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Teen Perceptions Of Cell Phone And Internet Sexual Messaging: Trends And Predictors

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TEEN PERCEPTIONS OF CELL PHONE AND INTERNET SEXUAL MESSAGING: TRENDS AND PREDICTORS

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DEDICATION

To my father, whose spirit guides me each day toward a brighter future.

I'm grateful for his sacrifice, and wish him everlasting peace.

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CHAPTER 1 INTRODUCTION

Sexting refers to the act or acts of sending, receiving, or forwarding sexually explicit messages or images from one individual's cell phone or computer to another's (Klettke, Hallford, & Mellor, 2014). Sexually *explicit* images have been defined as those where the individual's exposed buttocks or genitals are visible in the photo (including breasts for females; Mitchell, Finkelhor, Jones, & Wolak, 2012; Strassberg, McKinnon, Sustaíta, & Rullo, 2013). The individual may be fully nude, partially nude, or simply lifting articles of clothing to reveal private areas of the body. Sexually *suggestive* content has typically referred to text-only messages (Peskin, Markham, Addy, Shegog, Thiel, & Tortolero, 2013). Text-only messages usually take the form of commenting on one's sexual attractiveness (e.g., flirtation or foreplay; Drouin & Tobin, 2014), as well as requesting (Peskin et al., 2013) or arranging sexual encounters ("hook-ups;" Dir, Cyders, & Coskupinar, 2013).

The purpose of this study was to better understand key factors contributing to the occurrence of sexting among high school students in order to better identify adolescents who may be at risk of engaging in this behavior. Sexting among minors is a risk behavior that must be better understood by educators, parents, and adolescents alike. Minors can face criminal charges for production, possession, or distribution of child pornography. Individuals who share nude photos may suffer severe humiliation and distress by having their images posted on public forums for the entire world to see. Sexting has also been associated with increased sexual risk behavior and substance abuse. Information revealed by this study may help guide efforts to reduce sexting and minimize potential harm associated with this behavior.

Prevalence

One challenge in determining the prevalence of sexting is the inconsistent manner in which sexting has been defined and measured in prior research (Agustina & Gómez-Durán, 2012; Klettke et al., 2014; Ahern & Mechling, 2013). Not all studies have distinguished between sending and receiving sexts (e.g., Dake, Price, Maziarz, & Ward, 2012), nor between the use of sexual images and text-only messages (e.g., Lenhart, 2009). These behaviors may all be considered forms of sexting, though frequencies (Associated Press and Music Television [AP-MTV], 2009; Peskin et al., 2013) and associated risks (Klettke et al., 2014; Houck, Barker, Rizzo, Hancock, Norton, & Brown, 2014) tend to differ according to the specific form of sexting performed.

Indeed, adolescent sexting rates have been estimated to range from as low as 1% (Mitchell et al., 2012) to as high as 27.6% (Temple et al., 2012). Klettke et al. (2014) calculated an average prevalence of 11.96% for sending sexually explicit images among adolescent samples, and 48.56% among young adult or college samples. On average, 11.95% of adolescents between the ages 10 to 19 have reported receiving sexually explicit photos, and 15.46% reported receiving sexually explicit messages or photos (Klettke et al, 2014). Both messages and images were examined in the current study.

Sexting rates tend to increase as adolescents approach young adulthood (Cox Communications, 2009; AP-MTV, 2009; Mitchell et al., 2012). Most studies have found age to be positively correlated with sexting among adolescents (Klettke et al., 2014), reaching maximum rates as one approaches age 18 (Crimmins & Seigfried-Spellar, 2014; Dir, Cyders et al., 2013). Age is no longer associated with sexting prevalence in young adulthood (Benotsch Snipes, Martin, & Bull, 2013; Dir, Coskupinar, Steiner, & Cyders, 2013). In fact, older adults tend to report *less* sexting than younger adults (Wysocki & Childers, 2011). Some studies have not explicitly

distinguished adults from minors in their samples (e.g., Ferguson, 2011; Peskin et al., 2013; The National Campaign to Prevent Teen and Unplanned Pregnancy [NCPTUP], 2008), making age comparisons difficult to examine (Lounsbury, Mitchell, & Finkelhor, 2011). The current study focused on sexting among high school students.

Demographics

In addition to age, significant differences in sexting prevalence according biological sex have been found. Adolescent females have been more likely to report sending nude or semi-nude images of themselves to others (AP-MTV, 2009; Cox Communications, 2009; Mitchell et al., 2012; Strohmaier, Murphy & DeMatteo, 2014), and adolescent males were more likely to report receiving sexts (images *or* text messages) than females (Hinduja & Patchin, 2010). However, other studies have found no sex differences in sending nude photos to others (Hinduja & Patchin, 2010; Rice, Rhoades, Winetrobe, Sanchez, Montoya, & Kordic, 2012; Lenhart, 2009). Only one study found males to more often report sending nude or seminude images of themselves to others, and this study examined Belgian teens (Vanden Abeele, Campbell, Eggermont, & Roe, 2014)

In contrast, sex differences have not been found among most young adult samples (Benotsch et al., 2013; Drouin & Landgraff, 2012; Giroux, 2011; Henderson & Morgan, 2011; NCPTUP, 2008), with males and females participating to equal degrees. However, some studies found females to more often report sending nude images of themselves (AP-MTV, 2009; Englander, 2012), and males more often receiving them (AP-MTV, 2009; Dir, Cyders et al., 2013; Gordon-Messer, Bauermeister, Grodzinski, & Zimmerman, 2012). This suggests that young adult males may more often send sexually explicit messages and receive nude images from females in return (Drouin & Tobin, 2014). Males may be seeking to establish exchanges of sexual content with females.

Among adolescent samples, African Americans were more likely to sext than Caucasians or Hispanics (Dake et al., 2012; Rice et al., 2012; Peskin et al., 2013). Adolescents (Rice et al., 2012) and adults (Wysocki & Childers, 2011; Bauermeister, 2014) who identified as lesbian, gay, bisexual, or transgender were more likely to report engaging in sexting behavior. Among young adult samples, Caucasians (Benotsch et al., 2013) and white females (Wysocki & Childers, 2011) reported higher rates of sexting, and Asians and Pacific Islanders reported relatively lower sexting rates (Gordon-Messer et al., 2013). One study found no racial differences (Hudson, 2011).

Associated Risks of Sexting

Sexting itself is a risk behavior particularly among minors, as this behavior is illegal below age 18 (Chalfen, 2009), and has resulted in arrests (Calvert, 2014). These cases are relatively few, and tend to involve aggravating circumstances, such as sexual abuse or wide-spread distribution (Wolak, Finkelhor, & Mitchell, 2012). This leads to another major risk of sharing sexually explicit images, which is the possibility that these images may be publicly distributed without consent (AP-MTV, 2009; Siegle, 2010), resulting in humiliation (Strohmaier, 2014), bullying (AP-MTV, 2009; Siegle, 2010), depression (Dake et al., 2012), and occasional cases of suicide (Celizic, 2009; Kaye, 2010).

Sexting has been consistently associated with a higher likelihood of being sexually active among young adults (Dir, Cyders, et al., 2013; Giroux, 2011; Gordon-Messer et al., 2013) and adolescents (AP-MTV, 2009; Rice et al., 2012; Temple et al., 2012; Dake et al., 2012). It has also been associated with multiple sexual risk behaviors, including earlier sexual debut (Rice, Gibbs, Winetrobe, Rhoades, Plant, Montoya, & Kordic, 2014) higher number of sexual partners (Benotsch et al., 2013; Dake et al., 2012; Dir, Cyders, et al., 2013, Temple et al., 2012; Henderson & Morgan, 2011), unprotected sex (Benotsch et al., 2013; Dake, 2012; Ferguson, 2011), teen pregnancy (Rice

et al., 2014), sexually transmitted diseases (Benotsch et al., 2013; Rice et al., 2014), and consuming alcohol before engaging in sex (Benotsch et al., 2013; Temple, 2012). Sexting has also been associated with higher use of alcohol and other drugs (Benotsch et al., 2013; Dake et al., 2012; Dir, Cyders, et al., 2013).

Sexting may enable more frequent propositions and arrangements for sexual encounters among individuals predisposed to seek these scenarios out. Sexting has already been supported as a mediator between problematic alcohol consumption and sexual risk behavior among young adults (Dir, Cyders, et al., 2013). Cell phone communication can be very difficult for parents to monitor (Thomas, 2009), making unsanctioned communication more likely to occur undetected. Adolescents high in sensation seeking may more often use these communication channels to sext (Baumgartner, Sumter, Peter, Valkenburg, & Livingstone, 2014), and elicit or arrange sexual encounters that may not have otherwise occurred.

In general, those who have reported having sexted also reported positive attitudes toward sexting (Strassberg et al., 2013; Ferguson, 2011; Hudson, 2011; Weisskirch & Delevi, 2011; Woolard, 2011). Adults (Henderson, 2011; Drouin, Vogel, Surbeyi, & Stills, 2013) and adolescents (NCPTUP, 2008) have cited "to be sexy" or "flirtatious" as one of the primary reasons for sexting. Overall, findings suggest that sexting may generally be a harmless, adventurous behavior among young adults, but may leave younger or more vulnerable individuals subject to unwanted pressure (Englander, 2012), exploitation (e.g., unauthorized sharing; AP-MTV, 2009).

Etiology of Sexting

A large number of factors influencing the likelihood of teen sexting have been examined in previous literature. A risk model has been proposed by Dir, Koo, and Cyders (2013), which addresses potential influences of social learning theory and personality factors (i.e., 5-factor

model; McCrae & Costa, 1987; as cited in Dir, Koo, et al., 2013) in predicting sexting. The current study consolidated findings across the literature, and proposed and tested a theoretical predictive model for sexting that included the factors of social learning, peer pressure, self-esteem, frequency of electronic communication, and disinhibition as predictors. Demographic factors such as sex, race, and age were also be examined in forming this this model.

Social learning theory. Bandura's, (1977) social learning theory posits that behavior is learned by observing and imitating models, which may be real, imagined, or verbal descriptions of behavior and its consequences (Bandura, Blanchard, & Ritter, 1969). The more trusted or like-minded the model is, the more likely the observer will reenact behaviors that were *perceived* to result in desirable outcomes (Rosekrans, 1967). Therefore, measures of imitation need to include estimates of the model's perceived trustworthiness, influence, or significance to the observer.

Social learning is especially likely to occur among adolescent peers, due to an increased degree of peer influence at this age (Baumgartner, Valkenburg, & Peter, 2011). Walrave, Heirman, and Hallam (2013) found that the belief that sexting occurs among highly trusted friends was the most important belief associated with one's personal intention to sext. Hudson (2011) found similar results among college students. Interaction with deviant peers has also been associated with more teen sexting (Ricketts, Maloney, Marcum, & Higgins, 2014). These findings support the essential role of peer observation and imitation in the occurrence of sexting, similar to other risky behaviors (Weden & Zabin, 2005),

Social contagion theory (Scherer & Cho, 2003) is similar to social learning theory, but specifically addresses shared communication networks (Monge & Contractor, 1999). Social contagion theory states that "behaviors and perceptions initiated by one member of the network will influence others in the network… the more frequent the communication between two actors,

the more similar their attitudes are likely to be" (Scherer & Cho, 2003, p. 2). Developments in computer-mediated communication (CMC) have enabled both the possibility of sexting as well as access to larger communication networks. Therefore, adolescents are more likely to be exposed to attitudes favoring sexting, and may gradually approximate these viewpoints as they continue to interact with individuals who endorse sexting. Associations between observed peer sexting and sexting among high school students was examined in this study.

Peer pressure and self-esteem. Peer group dynamics theory (Taba, 1955) has been used to explain sexting among adolescents as a means of gaining social status and popularity (Vanden Abeele et al., 2014). This motivating factor is especially likely among emerging adolescents, who begin placing greater importance in peer approval at this age (Scholte & van Aken, 2006). Vanden Abeele et al. (2014) found that adolescents with a greater need for popularity were more likely to engage in sexting, girls were almost twice as likely to sext with each unit increase in need for popularity, where males were only 52% more likely. (Vanden Abeele et al., 2014). The need for popularity may leave some teens even more susceptible to peer pressure.

Teens report being pressured or coerced into sharing sexual images of themselves, particularly females (AP-MTV, 2009; Englander, 2012; Temple et al., 2012; Walrave et al., 2013). Walrave et al. (2013) found teens to report being pressured to sext most often by friends and romantic partners. Those who reported being pressured also reported more negative attitudes toward sexting (Walrave et al., 2013). This suggests that teens may experience regret when sexting under pressure. Teens may be especially susceptible to the effects of peer pressure if they also report low self-esteem (Ybarra, & Mitchell, 2014), or a need for peer acceptance (Vanden Abeele et al., 2014). Thus, self-esteem may moderate the associations between peer pressure and sexting,

as low self-esteem has been shown to be associated with adolescent susceptibility to peer pressure (Dielman, Campaneli, Shope, & Butchart, 1987).

Frequency of electronic communication. Drawing on the theory of technological determinism (Draper, 2012), it is possible that more frequent cell phone and social media use may expose teens to pro-sexting attitudes, as well as encouraging sexting itself. The more connected one is to a device, the more likely that device will be present when impulses occur. For instance, an adolescent could decide to send a sext out of boredom (Drouin, 2013), as a joke, or to flirt with a crush (NCPTUP, 2008) without fully considering the long-term consequences. Rice et al. (2014) found that teens who texted more than 100 times per day were significantly more likely to sext. Signs of internet addiction have also been associated with sexting (Ricketts et al., 2014).

Thomas (2009) found that 44% of teens have no parental-set limits using their electronic communication devices whatsoever. Limiting or budgeting monthly text messaging has been suggested to be more effective than attempting to monitor usage (Lenhart, 2009), though this has not been experimentally tested. It may simply be that the more involved a teen becomes with cell phone and social media use, the more likely that he or she will encounter opportunities to sext. The association between frequency of electronic communication and sexting was examined in this study.

Disinhibition. Another factor that may contribute to the occurrence of sexting may be disinhibition, which is an umbrella term for characteristics such as sensation seeking and impulsivity (Reynolds, Collado-Rodriguez, MacPherson, & Lejuez, 2013). Sensation seeking and impulsivity are historically studied together as closely related traits (Blackburn, 1969), and have previously been associated with sexual risk behaviors (Charnigo, Noar, Garnett, Crosby, Palmgreen, & Zimmerman, 2013) and drug addiction (Mezzich, Tarter, Feske, Kirisci, McNamee,

& Day, 2007). An association between sensation seeking and sexting was found in a large multinational European study (Baumgartner et al., 2014). Some research also supports associations between impulsivity and sexting (Rice et al., 2012), as well as impulsivity and sexual risk behavior (Dir, Cyders, et al., 2013; Temple et al., 2014).

Disinhibition may moderate the degree to which increased use of communication technology (technological determinism) will lead to sexting. The more connected one is to a communication device, the more likely the device will be accessible when impulsive inclinations occur. In other words, increased use of communication technology may explain increased chances of sexting when one is also high in disinhibitory traits. Frequency of electronic communication may be irrelevant to sexting if the individual is not also disinhibited. Measures of impulsivity and disinhibition were examined for associations with sexting.

Limitations of Prior Research

Extant research on sexting is exceptionally diverse, though more research measuring specific sexting behaviors among minors is needed. Theoretical models have been proposed, though none have been tested or replicated on a United States sample of adolescents. More information regarding the typical senders and receivers of sexually explicitly content is needed, as well as the demographic and social dynamics of sexting. Consistent measuring of specific sexting behaviors and associated predictors is also needed. It was determined that a comprehensive analysis examining the factors associated with sexting would greatly contribute to the existing knowledge base concerning sexting.

Purpose of Current Study

Sexting is a form of risk behavior (Jessor, 1992; Dir, Koo, et al., 2013) that can result in serious consequences, particularly among minors. The prevalence of sending nude photos tends to

range between one and two in every ten adolescents. This average could be higher, due to possible reluctance of adolescents to disclose such sensitive or incriminating information. Sexing may offer impulsive teens more convenient avenues to elicit and arrange sexual encounters with other teens, resulting in significant associations with sexual risk behavior and other associated risks. Sexting behavior must be better understood in order to improve existing efforts to reduce risk and prevent harm.

This study addressed the question of who is sexting whom, and for what reasons. Demographic variables were used as controls when significant associations with sexting were found. Described in the aforementioned literature review, the predictive variables examined in this study included social learning (peer influence, approval, & behavior), peer pressure, self-esteem, frequency of electronic communication, and disinhibition. The following research questions were proposed:

Question 1: What are the rates of sexting among teens? Who are the most common sexting recipients among teens? Are there significant differences by sex or race among measured variables (sexting, self-esteem, frequency of electronic communication, peer pressure, peer sexting, impulsivity, peer sexting influence)?

Question 2: Do teens sext more often when they: a) are of older age; b) use social media more often; c) observe their peers sexting more frequently; d) believe their peers approve of them sexting; e) feel pressured by their peers to sext; and f) are more impulsive?

Question 3: Do the predictor variables (peer sexting, peer pressure, peer sexting influence, self-esteem, disinhibition, and frequency of electronic communication) explain a statistically significant amount of variance in sexting beyond that of demographic factors?

Question 4: Are teens with low self-esteem more likely to send sexts when pressured by their peers, and are teens high in disinhibition more likely to send sexts if they more frequently use electronic communication?

Question 5: Do the predictor variables (peer sexting, peer pressure, peer sexting influence, self-esteem, disinhibition, and frequency of electronic communication) adequately fit a comprehensive prediction model, and does this model differ in predictive strength by sex?

It was expected that more females would report sending nude or semi-nude photos, and more males would report sending sexually explicit messages and receiving sexually explicit images. Age was expected to be positively correlated with sexting. Awareness of peer sexting, peer pressure, access to communication technology, and disinhibition were expected to be associated with more frequent sexting. Self-esteem was expected to moderate the effects of peer pressure on likelihood of sexting, and disinhibition was expected to moderate frequency of electronic communication on the likelihood of sexting. Finally, it was expected that the variables included in this study would adequately fit a comprehensive predictive model. The variables included age, sex, social learning, self-esteem, peer pressure, disinhibition, and frequency of electronic communication use.

Significance

This study contributes greatly to existing literature by providing additional information regarding the motivations, circumstances, and experiences of teen sexting. The findings provide a point of reference for future research to design and implement school-wide and family preventative services for sexting as well as general risks associated with communication technology. This study also contributes to current theory addressing whether social learning and disinhibition may be associated with sexting.

CHAPTER 2 LITERATURE REVIEW

The first quantitative studies addressing sexting were conducted in 2008 and 2009. Most of these studies were large-sample surveys addressing multiple aspects of internet safety, and were conducted by nonprofit research organizations (NCPTUP, 2008; Lenhart, 2009) and corporate affiliations (AP-MTV, 2009; Thomas 2009). Most were not published in peer-reviewed journals. The methods and results of these initial studies tended to vary, creating a degree of uncertainty regarding the definition and frequency of sexting. Peer reviewed publications using larger samples began to emerge in 2011 (Wysocki & Childers, 2011), and have grown in number ever since. However, a large number of published studies have used undergraduate samples of convenience, which may not be adequately representative.

This review includes an introduction to sexting as a form of risk behavior, particularly among adolescents. Basic definitions of sexting behavior are provided in chapter 1. Thereafter, an expansion of the literature pertaining to the prevalence, demographic trends, and associated risks of sexting is provided. Separate focus will be given to adults and adolescents, as age has been shown to significantly influence these factors (Klettke et al., 2014). Finally, the theoretical underpinnings of the proposed etiological factors will be addressed.

Adolescent Risk Behavior and Sexting

Risk-taking is a type of stimulating, exciting, or otherwise rewarding behavior that entails an element of danger, potential harm, or the possibility of being caught and punished (Jessor, 1992). Adolescent risk behavior is described as purposeful and with a particular goal in mind. Erikson (1950) views the time of adolescence as a critical period for identity formation. Curiosity and experimentation with different values, beliefs, and behaviors often occur during adolescence. Sexuality also emerges during this time (Henderson & Morgan, 2011), which may explain why young individuals would experiment with flirtatious behavior such as sexting.

Adolescents have demonstrated significantly more risk-taking behavior than older age groups (Husain & Cantwell, 1991). Some believe this is due to the gradual development of the frontal cortex, the area of the brain responsible for reasoning and impulse control (Farley & Reyna, 2006). The frontal cortex is not fully developed until one is in his or her mid-twenties (Steinberg, 2007). A teenager, for instance, has not yet fully developed the anatomical regions related to careful reasoning and planning, which may increase their propensity to make poor choices. Teens may be more likely to engage in risk behaviors, such as sexting, if they do not incorporate appropriate planning and problem solving skills into their daily lives.

