parental mediation, restrictive parental mediation, and attachment to parents. Each of the three variables was tested for moderation and none was found to be a moderator of the relationships between teens' primary source of Internet access and the outcomes examined in this study. Nonetheless, some important conclusions from the findings were made concerning active and restrictive parental mediation and teens' attachment to their parents.

**Active Parental Mediation**

Active mediation, which refers to parents and children having conversations about the media that they are viewing (Gentile et al., 2012), was surprisingly not a factor in these analyses. The only significant findings related to active parental mediation was in the bivariate correlation for female participants, where a negative correlation was found between active mediation and intentional pornography exposure. Considering the amount of previous research that has found active parental mediation to be an effective way of helping teens avoid harmful online behaviors, this finding was surprising and deserves further examination.

**Restrictive Parental Mediation**

A second important finding in this study related to the parents' use of restrictive parental mediation strategies, which involves parents setting rules or limits on children's exposure to the media (Gentile et al., 2012). In most cases, restrictive mediation was not associated with the outcomes examined in this study. However, in some cases, higher occurrences of restrictive parental mediation were associated with potentially unwanted online behaviors.

For example, a positive association was found between levels of restrictive parental mediation and unintentional exposure to pornography. It was also determined that among older teens, restrictive parental mediation was positively correlated with willingness to sext. These findings are not entirely surprising, as previous researchers have discussed teens' tendency to resist their parents' attempt to restrict their media choices as they grow older and gain more independence (Nathanson, 2001).

Some of the basic constructs of restrictive parental mediation—such as restricting access to certain technological activities or digital devices—are similar to those of authoritarian parenting, in which parents attempt to shape and control child behavior through restrictive means (Baumrind, 1967). Authoritarian parenting has been associated with a number of internalizing and externalizing behaviors among adolescents, (Lansford, Deter-Deckard, Dodge, Bates, & Pettit, 2004).

It should be noted that the association between restrictive parental mediation and potentially unwanted online behaviors does not imply directionality. While it is possible that teens with restrictive parents may engage in negative online behaviors as a form of rebellion or pushback against their parents, it is just as likely that parents who have teens who are already involved in what parents consider to be inappropriate online behaviors may be more prone to employ restrictive mediation strategies in an attempt to curb the occurrence of such behaviors.

### **Attachment to Parents**

Of the three parental variables that were studied, a strong parent-child attachment was the most highly associated with teens avoiding engaging in risky online behaviors. Teens who reported strong relationships with their parents were less likely to experience problematic Internet use, view pornography or participate in sexting, underscoring the importance of a strong attachment between parents and children. Although parental attachment was not found to be a statistically significant moderator of the relationships between teens' primary source of Internet access and the outcomes examined in this study, it is clear that it plays an important role in helping teens to make smart media

choices, a finding that has also been stated in previous literature (Sasson & Mesch, 2014; Ybarra & Mitchell, 2005).

### **Relationship amongst Parenting Variables**

In addition to examining how active parental mediation, restrictive parental mediation and attachment to parents acted as potential moderators for the relationships between device ownership and the online behaviors, the extent to which those moderators related to one another was also examined. Teens who were strongly attached to their parents experienced lower levels of restrictive parental mediation. It appears that parents who have strong relationships with their teens use less restrictive means to monitor their teens' online activities, but it should be emphasized that strongly attached teens in this study also engaged in less risky online behaviors than their less strongly attached peers.

These findings underscore the benefit of gaining and maintaining a strong parent-adolescent relationship. With restrictive parental mediation being associated with teens' involvement in certain risky digital behaviors and attachment to parents being associated with the absence of them, it seems that the strength of the relationship that teens have with their parents trumps specific parental mediation practices used by parents.

The abundance of previous literature highlighting the effectiveness and importance of parental monitoring strategies makes it clear that parents should not abandon attempts to monitor their teens use of the Internet (Gentile et al., 2012; Khurana et al., 2015; Lee & Chae, 2007; Williams & Merten, 2011). Even so, the findings from this study suggest that parents' efforts to monitor and regulate their teens' use of the Internet should be done in conjunction with attempts to achieve and maintain strong

relationships with their children, as these parent-child connections can make an important contribution to their teens having positive online experiences.

### **Implications for Parents and Theoretical Discussion**

In today's rapidly changing technological landscape, many parents are concerned about the extent to which they should allow their children to be involved in the use of certain technologies, such as Internet-enabled mobile devices, because they are unsure of outcomes that are associated with the use of these technologies. It is also common for parents to wonder what would be the most effective means of regulating or monitoring their teens' use of mobile Internet devices.

This study made efforts to address these questions, and a number of associations were found between teens' use of mobile devices to access the Internet and problematic digital behaviors that could be of value to parents. Several personal characteristics and contextual factors were also highly associated with the same online behaviors, indicating that teens' participation in these behaviors is often much more complex than simply using a certain device to access the Internet. This emphasizes the usefulness of examining the findings of this study through the lens of Bronfenbrenner's bioecological theory. Key findings of this study and their implications for parents are discussed below in relation to Bronfenbrenner's PPCT model.

#### **Proximal Processes**

What Bronfenbrenner termed as proximal processes, or the interactions that take place between a developing person and the environment (Bronfenbrenner & Morris,

1998), were examined by focusing on teens' use of certain technologies to access the Internet. Parents should consider a number of factors when contemplating the number and types of devices that they provide for their teens to access the Internet.

First, an association was found in this study between teens' use of mobile Internet devices and the amount of time that they spent online each day. While teens in general spend large amounts of time online, participants in this study that used mobile Internet devices (e.g., smartphones, tablets, or mp3 players) as their primary source of Internet access spent more time online than their peers that used more stationary devices, such as computers, to access the Internet.

For most teens in this study, accessing the Internet from one primary mobile device was associated with spending more time online, but not with problematic Internet use (i.e., Internet addiction). However, teens who reported using multiple devices to access the Internet were much more likely to experience high levels of problematic Internet use. Although the methods used in this study do not provide answers about the directionality of this association, parents would do well to be cautious about providing an overabundance of means for their teens to access the Internet, as the association between multiple points of access to the Internet and levels of problematic use of the Internet was high in this study.

A couple of important findings from this study illustrate that parents should carefully consider the types of devices they provide for their teens to access the Internet. First, teens' use of smartphones as their primary source of Internet access was associated with being asked to sext by other teens. Smartphone using teens were much more likely

to receive sexting requests than teens using computers, tablets, mp3 players, or anything else to access the Internet. That smartphones were related to sexting is not surprising, but the pervasiveness is something that parents might consider.

On the other hand, intentional exposure to pornography was a behavior that was not associated with the use of mobile devices, but rather with teens using computers to access the Internet. When compared with teens using smartphones or any other kind of mobile devices to access the Internet, teens who used computers as their primary source of Internet access had much higher rates of intentional pornography exposure.

Considering all of these findings together, it becomes clear that teens are faced with many opportunities to engage in potentially problematic online behaviors, many of which are associated with using certain types or numbers of device to access the Internet. However, it would be unwise for parents conclude that providing their teen with a smartphone or another type of mobile device automatically determines that their teens will engage in certain behaviors. Nor should they expect that their teens would avoid certain unwanted behaviors by withholding a specific kind of technological device from them.

The personal characteristics, contextual influences, and time-related factors discussed in Bronfenrenner's PPCT model also played a role in the outcomes that were examined in this study. For example, age, gender, religious commitment, parental monitoring strategies, parent-child relationships, and time owning a mobile Internet device were each important factors that were associated with teens exhibiting or avoiding certain online behaviors in this study, and, in many cases, were more strongly associated

with those behaviors than the devices that teens used to access the Internet. These factors are discussed in greater detail below in relation to how they fit within Bronfenbrenner's PPCT model.

### **Personal Characteristics**

Two personal characteristics that were clearly associated with the outcomes of this study were age and gender. When compared with younger teens, older teens in this study were more likely to own a smartphone and use it as their primary source of Internet access, had higher rates of unintentional and intentional exposure to pornography, were more likely to be willing to sext, and received more requests to sext.

When analyzing the results of this study by gender, males were less likely than females to own a smartphone, and were much more likely to use a computer as their primary source of Internet access. Males also had higher rates of unintentional and intentional pornography exposure, and were more willing than females to send sexual messages to their significant other. Females, on other hand, were asked to sext more frequently.

Findings from this study indicate that age and gender played just as important, if not a more important role in teens being exposed to pornography and being willing to sext as the type of device that they used to access the Internet. Two key findings highlight this point. First, even after controlling for the device that teens primarily used to access the Internet, older teens and males experienced higher rates of intentional pornography exposure than younger teens and females. Second, older teens were much more willing to

sex than younger teens, after controlling for the device that teens use to access the Internet.