Sexting, the acts of sending or receiving sexually explicit messages, photos, or videos from one cell phone or computer to another's (Klettke et al., 2014), is riddled with risk for adolescents and young adults alike. All individuals who engage in sexting are at risk of having their personal images or messages forwarded to individuals that the content was not intended to be seen by. Content can also be hacked, hijacked, or stolen in large quantities (Peterson, Yahr, & Warrck, 2014). People of all ages may be unaware of the indeterminate longevity of information uploaded to the internet. Data traces can remain in cyberspace long after local data have been deleted or removed (Bilton, 2011). This creates a long-term danger of unintended consequences. Avoiding these risks requires both knowledge and forethought.

The greatest risk associated with sexting among minors is incurred when exchanging sexually explicit photos. Sexually explicit photos have been previously defined as those where the individual's exposed buttocks or genitals are visible in the photo or video, including breasts for females (Mitchell et al., 2012; Strassberg et al., 2013). The risk of being caught by disapproving adults is still possible when exchanging sexually provocative messages, though this behavior is not illegal. Flirtation among youth is to be expected, though cases of harassment are also a

possibility. *Unwanted sexual attention*, a form of sexual harassment, can take the form of text messages that communicate sexual appraisal, desire, or sexual requests that are unwanted by the recipient (Barak, 2007).

Risk behavior is often impulsive, in the sense that it occurs with the expectation of obtaining short-term rewards while disregarding long-term consequences (Eysenck, 1993). Attaining long-term goals often requires one to withhold more immediate rewards, which is best accomplished with effective reasoning skills and self-control. Rewards that take longer to obtain can seem less appealing than immediate rewards, even if the delayed reward is larger. This phenomenon is known as the *discount factor* (Prelec & Loewenstein, 1991). Continuous abstinence from sexting may be very difficult to maintain for some teens, especially if they discount the delayed consequences in favor of the more immediate rewards, such as praise, attention, and popularity they may receive for sharing such content.

Prevalence

Multiple factors influence sexting prevalence, including age, race, sex, relationship status, and sexual identity. These factors will be elaborated in addition to general sexting rates examined in prior research. Most studies have distinguished young adult samples from adolescent samples, though many studies included mixtures of both age groups.

One challenge in determining the prevalence of sexting is the inconsistent manner in which sexting has been defined and measured in past research (Agustina & Gómez-Durán, 2012; Klettke et al., 2014; Ahern & Mechling, 2013). Not all studies have distinguished between sending and receiving sexts (e.g., Dake, Price, Maziarz, & Ward, 2012), nor between the use of sexual images and text-only messages (e.g., Lenhart, 2009). These behaviors may all be considered forms of sexting, though frequencies (AP-MTV, 2009; Peskin et al., 2013) and associated risks (Klettke et

al., 2014; Houck, Barker, Rizzo, Hancock, Norton, & Brown, 2014) tend to differ according to the form of sexting performed.

Prevalence estimates of adolescent sexting have ranged from as low as 1% (Mitchell et al., 2012) to as high as 27.6% (Temple, Paul, van den Berg, Le, McElhany, & Temple, 2012). In understanding this difference in reported rates, it is important to consider differences in survey content and sample composition. Temple et al. (2012) simply asked if the respondent had ever sent naked pictures of his or her self to another individual via text or e-mail. Participant ages ranged from 14 to 19, and the average age was 15.8 years. Mitchell et al. (2012) was measuring the sending of photos that contained explicit imagery of one's naked breasts, genitals, or bottom. The sample for this study included 1560 student who were between the ages of 10 and 17, with an average age of 14.2 years.

Several factors may explain the conflicting findings in these two studies. Mitchell et al. (2012) used different language to describe sexting, and examined a sample with an average age that was almost two years younger than Temple et al. (2012). Age and sexting have been determined to be positively correlated. Thus, it would be expected that a younger sample would report lower sexting rates. Additionally, Temple et al. (2012) did not define sexting behavior as explicitly as Mitchell et al. (2012). Specific body parts necessary to be both naked and visible were indicated, which may have ruled out many instances participants may have thought to be sexting. This suggests that respondents may more broadly perceive what constitutes sexual imagery unless specific parameters are provided.

Data collection methods must also be considered in determining differences in sexting rates. For instance, Mitchell et al. (2012) employed a 30-minute telephone survey using random-digit dialing. Though some attempts were made at ensuring the respondents' confidentiality,

complete privacy could not be guaranteed using this method. Temple et al. (2012) used data from a multi-wave study that collected self-report data during school hours. This method could have provided a greater sense of privacy. Temple et al. (2012) asserted that the land-line phone method used in Mitchell et al. (2012) resulted in an unrepresentative sample that was 73% white, 78% living in a 2-parent household, and 30% at or above the $100,000 annual income bracket. This feature of the sample may have resulted in lower sexting rates, because well-off families tend to be more conservative (Christian, Keeter, Purcell, & Smith, 2010; cited in Temple, 2012, p. 829).

A meta-analysis was conducted in a study by Klettke et al. (2014), which accumulated all prior studies containing estimates of sexting prevalence, and calculated the average prevalence of sending sexual images. The average prevalence was 11.96%, 95% CI [5.06, 18.85] among studies with randomly selected adolescent samples, and 15.48%, 95% CI [11.08, 19.89] among studies that used nonrandom sampling. The studies that used nonrandom sampling reported noticeably higher average rates than the randomized studies. The average prevalence of *receiving* nude photos, 11.95%, 95% CIs [10.46, 13.43], was similar to *sending* nude photos among randomized samples. However, *non*-random samples reported a much higher average receiving rates, 35.37%, CIs [33.63-37.10]. This could be because there were only two nonrandom studies available.

A recent study by Strohmaier, Murphy, and Dematteo (2014) surveyed college freshman, asking them to retrospectively report their sexting habits when they were in high school. Of this sample, 28% reported having shared nude photos of his or her self when in high school. This rate was considerably higher than averages of both random and nonrandom studies. Similar findings were found in Englander (2012), where 30% of college freshmen reported sending nude photos during high school. These higher estimates may also be inaccurate due to retrospective self-

reporting, but may indicate that adolescents are more *willing* to report sexting as they approach young adulthood.

Age and sexting. Sexting prevalence among minors and young adults has been difficult to distinguish within the literature. Many studies have not partitioned samples into adolescent and young adult subgroups (e.g., Ferguson, 2011; Peskin et al., 2013; NCPTUP, 2008; Lounsbury, Mitchell, & Finkelhor, 2011). As a result, the meta-analysis conducted by Klettke et al. (2014) distinguished adolescent samples as those where participants were between the ages of 10 and 19. As this range included individuals who were older than 17, this analysis could not adequately distinguish young adults from minors. Klettke et al. (2014) defined previous adult studies as those where participants were 18 years or older, indicating some age overlap in distinguishing adults from adolescents. Most young adult samples were composed of undergraduate students.

Adolescents and young adults have demonstrated unique trends according to age and sexting frequency. Adolescent sexting has been positively correlated with age in virtually all studies (Cox Communications, 2009; AP-MTV, 2009; Mitchell, Finkelhor, Jones, & Wolak, 2012; Lenhart, 2009; Rice, Rhoades, Winetrobe, Sanchez, Montoya, & Kordic, 2012; Hinduja & Patchin, 2010). Sexting prevalence tends to increase as adolescents approach young adulthood, and nearly all studies examining young adults have shown no relationship between sexting and age (Benotsch, Snipes, Martin, & Bull, 2013; Dir, Cyders, et al., 2013; Drouin & Landgraff, 2012; Giroux, 2011; Gordon-Messer et al., 2013; Hudson, 2011). Two studies have found a negative correlation between age and sexting among adults (Parker, Blackburn, Perrry, & Hawks, 2013; Wysocki & Childers, 2011), indicating that sexting prevalence peeks during young adulthood and then gradually dissipates thereafter. The findings may also reflect less general technology use among older individuals

All but one study (AP-MTV, 2009) that examined adult sexting used samples of convenience. Therefore, only average prevalence of sending nude photos among non-random or non-representative samples was calculated for young adults. An average prevalence of 48.56%, 95% CDs [46.21-50.92] was calculated for adults having sent sexual images (Klettke, et al., 2014). This average prevalence is considerably higher than that reported among adolescents. The only study to use random sampling among adults found 33% to report sending sexual images (AP-MTV, 2009), which was lower than the aggregated adult samples of convenience.

Demographics. In addition to age, the demographic factors of race, sex, and sexual orientation have been shown to influence reported sexting rates. Some of these factors have only been tested among adults, or may vary according to age. The findings of various studies addressing these demographic variables are presented in this section, which also includes trends relating to relationship status and culture.

There have been mixed findings regarding sex as a factor associated with adolescent sexting. A large number of studies have found females to be significantly more likely to send sexual images than males (AP-MTV, 2009; Cox Communications, 2009; Mitchell et al., 2012; Strohmaier, Murphy & DeMatteo, 2014; Houck et al., 2014; Ybarra & Mitchell, 2014). However, several studies have also found no significant sex differences in sending nude photos (Rice, Rhoades, Winetrobe, Sanchez, Montoya, & Kordic, 2012; Lenhart, 2009). Adolescent males have more frequently reported general sexting behavior (sending *or* receiving sexual messages or images, Rice et al., 2014; Hinduja & Patchin, 2010).

Significant differences by sex have not been observed among most *young adult* samples (Benotsch, Snipes, Martin, & Bull, 2013; Drouin & Landgraff, 2012; Giroux, 2011; Henderson & Morgan, 2011; NCPTUP, 2008). However, some studies have found young adult females to more

often report sending nude images (AP-MTV, 2009; Wysocki & Childers, 2011), and males to more often receive them (AP-MTV, 2009; Dir, Coskunpinar, Steiner, & Cyders, 2013; Gordon-Messer et al., 2013). The overall findings suggest that males typically send more sexually explicit text messages (Hudson, 2011), and females send more nude images, particularly among teens. This pattern suggests that young males may be sending sexual text messages to females that also contain requests for sexual photos in return (Ogletree, Fancher, & Gill, 2014; Drouin & Tobin, 2014; Temple et al., 2012).

Among adolescent samples, African Americans were consistently more likely to sext than Caucasians (Dake et al., 2012; Rice et al., 2012; Peskin et al., 2013). Adolescent Latinos have been found to sext more often than Caucasians (Houck et al, 2014), but less often than African Americans (Dake et al., 2012; Peskin et al., 2013). Among young adult samples, Caucasians (Benotsch et al., 2013) and white females (Wysocki & Childers, 2011) reported higher rates of sexting than nonwhite or males. Asians and Pacific Islanders reported relatively lower sexting rates than other races (Gordon-Messer et al., 2013). However, one study found no racial differences among undergraduate students (Hudson, 2011). Overall, minorities tend to report relatively more sexting during adolescence, and Caucasians report more sexting during young adulthood.

Adolescents (Rice et al., 2012; Ybarra & Mitchell, 2014; Rice et al., 2014) and adults (Wysocki & Childers, 2011; Bauermeister, 2014) who identified as lesbian, gay, bisexual, or transgender have been consistently more likely to report engaging in sexting behavior than heterosexuals. Bauermeister et al. (2014) surveyed a sample of 1,502 young men who have sex with men. Within this sample, 87.5% had reported sending a nude or nearly nude photo to someone else. This is a considerably larger percentage than the average adult prevalence (48.5%) calculated by Klettke et al. (2014). Race, education and frequency of technology use did not influence sexting

for this sample, though younger individuals were more likely to not have sexted (Bauermeister et al., 2014).

Cultural differences associated with sexting have also been investigated. A survey composed of 14,946 adolescents across twenty different European countries examined the effect of traditionalism, gross-domestic product, internet access, and gender in relation to sexting (Baumgartner et al., 2014). Traditionalism was characterized as conservative world views, explicit gender roles, and restrictive sexual behaviors endorsed and practiced among the majority of a country's citizens. The instrument measuring traditionalism was very brief, and used a 1 to 5 likert scale. Countries rated higher in traditionalism tended to have greater gender role differences, with males being more likely to engage in sexting than females (Baumgartner et al., 2014).

Another study collected data from a sample of 1,943 high school students in Flanders, Belgium. Contrary to most United States samples, males were found to be more likely to report sending nude images than females (Vanden Abeele et al., 2014). In Baumgartner et al. (2014), Belgium was listed as having an average level of traditionalism and slightly more females than males engaging in sexting. However, Vanden Abeele et al. (2014) mentioned that "Flemish culture is fairly liberal toward youths and their sexual activity" (p. 12). It is possible that the liberal culture specifically within Flanders may have contributed to these discrepancies.

Relationship status. Young adults reporting to be in relationships have been consistently more likely to sext than those who were not in relationships (Dir, Coskunpinar, et al., 2013; Dir, Cyders, et al., 2013; Drouin et al., 2013, Hudson, 2011; Weisskirch & Delevi, 2011). Adult couples report being more likely to sext in order to maintain intimacy when separated by distance (Drouin et al., 2013). Partners with insecure or avoidant attachment styles have been found to be more

likely to send sexual images to their partners, where sending text-only sexual messages was more prevalent among securely attached partners (Drouin & Landgraff, 2012).

Further research has indicated that women with anxious attachment styles may be more likely to consent to undesired sexting in order of fulfill the needs of her partner, or to avoid arguments (Drouin & Tobin, 2014). This sets a more coercive tone to sexting, particularly within insecurely attached couples. Women have expressed needing greater relationship commitment than men before engaging in sexting (Delevi & Weisskirch, 2013), though marital status has not been found to predict sexting rates (Drouin & Landgraff, 2012) or the content of sexting (Parker et al., 2013).

Relationship status has not been studied as extensively among adolescents compared to adults. A majority of adolescents have cited sending nude photographs to boyfriends or girlfriends (69%, NCTUP, 2008; 66%, Englander, 2012), or to foster romance within an existing relationship (51%, Mitchell et al., 2012). Teens who are in relationships also report more positive attitudes toward sexting in general (Walrave et al., 2013). Sending and receiving nude photos has been referred to as a form of "relationship currency" to acquire or maintain interest within teen relationships (Ringrose et al., 2012, p.13).

Overall, both adults and adolescents appear more likely to share sexual images when in relationships, though adolescents may also more often share images outside of committed relationships in order to attract a partner (66%; Englander, 2012) or to attain social standing among peers (Vanden Abeele et al., 2014).

Risks associated with sexting

Sexting itself is a particularly risky behavior for minors, as this behavior is illegal below age 17 (Chalfen, 2009), and has resulted in arrests (Calvert, 2014). Wolak, Finkelhor, and Mitchell

(2012) examined a representative sample 675 legal cases involving "youth-produced sexual images" (p.1) that had occurred between 2008 and 2009. Wolak et al. (2012) found that 13% of youth-perpetrated cases resulted in arrest. Arrests primarily occurred in cases of *aggravated sexting,* which occurs when sexting also includes an instance of sexual abuse or nonconsensual sharing of images (Calvert, 2014). Among the sampled cases, only 5% resulted in youth being registered as sex offenders, and 70% of these cases also involved sexual assault (Wolak et al., 2012). Proposals have been made to modify child pornography laws to realistically reflect contemporary trends pertaining to sexting among minors (Ostrager, 2010; Angelides, 2013)

The argument of whether or not minors should be subject to criminal charges for producing and distributing self-made child pornography inexorably leads to another major risk of sexting, which is the possibility that these images may be non-consensually shared across a myriad of communication channels (AP-MTV, 2009; Siegle, 2010). Young couples may exchange sexual content under the assumption that his or her partner will not share the content, but this trust is often betrayed (e.g., *revenge porn,* Goode, 2013). Mass distribution of sexual content inevitably results in the original sexter experiencing significant humiliation (Strohmaier, 2014), bullying (AP-MTV, 2009; Siegle, 2010), depression (Dake et al., 2012), and occasional cases of suicide (Celizic, 2009; Kaye, 2010).

Sexting has been consistently associated with a higher likelihood of being sexually active among young adults (Dir, Cyders, et al., 2013; Giroux, 2011; Gordon-Messer et al., 2013) and adolescents (AP-MTV, 2009; Rice et al., 2012; Temple et al., 2012; Dake et al., 2012). Sexting has also been associated with earlier sexual debut (Rice, Gibbs, Winetrobe, Rhoades, Plant, Montoya, & Kordic, 2014), meaning that minors who sext tend to initiate sexual intercourse at an earlier age than those who do not sext. Adults and adolescents who sext also tend to report a higher

number of sexual partners than their peers (Benotsch et al., 2013; Dake et al., 2012; Dir, Cyders, et al., 2013, Temple et al., 2012; Henderson & Morgan, 2011; Ybarra et al., 2014). Houck et al. (2014) found higher rates of sexual activity to be associated with sexting photos, but not sexting text messages, indicating a differential severity associated with these two behaviors.

Sexting has also been associated with a number of sexual risk behaviors and negative outcomes, including consuming alcohol before sex (Benotsch et al., 2013; Temple, 2012), concurrent sexual partners (Ybarra et al., 2014), unprotected sex (Benotsch et al., 2013; Dake, 2012; Ferguson, 2011), sexually transmitted diseases (Benotsch et al., 2013; Rice et al., 2014), and teen pregnancy (Rice et al., 2014). Temple et al. (2012) found sexual risk behavior to be associated with sexting only among adolescent females. Sexting has also been associated with greater use of alcohol and other drugs among teens (Englander, 2012; Dake et al., 2012; Temple et al., 2014) and young adults (Benotsch et al., 2013; Dir, Cyders, et al., 2013). These associations with other risk behaviors further support sexting to also be categorized as a risk behavior.

Sexting may indirectly increase sexual behavior by creating new opportunities for teens and young adults to initiate sexual activity (Henderson & Morgan, 2011). In other words, individuals who are disposed to seek out sexual encounters have new communication channels to cultivate sexual interest and seek out sexual relations by being "fun or flirtatious" (NCPTUP, 2008; Henderson & Morgan, 2011). Sexting has already been supported as a mediator between problematic alcohol consumption and sexual risk behavior among young adults (Dir, Cyders, et al., 2013), suggesting that sexting may act as a link between the predisposition to seek sexual encounters and the opportunity to initiate these encounters. With access to communication channels that are fast, simple, and seemingly private, teens may also feel emboldened to pursue opportunities they would have otherwise disregarded.

Attitudes and experiences with sexting

In general, those who have reported sexting also report having positive attitudes toward sexting (Strassberg et al., 2013; Ferguson, 2011; Hudson, 2011; Weisskirch & Delevi, 2011; Woolard, 2011). However, age and gender seem to significantly influence the attitudes and experiences of those who sext. Mitchell et al. (2012) found that 21% of adolescents felt very upset, embarrassed, or afraid after sexting. Young females also appear to be more likely to have negative attitudes toward sexting than young males (Walrave et al., 2014), and label it as a "stupid" or "slutty" (AP-MTV, 2009). Several factors may explain reported differences in sexting attitudes and experiences, including the perceptions, motivations and outcomes among those who sext.

One of the primary factors to influence ones attitudes toward sexting appears be the attitudes of one's peers toward sexting. This concept will be addressed in greater detail within the social learning section. Nonetheless, it is important to consider how *subjective norms*, the perceived attitudes and behaviors of one's peers, influence one's own attitudes and behavior. Walrave et al. (2014) found subjective norms to be the greatest predictor of teen sexting among examined predictors. The second greatest predictor within this sample was one's attitude toward sexting. Subjective norms and attitudes toward sexting both significantly predicted one's intention to sext, and consequential sexting behaviors (Walrave et al., 2014). It is likely that subjective norms influence one's own attitudes about sexting.

Reported reasons for sexting may serve as an indication of general attitudes and experiences of sexting. Adults (Henderson, 2011; Drouin, Vogel, Surbey, & Stills, 2013) and adolescents (NCPTUP, 2008) have most often cited "to be sexy" or "flirtatious" as reasons for sexting. These motives would suggest that sexting may be a generally harmless, adventurous behavior. However, adolescents have also cited peer pressure as a primary reason to sext (AP-

MTV 2009), particularly among young females (Englander, 2012). This pressure most often comes from members of the opposite sext (NCPTUP, 2008), and is typically associated with more negative attitudes toward sexting (Walrave et al., 2014; Englander, 2012). Young women appear to make trust and commitment a priority before sexting (Delevi & Weisskirch 2013). Instead, teens may find themselves more often capitulating to the coercion of less trustworthy individuals.

Sexting has not been associated with emotional difficulties among young adults (Hudson, 2011; Gordon-Messer et al., 2013). In fact, Hudson (2011) found that positive beliefs about sexting were associated with *higher* self-esteem among young adults. Emotional difficulties have been inconsistently associated with sexting among adolescents and teenagers. Ybarra and Mitchell (2014) found sexting to be negatively associated with self-esteem among adolescents, although Englander (2012) found sexting to be associated with *less* reported depression. However, the latter study examined a sample of young adults who were reporting retrospectively on their high school experiences. Temple et al. (2014) found sexting to be weakly associated with increased depression among adolescents, though the association was no longer significant when controlling for demographics and prior sexual behavior. These findings suggest that emotional difficulties may be associated with sexting, but that situational and individual factors may superlatively contribute to these associations.

Dake (2012) found sexting to be associated with a host of emotional health issues, including attempting or contemplating suicide, being cyber-bullied, raped, or physically injured by a boyfriend or girlfriend. Thomas (2009) also found links between sexting and being bullied among teens. Houck, Barker, Rizzo, Hancock, Norton, & Brown (2014) found sexting to be associated with increased difficulties with emotional awareness and emotional self-efficacy within

a sample of emotionally at-risk seventh graders (ages 12-14). These findings suggest that sexting may be a particular concern among emotionally vulnerable youth.

One of the greatest determinants of an individual's experience with sexting hinges on whether the images they share are kept private or were forwarded, shared, or publicly posted for others to view without consent from the original sender. Unauthorized sharing of sexual images appears to be more of a problem among adolescents than young adults (AP-MTV, 2009). This may explain links between sexting and cyberbullying among teens, as nude photographs may act as powerful content to substantiate cyberbullying. This can result in prolonged bullying as well as cyber bullying which could ultimately lead to depression and suicide (Dake et al., 2012; Celizic, 2009; Kaye, 2010).

Adult sexting has been addressed with less gravity than adolescent sexting. Some studies have even investigated potential benefits of consensual sexting in adult relationships. For instance, Parker et al. (2013) found increased sexting to predict relationship satisfaction among a sample of adults in relationships. Both age and length of the relationship were negatively correlated with sexting, supporting findings from Parker et al. (2013) and Wysocki and Childers (2011) that adults are less likely to sext at older ages. Hedonism was the strongest motivation associated with sexting in this study, indicating that sexting may be a pleasurable and exciting activity among adults in romantic relationships.

In summary, attitudes and experiences with sexting hinge greatly on perceptions, motivations, and outcomes of sexting. If someone observes positive outcomes among trusted peers, he or she may be more likely to also have a positive attitude toward sexting, and be more likely to try it themselves. However, being pressured or coerced by peers appears to have a negative effect on one's attitudes and experiences with sexting. Individuals with low self-esteem or emotional

difficulties may be more at risk of giving in to this form of coercion. Coercion may exist among both adults and adolescents. Sexting can enhance excitement and intimacy in a committed relationship, or lead to tremendous hardship by an abusive or careless partner.

Etiology of Sexting

A large number of potential sexting predictors have been examined in previous research. However, most of these studies have not been replicated, and the predictors have not been consolidated into an inclusive theoretical model. A theoretical model for sexting has been proposed by Dir and Koo et al. (2013), which conceptualized sexting as a risk behavior, and discussed two particular factors that may influence the occurrence of sexting: social learning and personality. Smith and Anderson (2001) established the Acquired Preparedness Model to explain the interaction between personality and environment in predicting alcohol consumption and other risk-taking behaviors. Dir and Koo et al. (2013) applied this theory in proposing personality and social learning to best predict sexting.

Dir and Koo et al. (2013) also employed the five-factor theory of personality (Costa & McCrae, 1987) to explicate use of the Acquired Preparedness model. The specific personality traits delineated in five-factor model of personality include extraversion, openness to experience, neuroticism, agreeableness, and conscientiousness (McCrae & Costa, 1987; McCrae & John, 1992; as cited in Dir, Koo, et al., 2013). Extraversion includes the trait of sensation seeking, and refers to a general tendency to be outgoing, bold, and unworried. Extraversion also includes the concept of self-monitoring which is conceptually associated with susceptibility to peer pressure (Perrine & Aloise-Young, 2004).

Openness to experiences represents a tendency to approach novel or original experiences. Neuroticism reflects a propensity toward impulsive, emotionally-driven decision making. Dir and

Koo et al. (2013) suggested that low self-esteem may play an important role with neuroticism, especially when applied to negative and positive urgency (Whiteside & Lynam, 2001). Agreeableness represents a willingness to cooperate with groups and participate in a constructive manner. Low agreeableness has been associated with higher likelihood of engaging in sexual risk behavior (Hoyle, Fejfar, & Miller, 2000; as cited in Dir, Koo, et al., 2013). Finally, conscientiousness refers to self-discipline and forethought. Low conscientiousness is similar to disinhibition; individuals do not plan ahead or consider the consequences of their actions.

Although the five-factor model includes many characteristics that may be linked to sexting, there appears to be conceptual overlap among the five factors. The predictor variables for this study were established by adapting theories proposed in Dir and Koo et al. (2013), as well as other research studies. The factors examined in the current study include social learning, peer pressure, self-esteem, frequency of electronic communication, and disinhibition. All of these factors have been related to sexting in previous research, and have been compiled below to formulate an inclusive predictive model of sexting.

Social learning theory. Social learning theory (Bandura, 1977) posits that behavior is learned by observing and imitating models, which may be real, imagined, visual, or verbal descriptions of behavior and its consequences (Bandura et al., 1969). Observation of a model may take the form of watching a teacher solve a math problem, listening to a friend explain how he or she sent a nude photo of him or herself to a romantic interest, or reading an instruction manual on how to assemble a new piece of furniture. Modeling can even include observing your own behavior using video recordings (Prater, Carter, Hitchcock, & Dowrick, 2012).

Social learning has several functions. One can learn new behaviors, improve on existing behaviors, or be encouraged or discouraged from performing certain behaviors. For instance, one

can learn how to sext from a friend, but may be discouraged after witnessing the friend experience negative consequences from sexting. Among its many uses, modeling has been incorporated into treatments proven to enhance academic performance (Prater et al., 2012), teach social skills (Gresham, & Nagle, 1980), and reduce phobic responses (Ladouceur, 1983).

There are four primary stages to acquiring new behavior via social learning: attention, retention, reproduction, and motivation (Bandura, 2014). Attention requires the observer to be aware of an opportunity for learning, and to observe the behavior and its consequences. Characteristics of the event (e.g. perceived value, observable, etc.) and the observer (e.g. current goals, alertness, etc.) contribute to the likelihood of the observer giving full attention to the model. For instance, learning about sexting from a friend requires the learner to commit his or her attention when the opportunity to listen or witness an instance of sexting occurs.

After observing an instance of a new behavior, the observer must retain the information for future use. Retention includes mentally rehearsing and encoding details about the observed behavior, and resulting outcomes. The information retained will influence the likelihood, manner, and circumstances in which the observer might imitate the model. The observer must commit certain steps of the behavior to memory, and remember the appropriate context in which to enact the behavior for the desired result (Bandura, 2014).

Before successful imitation is likely, the behavior must be mentally or physically practiced, which occurs during the reproduction stage. Reproduction may take the form of a mental exercise, imagining situations in which the behavior may be best executed, or practicing trial runs of the behavior. This gives the individual the opportunity to monitor their performance, make self-corrections, and optimize likelihood of success in a real situation (Bandura, 2014).

Motivation to initiate a learned behavior in real life can be attained from a culmination of internal drives, appealing rewards, noticeable cues to act, and a history of prior successes in similar situations (Hull, Felsinger, Gladstone, & Yamaguchi, 1947). The individual must recognize an opportunity to enact these behaviors in a real-world situation. Cues indicating that the behavior may produce the anticipated outcome must be present *and* noticeable in order for the individual to be motivated to act. Cues may also be recognized from prior situations where the behavior produced the desired outcome. Finally, the individual must actually want this outcome, meaning they must perceive some internal deficiency that could be assuaged upon acquisition of the anticipated outcome.

The more trusted or like-minded a model is, the more likely the observer will attempt to reenact observed behaviors (Rosekrans, 1967). It must also be perceived that the model attained a desirable outcome as a *result* of engaging in the observed behavior in order to encourage imitation (Bandura, 2014). A model may also directly encourage someone else to engage in certain behaviors by use of verbal persuasion (Bandura, 1982). The border between model persuasion and peer pressure may be difficult to discern. Measures of imitation should consider the perceived influence, esteem, or importance of the model.

Social learning is especially likely to occur among adolescent peers, due to an increased degree of peer influence at this age (Baumgartner, Valkenburg, & Peter, 2011). As mentioned previously, Walrave et al. (2013) found that the belief that sexting occurs among highly trusted friends was the most important belief associated with one's own intention to sext. Hudson (2011) found similar results among college students. Additionally, associating with deviant peers has been associated with teen sexting (Ricketts, Maloney, Marcum, & Higgins, 2014). These findings support the essential role of peer models in the imitation of sexting and other risky behaviors.

Social contagion theory (Scherer & Cho, 2003) is similar to social learning theory, but specifically addresses *shared communication networks*, which refer to unified patterns of correspondence between individuals using a common communication platform (Monge & Contractor, 1999). Social contagion theory states that "behaviors and perceptions initiated by one member of the network will influence others in the network… the more frequent the communication between two actors, the more similar their attitudes are likely to be" (Scherer & Cho, 2003, p. 2). In other words, communication channels offer additional opportunities to be exposed to attitudes and behaviors endorsing risky behaviors such as sexting. The more often an individual interacts with someone who endorses sexting, the more likely he or she will also adopt positive attitudes toward sexting.

Computer-mediated communication (CMC) is a term that originally referred to exchanging messages using computer networks such as e-mail (Kiesler, Siegel, & McGuire, 1984). Since its inception, CMC as come to include all forms of commonly used electronic communication technology (Thurlow, Lengel, & Tomic, 2004). Developments in CMC have enabled both the possibility of sexting, as well as greater access to larger and more diverse communication networks. Therefore, adolescents are more likely to be exposed to attitudes favoring sexting, increasing chances of adopting positive attitudes of their own.

Peer group dynamics (Taba, 1955) is closely related to social learning, but goes one step further by demonstrating the powerful influence of group conformity on an individual member's thoughts and behaviors. Research has shown that members will conform to the group's consensus even in situations where the judgment is perceivably false (Asch, 1951). Group dynamics suggests that an adolescent may more likely have a positive attitude toward sexting if sexting is perceived to be commonly accepted and practiced among his or her peers.

Peer group dynamics has also been used to explain sexting as a means of gaining social status and popularity among peers (Vanden Abeele et al., 2014). Adolescence is a period in life when the importance of peer approval greatly increases (Scholte & van Aken, 2006). Adolescents often engage in dangerous or antisocial behavior for the purpose of gaining peer approval (Brown, Clasen, & Eicher, 1986). Vanden Abeele et al. (2014) found that adolescents with a greater need for popularity were more likely to engage in sexting. Adolescents who have sexted also reported greater popularity with peers of the opposite sex (Vanden Abeele et al., 2014). Perceived need for popularity may leave some teens to be more likely to model and imitate behaviors like sexting.

Peer pressure and self-esteem. If the pressure to conform to peer attitudes and behavior is sufficient to influence decision making, it is all the more likely that teens would be vulnerable to direct pressure, coercion, or persuasion from their peers. Teens, particularly females, reported being pressured or coerced into sharing sexual images of themselves (AP-MTV, 2009; Englander, 2012; Temple et al., 2012; Walrave et al., 2013). In NCPTUP (2008), 51% of females who sexted were pressured by a boy, where only 18% of boys who sexted reported being pressured to by a girl. Walrave et al. (2013) found teens to report being pressured to sext most often by friends and romantic partners. Those who reported being pressured also reported more negative attitudes toward sexting (Walrave et al., 2013), suggesting possible regret when sexting under pressure.

Peer pressure often contributes to risk behavior among adolescents (Levitt, Selman, & Richmond, 1991). One study found that 51% of adolescent females who sexted felt pressured to do so from a male (NCTUP, 2008). Young males have reported that they felt pressured by their friends to obtain sexual images from their girlfriends (Walker, Sanci, & Temple-Smith, 2013). One interviewee mentioned that young men sometimes sent nude images to their girlfriends as a way of coercing girlfriends to send nude images in return (Walker et al., 2013). As mentioned

previously, young adults with anxious or avoidant attachment would often send sexts in order to avoid conflict, or fulfill his or her partner's needs (Drouin & Tobin, 2014). Ultimately, it would appear that young males do most of the pressuring to send nude photos, be it directly from females, or pressuring other males to obtain these photos.

Teens may be especially susceptible to the effects of peer pressure if they also report low self-esteem (Ybarra & Mitchell, 2014). Self–esteem is a term that has been in use for over 100 years (Schroeder, 1909), and generally refers to one's beliefs, evaluations, or perceptions regarding personal worth or value. Self-esteem is considered a vital component to healthy development throughout the lifespan, and has been shown to be a life-long predictor of emotional functioning, job satisfaction, and general health (Orth, Robins, & Widaman, 2012). High self-esteem has been associated with academic success (Liu, Kaplan, & Risser, 1992), and low self-esteem has been associated with internalizing symptoms (McDonald, McCabe, Yeh, Lau, Garland, & Hough, 2005) and psychological distress (DuBois & Tevendale, 1999).

One's perceived self-worth can be strongly influenced by or fused with personal attributes, actions, or circumstances, such as skill mastery, appearance, or social affiliation. *Contingent self-esteem* occurs if one’s sense of self-worth his intrinsically attached to certain conditions (Patrick, Neighbors, & Knee, 2004). For instance, a teen's self-esteem may be contingent on peer approval. Without feeling accepted by certain peers, a teen may feel drastically less valuable as a person. This may lead teens to take drastic measures in order to gain a sense of acceptance from their peers. These individuals may be far more likely to do what their peers ask them to do, out of fear of being rejected if they decline.

Low self-esteem has been associated with adolescent susceptibility to peer pressure (Dielman, Campaneli, Shope, & Butchart, 1987). These findings suggest that someone with high

self-esteem may be less vulnerable to the effects of peer pressure than someone with low self-esteem. Thus, self-esteem could play a significant role in determining whether a teen will sext when being pressured by his or peers to do so. Similar associations have been found between peer approval, self-esteem, and alcohol consumption (Neighbors, Larimer, Geisner, & Knee, 2004), making it likely that sexting may function in a similar manner.

Frequency of electronic communication. Drawing on the theory of technological determinism (Oliver, 2011), it is possible that increased use of computer mediated communication (CMC) technology may increase the likelihood of engaging in online risk behaviors such as sexting.

The theory of technological determinism is a century-old reductionist theory asserting that developments in technology continually influence and shape socioeconomic, political, and cultural practices (Smith & Marx, 1994). The groundings of this theory were first postulated within the works of Karl Marx (Bimber, 1990). Developments in technology, particularly biomedical, have been significant driving forces in the changing customs and rituals of human civilization (Parens, 2015). The notion that technology significantly influences human habit is generally accepted in contemporary society. Some radical proponents of this theory have asserted that technology is a *governing* force that shapes and changes the ways people think and interact (Smith & Marx, 1994). Social contagion theory could be considered a more selective version of technological determinism that specifies the mechanism by which CMC influences behavior (communication networks).

As applied to sexting, technological determinism postulates that technology not only enables new forms of risk behavior, but actually enhances existing predispositions to act on such impulses. The theory was linked to sexting by analyzing patterns of news coverage regarding sexting and sexual behavior (Draper, 2012). Rice et al. (2014) Found that teens who texted more

than 100 times per day were significantly more likely to sext. Frequency of internet use predicted sexting across all European countries (Baumgartner, Sumter, Peter, Valkenburg, & Livingstone, 2014). Additionally, signs of internet addiction were associated with sexting in Ricketts et al. (2014).

Although recent data have indicated an association between more frequent CMC and sexting (e.g., Rice et al., 2014; Baumgartner et al., 2014), technological determinism has not been considered a sufficient explanation regarding the influence of technology on behavior (Oliver, 2011). The theory requires an additional factor addressing specifically how some individuals may be more at risk to sext when using CMC than others. Disinhibition, including impulsivity, may be an appropriate factor to link these concepts. The more connected one is to a communication device, the more likely the device will be accessible when impulsive inclinations occur. For instance, an adolescent could decide to spontaneously send a sext to a friend as a joke (NCPTUP, 2009), out of boredom (Drouin, 2013), or to flirt with a crush (NCPTUP, 2008) without fully considering the long-term consequences.

Disinhibition. Disinhibition is an umbrella term that includes traits such as sensation seeking and impulsivity (Reynolds et al., 2013). Sensation seeking and impulsivity are historically studied together as closely related traits (Blackburn, 1969). Both have been previously associated with sexual risk behavior (Charnigo, Noar, Garnett, Crosby, Palmgreen, & Zimmerman, 2013) and drug addiction (Mezzich, Tarter, Feske, Kirisci, McNamee, & Day, 2007) indicating a strong conceptual link with risk-taking.

Sensation seeking refers to an individual's predisposition to seek out and engage in new, exciting, or thrilling activities that may have an element of risk or danger (Zuckerman, 1979). Individuals high in sensation seeking are more likely to seek out activities such as gambling, car

racing, sky diving, or criminal activity for the thrill or excitement involved with such acts (Zuckerman, 1994). Sexting has also been described as exciting behavior (NCPUP, 2008), and carries an element of risk or danger of being caught or exposed. It is likely that individuals high in sensation seeking will be more likely to engage in sexting for the thrill and excitement.

It is believed that individuals high in sensation seeking have a lower resting level of physiological arousal, and require more stimulation or excitement to reach the same degree of arousal than the average individual (Zuckerman, 2006; Gatzke-Kopp, Raine, Loeber, Stouthamer-Loeber, & Steinhauer, 2002). Sensation seekers have demonstrated blunted affect under normal conditions (Pierson, le Houezec, Fossaert, Dubal, & Jouvent, 1999), suggesting that they may tolerate greater amounts of stimulation before reaching aversive levels of emotional arousal. Although individuals with low basal arousal may have a predisposition to seek out thrilling or risky situations, their behavior is ultimately determined by personal choice, environmental circumstance, and social learning (Farley, 1986). Thus, thrill seekers may gravitate toward sexting for the thrill, but they can still be redirected toward more beneficial behaviors that may also provide the same excitement.

Impulsivity refers to a difficulty with forethought, resisting short-term rewards, or restraining physical activity (Caswell, Bond, Duka, & Morgan, 2015). Impulsive individuals may struggle with planning and executing long-term tasks due to increases in delay or probability discounting (Richards, Zhang, Mitchell, & de Wit, 1999). In other words, individuals high in impulsivity may place less value in completing long-term goals, and find it more difficult to resist temptations that would interfere with task completion. Impulsive children tend to have difficulty internalizing social rules and controlling emotional outbursts (Barratt, Stanford, Kent, & Felthous, 1997), leading to an increased likelihood of experiencing social rejection (Gomes, & Livesey,

2008). Therefore, they may also be more likely to send a sext to someone on emotional impulse, or as an attempt to regain peer approval.

A unique line of research has sought to define impulsivity as a multi-factorial personality construct, including the context of emotional states and traits such as sensation seeking (Whiteside & Lynam, 2001; Cyders, Smith, Spillane, Fischer, Annus, & Peterson 2007). This line of research appears distinct from neurocognitive approaches that consider the behavioral activation and inhibition systems as underlying factors (Gray, 1987; Amodio, Master, Yee, & Taylor, 2008). This separate line of research has produced a valuable method of measuring impulsivity in the form of a survey instrument called the UPPS-P. The instrument itself is useful for measuring both impulsivity and sensation seeking. This instrument contains five dimensions: negative urgency, lack of premeditation, lack of perseverance, sensation seeking, and positive urgency. The UPPS-P was originally comprised of four independent yet interrelated dimensions (Whiteside & Lynam, 2001), and positive urgency was added as a fifth element later on (Cyders et al., 2007).

Cyders et al. (2007) found that positive and negative emotion states were differentially associated with impulsive behaviors. Specifically, positive and negative urgency were both associated with alcohol consumption, but only negative urgency was associated with eating disorder symptoms. It was found that individuals with positive expectancies toward drinking were more likely to exhibit positive urgency in association with alcohol consumption, indicating a unique mechanism to problematic drinking, and possibly other impulsive behaviors (Cyders et al., 2007). Impulsive sexting may also be more likely to occur under one emotional state rather than another. However, this study is only interested in how impulsivity, independent of emotional state, may influence sexting.