Older teens' higher rates of pornography exposure and greater willingness to sext fits within their developmental trajectory, as they naturally become more sexually involved and curious as they increase in age (Owens et al., 2012). Likewise, males tend to be more interested in pornography than females (Wolak et al., 2007), and tend to be the initiators of sexting conversations (Ringrose et al., 2012). All of this suggests that parents should bear in mind the important role that normal development plays in their teenage children's decisions to engage in certain online behaviors, and that in many cases, these behaviors occur regardless of the kind of device teens are using to access the Internet.

It is interesting to note, however, that age did not play a role in the relationship between teens using smartphones and the number of requests they received to sext. In other words, younger teens who used smartphones as their primary source of Internet access were just as likely to receive sexting requests as older teens who used smartphones. Given that sexting requests generally increase with age, this finding should give parents pause when considering the ways that they allow their younger teens to use a smartphone. Parents of younger smartphone users might consider regulating their teens' use of sexting-friendly apps, such as Snapchat, if they wish to mitigate their teens' likelihood of receiving sexting requests.

### **Contextual Influences**

Contextual influences are an important part of Bronfenbrenner's theory, and represent the many interconnected environmental influences that directly or indirectly impact an individual (Bronfenbrenner & Morris, 1998). Contextual influences that were measured in this study were religious commitment, family structure, restrictive parental mediation, active parental mediation, and attachment to parents. Of these, religious commitment, restrictive parental mediation, and attachment to parents were most highly related to the outcomes examined in this study.

Teens with higher levels of religious commitment tended to have healthier media habits, such as spending less time online each day, less exposure to pornography, being less willing to sext others, and reporting to receive fewer requests to sext. Religious commitment was a major factor that, in most cases, seemed to outweigh the impact that teens' primary source of Internet access had on the outcomes that were examined in this study.

Parent-child attachment and restrictive parental mediation were two other important contextual influences for teens that were related to their participation in the online behaviors that were examined. In this study, teens' attachment to their parents was the most important parenting factor and was related to fewer occurrences of the negative behaviors that were examined. Teens who had strong relationships with their parents had lower levels of problematic Internet use, were less likely to be unintentionally or intentionally exposure to pornography, and were less willing to participate in sexting.

Specific parental monitoring strategies such as restrictive and active parental mediation were either nonfactors, or, in a few cases, were associated with teens engaging in problematic online behaviors. Teens who experienced higher levels of restrictive parental mediation were less attached to their parents and were more likely to have unintentionally viewed pornography in the past year. It appears from these findings that one of the most effective things parents can do as it relates to directly influencing their teens to avoid unwanted online behaviors is to build and maintain a healthy relationship.

### **Time-Related Factors**

Bronfenbrenner described a number of time-related factors that impact an individual, including mesotime, or the extent to which an activity occurs across days, weeks, and years (Tudge et al., 2009). The time-related factor analyzed in this study was the length of time that teens had owned at least one mobile Internet device.

It was found in this study that, even after controlling for age, teens who owned at least one mobile Internet device for greater amounts of time experienced higher levels of problematic Internet use. Parents should at least consider the possibility that problematic Internet use could be a long-term ramification that comes with teens owning a mobile Internet device that does not manifest itself within short periods of time.

### **Limitations**

A number of limitations should be considered when interpreting the results of this study. First, the sample was relatively small and homogenous. A sample of 97 participants was a good starting point, but a larger sample would have been beneficial in

order to increase the likelihood that the sample was representative of the population.

Because a high percentage of the sample was recruited through personal contacts of the researcher, the resultant sample consisted of a high percentage of teens who lived in a specific geographical region. A nationally representative and diverse sample would have been more effective in examining the questions in this study, as the characteristics and experiences of this sample may differ from other teens.

In addition, the parent-based recruiting approach potentially biased the sample. There are likely certain characteristics that these parents possessed which made them more prone to sign their child up to take the survey, and certain characteristics that would have made other parents shy away from doing so. For example, it is possible that parents contacted via social media may have had different mindsets about Internet use and device ownership in their home than parents who do not use social media or use it infrequently. Had permission been granted to directly contact adolescents about participating, it is possible that teens coming from different backgrounds and family situations would have agreed to participate. With that being said, the findings from this study should not be discarded, as the descriptive statistics from this study held up nicely when compared with findings from previous research.

Another limitation of this study was the use of self-report data. Many of the questions asked in the study were of a somewhat sensitive nature, and although participants were assured that measures had been taken to protect participants' anonymity and confidentiality, there is no guarantee that the answers that were provided accurately reflected participants' actual attitudes and behaviors. This limitation is not unique to this

study, however, and the fact that descriptive statistics for the variables examined in this study were similar to what has been previously found in the research suggests that the self-report limitation was no bigger issue in this study than it has been in past self-report studies.

A final limitation that should be noted is that restrictions that were imposed by IRB limited the types of questions that could be asked to the participants. Concerns about teens admitting to participating in illegal behaviors (e.g., possession of child pornography, sending sexts to or receiving them from minors) precluded the researcher from asking more specific questions about sexting and pornography use to the participants. This was particularly problematic for the sexting questions, as it was the original intention of this study to measure teens' involvement with sexting. Not being able to ask teens whether they had actually sent or received sexts required adjustments that diluted the scope of the inquiry.

### **Future Research**

Notwithstanding the limitations mentioned above, the findings of this study should be of interest to researchers wanting to know how the newest forms of technology relate to teenage behaviors. This descriptive study did not make conclusions about causality, but the associations between certain types of devices and online behaviors, along with external influences related to such behaviors, provide a framework for future research. It would be effective to transition the findings from this study to other studies that can address causality.

In addition, very few implications were given concerning the behaviors that were examined as outcome variables in this study. For example, while it was found that teens using computers as their primary source of Internet access were more likely to intentionally view pornography than teens using other devices, this finding did not lend itself to conclusions about the implications of pornography use and how it impacts teens' lives. It would be beneficial for future researchers to take this research one step further and examine the implications that come with participation in any of the outcome variables that were studied in this research.

Finally, the behaviors examined in this study were only a small portion of the overall selection of behaviors that could have been studied. Future researchers could conduct a similar study but examine other outcome variables than the ones examined in this study, such as cyberbullying, online safety, classroom performance, relationships with others, body image, overall life satisfaction, ability to pay attention, educational benefits, and social skills.

**REFERENCES**

- Allen, J. P., Porter, M. R., McFarland, F. C., McElhaney, K. B., & Marsh, P. (2007). The relation of attachment security to adolescents' paternal and peer relationships, depression, and externalizing behavior. *Child Development, 78*, 1222-1239. doi: 10.1111/j.1467-8624.2007.01062.x
- Alvarez, J. A., & Emory, E. (2006). Executive function and the frontal lobes: A meta-analytic review. *Neuropsychology Review, 16*, 17-42. doi: 10.1007/s11065-006-9002-x
- Barkin, S., Ip, E., Richardson, I., Klinepeter, S., Finch, S., & Krcmar, M. (2006). Parental media mediation styles for children aged 2 to 11 years. *Archives of Pediatric Adolescent Medicine, 160*, 395-401. doi: 10.1001/archpedi.160.4.395
- Baumrind, D. (1967). Child care practices anteceding three patterns of preschool behavior. *Genetic Psychology Monographs, 75*, 43-88.
- Beard K. W., & Wolf, E. M. (2001). Modification in the proposed diagnostic criteria for Internet addiction. *CyberPsychology & Behavior, 4*, 377-383. doi: 10.1089/109493101300210286
- Bowlby, J. (1973). *Attachment and loss: Vol. 2. Separation, anxiety and anger*. New York, NY: Basic Books.
- Braun-Courville, D. K., & Rojas, M. (2009). Exposure to sexually explicit web sites and adolescent sexual attitudes and behaviors. *Journal of Adolescent Health, 45*, 156-162. doi: 10.1016/j.jadohealth.2008.12.004

- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press. doi: 10.1080/00131728109336000
- Bronfenbrenner, U., & Morris, P. A. (1998). The ecology of developmental processes. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology, Vol. 1: Theoretical models of human development* (5th ed., pp. 993-1023). New York, NY: Wiley. doi: 10.1017/S0021963001216977
- Brown, J. D., & Bobkowski, P. S. (2011). Older and newer media: Patterns of use and effects of adolescents' health and well-being. *Journal of Research on Adolescence, 21*, 95-113. doi: 10.1111/j.1532-7795.2010.00717.x
- Brown, J. D., & L'Engle, K. L. (2009). X-rated: Sexual attitudes and behaviors associated with U.S. early adolescents' exposure to sexually explicit media. *Communication Research, 36*, 129-151. doi: 10.1177/0093650208326465
- Caplan, S. E. (2002). Problematic internet use and psychosocial well-being: Development of a theory-based cognitive-behavioral measurement instrument. *Computers in Human Behavior, 18*, 553-575. doi: 10.1016/S0747-5632(02)00004-3
- Caplan, S. E. (2010). Theory and measurement of generalized problematic Internet use: A two-step approach. *Computers in Human Behavior, 26*, 1089-1097. doi: 10.1016/j.chb.2010.03.012
- Chang, F.-C., Chiu, C.-H., Miao, N.-F., Chen, P.-H., Lee, C.-M., Chiang, J.-T., & Pan, Y.-C. (2015). The relationship between parental mediation and Internet addiction

among adolescents, and the association with cyberbullying and depression.

*Comprehensive Psychiatry*, 57, 21-28. doi: 0.1016/j.comppsy.2014.11.013

Chen, A.-S., Leung, M., Chen, C.-H., & Yang, S. C. (2013). Exposure to the Internet and pornography among Taiwanese adolescents. *Social Behavior and Personality*, 41, 157-164. doi: 10.2224/sbp.2013.41.1.157

Chou, C., & Hsiao, M.-C. (2000). Internet addiction, usage, and gratifications the Taiwan's college students' case. *Computers & Education*, 35, 65-80. doi: 0.1016/S0360-1315(00)00019-1.

Common Sense Media (2012). *Social media, social life: How teens view their digital lives. Summer 2012*. Retrieved from <https://www.commonsensemedia.org/file/socialmediasociallife-final-061812pdf-0/download>

Copen, C. E., Chandra, A., & Martinez, G. (2012). *Prevalence and timing of oral sex with opposite-sex partners among females and males aged 15-24 years: United States, 2007-2010*. National Health Statistics Reports, 56. Hyattsville, MD: National Center for Health Statistics. Retrieved from <http://www.cdc.gov/nchs/data/nhsr/nhsr056.pdf>

Davies, J. J., & Gentile, D. A. (2012). Responses to children's media use in families with and without siblings: A family developmental perspective. *Family Relations*, 61, 410-425. doi: 10.1111/j.1741-3729.2012.00703.x

Domenech, P., & Koechlin, E. (2015). Executive control and decision-making in the prefrontal cortex. *Current Opinion in Behavioral Sciences*, 1, 101-106. doi: 10.1016/j.cobeha.2014.10.007

- D'Orlando, F. (2011). The demand for pornography. *Journal of Happiness Studies*, *12*, 51-75. doi: 10.1007/s10902-009-9175-0.
- Durak, M., & Senol-Durak, E. (2014). Which personality traits are associated with cognitions related to problematic Internet use? *Asian Journal of Social Psychology*, *17*, 206-218. doi: 10.1111/ajsp.12056
- Egeland, B., & Carlson, B. (2004). Attachment and psychopathology. In L. Atkinson & S. Goldberg (Eds.), *Attachment issues in psychopathology and intervention*. Mahway, NJ: Erlbaum.
- Ellison, N., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook “friends”: Social capital and college students’ use of online social network sites. *Journal of Computer-Mediated Communication*, *12*, 1143-1168. doi: 10.1111/j.1083-6101.2007.00367.x
- Ferguson, C. J. (2011). Sexting behaviors among young Hispanic women: Incidence and association with other high-risk sexual behaviors. *Psychiatric Quarterly*, *82*, 239-243. doi: 10.1007/s11126-010-9165-8
- Flood, M. (2007). Exposure to pornography among youth in Australia. *Journal of Sociology*, *43*, 45-60. doi: 10.1177/1440783307073934
- Gómez-Guadix, M., Villa-George, F., & Calvete, E. (2012). Measurement and analysis of the cognitive-behavioral model of generalized problematic Internet use among Mexican adolescents. *Journal of Adolescence*, *35*, 1581-1591. doi: 10.1016/j.adolescence.2012.06.005

- Gentile, D. A., Nathanson, A. I., Rasmussen, E. E., Reimer, R. A., & Walsh, D. A. (2012). Do you see what I see? Parent and child reports of parental monitoring of media. *Family Relations, 61*, 470-487. doi: 10.1111/j.1741-3729.2012.00709.x
- George, C., Kaplan, N., & Main, M. (1984). *Adult attachment interview protocol*. Unpublished manuscript, University of California at Berkeley, Berkeley, CA.
- Guan, S.-S. A., & Subrahmanyam, K. (2009). Youth Internet use: Risks and opportunities. *Current Opinion in Psychiatry, 22*, 351-356. doi: 10.1097/YCO.0b013e32832bd7e0
- Hägström-Nordin, E., Sandberg, J., Hanson, U., & Tydén, T. (2006). It's everywhere! Young Swedish peoples' thoughts and reflections about pornography. *Scandinavian Journal of Caring Science, 20*, 386-393. doi: 10.1111/j.1471-6712.2006.00417.x
- Hardy, S. A., Steelman, M. A., Coyne, S. M., & Ridge, R. D. (2013). Adolescent religiousness as a protective factor against pornography use. *Journal of Applied Developmental Psychology, 34*, 131-139. doi: 10.1016/j.appdev.2012.12.002
- Henson, R. (2001). Understanding internal consistency reliability estimates: A conceptual primer on coefficient alpha. *Measurement and Education in Counseling and Development, 34*, 177-189.
- Hodge, C. J., Zabriskie, R. B., Fellingham, G., Coyne, S., Lundberg, N. R., Padilla-Walker, L. M., & Day, R. D. (2012). The relationship between media in the home and family functioning in context of leisure. *Journal of Leisure Research, 44*, 285-307.

IBM Corp. (Released 2015). IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.

Jackson, L. A., von Eye, A., Witt, E. A., Zhao, Y., & Fitzgerald, H. E. (2011). A longitudinal study of the effects of Internet use and videogame playing on academic performance and the roles of gender, race, and income in these relationships. *Computers in Human Behavior, 27*, 228-239. doi: 10.1016/j.chb.2010.08.001

Jelenchick, L. A., Eickhoff, J., Christakis, D. A., Brown, R., Zhang, C., Benson, M., & Moreno, M. A. (2014). The Problematic and Risky Internet Use Screening Scale (PRIUSS) for adolescents and young adults: Scale development and refinement. *Computers in Human Behavior, 35*, 171-178. doi: 10.1016/j.chb.2014.01.035

Khurana, A., Bleakley, A., Jordan, A. B., & Romer, D. (2015). The protective effects of parental monitoring and Internet restriction on adolescents' risk of online harassment. *Journal of Youth and Adolescence, 44*, 1039-1047. doi: 10.1007/s10964-014-0242-4

Kuss, D. J., van Rooij, A. J., Shorter, G. W., Griffiths, M. D., & van de Mheen, D. (2013). Internet addiction in adolescents: Prevalence and risk factors. *Computers in Human Behavior, 29*, 1987-1996. doi: 10.1016/j.chb.2013.04.002

Lansford, J. E., Deter-Deckard, K., Dodge, K. A., Bates, J. E., & Pettit, G. S. (2004). Ethnic differences in the link between physical discipline and later adolescent externalizing behaviors. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 45*, 805-812. doi: 10.1111/j.1469-7610.2004.00273.x

- Lee, S.-J. (2012). Parental restrictive mediation of children's Internet use: Effective for what and for whom? *New Media and Society, 15*, 466-481. doi: 10.1177/1461444812452412
- Lee, S.-J., & Chae, Y.-G. (2007). Children's Internet use in a family context: Influence on family relationships and parental mediation. *CyberPsychology & Behavior, 10*, 640-644. doi: 10.1089/cpb.2007.9975
- Lei, L., & Wu, Y. (2007). Adolescents' paternal attachment and Internet use. *CyberPsychology & Behavior, 10*, 633-639. doi:10.1089/cpb.2007.9976.
- Lemola, S., Perkinson-Gloor, N., Brand, S., Dewald-Kauffman, J. F., & Grob, A. (2015). Adolescents' electronic media use at night, sleep disturbance, and depressive symptoms in the smartphone age. *Journal of Youth and Adolescence, 44*, 405-418. doi: 10.1007/s10964-014-0176-x
- Lenhart A. (2009). *Teens and sexting: How and why minor teens are sending sexually suggestive nude or nearly nude images via text messaging*. Washington, DC: Pew Internet and American Life Project. Retrieved from [http://www.pewinternet.org/files/old-media//Files/Reports/2009/PIP\\_Teens\\_and\\_Sexting.pdf](http://www.pewinternet.org/files/old-media//Files/Reports/2009/PIP_Teens_and_Sexting.pdf)
- Lenhart, A. (2015). *Teens, social media, and technology overview 2015*. Washington, DC: Pew Internet and American Life Project. Retrieved from [http://www.pewinternet.org/files/2015/04/PI\\_TeensandTech\\_Update2015\\_0409151.pdf](http://www.pewinternet.org/files/2015/04/PI_TeensandTech_Update2015_0409151.pdf)