Disinhibition likely goes hand-in-hand with increased use of communication technology in increasing the chances of sexting. An association between sensation seeking and sexting was significant among European teens (Baumgartner et al., 2014). The same study also found an association between frequency of internet use and sexting, suggesting that impulsive individuals may be even more likely to sext if they also use the internet more frequently. In Dir and Cyders et al. (2013), sensation seeking and impulsivity were associated with both sexting and problematic alcohol use. However, sensation seeking was not a significant predictor of sexting among undergrads in Delevi (2013). Less consistency seems to exist among young adults, though it appears likely that disinhibition plays a role in teen sexting.

Adolescents high in sensation-seeking tend be more likely to seek out sexual encounters (Zuckerman, 1994). They may also be more likely to impulsively engage in sexting in order to elicit or arrange these encounters (Baumgartner et al., 2014). Some research supports associations between impulsivity and sexting, as well as impulsivity and sexual risk behavior (Rice et al., 2012). Thus, impulsive individuals who are also high in sensation seeking may also solicit sexual discourse using communication technology, and then engage in sexual risk behavior elicited by these interactions (Dir, Cyders, et al., 2013; Temple et al., 2014).

Prevention.

There is little research addressing preventative measures for adolescent sexting. Several expositional pieces have provided general advice to parents, educators, and health care professionals. Hinduja and Patchin (2010) focused attention on steps that can be taken in the school setting. Educating youth, parents, and educational professionals using online bulletins, workshops, and school assemblies to warn of the dangers of sexting was proposed. Responsible use of communication technology would also be of focus. Preventing harmful instances of sexting was

framed in the same manner as preventing cyberbullying with the following methods: establishing peer mentoring, data-driven action plans, and fostering a school and community-wide culture that is knowledgeable and cautionary regarding sexting (Hinduja & Patchin, 2012).

Some research has suggested that setting limits on access to communication technology may be an effective method of reducing adolescent sexting (Lenhart, 2009). As mentioned previously, unrestricted access to social media technology has been associated with a higher chance of sexting (Ricketts et al., 2014). Restricting access to communication technology may be an effective way to reduce chances of impulsive individuals sending sexual images. Having a time interval separating the impulse to sext and access to a social media may provide impulsive teens the chance to stop and deliberate over the consequences of their behavior.

Parents have the arduous responsibility of ensuring that their children's cell phone privileges are not abused. This can be a daunting task considering the many nuances of modern technology. Thomas (2009) found that 44% of teens may have no parental limits set over communication technology whatsoever, and that one quarter of teens who reported parental controls felt confident they could override these precautions. About one fifth of teens in this study also said that their parents were unaware whether the teen's cell phone had internet access, and half of teens reported having no limitations whatsoever (Thomas, 2009).

There may still be options for parents to consider in gaining some control over their teen's cell phone use without completely restricting access. Parents can set data limits with their cell phone company, and restrict the number of texts than can be sent or received each month. Considering that 18% of teens with unlimited plans reported receiving sexts, compared to 8% of teens with limited plans, and 4% with pay-per-message (Lenhart, 2009), data budgeting may encourage more overall responsibility using communication technology. This strategy may be

more effective than attempting to manually monitor and regulate usage (Thomas, 2009), though such methods would benefit greatly from experimental testing.

Child pornography laws have been enforced with the intention of lessening the rates of sexting, namely aggravated sexting (Calvert, 2014). Strohmaier et al. (2014) found that 61% of undergrads were not aware that sexting as a minor was a criminal offense. Those who *were* aware were significantly less likely to report having sent nude or semi-nude photos as minors (Strohmaier et al., 2014). This would suggest that education may be a powerful tool for preventing under-aged sexting. By informing teens and young adults about the legal, social, and emotional risks of sexting, individuals of all ages may be more likely to reconsider sending nude images unless these risks are minimized.

Sadhu (2012) composed an article primarily addressing healthcare professionals, covering effective methods to screen and discuss sexting instances with adolescents and their parents on an individual scale. This article also addressed the importance of parental awareness and knowledge regarding their children's cell phone capabilities and daily use (i.e., *media literacy*; Sadhu, 2012, p. 80). Additionally, it was recommended that clinicians become familiar with social media trends and local laws related to sexting. Sadhu (2012) recommended that clinicians incorporate questions addressing cell phone and computer use into routine diagnostic evaluations. Guidelines for when disclosure to parents may be necessary were also provided. Most of these recommendations have been based loosely on research, though not experimentally tested.

Not only does providing information seem to be effective at influencing attitudes toward sexting, but the manner in which this information is conveyed may also influence the reception and impact of the message. One study compared two online video formats in order to maximize reception of information regarding the risks of sexting (Joyce & Harwood, 2014). One video

provided information in the form of a public service announcement provided by the government. The second appeared to be an amateur music video providing information on sexting in a humorous manner. The amateur music video was significantly more effective at influencing teen viewers' attitudes toward sexting (Joyce & Harwood, 2014), indicating that teens may be more receptive to messages that use entertainment or humor to convey information.

Conclusions

Sexting is a form of risk behavior, because harmful outcomes are possible, though not imminent. Sexting rates peek during young adulthood, when harmful outcomes are also less often reported. The general trend appears to be that adolescent males are pressuring young females to send nude images to them. Thus, adolescent females tend to more often report sending nude images than young males. Teens may also be imitating this behavior when observing their peers doing it. Impulsive teens may be more likely to engage in sexting, especially if they use electronic communication devices more often. Sexting is ultimately unsafe, and consistently associated with sexual risk behavior among adolescents. Reasons for sexting must be better understood to reduce the likelihood of teen sexting.

CHAPTER 3 METHOD

Participants

A large survey sample was collected from a suburban high school in South East Michigan. With a medium effect size of .15, power of .85, and alpha level of .05, a minimum sample size of 130 was required. With about ten parameters, a minimum sample size of two hundred was required to conduct structural equation modeling with maximum likelihood estimation. More subjects have been recommended if any variables are not normally distributed (Kline, 2011, p. 12). A large enough sample was collected to perform all tests proposed for this study.

The sample originally consisted of 321 participants, but was reduced to 314 due to obvious patterns and incomplete or missing data. Of the remaining 314 participants, 152 identified as male (48.7%). There were 168 (53.5%) African American students, 65 (20.7%) Caucasian students 47 (15.0%) mixed-race students, and 34 (10.8%) Asian, Hispanic, or Latino students. There were 78 students in 9th grade (24.8%), 82 students in 10th grade (26.1%), 79 students in 11th grade (25.2%), and 75 students in 12th grade (23.9%). The majority of participants ranged between ages 14 to 18. A relatively equal number of males and females participated in the study, and subjects were racially diverse. Demographics were comparable to the overall student population, and are summarized in Table 1 below.

Table 1

Frequency Distributions: Demographics (n=314)

Variables	Mean	SD	Min.	Max.	Frequency	Percent
Sex						
Male					153	48.7
Female					161	51.3
Ethnicity						
African American					168	53.5
Caucasian					65	20.7
Mix					47	15.0
Asian/Other					34	10.8
Grade						
9					78	24.8
10					82	26.1
11					79	25.2
12					75	23.9
Age	16.2	1.26	14	20		
14					27	8.6
15					71	22.6
16					83	25.4
17					80	25.5
18					47	15.0
19					5	1.6
20					1	0.3

Measures

The first section of the survey collected basic demographic information, including age, grade, sex, race, and approximate grade point average. Questions regarding general social media and cell phone use were included on the first page of the survey. The variables measured in this survey included frequency of electronic communication, self-esteem, impulsivity, peer pressure, peer sexting influence (reinforcement residue), peer sexting, and self-reported sexting behavior The survey took approximately 15 minutes to complete, and was completed with paper and pencil by students in their classrooms. Copies of the instruments are available in appendix E.

Frequency of electronic communication. Three questions regarding social media use and text messaging were included in order to form a composite score representing electronic communication: two questions addressed social media use, and one addressed text messaging. Before beginning this section, definitions for *social media* and *text message* were provided: 1) "Social media refers to any internet program where you can communicate with other people, such as Facebook, Twitter, or Tumbler"; and 2) "Text messages refer specifically to messages you send using your cell phone's texting feature." These definitions were added to provide clarity regarding the behaviors in question.

The questions used to measure social media use were taken from The 2010 EU Kids Online Survey (Livingstone, Haddon, Görzig, & Ólafsson, 2011): 1) "About how long do you spend using the internet on a normal school day?"; and 2) "About how long do you spend using the internet on a normal non-school day (weekend or holiday)?" Livingstone et al. (2011) originally collected and coded responses using an interviewer, with response options ranging from 1 (*Just a few minutes*) to 10 (*More than four hours*). The original format and also included 11 *(None at all*) and 88 (*Don't know*). This instrument was also used for large a study that investigated sexting behavior across

20 European countries (Baumgartner, 2014). Adaptations to this instrument for use in the current study are described below.

Because teens may use the internet for purposes other than interacting on social networks, the questions above were changed to address the use of "social media" rather than "the internet." The response options were changed to self-report format, and reduced to a range of 0 (*Never*), to 7 (*More than four hours*). These options were similar to the original instrument, but spaced by hourly intervals from option 3 (*About an hour*) to 6 (*About four hours*) rather than half-hour intervals. This was done to avoid overwhelming the participants with too many response options. The answer to question one (normal school day) is multiplied by 5, and the answer to question two (normal non-school day) is multiplied by 2. These numbers are then added together to produce an average number of minutes per week using social media. Higher total scores indicate more minutes using social media per day.

The individual question used to measure text messaging frequency was derived from Rice et al. (2014). The single question used from this study was, "About how many text messages do you send in a day?" The 7-point Likert-type response options for this item range from 0 (*I don't text*) to 6 (*More than 300*). Higher scores on this scale indicate more frequent texting per day. The response from this item will be summed and averaged with the average time per week using social media to derive a general measure of electronic communication frequency.

To our knowledge, a valid, reliable, and comprehensive instrument to measure frequency of computer-mediated communication had not yet been established at the time of data collection (Rice et al., 2014). No reliability or validity estimates were provided for the above measures. However, previous research has indicated that use of interval scales with provisional response categories tends to produce more valid self-report estimates than continuous open-response

measures of cell phone use (Boase & Ling, 2013). This form of measurement may still not be as accurate as direct server log data (i.e., directly tracking phone records).

Sexting. No operational definitions or validated measures of sexting have been widely established at the time of this study (Klettke et al., 2014; Livingstone et al., 2014). However, one line of research had developed a 10-item survey instrument to measure overall sexting behavior called the Sexting Behavior Scale (SBS, Dir, 2012). This instrument was first developed to collect data for a doctoral dissertation, and had been since used in several subsequent studies (Dir, Coskunpinar, et al., 2013; Dir, Cyders, et al., 2013). At the time of this study, it was the only instrument of its kind to calculate sexting behavior as a comprehensive construct.

Subjects were provided a definition of sexting before responding to questions on the SBS. Sexting was originally defined as, "sending or receiving sexually suggestive or provocative messages and/or photographs via mobile phone and/or Facebook or other internet social networking site." The respondent was then presented with eight questions with response options ranging from 1 (*never*) to 5 (*frequently [daily]*). The first eight questions addressed an assortment of sexting behaviors, such as "How often have you received suggestive or sexually charged text messages?"; "How often have you sent provocative or suggestive pictures by text message?"; and "How often have you publicly posted suggestive or provocative pictures on Facebook, Twitter, or MySpace?".

Items 1 through 8 are summed and averaged to produce an overall estimate of sexting behavior. Higher values indicate more frequent sexting. Question 9 on the SBS asks, "How many people have you exchanged provocative pictures or texts with?" The participant must provide an open-response estimate in a blank space beside the question. Question 10 asks, "Who do you

usually sext with?" and provides three multiple choice response options: a) "Girlfriend/boyfriend"; b) "Someone I'm attracted to"; and c) "Friends."

The original SBS was first designed and tested in a pilot study consisting of 255 undergraduate college students (Dir, Cyders, & Coskunpinar, 2011). The instrument produced good internal consistency in the pilot study (α = .88, Dir et al., 2011), and with the subsequent dissertation sample (α = .89, Dir, 2012). The SBS was used in two additional studies that have both been published in peer-reviewed journals. Dir, Coskunpinar et al. (2013) reported an internal consistency of .81 when the SBS was administered to a sample of 278 college undergraduate students, and Dir, Cyders, et al. (2013) reported an internal consistency of .93 using a sample of 611 undergraduate students.

Dir, Coskunpinar, et al. (2013) reported evidence of convergent and discriminant validity, citing consistent associations between SBS scores and measures of impulsivity, sexual behaviors, problematic mobile phone use, and internet use (Dir, Coskunpinar et al., 2013, p. 569). The history of its use indicates that the SBS produces a valid estimate of sexting that is internally consistent, particularly when administered to undergraduate college students.

Several terms and definitions in the SBS were altered in order to better clarify what constitutes sexting for the participants in this study. This was done in light of the discussion in Mitchell et al. (2012) regarding the use of specific and direct inquiry. The original SBS provided only a definition for sexting. This study included two additional definitions for sexual imagery and sexual text messages. The term "suggestive or sexually charged text message" was replaced with "sexual text message." The definition of *sexual text message* was presented as, "any electronic message where the sender comments on the receiver's sexiness/attractiveness or expresses sexual desires to the receiver." Additionally, "of yourself" was added for any instances were sending

sexual images was specifically inquired in order to ensure clarity of the behavior being addressed (items 6, 7, and 8).

The phrase, "provocative or suggestive picture(s)" was replaced with the phrase, "sexual images." The definition of "sexual images" was presented as, "as any photo or video of his or her self where all or most of the person's exposed genitals or buttocks (breasts for females) is visible." Additionally, instances of "sent pictures by text message" were replaced with "sent images by cell phone" to avoid confusion over what constitutes a text message and what constitutes a sexual image. Upon reviewing the literature, these terms (sexual text message, and sexual image) and corresponding definitions appeared adequately specific and inclusive of content indicative of sexting.

Two additional response options were included for SBS question 10 ("Who do you usually sext with?"): "Ex-boyfriend/girlfriend", and "Someone I only know online." These five response options were then changed from multiple choice to individual 5-point Likert scales, identical to questions 1 through 8 (1 [*Never*] to 5 [*Frequently*]). This gave the respondent the option to provide relative frequencies according to these various sexting partners, and also provide more explicit data for the study. Responses to questions 9 and 10 were interpreted separately from questions 1 through 8.

Social learning (I): Reinforcement residue. The measurement of social learning was two-fold. First, a 7-item measure developed by Brauer (2009) was employed to estimate the degree to which respondents felt socially reinforced to sext. A second self-made section was employed to determine if the respondent had observed peers engaging in sexting in the past.

Brauer (2009) retroactively analyzed data collected from waves 1 through 5 of the National Youth Survey (NYS; Elliott, Huizinga, & Ageton. 1985) to estimate *reinforcement residue* (i.e.,

the degree that an individual feels they've been socially reinforced to perform certain behaviors) by both parents and peers. Brauer's (2009) instrument originally estimated social reinforcement of theft and marijuana use, and was adapted to measure reinforcement residue of sexting for this study. For the sake of simplicity, and because peer influence is typically more salient during adolescence (Baumgartner, Valkenburg, & Peter, 2011; Walrave et al., 2013), only questions measuring peer reinforcement residue (not parental) were measured in the current study.

Reinforcement residue was calculated by multiplying two factors: *Reinforcement content* and *reinforcer influence*. Reinforcement content estimates the degree to which the respondent believes his or her peers would approve of him or her engaging in certain behaviors (sexting), and was measured using two questions: "How would your peers react if you sent sexual photos or videos of yourself to someone?" This question was repeated using "text messages" instead of "photos or videos." Response options for these two questions ranged from 1 (*strongly disapprove*) to 5 (*strongly approve*), and were transformed to range from -2 to 2. Negative scores indicate that respondents expect parents or peers to disapprove of the particular behavior, where positive scores indicate expected approval of the behavior. Reinforcement content could also represent subjective norms of sexting (e g., Walrave et al., 2013).

Reinforcer influence estimated the extent to which peer appraisal impacted the respondent's behavior, and was computed using five items: 1) "How important is it to you to have a group of friends and be included in their activities?"; 2) "How much do your friends influence what you think and do?"; 3-4) "On average, how many weekday afternoons/evenings, Monday through Friday, from the end of school or work to dinner, do you spend with your friends?"; and 5) "On the weekends, how much time do you generally spend with your friends?" Response options for item 1 range from 0 (*not at all important*) to 4 (*very important*). Higher scores indicate

greater perceived importance of being included in peer groups. The answer options for item 2 range from 0 (*very little*) to 4 (*a great deal*). Higher values indicate greater peer influence on the respondent's behavior.

Answer options for items 3 and 4 range from 0 days to 5 days. Higher scores on these scales indicate more weekday afternoons (item 5) or weekday evenings (item 6) spent with one's peers. Finally, answer options for item 5 range from 0 (*very little*), to 4 (*a great deal*). Higher scores on this item indicate more time spent with peers on the weekend. Items 3 through 5 were summed and averaged to estimate amount of time the respondent spent with his or her peers each week. The mean was then summed and averaged with items 3 and 4 to create an estimate of overall reinforcer influence. The original Brauer (2009) instrument also estimated parental influence using these items, though the current study only estimated peer influence.

The score obtained for reinforcer influence was multiplied by reinforcement content to produce the magnitude and direction of social reinforcement of the target behavior (reinforcement residue). This product could range from -8.4 to 8.4. Lower negative scores indicate stronger parental or peer influence in *opposition* to the target behavior (sexting). Higher positive scores indicate stronger parent or peer influence in *favor* of sexting. Scores of zero indicate no peer or parental influence either in opposition or in favor of sexting.

Brauer (2009) mentioned that self-report surveys are an under-investigated method of examining social learning, and that his study was intended to be a starting point for assessing indirect indicators of social learning. No estimates of reliability were provided for the peer involvement scale in either Brauer (2009), or Elliot et al. (1985). Validity was tested by determining whether increased reinforcement residue would predict theft and marijuana use at later waves in the NYS. The study did not find reinforcement residue to predict theft or marijuana use

at later time periods. However, the study did find significant between-subject effects; individuals who reported positive reinforcement residue for either theft or marijuana use were significantly more likely to engage in that behavior Brauer (2009). This suggests that Brauer's (2009) method may be valid for use with cross-sectional data.

For the remainder of this paper, reinforcement residue will be referred to as *peer sexting influence*, because the variable represents the product of peer influence and peer approval of sexting. This was done in order to more clearly represent the underlying meaning of the variable itself. Likewise, reinforcer influence will be referred to as *peer influence*, and reinforcement content will be referred to as *peer approval of sexting* for the remainder of the paper.

Social learning (II): Observed peer sexting. Observation of a model or symbolic exposure to a behavior (e.g., speech or images) is considered a prerequisite to social learning and imitation (Bandura et al., 1969). There are two questions in this additional section. Item 1 in this section asks, "In general, how often do you think your friends send sexual photos or videos of themselves to other people?" This question is repeated using "sexual text messages" for item 2. Items 1 and 2 use a 5-point scale with response options ranging from 1 (*never*) to 5 (*almost every day*). Higher scores indicate that the respondent perceives more frequent sexting among his or her peers.

Peer pressure (I): The Network of Relations Scale. The Network of Relations Inventory – Relational Quality Version (NRI-RQV; Furman & Buhrmester, 1992) is a 30-item survey that addresses a number of positive and negative relationship features, such as companionship, emotional support, and criticism. It includes a three-item, five-point Likert-type subscale that estimates peer pressure the respondent experiences from a specific person. The subscale contains three questions regarding how often the individual feels pressured to do things they do not want to

do. For example, one item asks, “How often does your friend try to get you to do things you don’t like?” Response options on the NRI-RQV peer pressure subscale range from 1 (*almost never*) to 5 (*almost always*). The three items are added up and averaged. Higher scores on this subscale indicate the subject experiences more frequent peer pressure from the target individual.

The NRI-RQV and the peer pressure subscale have been found to have adequate internal consistency. Hibbard and Buhrmester (2010) found Cronbach’s alphas for the composite measure to range from .82 and .93. Internal consistency for the peer pressure subscale was assessed referencing six different relationships: male friend (α = .73), female friend (α = .68), romantic friend (α =.90), sibling (α =.76), mother (α =.75), and father (α =.71; Furman & Buhrmester, 2008). Though the NRI-RQV does not address pressure to perform specific behaviors such as sexting, the NRI composite is considered to be an overall valid measure of relationship quality (Furman & Buhrmester, 2009).