- Lenhart, A., Madden, M., Smith, A., Purcell, K., Zickuhr, K., & Lee, R. (2011). *Teens, kindness, and cruelty on social network sites: How American teens navigate the new world of digital citizenship*. Washington, DC: Pew Internet and American Life Project. Retrieved from [http://www.pewinternet.org/~media/Files/Reports/2011/PIP\\_Teens\\_Kindness\\_Cruelty\\_SNS\\_Report\\_Nov\\_2011\\_FINAL\\_110711.pdf](http://www.pewinternet.org/~media/Files/Reports/2011/PIP_Teens_Kindness_Cruelty_SNS_Report_Nov_2011_FINAL_110711.pdf)
- Liu, C.-Y., & Kuo, F.-Y. (2007). A study of Internet addiction through the lens of interpersonal theory. *CyberPsychology & Behavior, 10*, 799-804. doi: 10.1089/cpb.2007.9951
- Livingstone, S. (2003). Children's use of the Internet: Reflections on the emerging research agenda. *New Media & Society, 5*, 147-166. doi: 10.1177/1461444803005002001
- Livingstone, S. (2008). Taking risky opportunities in youthful content creation: Teenagers' use of social networking sites for intimacy, privacy, and self-expression. *New Media and Society, 10*, 393-411. doi: 10.1177/1461444808089415
- Livingstone, S., Haddon, L., Görzig, A., & Ólafsson, K. (2011). *Technical report and user guide: The 2010 EU kids online survey*. LSE, London: EU Kids Online. Retrieved from <http://www.lse.ac.uk/media@lse/research/EUKidsOnline/EU%20Kids%20II%20%282009-11%29/Survey/Technical%20report.pdf>
- Lounsbury, K., Mitchell K. J., & Finkelhor, D. (2011). *The true prevalence of "sexting."* Crimes Against Children Research Center University of New Hampshire.

Retrieved from [http://www.unh.edu/ccrc/pdf/Sexting%20Fact%20Sheet%204\\_29\\_11.pdf](http://www.unh.edu/ccrc/pdf/Sexting%20Fact%20Sheet%204_29_11.pdf)

- Madden, M., Lenhart, A., Duggan, M., Cortesi, S., & Gasser, U. (2013). *Teens and technology 2013*. Washington, DC: Pew Research Center's Internet & American Life Project, March 13, 2013. Retrieved from <http://www.pewinternet.org/Reports/2013/Teens-and-Tech.aspx>
- Malamuth, N. M., & Impett, E. A. (2001). Research on sex and media: What do we know on the effects on children and adolescents? In D. G. Singer & J. L. Singer (Eds.), *Handbook of children and media* (pp. 269-287). Thousand Oaks, CA: Sage.
- Meerkerk, G. J., van den Eijnden, R. J. J. M., Franken, L. H. A., & Garretsen, H. F. L. (2010). Is compulsive Internet use related to sensitivity to reward and punishment, and impulsivity? *Computers in Human Behavior, 26*, 729-735. doi: 10.1016/j.chb.2010.01.009
- Meerkerk, G. J., van den Eijnden, R. J. J. M., & Garretsen, H. F. L. (2006). Predicting compulsive Internet use: It's all about sex! *CyberPsychology & Behavior, 9*, 96-103. doi: 10.1089/cpb.2006.9.95
- Meerkerk, G. J., van den Eijnden, R. J. J. M., Vermulst, A. A., & Garretsen, H. F. L. (2009). The Compulsive Internet Use Scale (CIUS): Some psychometric properties. *CyberPsychology & Behavior, 12*, 1-6. doi: 10.1089/cpb.2008.0181.
- Munezawa, T., Kanata, Y., Osaki, Y., Kanda, H., Minoa, M., Suzuki, K., ... Ohida, T. (2011). The association between use of mobile phones after lights out and sleep

disturbances among Japanese adolescents: A nationwide cross-sectional survey.

*Sleep*, 34, 1013-1020. doi: 10.5665/SLEEP.1152

Nathanson, A. I. (2001). Parent and child perspectives on the presence and meaning of parental television mediation. *Journal of Broadcasting & Electronic Media*, 45, 201-220. doi: 10.1207/s15506878jobem4502\_1

Nathanson, A. I., & Yang, M-S. (2003). The effects of mediation content and form on children's responses to violent television. *Human Communication Research*, 29, 111-134. doi: 10.1111/j.1468-2958.2003.tb00833.x

Ofcom. (2014). *Children and parents: Media use and attitudes in the nations, 2013*.

London, England: Ofcom. Retrieved from

[http://stakeholders.ofcom.org.uk/binaries/research/media-literacy/media-use-attitudes-14/Childrens\\_2014\\_Report.pdf](http://stakeholders.ofcom.org.uk/binaries/research/media-literacy/media-use-attitudes-14/Childrens_2014_Report.pdf)

Oksman, V., & Turtiainen, J. (2004). Mobile communication as a social stage: Meanings of mobile communication in everyday life among teenagers in Finland. *New Media Society*, 6, 319-339. doi: 10.1177/1461444804042518

Owens, E. W., Behun, R. J., Manning, J. C., & Reid, R. R. (2012). The impact of Internet pornography on adolescents: A review of the research. *Sexual Addiction and Compulsivity*, 19, 99-122. doi: 10.1080/10720162.2012.660431

Padilla-Walker, L. M., & Coyne, S. M. (2011). "Turn that thing off!" parent and adolescent predictors of proactive media monitoring. *Journal of Adolescence*, 34, 705-715. doi: 10.1016/j.adolescence.2010.09.002

- Peter, J., & Valkenburg, P. M. (2008a). Adolescents' exposure to sexually explicit Internet material and sexual preoccupation: A three-wave panel study. *Media Psychology, 11*, 207-234. doi: 10.1080/15213260801994238
- Peter, J., & Valkenburg, P. M. (2008b). Adolescents' exposure to sexually explicit Internet material, sexual uncertainty, and attitudes toward uncommitted sexual exploration: Is there a link? *Communication Research, 35*, 579-601. doi: 10.1177/0093650208321754
- Peter, J., & Valkenburg, P. M. (2011). The use of sexually explicit Internet material and its antecedents: A longitudinal comparison of adolescents and adults. *Archives of Sexual Behavior, 40*, 1015-1025. doi: 10.1007/s10508-010-9644-x
- Poltash, N. A. (2013). Snapchat and sexting: A snapshot of baring your bare essentials. *Richmond Journal of Law & Technology, 14*, 1-24. Retrieved from <http://jolt.richmond.edu/v19i4/article14.pdf>
- Rice, E., Rhoades, H., Wine Trobe, H., Sanchez, M., Montoya, J., Plant, A., & Kordic, T. (2012). Sexually explicit cell phone messaging associated with sexual risk among adolescents. *Pediatrics, 130*, 667-673. doi: 10.1542/peds.2012-0021.
- Rideout, V. J. (2015). *The Common Sense Census: Media use by tweens and teens*. Common Sense Media. Retrieved from [https://www.commonsensemedia.org/sites/default/files/uploads/research/census\\_researchreport.pdf](https://www.commonsensemedia.org/sites/default/files/uploads/research/census_researchreport.pdf)
- Rideout, V. J., Foehr, U. G., & Roberts, D. F. (2010). *Generation M<sup>2</sup>: Media in the lives of 8- to 18-year-olds*. Menlo Park, CA: The Henry J. Kaiser Family Foundation.