This peer pressure subscale was adapted from a study that examined peer pressure and sexting, in which it obtained a Cronbach alpha of .75 (Vanden Abeele et al., 2014). Vanden Abeele et al. (2014) adapted the instrument to measure perceived pressure from friends in general, rather than from an individual person. We employed the same adaptation for the current study. However, this adapted instrument did not specifically measure peer pressure to *sext*. An additional section measured peer pressure to sext, and is described below.

Peer pressure (II): Peer pressure to sext. Two additional items were added to address peer pressure specific to sexting, as well as from what individual the peer pressure was experienced. This question was created using a format similar to the SBS question 10 (Dir, Cyders, et al., 2013). Instead of asking "Who do you usually sext with?”, the respondent will be asked, “Who usually pressures you to send sexual images of yourself?” The same five individuals

provided in question 10 on the SBS were provided here: a) "Girlfriend/boyfriend", b) "Ex-girlfriend/ex-boyfriend", c) "Someone I'm attracted to", d) "Friends", and e) "Someone I only know online". A response was given for each individual above using a 5-point Likert scale (1 [*Never*] to 5 [*Frequently*]). Item 2 asked, "How strongly do you feel pressured to send sexual images of yourself?" Response options for this question ranged from 1 (*Not at all*) to 5 (*Very pressured*) on a 5-point Likert-type scale. The five responses from item 1 and the response for item 2 were summed and averaged with responses from the NRI-RQV in order to produce an overall estimate of peer pressure, including pressure specific to sexting. Responses higher in value indicate more frequently experienced peer pressure.

Self-esteem. The 10-item Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965) was used to assess self-reported levels of global self-esteem among respondents in this study. Sample items include “I feel that I have a number of good qualities,” and “I feel that I'm a person of worth, at least on an equal plane with others.” Response options ranged from 0 (*strongly disagree*) to 3 (*strongly agree*). Item responses were summed and averaged, ranging from 0 to 3. Higher scores indicate higher reported self-esteem. The RSES has a test-retest correlation of 0.85 (Rosenberg, 1965), as well as a Guttman scale coefficient of reproducibility of 0.92, and a coefficient of scalability of 0.72 (Rosenberg, 1965).

The RSES has been determined to be a valid instrument when compared to the Self-Perception Profile for Adolescents (SPPA; Hagborg, 1993). Scores obtained with RSES were strongly correlated with scores on the SPAA Global Self-Worth measure. This correlation was stronger than those found with other self-concept domains measured using the SPAA. The study determined that, although the instrument appears to be measuring two distinct factors, these factors

both represent the same overall construct (Hagborg, 1993). The RSES continues to be used in current research around the world (Huang & Dong, 2012).

Disinhibition. The Urgency, Premeditation, Perseverance, Sensation Seeking, and Positive Urgency Impulsive Behavior Scale (UPPS-P; Whiteside & Lynam, 2001; Cyders, Smith, Spillane, Fischer, Annus, & Peterson, 2007) is a 59 item self-report instrument that measures impulsivity as a 5-factor personality construct. The original version of this instrument was called the UPPS (Whiteside & Lynam, 2001) and included the following 4 components: 1) Negative urgency (12 items; e.g., "When I feel bad, I will often do things I later regret in order to make myself feel better now") which represents the tendency to act impulsively when experiencing a negative mood; 2) (lack of) premeditation (11 items; e.g., "I don't like to start a project until I know exactly how to proceed"), which represents the tendency not to consider consequences before acting; 3) (lack of) perseverance (10 items; e.g., "I finish what I start"), defined as maintaining focus and progress on tasks that may require sustained mental effort; and 4) sensation seeking (12 items; e.g., "I would enjoy water skiing"), representing a tendency to seek out novel and thrilling experiences. Factorial analysis determined these dimensions to make up a cohesive construct if independent yet interrelated facets related to impulsiveness (Whiteside & Lynam, 2001).

Positive urgency (14 items; e.g., "When I am very happy, I tend to do things that may cause problems in my life.") was added as a fifth factor in subsequent research. The addition of this factor was supported using exploratory and confirmatory factor analysis (Cyders & Smith, 2008). This factor represents the tendency to act impulsively when feeling happy or being in an otherwise positive mood. It was reasoned that impulsive propensities can be enhanced by both positive and negative mood states, and that these two mood states may differentially contribute to various impulsive behaviors (Cyders et al., 2007). Both positive and negative urgency predicted alcohol

consumption, but only negative urgency predicted eating disorder symptoms, indicating discriminant validity from the other factors measured with the UPPS.

The UPPS-P uses a Likert type scale with response options ranging from 1 (*Agree Strongly*) to 4 (*Disagree strongly*). All but one item on the negative urgency subscale are reversed coded, and all items in sensation seeking and positive urgency are reverse coded. This means that scores on the subscale represent *less* of that factor until these scores are inverted. This must be done with two items in the perseverance scale as well. Once this is completed, all items may be summed and averaged within each subscale and as a whole. Higher scores for each subscale would indicate greater occurrence of that particular factor (lace of perseverance, negative urgency, etc.). Higher overall scores would indicate more overall impulsiveness (Cyders et al., 2007).

Whiteside and Lynam (2001) conducted exploratory factor analyses using 9 measures of impulsivity along with the Neuroticism-Extroversion-Openness Personality Inventory-Revised (NEO-PI-R). The four UPPS factors were derived by consolidating and grouping associated items among these instruments. The model demonstrated good convergent validity by attaining an average correlation of .58 with the original impulsivity scales (Costa & McCrae, 1992), and good divergent validity by attaining an average correlation of .17 with measures of unrelated constructs (Whiteside & Lynam, 2001). Reynolds et al. (2013) also found the UPPS-P to demonstrate concurrent validity with a substance abusing population.

The UPPS-P has demonstrated acceptable internal consistency on all subscales. Positive urgency (α = .94) and premeditation (α = .85) attained the highest internal consistencies, though negative urgency (α = .77), perseverance (α = .78), and sensation seeking (α = .77) were still within acceptable limits (Cyders & Smith, 2007). Anestis, Selby, and Joiner (2007) also assessed the internal consistency for each factor of UPPS (positive urgency not included) in two separate

measurements that took place about 3 to 4 weeks apart. Internal consistency estimates were high for all factors: negative urgency obtained alphas of .91 and .89 (phase 1 and phase 2, respectively); lack of premeditation was .81and .84; lack of perseverance was .87 and .84; and sensation seeking was .91 and .90.

The four subscales selected for this study were sensation seeking, negative urgency, positive urgency, and (lack of) premeditation. All four subscales were aggregated to create an overall estimate of disinhibition or general impulsiveness. Subscales were separately added as indicators when performing structural equation modeling. Negative urgency contained many items endemic of general impulsivity (e.g., “I have trouble controlling my impulses”, Sometimes I do impulsive things that I later regret", etc.), making it an optimal choice to represent impulsivity alongside lack of premeditation. Persistence was not considered to be an aspect of impulsivity relevant to the act of sexting.

Procedure

Permission to conduct this study was obtained from the Wayne State University Institutional Review Board (IRB). The principal of Lincoln High School was contacted, and provided a brief description of the study along with a request to conduct data collection at her school. A letter of support was obtained from the principal, allowing for data collection to occur during a homeroom period which took place Monday mornings. Parents were sent supplemental information forms via first-class mail two weeks prior to data collection. These letters described the nature of the study and what type of information was to be collected. They also provided parents the opportunity to refuse their child’s participation, and to request an electronic copy of the survey for their own viewing purposes. Six parents declined their child’s participation in the study either by mail or phone. Twenty-two letters were returned via the mail due to outdated

addresses. Students whose parents could not be contacted or whose parents declined their participation were given an alternative task during data collection.

The high school selected for data collection was located just outside of Detroit city. The school had a student count ranging around 600 during the 2014 to 2015 academic year. Exact demographic numbers were difficult to attain due to a high number of students enrolling, dropping out, or transferring throughout the year. Approximately 54% of the student body was male. About 58.7% of students were African American, 27.2% were Caucasian, 7.7% were mixed-race, and 6.1% were Asian or Hispanic. Approximately 65.5% of students were eligible for free or reduced lunches. A roughly even percentage of students attended each grade level (Michigan Department of Education, 2015).

The principal investigator (PI) entered the high school with blank surveys contained in manila envelopes, and distributed an appropriate number to each classroom. Oral assent forms were given to all students before they were asked to participate in the study. The PI provided each classroom with instructions that directed participating students to take a blank survey from a manila envelope, and then place the survey in a second manila envelope when completed. Students could take several pieces of candy from a bag after completing or attempting to complete the survey. Parents, teachers, and students were informed that the study was voluntary, and that all collected data were completely anonymous. The PI returned to each classroom to pick up all testing materials, which were later stored in a locked filing cabinet. Teachers were compensated with five-dollar gift cards for their assistance.

Data Analysis

Survey results were entered coded, cleaned, and analyzed using SPSS software. Race and sex were examined for significant effects on sexting frequency using multivariate analysis.

Multiple variables were initially assessed for positive correlation with sexting frequency using Spearman's rank-order correlation. The examined variables included age, impulsivity, frequency of electronic communication, peer sexting, peer sexting influence, and peer pressure.

Moderation of self-esteem on the relations between peer pressure and sexting were examined with two-step hierarchical multiple linear regression. Two-step hierarchical linear regression was also used to examine moderation of disinhibition on the relation between electronic communication and sexting, and to examine the predictors' effect on sexting above that of demographic variables. Structural equation modeling using AMOS software tested overall fit of the theoretical model with the data sample. Multi-group analysis was tested for significant differences according to sex in the predictive model.

Table 2

Statistical Analyses

Research Questions and Hypotheses	Variables	Statistical Analysis
1. What are the rates of sexting among teens? Who are the most common sexting recipients among teens? Are there significant differences by sex or race among measured variables (sexting, self-esteem, frequency of electronic communication, peer pressure, peer sexting, impulsivity, and peer sexting influence)?		
H_{1a}: Notable patterns will be evident in the rates and recipients of teen sexting.	Sexting behavior (SBS); and sexting partner scale.	Descriptive analysis
H_{1b}: There will be variation in race and sex in terms of sexting and the measured predictor variables.	<u>Independent variables:</u> Sex and race. <u>Dependent variables:</u> Sexting behavior (SBS: sending, or receiving sexual images or text messages.); self-esteem (RSE); frequency of electronic communication; peer sexting; peer pressure (NRI-RQV); & disinhibition (UPPS-P).	2 x 4 Multivariate Factorial Analysis of Variance.
2. Do teens sext more often when they: a) are of older age; b) use social media more often; c) observe their peers sexting more frequently; d) believe their peers approve of them sexting; e) feel pressured by their peers to sext; and f) are more impulsive?		
H_2: Sexting is positively correlated with age, electronic communication, perceived peer sexting, peer sexting influence, peer pressure, and impulsivity.	Sexting behavior (SBS); age, frequency of electronic communication; peer sexting; peer sexting influence (reinforcement residue); and reported peer pressure (NRI-RQV).	Spearman Rank-Order Correlation Matrix (All study variables will be included)
3. Do the predictor variables (peer sexting, peer pressure, peer sexting influence, self-esteem, disinhibition, and frequency of electronic communication) explain a statistically significant amount of variance in sexting beyond that of demographic factors?		

Research Questions and Hypotheses	Variables	Statistical Analysis
H_3: The predictor variables in this study will explain a statistically significant proportion of variance I frequency of sexting beyond that of demographic variables.	Step 1: Demographics Age, sex, & race Step 2: Predictors Frequency of electronic communication; peer sexting; peer pressure (NRI-RQV); peer sexting influence (reinforcement residue); & disinhibition (UPPS-P: sensation seeking, negative urgency & premeditation). Criterion Variable Sexting	Two-Step Hierarchical Linear Regression Analysis
4. Are teens with low self-esteem more likely to send sexts when pressured by their peers, and are teens high in disinhibition more likely to send sexts if they more frequently use electronic communication?		
H_{4a}: Self-esteem will moderate relations between peer pressure and sexting.	Step 1: Predictor variables: Peer pressure (NRI-RQV) & self-esteem (RSE) Step 2: Predictor variables: Peer pressure (NRI-RQV), self-esteem (RSE), & Interaction between peer pressure and self-esteem. Criterion variable: Sexting (SBS)	Two-Step Hierarchical regression analysis
H_{4b}: Disinhibition will moderate relations between frequency of electronic communication and sexting.	Step 1: Predictor variables: Disinhibition (UPPS-P: sensation seeking, negative urgency & premeditation) &	Two-Step Hierarchical regression analysis

Research Questions and Hypotheses	Variables	Statistical Analysis
	frequency of electronic communication. <u>Step 2: Predictor variables:</u> Disinhibition (UPPS-P: sensation seeking, negative urgency & premeditation), frequency of electronic communication & the interaction between disinhibition and frequency of electronic communication. <u>Criterion variable:</u> Sexting (SBS)	
5. Do the predictor variables (peer sexting, peer pressure, peer sexting influence, self-esteem, disinhibition, and frequency of electronic communication) adequately fit a comprehensive prediction model, and does this model significantly differ by sex?		
H_{5a} The variables measured in this study will represent a causal model of sexting with good overall.	<u>Predictor Variables</u> Frequency of electronic communication; peer sexting; peer pressure (NRI-RQV); peer sexting influence (reinforcement residue); & disinhibition (UPPS-P: sensation seeking & negative urgency. premeditation). <u>Criterion Variables</u> Sexting behavior (SBS: sending or receiving sexual images or text messages.).	Structural Equation Modeling: Alternative Models (Exploratory)
$H_{5b:}$ The data will fit the proposed model significantly better when	<u>Predictor Variables</u> Frequency of electronic communication; peer sexting;	Structural Equation Modeling: Multi-group analysis

Research Questions and Hypotheses	Variables	Statistical Analysis
(is the model group invariant)?	peer pressure (NRI-RQV); peer sexting influence (reinforcement residue); & disinhibition (UPPS-P: sensation seeking & negative urgency. premeditation). Criterion Variables Sexting behavior (SBS: sending or receiving sexual images or text messages.). Grouping Variable: Sex	

CHAPTER 4 RESULTS

The purpose of this study was to examine factors associated with adolescent sexting, and determine if sexting rates differed by race, age, or sex. A predictive model was proposed to explain the occurrence of sexting among adolescents, particularly *sending* sexual images and text messages to others. Descriptive data and internal consistency measures for all variables are presented in Table 3. Considerable skew was found in some variables, including sexting behavior and peer pressure to sext. This was expected, based on relatively low estimates in prior studies of sexting among teens. The use of Pearson's product-moment correlation estimates requires data to be normally distributed in order to accurately produce coefficients. Therefore, Spearman's rank-order correlation coefficients were generated to ensure accurate results. A correlation matrix examining associations between all measured variables is provided in Table 4, directly following Table 3

Table 3

Descriptive Statistics and Cronbach's Alphas: Survey Aggregate Scores (n=314)

						Range		
Variables	Missing	α	Mean	Median	*SD*	Min	Max	Skew
EC Frequency	0	.72	3.82	4.00	1.67	0.00	6.67	-0.30
S.M. School Day	0		3.77	4.00	2.15	0.00	7.00	0.04
S.M. Non-School	0		4.78	5.00	2.22	0.00	7.00	-0.63
Texting	0		2.90	3.00	1.88	0.00	6.00	0.28
Self-Esteem	1	.88	3.02	3.00	0.55	1.30	4.00	-0.15
Impulsivity	3	.91	2.28	2.31	0.38	1.42	3.31	-0.13
Lack Premeditation	1	.85	1.93	2.00	0.49	1.00	4.00	0.33
Negative Urgency	2	.88	2.45	2.48	0.65	1.08	4.00	-0.06
Sensation Seeking	2	.84	2.71	2.67	0.60	1.25	4.00	0.08
Positive Urgency	2	.94	2.04	2.07	0.68	1.00	4.00	0.18
General PP (NRI)	0	.86	2.05	2.00	0.94	1.00	5.00	0.88
Sexting PP	2	.82	1.38	1.00	0.65	1.00	5.00	2.20
R-Residue	0		-1.75	-1.72	2.63	-8.44	8.44	0.48
R-Texts	0		-1.39	-1.11	2.28	-8.44	8.44	0.37
R-Images	0		-2.17	-2.22	2.74	-8.44	8.44	0.63
R-Content	0		-0.96	-1.00	1.08	-2.00	2.00	0.81
Texts	0		-0.79	-1.00	1.20	-2.00	2.00	0.51
Images	0		-1.13	-2.00	1.11	-2.00	2.00	1.08
Rr-Influence	0		2.01	2.02	0.87	0.00	4.22	-0.06
Peer Sexting	0	.87	1.69	1.50	1.72	0.00	6.00	0.70
Sexting Behavior	0	.91	1.80	1.50	0.90	1.00	5.00	1.41
Received	0	.94	2.10	1.50	1.11	1.00	5.00	0.86
Sent	0	.93	1.50	1.00	0.86	1.00	5.00	2.21
Sexting With	0	.81	1.59	1.20	0.80	1.00	5.00	1.73

Note. EC = electronic communication; SM = social media; PP = peer pressure; R = reinforcement; Rr = reinforcer.

Table 4

Spearman's Rank-Order Correlation Matrix: All Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. EC Frequency	-													
2. Self-Esteem	-.10	-												
3. Impulsivity	.25**	-.36**	-											
4. Premeditation	.10	-.20**	.50**	-										
5. Neg. Urgency	.28**	-.46**	.75**	.24**	-									
6. Sen. Seeking	.06	.04	.46**	>.01	.07	-								
7. Pos. Urgency	.17**	-.28**	.78**	.24**	.53**	.14*	-							
8. Peer Pressure	.14**	-.21**	.32**	.13**	.27**	.08	.31**	-						
9. Rx-Residue	.09	.08	.10	.05	-.03	.12*	.06	.15*	-					
10. Rr-Influence	.16**	.01	.17**	.12*	.06	.15**	.10	.26**	-.21**	-				
11. Rx-content	.16**	.09	.16**	.14*	.02	.13**	.10	.31**	.86**	.17**	-			
12. Peer Sexting	.22**	-.02	.13*	.01	.03	.15**	.08	.34**	.37**	.16*	.45**	-		
13. Age	-.04	-.09	>.01	-.06	>.01	.01	.05	.04	.13*	-.09	.10	.10	-	
14. R-Sexts	.38**	.02	.26**	.14*	.16*	.16**	.20**	.36**	.38**	.27**	.51**	.43**	.04	-
15. S-Sexts	.23**	-.05	.26**	.15*	.15*	.11*	.24**	.37**	.38**	.21**	.48**	.42**	.17**	.64**

Note. EC = electronic communication; Neg. = negative; Sen. = sensation; Pos. = positive; Rx. = reinforcement; Rr = reinforcer R = received; S = Sent.

*p < .05; **p<.01

Question 1: What are the rates of sexting among teens? Who are the most common sexting recipients among teens? Are there significant differences by sex or race among measured variables (sexting, self-esteem, frequency of electronic communication, peer pressure, peer sexting, impulsivity, and peer sexting influence)?

Responses to the Sexting Behavior Scale (SBS) were compiled and examined in order to examine rates of high school sexting. Significant positive skew was detected in most reported sexting behaviors due to low frequencies. Items were dichotomized to represent whether a participant reported engaging in each sexting behavior at least rarely, versus never engaging in that behavior at all. The majority of prior literature on teen sexting has reported rates as dichotomous variables: either having or having never sent or received a sext (Thomas, 2009; Mitchell et al., 2012; Strassberg et al., 2013; Peskin et al., 2013). Dichotomizing in this way ensured results were more comparable to prior research. It was also of specific interest in this study to examine those who have *ever* sexted.

Of the sample, 63.4% of teens reported receiving sexual text messages via cell phone, 58.6% reported receiving sexual images on their cell phone, 48.7% reported receiving sexual text messages or images via the internet, 51.3% reported responding to a sexual text message or image they had received, 38.5% reported sending a sexual text message via cell phone, 28.7% reported sending a sexual image of themselves via cell phone, 20.7% reported sending a sexual text message or image to someone else on the internet, and 14.6% reported posting a sexual image online publicly at least rarely. Means, standard deviations, and skew estimates are presented in Table 5 below.

Table 5

Responses to Sexting Behavior Scale (n=314)

Sexting Behaviors				Rarely or more	Occasionally or more	Never
	M	*SD*	Skew	*n*(%)	*n*(%)	*n*(%)
1. Received Texts	2.35	1.40	0.73	199(63.4)	109(34.7)	115(36.6)
2. Received Images	2.06	1.20	1.01	184(58.6)	81(25.8)	130(41.4)
3. Rec. Text/Image Online	1.96	1.25	1.17	153(48.7)	83(26.4)	161(51.3)
4.Respond to Text/Image	2.03	1.29	1.10	161(51.3)	86(27.4)	153(48.7)
5. Sent Text via Cell	1.80	1.24	1.47	121(38.5)	65(20.7)	193(61.6)
6. Sent Image via Cell	1.49	0.94	2.21	90(28.7)	35(11.1)	224(71.3)
7. Sent Text/Image Online	1.40	0.93	2.59	65(20.7)	32(10.2)	249(79.3
8. Post Image Publicly	1.33	0.91	2.92	46(14.6)	31(9.9)	268(85.4)

Secondly, a one way within-subjects (repeated measures) analysis of variance (ANOVA) was conducted in order to determine the most common sexting recipients among teens. This test method was selected because the means for each sexting recipient were calculated using the same subjects. Only participants who reported engaging in any form of *sending* sexual content via cell phone or the internet (n = 129) were tested. Means from the original item scales were used rather than the dichotomized variables. Mauchly's test of sphericity was significant, *Mauchly's* $W(9)= .51$, $p < .001$, indicating that the assumption of sphericity had been violated. The Greenhouse-Geisser correction was used to correct for this violation. A significant main effect for sexting recipient was found, $F(2.97, 380.48)= 25.82$, $p <.001$, $\eta_p^2 = .17$. Post hoc tests using the Bonferroni

correction demonstrated that subjects who sent sexts reported sexting significantly more often with a boyfriend or girlfriend n = 102, 79.1%, than to a crush, n = 79, 55.8%, $p < .01$, or any other individual ($p < .001$). Sexting with an *ex*-boyfriend or girlfriend n = 72, 55.8%, did not significantly differ from sexting with a crush ($p = .59$) or with friends, n = 53, 41.1%, $p = .27$. Participants sexted significantly less often with people they only knew online, n = 44, 34.1%, compared to a boyfriend or girlfriend, a crush, or an ex-girlfriend or ex-boyfriend. Sexting with a friend and a person only known online did not significantly differ ($p > .05$). Means, standard deviations, and skew estimates are presented in Table 6 below.

Table 6

Sexting Recipients among Those Who Sent or Posted Sexts (n = 129)

Sexting Behaviors				"Rarely" or More		Never	
	Mean	*SD*	Skew	*n*	%	*n*	%
1. Girlfriend/Boyfriend	2.86	1.43	0.18	102	79.1	27	20.9
2. Ex-Girlfriend/Boyfriend	2.09	1.23	0.86	72	55.8	57	44.2
3. A Crush (Never GF/BF)	2.29	1.32	0.68	79	61.2	50	38.8
4. Friends	1.83	1.21	1.34	53	41.1	76	58.9
5. Person(s) only Online	1.69	1.16	1.64	44	34.1	85	65.9

The third portion of this research question was to determine whether there were significant differences by sex or race among the selected study variables, a 2x4 multivariate analysis of variance (MANOVA) was conducted using race and sex as independent variables. Frequency of electronic communication, self-esteem, peer sexting, impulsivity, peer pressure, peer sexting influence, reinforcer (peer) influence, and sexting were entered as dependent variables. Results of Pearson's product-moment correlations yielded moderate correlations between the dependent variables (see Table 4), indicating the need to perform a MANOVA (Meyers, Gamst, & Guarino, 2006). The aggregate scores from the SBS were used to represent overall sexting. Individual items from the SBS were tested only if main effects were detected in the omnibus test. The survey sections measuring general peer pressure (Network of Relations Inventory) and peer pressure to sext were also summed and averaged for the MANOVA. Box's M test of homogeneity of variance was significant, *Box's M*(315, 24609) = 523.98, $F = 1.42$, $p < .001$, indicating that the covariance

matrices of the dependent variables were not equal across all groups. Thus, the results should be interpreted with caution.

The interaction between sex and ethnicity was not significant, $F(24,888) = 0.89$, $p = .62$, $\eta_p^2 = .02$, nor was the main effect for race, $F(24,888) = 1.00$, $p = .47$, $\eta_p^2 = .03$. However, the main effect for sex was significant, $F(8,294) = 4.32$, $p < .001$, $\eta_p^2 = .11$. Females reported significantly more frequent electronic communication than males, $F(1,309) = 8.75$, $p < .01$, $\eta_p^2 = .03$, and males reported significantly more sexting, $F(1,309) = 5.65$, $p < .05$, $\eta_p^2 = .02$, higher peer sexting influence, $F(1,309) = 10.96$, $p < .05$, $\eta_p^2 = .04$, and higher self-esteem than females, $F(1,309) = 6.14$, $p < .05$, $\eta_p^2 = .02$. Peer sexting, reinforcer (peer) influence, peer pressure, and impulsivity did not significantly differ by sex. Results are presented in Table 7 below.

Table 7

Multivariate Analysis: Sex Comparisons across All Variables

	Males		Females				
	Mean	*SD*	Mean	*SD*	*SS*	*F*	Partial Eta^2
EC Frequency	3.55	1.76	4.08	1.56	24.27	8.75**	.03
Self-Esteem	3.07	0.58	2.97	0.53	1.79	6.14*	.02
Peer Sexting	1.79	1.75	1.59	1.69	1.81	0.61	<.01
Impulsivity	2.27	0.37	2.28	0.40	0.31	2.09	.01
Peer Pressure	1.67	0.64	1.53	0.56	0.95	2.61	.01
R-Residue	-1.17	2.74	-2.32	2.39	72.35	10.96**	.04
Rr-Influence	2.12	0.84	1.90	0.89	0.78	0.10	<.01
Sexting (All)	2.00	1.01	1.62	0.74	4.42	5.65*	.02

Note. EC = electronic communication; R = reinforcement; Rr = reinforcer.
*p < .05; **p<.01; *** p<.001

An additional MANOVA was run to order to determine which specific sexting behaviors measured by the SBS varied by sex. Each of the eight specific sexting items were entered as individual dependent variables. The effect for sex was statistically significant, $F(8, 305) = 2.93$, $p < .01$, $\eta_p^2 = .07$. Follow-up ANOVAs revealed that males reported higher rates of all forms of sexting except for posting sexual images online publicly. Means, standard deviations, and test results are presented in Table 8 below.

Table 8

MANOVA: Sexting Differences by Sex

	Males (*n*=153)			Females (*n*=161)			
	Mean	*SD*	*SE*	Mean	*SD*	*SE*	*F*
1. R-Texts	2.63	1.50	.12	2.08	1.23	.10	12.49***
2. R-Images	2.27	1.31	.11	1.87	1.05	.08	8.91**
3. R-Online	2.16	1.33	.11	1.78	1.13	.09	22.19***
4. RT-Text/Image	2.37	1.45	.12	1.71	1.02	.09	7.33**
5. S-Texts	2.01	1.38	.11	1.59	1.05	.08	9.42**
6. S-Images	1.60	1.02	.08	1.38	0.85	.07	4.44*
7. S-Text/Images	1.52	1.04	.08	1.29	0.79	.06	4.91*
8. Public Post	1.43	1.02	.08	1.24	0.78	.06	3.64

Note. R = received; RT = responded to; S = sent.
*$p < .05$; **$p < .01$; ***$p < .001$

Received text messages. Reported rates of receiving sexual text messages significantly differed by sex. Males ($M = 2.63$, $SD = 1.50$) received sexual text messages from other individuals more often than females ($M = 2.08$, $SD = 1.23$).

Received images. Reported rates of receiving photos or videos of a sexual nature significantly differed by sex. Males ($M = 2.27$, $SD = 1.31$) received sexual images signifantly more often than females ($M = 1.87$, $SD = 1.05$).

Received images online. Reported rates of receiving sexual text messages or images over the internet significantly differed by sex. Males ($M = 2.16$, $SD = 1.33$) received sexual text messages from other individuals more often than females ($M = 1.78$, $SD = 1.13$).

Responded to texts or images. Reported rates of responding to sexual text messages or images differed significantly by sex. Males (M = 2.63, SD = 1.50) responded to sexual text messages and images more often than females (M = 2.63, SD = 1.50).

Sent texts. Reported rates of sending text messages of a sexual nature to someone else significantly differed by sex. Males (M = 2.01, SD = 1.38) sent sexual text messages to other individuals more often than females (M = 1.59, SD = 1.05).

Sent images. Reported rates of sending sexual pictures or videos to others significantly differed by sex. Males (M = 1.60, SD = 1.02) sent sexual images to other individuals more often than females (M = 1.38, SD = 0.85).

Sent texts or images online. Reported rates of sending sexual images or text messages to someone else over the internet significantly differed by sex. Males (M = 1.52, SD = 1.04) sent sexual text messages to other individuals more often than females (M = 1.29, SD = 0.79).

Posted sexual images publicly. Reported rates of publicly posting sexual images online did not significantly differ between males (M = 1.43, SD = 1.02) and females (M = 1.24, SD = 0.78).

Question 2: Do teens sext more often when they: a) are of older age; b) use social media more often; c) observe their peers sexting more frequently; d) believe their peers approve of them sexting; e) feel pressured by their peers to sext; and f) are more impulsive?

Spearman's rank-order correlation coefficients were generated in addressing this research question, and the full analysis is presented in Table 4. Receiving sexts (SBS items 1-4) and sending sexts (SBS items 5-8) were aggregated and correlated with the selected study variables separately. Although receiving sexts was not associated with age (r = .04, p = .47), *sending* sexts was positively associated with age (r = .17, p <.01). Sending sexts was positively associated with

frequency of electronic communication (r = .23, p <.01), peer sexting (r = .42, p <.01), peer approval of sexting (reinforcement content; r = .48, p <.01), peer pressure (r = .37, p <.01), and impulsivity (r = .26, p <.01). *Receiving* sexts was also positively associated with frequency of electronic communication (r = .38, p <.01), peer sexting (r = .43, p <.01), peer approval of sexting (reinforcement content; r = .51, p <.01), peer pressure (r = .36, p <.01), and impulsivity (r = .26, p <.01). Only age demonstrated different associations with sending and receiving sexts; sending sexts was positively associated with age, but receiving sexts was not associated with age at all.

Question 3: Do the predictor variables (peer sexting, peer pressure, peer sexting influence, self-esteem, disinhibition, and frequency of electronic communication) explain a statistically significant amount of variance in sexting beyond that of demographic factors?

The following analyses examined instances of receiving sexts and sending sexts separately, as these two events are functionally and behaviorally distinct. Thus, two separate hierarchical linear regression models were conducted. The first model examined receiving sexts (SBS items 1-4) as the dependent variable, and the second model examined sending sexts (SBS items 5-8) as the dependent variable. Both models included race, sex, and age in the first step. Frequency of electronic communication, peer sexting, peer pressure, peer sexting influence, self-esteem, and impulsivity were included in the second step of each model. Overall R-squared values and beta weights were examined and compared from step one to step two in order to determine the relative predictive strength of each predictor when controlling for demographic factors. The first model examined receiving sexts as the criterion, and is presented in Table 9 below.

Table 9

Two-Step Hierarchal Linear Regression Analysis:

Receiving Sexts while Controlling for Demographics

Predictors	*B*	*SE*(*B*)	β	*p*-value	R^2
Step 1					.051
Age	.01	.05	.01	.828	
Sex	.50	.12	.23	>.001	
Race	.03	.06	.03	.590	
Step 2					.428
Age	-.01	.04	-.01	.767	
Sex	.43	.10	.19	>.001	
Race	.04	.05	.03	.447	
EC Frequency	.17	.03	.25	>.001	
Self-Esteem	.17	.10	.09	.075	
Impulsivity	.45	.14	.15	.001	
PP-Sext	.45	.08	.27	>.001	
Peer Sexting	.11	.03	.17	.001	
R-Residue	.08	.02	.18	>.001	

Note. EC= electronic communication; PP = peer pressure; R-Residue = peer sexting influence.
$\Delta R^2 = .377$, $F = 32.8$, $p < .001$

In step 1 of the hierarchical regression analysis, 5% of the variance in receiving sexts was explained by race, sex, and age, $R^2 = .051$, $F = 5.52$, $p < .01$. Sex remained a significant predictor of receiving sexts in both step 1 ($\beta = .23$, $p < .001$) and step 2 ($\beta = .19$, $p < .001$). Age and race were not significantly associated with receiving sexts in either step. Self-esteem was not significantly associated with receiving sexts ($\beta = .09$, $p = .075$). All remaining predictor variables were significantly associated with receiving sexts, including frequency of electronic communication ($\beta = .25$, $p < .001$), impulsivity ($\beta = .15$, $p < .01$), peer pressure to sext ($\beta = .27$, $p < .001$), peer sexting ($\beta = .17$, $p < .01$), and peer sexting influence ($\beta = .18$, $p < .001$). The inclusion of these predictor variables explained a significantly larger percentage of variance than the demographic variables alone, $\Delta R^2 = .377$, $F = 32.8$, $p < .001$. The second model examined sending sexts as the dependent variable, and is presented in Table 10 below.

Table 10

Two-Step Hierarchal Linear Regression Analysis:

Sending Sexts while Controlling for Demographics

Predictors	*B*	*SE*(*B*)	β	*p*-value	R^2
Step 1					.040
Age	.09	.04	.13	.026	
Sex	.26	.10	.15	.009	
Race	.01	.05	.01	.864	
Step 2					.345
Age	.07	.03	.10	.044	
Sex	.16	.08	.09	.068	
Race	>.01	.04	>.01	.963	
EC Frequency	.03	.03	.06	.248	
Self-Esteem	.08	.08	.05	.321	
Impulsivity	.48	.12	.22	>.001	
PP-Sext	.35	.07	.27	>.001	
Peer Sexting	.09	.03	.18	.001	
R-Residue	.06	.02	.19	>.001	

Note. EC = electronic communication; PP = peer pressure; R-Residue = peer sexting influence. $\Delta R^2 = .305$, $F = 23.20$, $p < .001$

Only 4% of the variance in sending sexts was explained by race, sex, and age, $R^2 = .040$, $F = 4.29$, $p < .01$. Both age ($\beta = .13$, $p < .05$) and sex ($\beta = .15$, $p = .01$) were significantly associated with sending sexts in step 1. Age remained positively associated with sending sexts in step 2 ($\beta = .10$, $p < .05$), although sex was no longer significant ($\beta = .09$, $p = .068$). Race was not significantly associated with sending sexts in either step 1 or step 2.

The inclusion of the predictor variables explained a significantly larger percentage of variance than the demographic variables alone, $\Delta R^2 = .305$, $F = 32.8$, $p < .001$. Self-esteem ($\beta = .05$, $p = .321$) and frequency of electronic communication ($\beta = .06$, $p = .248$) were not significantly associated with sending sexts. All remaining predictor variables were significantly associated with sending sexts, including impulsivity ($\beta = .22$, $p < .001$), peer pressure to sext ($\beta = .27$, $p < .001$), peer sexting ($\beta = .18$, $p < .01$), and peer sexting influence ($\beta = .19$, $p < .001$).

Question 4: Are teens with low self-esteem more likely to send sexts when pressured by their peers, and are teens high in disinhibition more likely to send sexts if they more frequently use electronic communication?

Self-esteem was examined as a possible moderator of the peer pressure in predicting sending sexts. Two-step hierarchical linear regression was performed. Self-esteem and reported peer pressure to sext were entered in step 1. Self-esteem and peer pressure were both centered and then multiplied together to produce the interaction variable. This interaction variable was then added in step two of the model. Moderation would be indicated if the addition of the interaction variable explained significantly more variance in predicting sexting, and produced a significant beta weight. The findings are presented in Table 11 below.

Table 11

Two-Step Hierarchical Linear Regression Analysis:

Sending Sexts and Peer Pressure with Self-Esteem as Moderating Variable (n = 311)

	B	*SE*(*B*)	β	*p*	R^2
Step 1					.416
Self-Esteem	.01	.08	>.01	.948	
Peer Pressure (Sexting)	.55	.07	.42	.000	
Step 2					.421
Self-Esteem	.02	.08	.01	.841	
Peer Pressure (Sexting)	.56	.07	.42	.000	
SE*PP Interaction	.06	.05	.07	.205	

*Note.*SE = self-esteem; PP = peer pressure.
ΔR^2= .005; F = 1.61; p = .205

The interaction variable did not explain a significant amount of additional variance to the model in step 1 (ΔR^2 = .005; F = 1.61; p = .205). The interaction variable was also not significantly associated with sending sexts (β = .07, p = .205). Reported peer pressure to sext remained a strong predictor of sending sexts (β > .42, p < .001), and self-esteem was not associated with sending sexts whatsoever (β > .01, p = .948). The overall model indicated that self-esteem did not moderate the relations between peer pressure and sending sexts.

The same method used to test for moderation in the analysis above was used to test for disinhibition as a moderator of the relations between electronic communication and sexting. The findings are presented in Table 12 below.

Table 12

Two-Step Hierarchical Linear Regression Analysis:

Sending Sexts and EC Frequency with Impulsivity as Moderating Variable (n = 311)

	B	SE(B)	β	*p*	R^2
Step 1					.105
EC Frequency	.06	.03	.12	.030	
Impulsivity	.61	.13	.27	.000	
Step 2					.105
EC Frequency	.06	.03	.12	.030	
Impulsivity	.61	.13	.27	.000	
EC*Impulsivity	-.01	.05	-.01	.915	

Note. EC = electronic communication.
$\Delta R^2 < .001$; $F = .01$; $p = .915$

As indicated in Table 11 above, the addition of the interaction variable did not explain a significant amount of additional variance in predicting sending sexts beyond that explained by electronic communication and impulsivity, $\Delta R^2 < .001$; $F = .01$; $p = .915$. The interaction variable was not significantly associated with sending sexts (β = -.01, p = .915). Both frequency of electronic communication (β = .12, $p < .05$) and impulsivity (β = .27, $p < .001$) remained significantly associated with sending sexts in both steps. The overall model indicated that impulsivity did not moderate the relations between electronic communication and sending sexts.

Question 5: Do the predictor variables (peer sexting, peer pressure, peer sexting influence, self-esteem, disinhibition, and frequency of electronic communication) adequately fit a comprehensive prediction model, and does this model significantly differ by sex?

Predictive models were estimated using exploratory structural equation modeling with AMOS software. Sending and receiving sexts were predicted in two separate models, as these two behaviors were considered functionally, behaviorally, and experientially distinct. Separate models eliminated the possibility of statistical collusion between these two variables. After calculating initial model estimates, alternative models were proposed in order to establish best fit to the data. The model producing the best fit was retained as the most representative predictive model. Self-esteem was excluded from model specification due to demonstrating no significant associations with sexting in research questions 3 or 4.