Retrieved from [https://kaiserfamilyfoundation.files.wordpress.com/](https://kaiserfamilyfoundation.files.wordpress.com/2013/04/8010.pdf)

2013/04/8010.pdf

- Ringrose, J., Gill, R., Livingstone, S., & Harvey, L. (2012). *A qualitative study of children, young people and 'sexting': A report prepared for the NSPCC*. London, England: NSPCC. Retrieved from <http://www.nspcc.org.uk/globalassets/documents/research-reports/qualitative-study-children-young-people-sexting-report.pdf>
- Sasson, H., & Mesch, G. (2014). Parental mediation, peer norms and risky online behavior among adolescents. *Computers in Human Behavior, 33*, 32-38. doi: 10.1016/j.chb.2013.12.025
- Shapira, N. A., Goldsmith, T. D., Keck, P. E., Jr., Khosla, U. M., & McElroy, S. L. (2000). Psychiatric features of individuals with problematic internet use. *Journal of Affective Disorders, 57*, 267-272. doi: 10.1016/S01650327(99)00107-X
- Shin, W., Huh, J., & Faber, R. (2012). Tweens' online privacy risks and the role of parental mediation. *Journal of Broadcasting & Electronic Media, 56*, 632-649. doi: 10.1080/08838151.2012.73213
- Siciliano, V., Bastian, L., Mezzasalma, L., Thanki, D., Curzio, O., & Molinaro, S. (2015). Validation of a new Short Problematic Internet Use Test in a nationally representative sample of adolescents. *Computers in Human Behavior, 45*, 177-184. doi: 10.1016/j.chb.2014.11.097

- Sinkkonen, H. M., Puhakka H., & Meriläinen, M. (2014). Internet use and addiction among Finnish adolescents (15-19 years). *Journal of Adolescence*, *37*, 123-131. doi: 10.1016/j.adolescence.2013.11.008
- Strasburger, V. C., Jordan, A. B., & Donnerstein, E. (2010). Children, adolescents, and the media: Health effects. *Pediatric Clinics of North America*, *59*, 533-587. doi: 10.1016/j.pcl.2012.03.025
- Strassberg, D. S., McKinnon, R. K., Sustaita, M. A., & Rullo, J. (2013). Sexting by high school students: An exploratory and descriptive study. *Archives of Sexual Behavior*, *42*, 15-21. doi: 10.1007/s10508-012-9969-8
- Subrahmanyam, K., & Greenfield, P. (2008). Online communication and adolescent relationships. *The Future of Children*, *18*, 119-146. doi: 10.1353/foc.0.0006
- Svedin, G. C., Åkerman, I., & Priebe, G. (2011). Frequent users of pornography. A population based epidemiological study of Swedish male adolescents. *Journal of Adolescence*, *34*, 779-788. doi: 10.1016/j.adolescence.2010.04.010
- Temple, J. R., Paul, J. A., van den Berg, P., Le, V. D., McElhany, A., & Temple, B. W. (2012). Teen sexting and its association with sexual behaviors. *Archives of Pediatrics & Adolescent Medicine*, *166*, 828-833. doi: 10.1001/archpediatrics.2012.835
- Tsitsika, A., Critselis, E., Kormas, D., Konstantoulaki, E., Constantopoulos, A., & Kafetzis, D. (2009). Adolescent pornographic Internet site use: A multivariate regression analysis of the predictive factors of use and psychosocial implications. *CyberPsychology and Behavior*, *12*, 545-550. doi: 10.1089=cpb.2008.0346

- Tudge, J. R. H., Mokrova, I., Hatfield, B. E., & Karnik, R. B. (2009). Uses and misuses of Bronfenbrenner's bioecological theory of human development. *Journal of Family Theory and Review, 1*, 198-210. doi: 10.1111/j.1756-2589.2009.00026.x
- Valkenburg, P. M., Piotrowski, J. T., Hermanns, J., & de Leeuw, R. (2013). Developing and validating the perceived parental media mediation scale: A self-determination perspective. *Human Communication Research, 39*, 445-469. doi: doi:10.1111/hcre.12010
- van den Eijnden, R. J. J. M., Meerkerk, G., Vermulst, A. A., Spijkerman, R., & Engels, R. C. M. E. (2008). Online communication, compulsive Internet use, and psychological well-being among adolescents: A longitudinal study. *Developmental Psychology, 44*, 655-665. doi: 10.1037/0012-1649.44.3.655.
- van den Eijnden, R. J. J. M., Spijkerman, R., Vermulst, A. A., van Rooij, T. J., & Engels, R. C. M. E. (2009). Compulsive Internet use among adolescents: Bidirectional parent-child relationships. *Journal of Abnormal Child Psychology, 38*, 77-89. doi: 10.1007/s10802-009-9347-8
- Van Ouytsel, J., Van Gool, E., Ponnet, K., & Walrave, M. (2014). Brief report: The association between adolescents' characteristics and engagement in sexting. *Journal of Adolescence, 37*, 1387-1391. doi: 10.1016/j.adolescence.2014.10.004
- Vanden Abeele, M. K., Campbell, S. W., Eggermont, S., & Roe, K. (2014). Sexting, mobile porn use, and peer group dynamics: Boys' and girls' self-perceived popularity, need for popularity, and perceived peer pressure. *Media Psychology, 17*, 6-33. doi: 10.1080/15213269.2013.801725

- Vaterlaus, J. M., Beckert, T., & Bird, C. V. (2015). "At a certain age it's not appropriate to monitor one's child": Perceptions of parental mediation of emerging adult interactive technology use. *Emerging Adulthood, 3*, 353-358. doi: 10.1177/2167696815581277.
- Vaterlaus, J. M., Beckert, T. E., Tulane, S., & Bird, C. (2014). "They always ask what I'm doing and who I'm talking to": Parental mediation of adolescent interactive technology use. *Marriage & Family Review, 50*, 691-713. doi: 10.1080/01494929.2014.938795
- Walker, S., Sanci, L., & Temple-Smith, M. (2013). Sexting: Young women's and men's views on its nature and origins. *Journal of Adolescent Health, 52*, 697-701. doi: 10.1016/j.jadohealth.2013.01.026
- Walrave, M., Heirman, W., & Hallam, L. (2014). Under pressure to sext? Applying the theory of planned behaviour to adolescent sexting. *Behaviour & Information Technology, 33*, 86-98. doi: 10.1080/0144929X.2013.837099
- Wang, R., Bianchi, S. M., & Raley, S. B. (2005). Teenagers' Internet use and family rules: A research note. *Journal of Marriage and Family, 67*, 1249-1258. doi: 10.1111/j.1741-3737.2005.00214.x
- West, M., Rose, S., Spreng, S., Sheldon-Keller, A., & Adam, K. (1998). Adolescent Attachment Questionnaire: A brief assessment of attachment in adolescence. *Journal of Youth and Adolescence, 27*, 661-673. doi: 10.1111/j.1532-7795.2010.00655.x

- Widyanto, L., & McMurrin, M. (2004). The psychometric properties of the Internet Addiction Test. *CyberPsychology & Behavior*, 7, 443-450. doi: 10.1089/cpb.2004.7.443
- Williams, A. L., & Merten, M. J. (2011). iFamily: Internet and social media technology in the family context. *Family & Consumer Sciences Research Journal*, 40, 150-170. doi: 10.1111/j.1552-3934.2011.02101.x
- Wolak, J., Mitchell, K., & Finkelhor, D. (2007). Unwanted and wanted exposure to online pornography in a national sample of youth Internet users. *Pediatrics*, 119, 247-257. doi: 10.1542/peds.2006-1891
- Ybarra, M. L., & Mitchell, K. J. (2005). Exposure to Internet pornography among children and adolescents: A national survey. *CyberPsychology and Behavior*, 8, 473-486. doi: 10.1089/cpb.2005.8.473
- Ybarra, M. L., & Mitchell, K. J. (2014). "Sexting" and its relation to sexual activity and sexual risk behavior in a national survey of adolescents. *Journal of Adolescent Health*, 55, 757-764. doi: 10.1016/j.jadohealth.2014.07.012
- Yen, J.-Y., Yen, C.-F., Chen, C.-C., Chen, S.-H., & Ko, C.-H. (2007). Family factors of Internet addiction and substance use experience in Taiwanese adolescents. *CyberPsychology & Behavior*, 10, 323-329. doi: 10.1089/cpb.2006.9948
- Young, K. (1998). Internet addiction: The emergence of a new clinical disorder. *Cyberpsychology and Behavior*, 1, 237-244. doi: 10.1089/cpb.1998.1.237

Young, K. (2007). *Assessment of Internet addiction*. Bradford, PA: The Center for Internet Addiction Recovery. Retrieved from

[http://www.icsao.org/fileadmin/Divers\\_papiers/KYoung-internetaddiction5.pdf](http://www.icsao.org/fileadmin/Divers_papiers/KYoung-internetaddiction5.pdf)

Yurgelun-Todd, D. (2007). Emotional and cognitive changes during adolescence.

*Current Opinion in Neurobiology*, 17, 251-257. doi: 10.1016/j.conb.2007.03.009

**APPENDICES**

**Appendix A**

Questionnaire Parent Invitation

Dear Friend,

We are conducting a research study to find out more about adolescent technology use and are looking for teenage Internet users between the ages of 13-18 who are in junior high or high school to participate in an anonymous online survey. The survey will take approximately 15 minutes to complete.

The purpose of the study is to examine the relationship between teens' use of Internet-enabled mobile devices and engaging in risky digital behaviors, such as problematic Internet use, pornography viewing, and their estimation of the prevalence and frequency of sexting among teens. Would you help us by asking your teenage children to participate in the study? Before they can participate, you will need to visit [this link](#), which will review the specifics of the study (provide you with a copy of the questions of the study so you can see what your child will be answering) and give you further instructions.

It would also be very helpful if you could forward this message to other parents that you know who have teenage children, and/or by posting the advertisement attached to this message to your social media accounts.

Thank you for your assistance.

Ryan Atwood  
Ph.D. Candidate  
Utah State University  
[atwoodryanm@gmail.com](mailto:atwoodryanm@gmail.com)  
801-425-1191

Troy Beckert, Ph.D.  
Associate Professor  
Utah State University  
[troy.beckert@usu.edu](mailto:troy.beckert@usu.edu)  
435-797-1570

**Appendix B**

Informed Consent

**Introduction**

Under the supervision of Dr. Troy Beckert in the Department of Family, Consumer, and Human Development at Utah State University, doctoral candidate Ryan Atwood is conducting a research study to examine the impact of Internet-enabled mobile devices on teenagers' behavior. Specifically, this research examines problematic Internet usage (e.g. Internet addiction), and behaviors like sexting and pornography access as related to parental involvement with their children's Internet access. Approximately 130 participants between the ages of 13 and 18 will take part in this confidential survey.

**Procedures**

If you agree to have your child participate, we will email you a link to an online survey for your child to take. The survey software has been instructed not to capture any identifying information about your child, but also will not allow the same device to access the survey more than once in order to ensure confidentiality. The survey will ask general demographic questions like age, family structure, gender, religious affiliation and commitment, Internet-enabled device ownership, etc.

Participants will also be asked to provide information about risky digital behaviors such as pornography use and sexting. Examples of questions regarding these behaviors include: "How often in the past 12 months have you INTENTIONALLY (you sought it out) viewed pornographic media" and "How many times in the last 12 months has another teenager asked you to send a nude or nearly nude photo of yourself". Please bear in mind that we cannot access your teen's responses once they are submitted – his or her responses will be completely confidential. The survey should take less than 15 minutes to complete.

**Benefits & Risks**

We hope that this research study will help researchers understand the ways that teenagers are using newer forms of technology and the relationship between teens' use of interactive technology and other online behaviors. No direct benefits to you or your child are anticipated.

The biggest risk inherent in this study is loss of confidentiality. Another risk is that your child might feel uncomfortable responding to questions in some of the topic areas outlined above, like sexting and pornography access. You will see in the Confidentiality section, below, that we have taken steps to minimize these risks. Another potential risk is

coercion, given that you will send the survey link to your child. Please do not pressure your child into responding to this survey.

### **Confidentiality**

Survey data will be kept confidential, consistent with federal and state regulations. Only the researchers involved with this study will have access to the data, which will be housed in a secure survey distribution software database until such a time as the researchers export the anonymous data. Once data is exported, it will be kept in a secure, encrypted file in Utah State University's Box.com account.

The researchers have specifically set the survey software, Qualtrics, such that it will collect no identifying information from survey respondents (including IP addresses or the email address the link came from). Further, while responses are requested for every item in the survey, your child can proceed through the survey while skipping any questions they do not want to answer. They will be notified of this prior to the start of the survey.

### **Voluntary Nature of Participation and Right to Withdraw without Consequence**

Participation in this survey is completely voluntary. Participants may refuse to participate or withdraw at any time without consequence.

### **Explanation & offer to answer questions**

If you have any questions or research-related concerns before or after providing consent for your child's participation, contact Ryan Atwood at [atwoodryanm@gmail.com](mailto:atwoodryanm@gmail.com) or Troy Beckert at [troy.beckert@usu.edu](mailto:troy.beckert@usu.edu).

### **IRB Approval Statement**

The Institutional Review Board (IRB) for the protection of human participants at Utah State University has approved this research study. If you have any questions or concerns about your rights or a research-related inquiry and would like to contact someone other than the research team, you may contact the IRB Director at (435) 797-0567 or email [irb@usu.edu](mailto:irb@usu.edu) to obtain information or to offer input.

### **Investigator Statement**

"I, Troy Beckert, certify that information about the nature and purpose, the possible risks and benefits associated with taking part in this research study has been provided to the

individual, by me or my research staff through this form, and that the individual has had the opportunity to ask and receive answers to any questions that have been raised.”

**Copy of Consent**

Please print a copy of this consent form and keep for your records.

**Parent/Guardian Consent**

You will affirm that you consent to your son or daughter’s participation in this survey by contacting the researcher, Ryan Atwood, at [atwoodryanm@gmail.com](mailto:atwoodryanm@gmail.com) and stating that you give permission for your son or daughter to participate.

Upon reception of this email, the researcher will reply with a link to the survey that you may forward to your son or daughter.



**Troy E. Beckert, Principal Investigator**

[troy.beckert@usu.edu](mailto:troy.beckert@usu.edu)

(435) 797-1570



**Ryan Atwood, Student Researcher**

[atwoodryanm@gmail.com](mailto:atwoodryanm@gmail.com)

(801) 425-1191

**Appendix C**

Social Media Advertisement

# GOT 10 MINUTES?



**Utah State University is looking for teenagers between the ages of 13-17 to participate in an online survey about Internet-enabled mobile devices.**

**For more information, please visit [www.UsuSurvey.com](http://www.UsuSurvey.com). You may also contact the researcher at [atwoodryanm@gmail.com](mailto:atwoodryanm@gmail.com)**

This survey will be used for the research of Ryan Atwood and is under the direction of Troy Beckert ([troy.beckert@usu.edu](mailto:troy.beckert@usu.edu)). The purpose of this study is to examine associations between teens' use of Internet-enabled mobile devices and engaging in risky digital behaviors such as problematic Internet use, pornography, and sexting. Parental permission is required in order to participate.

**Appendix D**

Participant Webpage Content

Thank you for being willing to participate in this study. The survey will only take about 15 minutes and will be completely anonymous, meaning that you will not provide your name. You will be asked questions regarding your use of technology, along with some items relating to your family dynamics.

Before you can participate, we will need your parent's permission. This can be done by having one of your parents visit [this link](#).

You can also submit your parent's email address in the box below and the researchers will contact your parents for you.

Enter your parent's email address in the box below

**Parent's Email Address**

Submit

**Appendix E**

Participant Assent Form

**Introduction**

Under the supervision of Dr. Troy Beckert in the Department of Family, Consumer, and Human Development at Utah State University, doctoral candidate Ryan Atwood is conducting a research study to examine the impact of Internet-enabled mobile devices on teenager behavior. Specifically, this research examines problematic Internet usage (e.g. Internet addiction), and behaviors like sexting and pornography access as related to parental involvement with their children's Internet access. Approximately 130 participants between the ages of 13 and 18 will take part in this confidential survey.

**Procedures**

If you agree to participate, your parent or legal guardian will email you a link to an online survey for you to take. The survey software has been instructed not to capture any identifying information about you, and it will not allow the same device to access the survey more than once in order to ensure your confidentiality. The survey will ask general demographic questions like age, family structure, gender, religious affiliation and commitment, Internet-enabled device ownership, etc.

You will also be asked to provide information about risky digital behaviors such as pornography use and sexting. Examples of questions regarding these behaviors include: "How often in the past 12 months have you INTENTIONALLY (you sought it out) viewed pornographic media" and "How many times in the last 12 months has another teenager asked you to send a nude or nearly nude photo of yourself". Please bear in mind that we cannot access your specific responses once they are submitted – your responses will be completely confidential.

The survey should take less than 15 minutes to complete.

**Benefits & Risks**

We hope that this research study will help researchers understand the ways that teenagers are using newer forms of technology and the relationship between teens' use of interactive technology and other online behaviors. No direct benefits to you are anticipated.

The biggest risk inherent in this study is loss of confidentiality. Another risk is that you might feel uncomfortable responding to questions in some of the topic areas outlined above, like sexting and pornography access. You will see in the Confidentiality section, below, that we have taken steps to minimize these risks. Another potential risk is

coercion, given that the survey link will be sent to you from your parent. Please do not feel pressured to participate in this survey if you do not want to.

**Confidentiality**

Survey data will be kept confidential, consistent with federal and state regulations. Only the researchers involved with this study will have access to the data, which will be housed in a secure survey distribution software database until such a time as the researchers export the anonymous data. Once data has been pulled from that software, it will be kept in a secure, encrypted file in Utah State University's Box.com account.

The researchers have specifically set the survey software, Qualtrics, such that it will collect no identifying information from survey respondents (including IP addresses or the email address the link came from). As you proceed through the survey, please remember that you are not compelled to respond to any question that makes you feel uncomfortable.

**Voluntary Nature of Participation and Right to Withdraw without Consequence**

Participation in this survey is completely voluntary. You may refuse to participate or withdraw at any time without consequence.

**Explanation & offer to answer questions**

If you have any questions or research-related concerns before or after participating, please contact Ryan Atwood at [atwoodryanm@gmail.com](mailto:atwoodryanm@gmail.com) or Troy Beckert at [troy.beckert@usu.edu](mailto:troy.beckert@usu.edu).