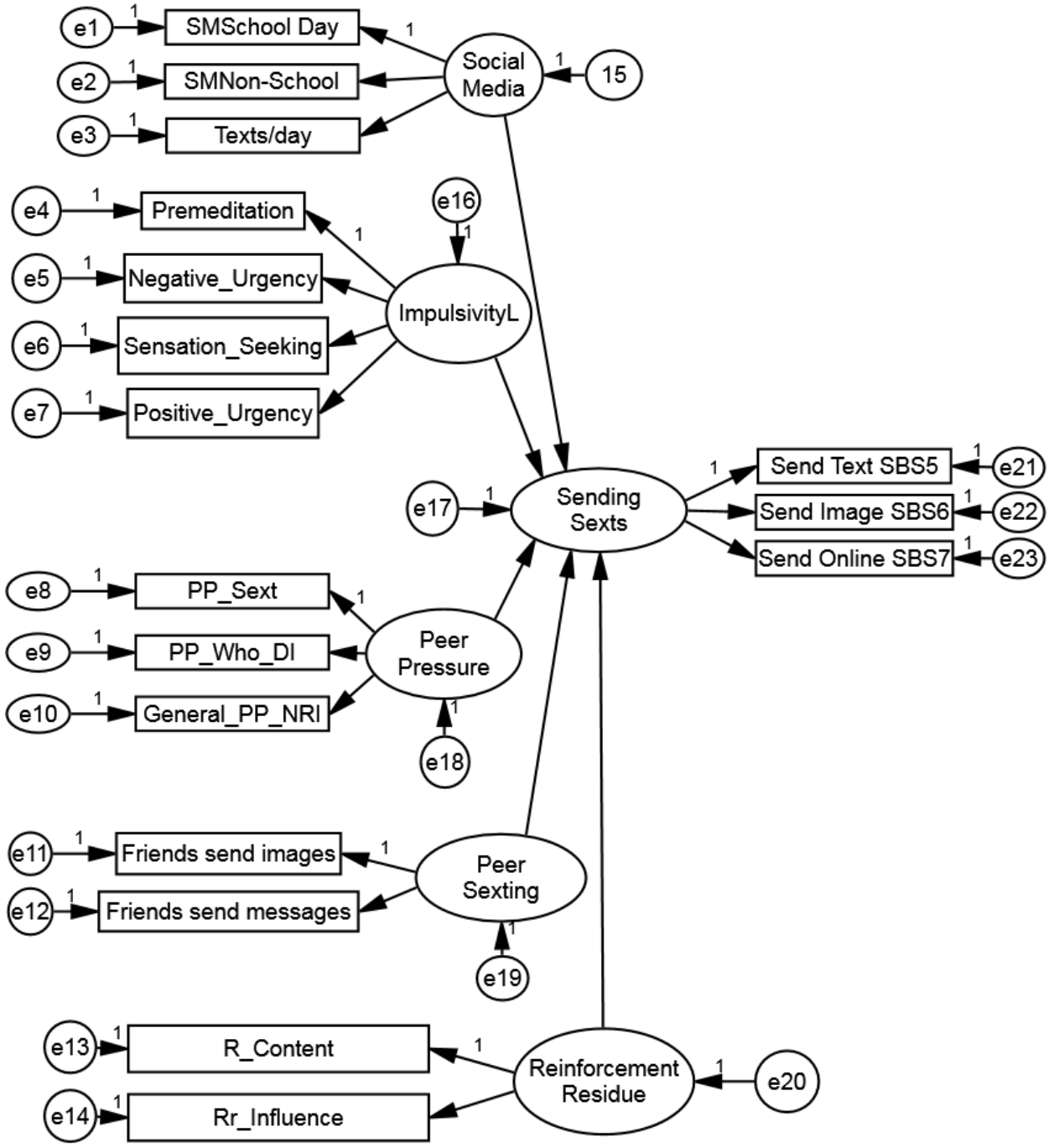
Frequency of electronic communication was represented by all three instrument items: using social media on a school day (SMSD), using social media on a non-school day (SMNSD), and number of texts send per day (Texts/day). Impulsivity was represented using the four subscales from the UPPS-P: (lack of) premeditation, negative urgency, sensation seeking, and positive urgency. Peer pressure was represented by three scores: The average score on the Network of Relations Inventory (NRI), the average score from the five sources of sexting peer pressure (PP-Who), and the single item representing peer pressure to sex (PP-Sext). The latent variable of peer sexting was represented by two items: frequency of peers sending sexual text messages (Peerbx1), and frequency of peers sending sexual images (Peerbx2). Peer sexting influence was represented using two aggregate scores from the reinforcement residue (peer sexting influence) instrument: reinforcer (peer) influence, and reinforcement content (peer approval of sexting). These two items

were intended to be multiplied together to produce an estimate of peer sexting influence, but were added individually to function as indicators.

Sending sexts was represented using SBS items 5 ("How often have you sent sexual text messages?"), 6 ("How often have you sent sexual images by cell phone?"), and 7 (How often have you sent sexual images or text messages over the internet?). Receiving sexts was represented using SBS items 1 (How often have you received sexual text messages?), 2 (How often have you received sexual images by cell phone?), and 3 (How often have you received sexual images or text messages over the internet?). Figure 1 below presents the full path model containing all 5 exogenous variables used to predict either sending or receiving sexts. The initial model for *receiving* sexts was identical to Figure 1, except the endogenous variable representing sending sexts (SBS items 5, 6, and 7) was replaced by the endogenous variable representing receiving sexts (SBS items 1, 2, and 3).

Figure 1

Initial Path Diagram Predicting Sending Sexts

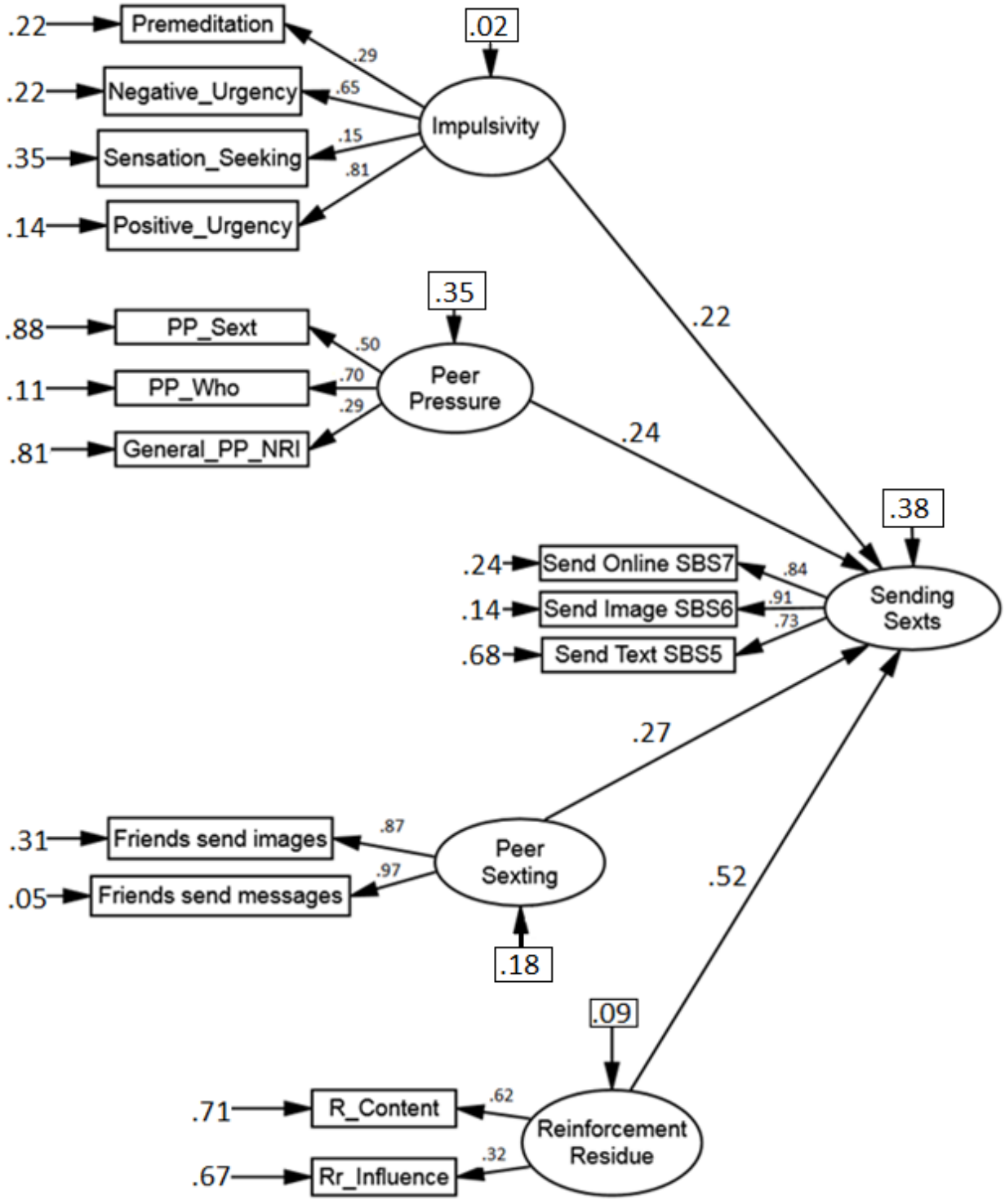


Note. SM = social media; PP = peer pressure; SBS = Sexting Behavior Scale; NRI = Network of Relations Inventory; R = Reinforcement; Rr = Reinforcer; Reinforcement Residue = peer sexting influence.

In order for an SEM model to fit well with measured data, the estimated chi-square and degrees of freedom must be low enough that the p-value is not significant. The model fit estimates, TLI and CFI, must both be above .95, and RMSEA must be below .05. The data fit acceptably with the proposed predictive model for sending sexts $\chi^2(133) = 195.59$, $p < .01$; TLI = .95, CFI = .96, RMSEA = .04. All predictors were significantly associated with sending sexts *except for* frequency of electronic communication ($\beta = -.03$, $p > .05$). Thus, a new model was specified in which frequency of electronic communication was removed, and estimates were recalculated. Figure 2 below presents the modified model predicting sending sexts with all parameter estimates.

Figure 2

Final Path Diagram Predicting Sending Sexts



Note. PP = peer pressure; NRI = Network of Relations Inventory; SBS = Sexting Behavior Scale R = Reinforcement; Rr = Reinforcer; Reinforcement Residue = peer sexting influence.

The alternative model omitting frequency of electronic communication fit significantly better with the data than the initial model using all five exogenous variables, $\Delta\chi^2(35)= 96.62$, $p < .001$, and produced excellent fit with the data, $\chi^2(89) = 98.97$, $p = .22$; TLI = .99, CFI = .99, RMSEA < .01. All predictor paths in the alternative model were statistically significant. The modified model excluding frequency of electronic communication was retained as the model of best fit for predicting sending sexts. Path and measurement estimates with bootstrap intervals are presented in Table 13 below.

Table 13

Final Model: Path Estimates and Standard Errors Predicting Sending Sexts

				Bootstrapping (95% CI)	
			β	*SE*	*LL, UL*
Pathway Estimates					
Peer Sexting	--->	Sending Sexts	.27***	.07	.14, .34
Peer Pressure	--->	Sending Sexts	.24**	.10	.02, .47
Impulsivity	--->	Sending Sexts	.22**	.07	.06, .35
R-Residue	--->	Sending Sexts	.52**	.13	.30, .92
Factor Loadings					
Sending Sexts	--->	Sent Text (SBS5)	.73***	.05	.62, .80
Sending Sexts	--->	Sent image (SBS6)	.91***	.03	.83, .95
Sending Sexts	--->	Sent Online (SBS7)	.84***	.04	.73, .89
Impulsivity	--->	Positive-Urgency	.81**	.17	.52, 1.27
Impulsivity	--->	Sensation-Seeking	.15*	.09	-.04, .28
Impulsivity	--->	Negative-Urgency	.65***	.13	.35, .92
Impulsivity	--->	Premeditation	.29**	.08	.14, .46
Peer Pressure	--->	PP-Sext	.50**	.09	.31, .70
Peer Pressure	--->	PP-Who	.70**	.13	.52, 1.05
Peer Pressure	--->	General PP (NRI)	.29***	.07	.10, .41
Peer Sexting	--->	Peerbx2	.97***	.18	.77, 1.48
Peer Sexting	--->	Peerbx1	.87***	.16	.56, 1.13
R-Residue	--->	Rr-Influence	.32**	.09	.13, .49
R-Residue	--->	R-Content	.62***	.13	.36, .88

Note: R-Residue = peer sexting influence; R = reinforcement; PP = peer pressure; SBS = Sexting Behavior Scale; NRI = Network of Relations Inventory; Peerbx2 = friends who send sexual images; Peerbx1 = friends who send sexual text messages; Rr = reinforcer.

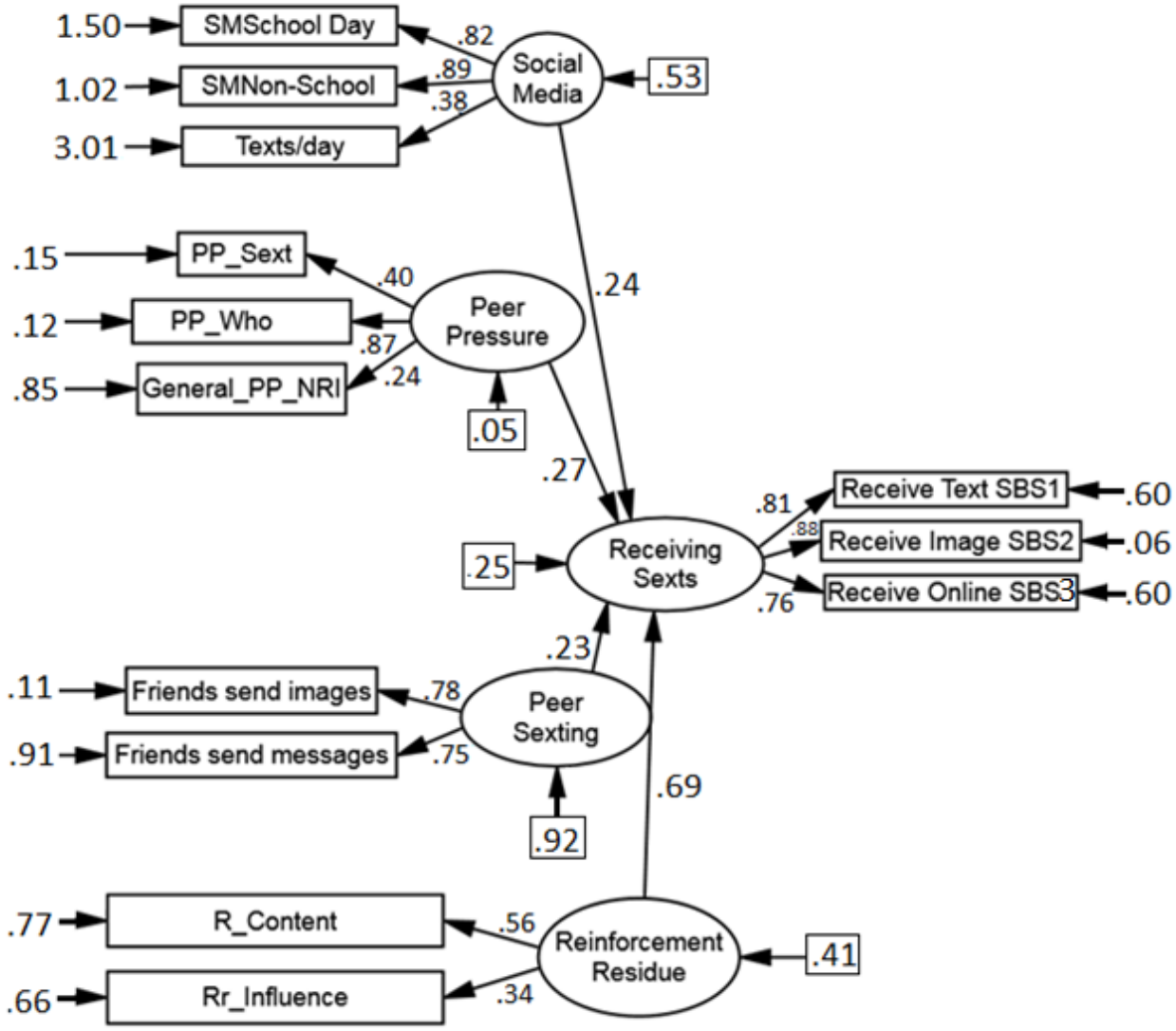
χ^2 = 98.97, df = 89, *p* = .22; TLI = .99; CFI = .99; RMSEA = .02

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

The initial model for receiving sexts contained all 5 original exogenous variables (electronic communication, impulsivity, peer sexting, peer pressure, and peer sexting influence [reinforcement residue]). The data fit well with the proposed theoretical model predicting receiving sexts $\chi^2(133) = 156.51$, $p = .08$; TLI = .98, CFI = .99, RMSEA = .02. All predictors were significantly associated with sending sexts except impulsivity ($\beta = .11$, $p > .05$). Thus, an alternative model was created by removing impulsivity, and estimates were recalculated. Figure 3 below presents the modified model with all regression and variance estimates.

Figure 3

Final Path Diagram Predicting Receiving Sexts (Impulsivity Removed)



Note. SM = social media; PP = peer pressure; SBS = Sexting Behavior Scale; NRI = Network of Relations Inventory; R = Reinforcement; Rr = Reinforcer; Reinforcement Residue = peer sexting influence.

The alternative model omitting impulsivity fit significantly better with the data $\Delta\chi^2(57)= 136.12$, $p < .001$, producing excellent model estimates, $\chi^2(76) = 20.39$, $p = .16$; NFI = .99, CFI = 1.00, RMSEA < .01. All predictor paths were statistically significant. The modified model excluding impulsivity was retained as the model of best fit for predicting receiving sexts. Path and measurement estimates with bootstrapping intervals for the final model are presented in Table 14 below.

Table 14

Final Model: Path Estimates and Standard Errors Predicting Receiving Sexts

				Bootstrapping (95% CI)	
			β	*SE*	*LL, UL*
Pathway Estimates					
Social Media	--->	Received Sexts	.24**	.06	.08, .34
Peer Sexting	--->	Received Sexts	.23**	.06	.08, .45
Peer Pressure	--->	Received Sexts	.27**	.07	.11, .41
R-Residue	--->	Received Sexts	.69**	.13	.51, 1.03
Factor Loadings					
Social Media	--->	Texts	.38*	.06	.26, .51
Social Media	--->	SMNSD	.89**	.06	.80, 1.02
Social Media	--->	SMSD	.82**	.06	.67, .93
Received Sexts	--->	Received Texts (SBS1)	.81**	.04	.72, .87
Received Sexts	--->	Received Images (SBS2)	.88**	.03	.82, .93
Received Sexts	--->	Received Online (SBS4)	.76**	.04	.68, .82
Peer Sexting	--->	Peerbx1	.75**	.16	.71, .79
Peer Sexting	--->	Peerbx2	.78**	.19	.77, .79
R-Residue	--->	Rr-Influence	.34**	.09	.21, .49
R-Residue	--->	R-Content	.56**	.12	.32, .76
Peer Pressure	--->	General (NRI)	.24**	.07	.10, .36
Peer Pressure	--->	PP-Who	.87**	.19	.66, 1.57
Peer Pressure	--->	PP-Sext	.40**	.09	.15, .57

Note: R = reinforcement; SMNSD = social media on a non-school day; SMSD = social media on a school day; SBS = Sexting Behavior Scale; NRI = Network of Relations Inventory; Peerbx2 = friends who send sexual images; Peerbx1 = friends who send sexual text messages; Rr = reinforcer; R-Residue = peer sexting influence.
$\chi^2 23 = 20.39$, df = 76, $p = .16$; NFI = .99; CFI = 1.00; RMSEA = >.01
*p < .01; **p <.001

The final predictive models established above (sending and receiving sexts) were tested for moderation by sex using multigroup analysis (Kaczynski, Claar, & Logan, 2009). The analyses calculated estimates and compared chi-square estimates for each predictive model. One analysis estimated pathways for males and females separately, while the other model constrained pathways to be equal. An explanation of procedures is provided below.

Grouping variables representing males and females were created in order to produce unconstrained and constrained models (Sauer & Dick, 1993). An unconstrained model allows pathways to be estimated for males and females separately, where a constrained model forces pathways to be equal across both groups (male and female). Both models produce unique chi-square values, degrees of freedom, and model fit estimates that can be compared. If the constrained model produces a significantly higher chi-square value than the unconstrained model, this means that the overall model has better fit when regression paths are allowed to vary according to biological sex (i.e., non-equivalent model). This would affirm that parameter estimates differed significantly by sex, and would indicate moderation by sex.

The predictive model for sending sexts was analyzed first.

$\chi^2(12) = 8.28$, $p = .76$. The predictive model for receiving sexts was then analyzed. The unconstrained model, $\chi^2(152) = 86.98$, $p = 1.00$, did not fit the data significantly better than the constrained model, $\chi^2(164) = 95.48$, $p = 1.00$, indicating no significant sex moderation to be present, $\Delta\chi^2(12) = 8.50$, $p = .75$. No further analyses were conducted to investigate individual pathways, as sex did not moderate the predictive models for sending or receiving sexts. Sending and receiving sexts fit two similar but unique predictive models, neither of which were significantly moderated by sex.

CHAPTER 5 DISCUSSION

The use of communication technology to share sexual images and messages is a growing source of risk for adolescents and adults alike. Understanding the factors that influence a teen's decision to sext are essential to preventing risky sexting. The true wrong-doers may be the individuals who steal sexual content from others or share it without permission. Many states have recently adopted laws targeting the nonconsensual distribution of sexual content (i.e., revenge porn; Jacobs, 2015). Keeping this in mind, a great deal of distress may be prevented by stopping the sexual content from ever being produced, shared, or stored in unsafe locations. Vulnerabilities may exist among teens that place them at greater risk of making regrettable decisions. This study sought to identify patterns and trends of sexting among urban high school students. The main focus was to determine what factors acted as the strongest predictors of either sending or receiving sexual content via cell phone and computer.