**IRB Approval Statement**

The Institutional Review Board (IRB) for the protection of human participants at Utah State University has approved this research study. If you have any questions or concerns about your rights or a research-related inquiry and would like to contact someone other than the research team, you may contact the IRB Director, Nicole, at (435) 797-0567 or email [irb@usu.edu](mailto:irb@usu.edu) to obtain information or to offer input.

**Investigator Statement**

"I, Troy Beckert, certify that information about the nature and purpose, the possible risks and benefits associated with taking part in this research study has been provided to the

individual, by me or my research staff through this form, and that the individual has had the opportunity to ask and receive answers to any questions that have been raised.”

**Copy of Consent**

Please print a copy of this assent form and keep it for your records.

**Assent**

By clicking continue below, you affirm that you are between the age of 13 – 18, that your parent has given you permission to participate in this survey, and that you are participating because you want to, not just because your parent said you could.



Troy E. Beckert, Principal Investigator  
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(435) 797-1570



Ryan Atwood, Doctoral Candidate  
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(801) 425-1191

**Appendix F**

Questionnaire

- (1) What is your age?  
a. 13   b. 14   c. 15   d. 16   e. 17   f. other \_\_\_\_\_
- (2) What is your grade in school?  
a. 7   b. 8   c. 9   d. 10   e. 11   f. 12   g. other \_\_\_\_\_
- (3) What is your gender?  
a. Male  
b. Female
- (4) Do you live with both your mother and father (biological or adoptive)?  
a. Yes  
b. No
- (5) Are your mother and father married to each other?  
a. Yes  
b. No

**Ask if Q5 = No**

- (6) Which of the following reasons best describes why your mother and father are not married to each other?
  - a. They were divorced
  - b. They are separated
  - c. My mother or father has died
  - d. They were never married
  - e. I do not know my biological parents
  - f. I do not know the reason
- (7) What is your present religion, if any?
  - a. Protestant (Baptist, Methodist, Nondenominational, Lutheran, Presbyterian, Pentecostal, Episcopalian, Reformed, Church of Christ, Jehovah's Witness, Nondenominational, etc.)
  - b. Roman Catholic
  - c. Mormon (The Church of Jesus Christ of Latter-day Saints)
  - d. Orthodox (Greek, Russian, etc.)
  - e. Jewish
  - f. Muslim (Islam)
  - g. Buddhist
  - h. Hindu

- i. Atheist (do not believe in God)
  - j. Something else
  - k. Nothing in particular
- (8) How committed would you say that you are to the teachings and practices of your religion or your spiritual convictions?
- a. Very committed
  - b. Mostly committed
  - c. Moderately committed
  - d. Somewhat committed
  - e. Not at all committed
- (9) Do you own a mobile phone?
- a. Yes
  - b. No

**Ask if Q9 = Yes**

- (10) Is your mobile phone a smartphone that can connect to the Internet and download apps?
- a. Yes
  - b. No
- (11) How many mobile devices do you own that can connect to the Internet (such as a mobile phone, iPad, other tablet, iPod touch, Gameboy Advance, etc....)?
- a. 0
  - b. 1
  - c. 2
  - d. 3
  - e. 4
  - f. 5 or more

**Ask if Q11 > 0**

- (12) How long have you owned at least one mobile device that can connect to the Internet?
- a. Less than one year
  - b. 1 Year
  - c. 2-4 Years
  - d. 5 or More Years

**The next set of questions will ask about things related to your online behaviors. Keep in mind that “online” refers to any activity where you are connected to the Internet, including Google and other websites, as well as any apps that you can**

**download to your mobile or tablet devices, such as Facebook, Instagram, Snapchat, Twitter, Netflix, or YouTube.**

- (13) What do you most frequently use to connect to the Internet?
- Desktop or laptop computer
  - Smartphone
  - Tablet device such as iPad, Samsung Galaxy, or Kindle Fire
  - iPod Touch or other MP3 Player
  - Other Internet connected device

On average, how often would you say that you use the Internet each day on the following devices?

- (14) Desktop or laptop computer
- |                         |                           |
|-------------------------|---------------------------|
| a. Never                | b. Less than once per day |
| c. 1-15 minutes per day | d. 15-60 minutes per day  |
| e. 1-2 hours per day    | f. Over 2 hours per day   |
- (15) Smartphone
- |                         |                           |
|-------------------------|---------------------------|
| a. Never                | b. Less than once per day |
| c. 1-15 minutes per day | d. 15-60 minutes per day  |
| e. 1-2 hours per day    | f. Over 2 hours per day   |
- (16) Tablet device such as iPad, Samsung Galaxy, or Kindle Fire?
- |                         |                           |
|-------------------------|---------------------------|
| a. Never                | b. Less than once per day |
| c. 1-15 minutes per day | d. 15-60 minutes per day  |
| e. 1-2 hours per day    | f. Over 2 hours per day   |
- (17) iPod Touch or other MP3 player
- |                         |                           |
|-------------------------|---------------------------|
| a. Never                | b. Less than once per day |
| c. 1-15 minutes per day | d. 15-60 minutes per day  |
| e. 1-2 hours per day    | f. Over 2 hours per day   |
- (18) Other Internet connected device
- |                         |                           |
|-------------------------|---------------------------|
| a. Never                | b. Less than once per day |
| c. 1-15 minutes per day | d. 15-60 minutes per day  |
| e. 1-2 hours per day    | f. Over 2 hours per day   |
- (19) Do you find that you are staying online longer than you intended?

- a. Never b. Rarely c. From time to time d. Quite often e. Very often
- (20) Have you neglected homework because you are spending more time online?  
a. Never b. Rarely c. From time to time d. Quite often e. Very often
- (21) Have you been reprimanded or scolded by your parents or your friends about how much time you spend online?  
a. Never b. Rarely c. From time to time d. Quite often e. Very often
- (22) Have you lost sleep due to being online late at night?  
a. Never b. Rarely c. From time to time d. Quite often e. Very often
- (23) Do you feel nervous or anxious when you are offline and is that feeling relieved when you go back online?  
a. Never b. Rarely c. From time to time d. Quite often e. Very often
- (24) Have you chosen to spend more time online rather than going out with your friends?  
a. Never b. Rarely c. From time to time d. Quite often e. Very often

**Please answer the following questions about the parent or guardian who you would say took care of you the most from the time you were born until you were five years old.**

- (25) I am confident that my parent will listen to me  
a. Strongly Agree b. Agree c. Neither agree nor disagree  
d. Disagree e. Strongly Disagree
- (26) I am confident that my parent will try to understand my feelings  
a. Strongly Agree b. Agree c. Neither agree nor disagree  
d. Disagree e. Strongly Disagree
- (27) I talk things over with my parent.  
a. Strongly Agree b. Agree c. Neither agree nor disagree  
d. Disagree e. Strongly Disagree
- (28) My parent only seems to notice me when I am angry  
a. Strongly Agree b. Agree c. Neither agree nor disagree  
d. Disagree e. Strongly Disagree

- (29) I often feel angry with my parent without knowing why  
a. Strongly Agree      b. Agree      c. Neither agree nor disagree  
d. Disagree      e. Strongly Disagree
- (30) I get annoyed at my parent because it seems I have to demand his or her care and support  
a. Strongly Agree      b. Agree      c. Neither agree nor disagree  
d. Disagree      e. Strongly Disagree
- (31) I enjoy helping my parent whenever I can  
a. Strongly Agree      b. Agree      c. Neither agree nor disagree  
d. Disagree      e. Strongly Disagree
- (32) I feel for my parent when he or she is upset  
a. Strongly Agree      b. Agree      c. Neither agree nor disagree  
d. Disagree      e. Strongly Disagree
- (33) It makes me feel good to be able to do things for my parent.  
a. Strongly Agree      b. Agree      c. Neither agree nor disagree  
d. Disagree      e. Strongly Disagree

How often in the past six months has one of your parents or guardians done the following?

- (34) Forbidden or blocked certain websites or apps that you might use  
a. Never      b. Seldom      c. About Half the Time  
d. Usually      e. Always      f. Don't Know
- (35) Restricted the amount of time you spend online  
a. Never      b. Seldom      c. About Half the Time  
d. Usually      e. Always
- (36) Monitored or tracked what you are doing online, such as tracking your Facebook page or checking your search history  
a. Never      b. Seldom      c. About Half the Time  
d. Usually      e. Always      f. Don't Know
- (37) Talked to you about what is appropriate and inappropriate to view on the Internet or mobile devices  
a. Never      b. Seldom      c. About Half the Time  
d. Usually      e. Always

- (38) Talked to you about how to behave with people on the Internet or on mobile devices
- |            |           |                        |
|------------|-----------|------------------------|
| a. Never   | b. Seldom | c. About Half the Time |
| d. Usually | e. Always |                        |
- (39) Talked to you about things that you have seen on the Internet or on a mobile device
- |            |           |                        |
|------------|-----------|------------------------|
| a. Never   | b. Seldom | c. About Half the Time |
| d. Usually | e. Always |                        |

**The next section will contain questions asking about your exposure to pornographic media. Pornographic media can be generally defined as images or videos of people naked or having sex which are intended to cause sexual arousal.**

*Keep in mind that answering any question in this survey is voluntary but is private and every effort will be made to keep your responses confidential.*

How often in the past 12 months have you **ACCIDENTALLY** (you did not seek it out) viewed pornographic media in the following situations?

- (40) In books or magazines
- |                       |                          |
|-----------------------|--------------------------|
| a. Not at all         | b. Once                  |
| c. A few times        | d. 1-2 times per month   |
| e. 1-2 times per week | f. Several times per day |
- (41) On television or movies
- |                       |                          |
|-----------------------|--------------------------|
| a. Not at all         | b. Once                  |
| c. A few times        | d. 1-2 times per month   |
| e. 1-2 times per week | f. Several times per day |
- (42) Using email or other forms of online communication
- |                       |                          |
|-----------------------|--------------------------|
| a. Not at all         | b. Once                  |
| c. A few times        | d. 1-2 times per month   |
| e. 1-2 times per week | f. Several times per day |
- (43) On a mobile device, such as a phone, tablet, or mp3 player
- |                |                        |
|----------------|------------------------|
| a. Not at all  | b. Once                |
| c. A few times | d. 1-2 times per month |

- e. 1-2 times per week                      f. Several times per day
- (44) While searching the Internet
- a. Not at all                                      b. Once
- c. A few times                                    d. 1-2 times per month
- e. 1-2 times per week                          f. Several times per day
- (45) From media saved to your laptop or desktop computer
- a. Not at all                                      b. Once
- c. A few times                                    d. 1-2 times per month
- e. 1-2 times per week                          f. Several times per day

How often in the past 12 months have you *INTENTIONALLY* (you sought it out) viewed pornographic media in the following situations?

- (46) In books or magazines
- a. Not at all                                      b. Once
- c. A few times                                    d. 1-2 times per month
- e. 1-2 times per week                          f. Several times per day
- (47) On television or movies
- a. Not at all                                      b. Once
- c. A few times                                    d. 1-2 times per month
- e. 1-2 times per week                          f. Several times per day
- (48) Using email or other forms of online communication
- a. Not at all                                      b. Once
- c. A few times                                    d. 1-2 times per month
- e. 1-2 times per week                          f. Several times per day
- (49) On a mobile device, such as a phone, tablet, or mp3 player
- a. Not at all                                      b. Once
- c. A few times                                    d. 1-2 times per month
- e. 1-2 times per week                          f. Several times per day
- (50) While searching the Internet
- a. Not at all                                      b. Once
- c. A few times                                    d. 1-2 times per month
- e. 1-2 times per week                          f. Several times per day

- (51) From media saved to your laptop or desktop computer
- |                       |                          |
|-----------------------|--------------------------|
| a. Not at all         | b. Once                  |
| c. A few times        | d. 1-2 times per month   |
| e. 1-2 times per week | f. Several times per day |

**The final section will contain a few questions about sexting. Sexting can be generally defined as using digital devices (such as a computer, phone, or other mobile device) to send or show sexual pictures or videos of yourself in which you are nude or nearly nude, or to engage in sexual conversations with other people.**

*Once again, remember that answering any question in the survey is voluntary but this survey is private and every effort will be made to keep your responses confidential.*

- (52) In your opinion, which of the following choices most accurately represents the percentage of teens between the ages of 13-17 who have participated in sexting in the past 12 months?
- a. Very few   b. About 25%   c. About half   d. About 75%   e. Nearly all
- (53) In your opinion, how frequently do you think the average teen participates in sexting?
- a. Never   b. Rarely   c. From time to time   d. Quite often   e. Very often
- (54) Which method do you think teens most commonly use to participate in sexting?
- |                     |  |
|---------------------|--|
| a. Text or iMessage | b. Email or direct messages                      |
| c. Snapchat         | d. Video chat services such as FaceTime or Skype |
| e. Other            | f. I don't know                                  |
- (55) How many times in the past 12 months have you **BEEN ASKED** by another teen to digitally (on a computer, phone, or other mobile device) send or show a sexual picture or video of yourself in which you were nude or nearly nude?
- |                       |                        |
|-----------------------|------------------------|
| a. Not at all         | b. Once                |
| c. A few times        | d. 1-2 times per month |
| e. 1-2 times per week | f. Almost daily        |

How likely would you be to send or show sexual pictures or videos of yourself in which you were nude or nearly nude if you were asked by the following people:

- (56) Someone you do not know

- |                  |                |            |
|------------------|----------------|------------|
| a. Very unlikely | b. Unlikely    | c. Neutral |
| d. Likely        | e. Very likely |            |

(57) A friend or acquaintance of yours who is not your boyfriend/girlfriend

- |                  |                |            |
|------------------|----------------|------------|
| a. Very unlikely | b. Unlikely    | c. Neutral |
| d. Likely        | e. Very likely |            |

(58) A boyfriend/girlfriend

- |                  |                |            |
|------------------|----------------|------------|
| a. Very unlikely | b. Unlikely    | c. Neutral |
| d. Likely        | e. Very likely |            |

**Appendix G**

IRB Approval Letter



## Institutional Review Board

USU Assurance: FWA#00003308

### Expedite #7 Letter of Approval



FROM: Melanie Domenech Rodriguez, IRB  
Chair  
Nicole Vouvalis, IRB Administrator

To: Troy Beckert, Ryan Atwood  
Date: August 11, 2015  
Protocol #: 6874  
Title: The Relationship Between Adolescents' Use Of Internet-Enabled Mobile Devices And Engaging In Problematic Digital Behaviors II  
Risk: Minimal risk

Your proposal has been reviewed by the Institutional Review Board and is approved under expedite procedure #7 (based on the Department of Health and Human Services (DHHS) regulations for the protection of human research subjects, 45 CFR Part 46, as amended to include provisions of the Federal Policy for the Protection of Human Subjects, November 9, 1998):

Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies. This approval applies only to the proposal currently on file for the period of one year. If your study extends beyond this approval period, you must contact this office to request an annual review of this research. Any change affecting human subjects must be approved by the Board prior to implementation. Injuries or any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Institutional Review Board.

This approval applies only to the proposal currently on file for the period of one year. If your study extends beyond this approval period, you must contact this office to request an annual review of this research. Any change affecting human subjects must be approved by the Board prior to implementation. Injuries or any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Institutional Review Board.

Prior to involving human subjects, properly executed informed consent must be obtained from each

subject or from an authorized representative, and documentation of informed consent must be kept on file for at least three years after the project ends. Each subject must be furnished with a copy of the informed consent document for their personal records.

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WEB: [irb.usu.edu](http://irb.usu.edu)

## CURRICULUM VITAE

**Ryan M. Atwood**

Email: atwoodryanm@gmail.com

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### **Education:**

- 2016 Ph.D. Family and Human Development; Utah State University  
 Expected date of completion: May 2016  
 Dissertation: *The Relationship between Adolescents' use of Internet-enabled Mobile Devices and Engaging in Problematic Digital Behaviors*
- 2011 M.Ed. Curriculum and Instruction; Weber State University  
 Thesis: *The Impact of Cooperative Learning in an LDS Seminary Classroom*
- 2007 B.S. Accounting; Brigham Young University-Idaho

### **Employment and Related Experience:**

- 2014-Present Instructor, North Davis Jr. High LDS Seminary, Clearfield, UT
- Summer 2014 Graduate Instructor, Department of Family, Consumer, and Human Development. FCHD 1500 (Human Development Across the Lifespan), Utah State University, Logan, UT
- 2013-2014 Instructor, Clearfield LDS Seminary, Clearfield, UT
- 2008-2013 Instructor, Davis LDS Seminary, Kaysville, UT
- 2007-2008 Instructor, Bonneville LDS Seminary, Ammon, ID

### **Teaching Experience:**

- Undergraduate FCHD 1500: Human Development Across the Lifespan
- High School Doctrine and Covenants and Church History  
 Book of Mormon  
 Old Testament and Pearl of Great Price  
 New Testament

**Service to Community:**

- 2012-2013 Chartered Organization Representative, Boy Scouts of America, Troop 579, Roy, UT
- 2008-2011 Venturing Leader, Boy Scouts of America, Troop 579, Roy, UT