Only about one tenth to one quarter of the sample was expected to report engaging in sexting based on previous research (Klettke et al., 2014). Males were expected to send more sexual text messages than females, and females were expected to send more sexual images than males. It was expected that older adolescents would be more likely to report sexting. Peer pressure, peer sexting, peer sexting influence (reinforcement residue), impulsivity (negative urgency, positive urgency, sensation seeking, and lack of premeditation), and frequency of electronic communication were expected to explain a significant amount of variance in predicting sexting beyond that of age, sex, and race. Self-esteem was expected to moderate the effect of peer pressure on sending sexts, and impulsivity was expected to moderate relations between electronic communication and sending sexts. Finally, a theoretical casual model explaining the occurrence of sending and receiving sexts was expected to adequately fit with the acquired data, and this predictive model was expected to differ significantly by sex.

Many valuable and surprising findings were revealed in the results of this study. A larger proportion of students reported engaging in sexting behavior than was expected. Demographic variables did not have the expected effect on sexting as witnessed in prior studies. Of particular import was the finding that self-esteem had no association with sexting behavior whatsoever. The predictor variables selected in this study functioned similarly in predicting sending and receiving sexts, although several notable distinctions were evident. Results are discussed in greater detail in the remainder of this section.

Regarding research question one, reported rates of sexting were notably higher in this study than other studies examining sexting among teens. Klettke et al. (2014) calculated an average prevalence of 11.96% for sending sexual photos among teen samples, where 28.7% of the current sample reported sending sexual images at least rarely. Dichotomizing the Sexting Behavior Scale (SBS) scale at the next higher frequency response option (occasionally) produced rates closer to prior findings (11.1%). Measurement with the SBS may benefit from including a time specifier for reporting sexting such as "within the last year". On the other hand, sending sexual content at a young age may be meaningful regardless of how far in the past the sexting occurred.

It was expected that teens would report sexting significantly more often with a girlfriend or boyfriend than any other individual. This finding suggests that teens in relationships may be particularly vulnerable to making poor choices for the sake of pleasing a romantic partner. Teens may also be at risk of sending images to people they are attracted to, but are not currently in a relationship with. Teens were significantly less likely to sext with friends or individuals they only knew online, demonstrating that sexting is most likely to occur in settings that include romantic or sexual interest. It still warrants concern that about one third of individuals who reported sending

sexts had sent sexts to people they only knew online. Sexting with such individuals may bare exceptional risk, as online acquaintances may disguise their identities (Keipi & Oksanen, 2014).

An unexpected finding was that sexting rates did not significantly differ by race. Most prior research has shown African Americans to report sexting more frequently than Caucasian teens (Dake et al., 2012; Rice et al., 2012; Peskin et al., 2013). Caucasian and African American teens both reported sexting rates that were higher than prior findings. A shared factor influencing these elevated rates may be cultural context: attending a large school in an urban setting with lower average economic status. Other interacting factors may play a role, such as higher rates of delinquency, truancy, or less parental monitoring and guidance of technology use. These cultural factors likely play a more significant role than race itself.

Another unexpected finding was that males reported more sexting of all forms except posting sexual content publicly. Previous research has been fairly mixed when comparing sexting rates by sex (Klettke et al., 2014). Similar to other risk behaviors examined in the past (Weden & Zabin, 2005), this finding supports the notion that young males are more prone to engage in sexting than females. Cultural norms may also play a role, as females may have been less willing to disclose histories of sexting, and males may have been more likely to over-report or boast about sexting, similar to other sexual activities (Turner, Miller, & Rogers, 1997).

It was expected that males would report higher average levels of self-esteem, often found in prior research (McKay, Dempster, & Byrne, 2014; Bachman, O'Malley, Freedman-Doan, Trzesniewski, & Donnellan, 2011). Females reported significantly more frequent electronic communication, yet did not report receiving more sexts of any kind than males. This would seem contradictory to the finding that frequency of electronic communication was significantly associated with increased likelihood of receiving sexts. Females somehow reported high rates of

using electronic communication, yet did not report higher rates of receiving sexts, despite the positive correlation between these two variables. This supported the possibility that females may have been under-reporting sexting experiences compared to males (Turner et al., 1997).

Finally, males reported significantly higher rates of peer sexting influence (reinforcement residue) than females. Peer sexting influence was a multiplicative product of two related variables: peer influence and peer approval of sexting. Males and females did not significantly differ in reported peer sexting influence, which indicated that males believed their peers were more accepting of sexting than females believed their peers would be (reinforcer content). The average peer approval rating for both males and females was still negative, indicating that both males and females felt that their peers did not generally approve of him or her engaging in sexting, although males felt less discouraged by their peers than females.

Addressing question two, all hypothesized associations were significant and in the expected direction. A notable finding was that sending sexts was positively associated with age, but receiving sexts was not. This finding brings specificity to previous research indicating older students to more often sext than younger students (Mitchell et al., 2012; Rice et al., 2012). The current study supports a positive age correlation for *sending* sexts, although younger students appear just as likely to receive sexts. This is an important distinction to consider, because *receiving* sexts was also significantly associated with *sending* sexts. Receiving sexts from peers could influence one's perception of normative peer sexting rates, which may lead to a higher likelihood of the recipient also sending sexts (i.e., gateway experience). This finding also suggests that older teens may be sending sexual content to younger teens.

Weak to moderate associations were found between peer pressure, peer sexting, peer sexting influence, electronic communication, and impulsivity with sending and receiving sexts.

These associations were consistent with previous research (Walrave et al., 2014; Baumgartner et al., 2014; Rice et al., 2012). The correlation between frequency of electronic communication and receiving sexts was considerably higher than the correlation between frequency of electronic communication and sending sexts. This observation foreshadowed subsequent analyses that found the association between electronic communication and sending sexts to be negligible when controlling for shared variance with other variables.

The remaining predictor variables (peer sexting, peer pressure, impulsivity, and peer sexting influence) were no more than four points apart when comparing correlations between sending and receiving sexts. One of the largest associations with both sending and receiving sexts was peer approval of sexting (reinforcer content), which measured the extent to which students believed their peers would approve of them sending sexual images or messages to someone else. This finding suggests that subjective norms play a major role in a teen's decision to send sexts, and that these subjective norms may also be influenced by how often a teen *receives* sexts.

In addressing research question three, the two-step hierarchical regression model found the predictor variables to contribute a significant amount of variance in sexting above that of age, race, and sex. The demographic factors contributed fairly little compared to the predictor variables, although their individual coefficients did not drastically reduce with the inclusion of the predictor variables, indicating unique variance in predicting sexting. Age and sex were both significantly associated with sending sexts in both steps, but only sex was associated with *receiving* sexts. These findings further support the significant differences in reported sexting between males and females found in question one.

The majority of the hypothesized predictors demonstrated strong associations with both sending and receiving sexts. Peer pressure, impulsivity, peer sexting, and peer sexting influence

were all associated with both sending and receiving sexts. Teens appeared to be directly influenced by both the behavior and opinions of their peers when deciding whether to sext. It is also possible that students justified their own behavior by indicating their peers sexted as well. Impulsivity was also significant predictor of sexting, as planning and careful consideration of consequences before acting would likely reduce chances of sending explicit content to others.

An interesting finding was that frequency of electronic communication did not significantly predict sending sexts, but did predict receiving sexts. This finding was supported by social contagion theory; the more often one uses electronic communication devices, the larger their communication network will become, and the more likely they will encounter individuals who might send them sexual content. Simply using electronic communication may not, in itself, be enough to directly increase one's likelihood of sending sexts. It is unclear why impulsivity was also associated with receiving sexts in the linear regression model. The correlations matrix produced in this study revealed that students higher in impulsivity also tended to use electronic communication devices more often. Therefore, it is possible that relations between impulsivity and receiving sexts was mediated by frequency of electronic communication. Impulsive individuals may also be more likely to encourage their peers to send them sexual content.

Finally, self-esteem played no role in predicting sending or receiving sexts, suggesting that self-worth plays little part in a teen's decision to send self-produced sexual content to a peer. This finding has been more consistent among young adults (Gordon-Messer et al., 2013), than teens (Ybarra & Mitchell, 2014). Previous research has produced mixed results regarding the relations between internalizing symptoms and adolescent sexting behavior. The current finding supports the notion that internalizing symptoms may more likely be associated with individually experienced

negative outcomes of sexting and better explained by other inter-related factors, such as prior sexual experience (Temple et al., 2014).

Research question four determined that self-esteem did not moderate the relations between peer pressure to sext and sexting. In other words, students who were lower in self-esteem did not appear to be any more likely to give in to peer pressure to sext than students with high self-esteem. It was unexpected that lower self-esteem would not indicate a vulnerability to peer demands, as this propensity has been indicated in previous research (e.g., substance abuse; Dielman et al., 1987). Previous research has also shown that individuals who sext tend to have lower self-esteem (Vanden Abeele et al., 2014). Students in the current sample did not indicate any association between feelings of self-worth, and their willingness to send sexual content to their peers. This is further supported by the non-significant direct association between self-esteem and sexting found in question 3.

Impulsivity did not moderate the relations between frequency of electronic communication and sending sexts. Students who were high in impulsivity were more likely to send sexts, but the amount of time using electronic communication did not increase impulsive teens' likelihood of sexting. Although impulsivity was associated with increased electronic communication, frequency of electronic communication did not play a direct role in predicting the sending of sexts. Impulsive teens were more likely send sexts regardless of how often they used their electronic communication devices. This finding suggests that limiting cell-phone and computer-mediated communication may not be as effective in reducing sexting as teaching responsible use of technology and effective decision-making skills.

Research question five revealed excellent fit indices for two models predicting sending and receiving sexts that adequately represented *causal models* (Pearl, 2000). The most notable finding

was that impulsivity did not significantly predict receiving sexts. This finding appears consistent with the concept of impulsivity, as the reception of sexts should have less to do with an individual's decision making process than factors such as associating with deviant peers (Ricketts et al., 2014). All other relations were similar to the initial multiple linear regression analyses in research question three. Although the predictive models established in this study appear to be both optimal and parsimonious, other factors may exist that further contribute or better predict teen sexting. Replication of the current study should be conducted on additional samples, and compared to alternative models.

It was unexpected that sex did not moderate either predictive models. Although males reported significantly more frequent sexting of all but one form, *predictors* of sexting did not significantly differ by sex. Thus, individual pathways did not need to be assessed for sex differentiation. The two final predictive models established above were concluded to be the simplest and most appropriate predictive models for sending and receiving sexts.

In conclusion, a variety of factors appear to influence the rates, recipients, and predictors of sexting. Sexting appears to be more prevalent at schools located in urban areas with larger, more diverse populations. Teens are significantly more likely to sext with a boyfriend or girlfriend or someone they have a crush on. Sexting is best indicated by examining a combination of social and individual factors. Impulsivity is a significant predictor of sending sexts, particularly the tendency to make impulsive choices when in a good mood (positive urgency). Peer behavior and perceived norms play significant roles in predicting sexting, particularly peer sexting, peer approval of sexting, and peer pressure to sext. Frequency of electronic communication was associated with receiving sexts, but was not directly associated with sending sexts.

Limitations and Directions for Future Research

There were several limitations to the present study. The study design was cross sectional. Causation is difficult to prove when only taking a snap shot of individuals' behavior at one point in time. Future research should incorporate longitudinal elements with multiple data collection trials to determine how variables interact or change over time. Such methods may be very difficult to perform in urban settings where students often relocate or miss attendance. However, a longitudinal design would strengthen the predictive validity of the examined predictors.

The current study employed self-report measures to estimate the examined variables. It is possible that some individuals inaccurately representational their thoughts, feelings, or behaviors for the sake of more favorable appearances. Future research may also attempt to include direct measures of technology use that can reliably monitor usage. Such methods may also be incorporated into experimental studies intended to reduce misuse of communication technology, and may even be tested as an intervention. Many instruments used in this study were either adapted, created, or lacked sufficient validation evidence. Future research should seek to find or develop more reliable and psychometrically sound measuring instruments for some of the variables examined in this study, such as frequency of electronic communication, subject-specific peer pressure, and peer modeling. Peer nomination methods may also prove useful.

Although enough subject responses were collected to perform all test procedures for this study, the sample consisted of only about half of the total student population. Many students were not in attendance during the day of data collection, and some chose not to participate. Selection bias may have occurred a result. Motivation may have been low, because the survey was distributed in the final week of school. One consolation was that the sample composition appeared to adequately represent the demographics of the high school population.

A temporal relationship between impulsivity, frequency of electronic communication, receiving sexts, perceived peer sexting, and sending sexts may exist. Future research could address the possible mediating effect of electronic communication in the relations between impulsivity and receiving sexts, or the mediating effect of receiving sexts and peer approval of sexting on the relations between frequency of electronic communication and sending sexts. Finally, future research using the Sexting Behavior Scale with adolescents may benefit from including a time prompt such as "within the last year" to ensure responses are not including singular incidents no longer representative of current behavior. This distinction may not be necessary with adolescents unless conducting longitudinal research.

Conclusions and Implications

It is imperative that teens understand the potential consequences of sexting, and that parents and educators know what factors indicate a teen's risk of engaging in sexing. Two factors in particular seem to contribute most to a teen's likelihood to sext: impulsive decision making, and social influence. Impulsivity represents a more intrapersonal factor regarding a teens planning, forethought, and propensity to engage in exciting or stimulating activities. Social influence is an interpersonal factor, representing the degree to which one's peers approve of, engage in, and pressure the individual to partake in a certain behavior.

General use of communication technology was not directly associated with one's likelihood of sending sexts, but was associated with a higher chance of receiving sexts, which may act as a gateway into sending sexts in the future. Also, perceived self-worth did not predict sexting, which places particular significance on impulsivity as the critical intrapersonal factor associated with sexting.

Parents should be prepared to talk to their children about safe and responsible use of technology, especially if their child is in a relationship or showing romantic interest in someone

else. Research suggests that sexting may act as a catalyst or enabler of sexual activity, which means information about sexting may be appropriate to include in sexual education programs. The findings of this study establish a working blueprint for developing preventative programs by indicating the factors most closely associated with sexting. Of greatest importance is providing teens with a thorough understanding of the potentials and limitations of modern technology, engaging in thoughtful decision making, and putting self-interest above the expectations of one's peers, especially romantic interests.

APPENDIX A

Letter of Support from Lincoln High School

Lincoln Senior High School

22900 Federal Avenue · Warren, Michigan 48089
Telephone: (586) 758-8307 · Facsimile: (586) 758-8304

March 18, 2015

To whom it may concern;

This letter is to serve as confirmation to the Wayne State Institutional Review Board that Lincoln High School in Warren, Michigan is willing to participate in data collection. We understand that the data collection will deal with "Teen perceptions of peer cell phone and internet sexual messaging: Current Trends".

If you have any further questions, please feel free to contact my office at the number listed below.

Sincerely,

Billie Sczepaniak
Principal

Billie Sczepaniak
Principal
(586) 758-8306
sczepaniak.billie@vdps.net

Van Daugherty
Assistant Principal
(586) 758-8307
daugherty.van@vdps.net

Vic Breithaupt
Asst. Principal / Athletic Director
(586) 758-8314
breithaupt.victor@vdps.net

APPENDIX B

Parent Supplemental Information Letter with "Decline to Participate" Option
Title of Study: Teen perceptions of cell phone and internet sexual messaging: Current trends
Research's Name: David Gregg

Purpose:
You are being asked to allow your child to be in a research study at their school that is being conducted by Ph.D. candidate David Gregg in the department of Educational Psychology at Wayne State University to find out how students use electronic communication devices, such as cell phones and internet, and if these devices are ever used to send sexually suggestive content to other individuals. Your child has been selected, because he or she attends Lincoln High School, and is between 14 to 18 years of age.

Study Procedures:
If you decide to allow your child to take part in the study, your child will be asked to participate in a brief study lasting no longer than twenty minutes. He or she will complete a questionnaires addressing a number of issues, including cell phone and internet use, content shared with these devices, peer behavior, peer pressure, sensation seeking, and impulsivity. The survey will also have a brief section addressing self-esteem.

- Your child has the option of not answering some of the questions in the study, may decline participate, or withdraw from the study entirely, even after deciding to participate.
- Your child will be in the study for one 15-20 minute survey, which will take place in his or her homeroom for one day.
- Copies of the survey are held by the primary investigator (David Gregg) and the supervising professor and may be reviewed by the parents upon request.

Benefits:
The most relevant benefits from this study are that we will know more about how teens use technology and what some of their thought processes about it are. This information may help reduce the risk of teens performing potentially harmful behaviors in the future.

Risks:
By taking part in this study, your child may experience some uncomfortable feelings from some of the questions on this survey, as some are personal in nature. They will be encouraged to talk to the school counselor if they need to. There may also be risks involved from taking part in this study that are not known to researchers at this time.

Costs
There are no costs to you or your child to participate in this study.

Compensation:
For taking part in this research study, your child will receive a small snack, consisting of a bag of chips or candy bar with a can of soda.

Confidentiality:
All information collected about your child during the course of this study will be kept confidential to the extent permitted by law. All information collected about your child during the course of this study will be kept without any identifiers. Thus, the data are anonymous. There is no way to trace any survey back to a particular student.

Voluntary Participation /Withdrawal:
Your child's participation in this study is voluntary. He/she may withdraw at any time. You are free to withdraw your child at any time. Your decision about enrolling your child in the study will not change any present or future relationships with Wayne State University or its affiliates, your child's school, your child's teacher, your child's grades or other services you or your child are entitled to receive.

Questions:
If you have any questions about this study now or in the future, you may contact David Gregg or one of his research team members at the following phone number (248) 808 3875. If you have questions or concerns about your rights as a research participant, the Chair of the Institutional Review Board can be contacted at (313) 577-1628. If you are unable to contact the research staff, or if you want to talk to someone other than the research staff, you may also call (313) 577-1628 to ask questions or voice concerns or complaints.

If you do not wish to have your child participant in the study, you may fill out the form and return it to your child's teacher.

I do not allow my child _____to participate in this research study.

Name

_____
Printed Name of Parent

_____ _____
Signature of Parent Date

APPENDIX C

Administration Script

Good morning class,

Today you will have the opportunity to participate in a survey about the use of cell phones and the internet. The survey will ask a number of questions, including "sexting." The survey will describe what is meant by this term, and should only take about 15 minutes.

Please be sure to read both pages of the information sheet we give you, and put your initials at the bottom of each page to show that you read them. If you choose to be in the study, please pick up a survey from this envelope (marked "blank surveys"). Bring the survey back to your desk and fill it out. Please keep your answers covered with a piece of paper as you go, so no one can see your answers. Keep your eyes on your own survey.

You do not have to do this survey, and you do not have to complete it if you feel uncomfortable with the questions. We only ask that you give honest answers, so we can get a good idea of what teens are doing with technology these days. Please check to make sure you've answered all questions on the survey you are comfortable answering. The surveys are completely anonymous, so **no one** will ever know what answers you give.

When you are done with the survey, bring it back up to me, and place it in this envelope (marked "finished surveys"). You can then take a piece of candy from this box, even if you did not complete the entire survey.

APPENDIX D

Documentation of Adolescent Assent Form

(Ages 13-17)

Title: Teen perceptions of cell phone and internet sexual messaging: Current trends

Study Investigator: David Gregg

Why am I here?
This is a research study. Only people who choose to take part are included in research studies. You are being asked to take part in this study because you are a student attending Lincoln High school, and are between the ages of 14 to 18 years. Please take time to make your decision. Talk to your family about it and be sure to ask questions about anything you don't understand.

Why are they doing this study?
This study is being done to find out how students use electronic communication devices, such as cell phones and internet, and if these devices are ever used to send explicit content to other individuals. The study also seeks to find out possible reasons for this behavior.

What will happen to me?
You will be provided the opportunity to complete a short survey that will ask questions about your personal cell phone and internet use. The survey will also include questions about what you think your peers do with this technology, whether you ever feel pressured by your peers. Finally, the study will ask questions about how you feel about yourself and things that you do on a regular basis.

How long will I be in the study?
You will be in the study for just this one-time survey, which is expected to last no longer than 15 minutes.

Will the study help me?
In taking the study, you may gain insight about your peers, as well as your own behavior and personal feelings. This study may also help other people in the future by providing critical information about how and why people use communication technology, which may help reduce the risk of teens performing potentially harmful behaviors when using cell phones and the internet.

Will anything bad happen to me?
Not really, but some people may experience some uncomfortable feelings from some of the questions on this survey, as they are personal. But if you do, it is OK to contact the school counselor in his/her office at school and tell him/her what is bothering you.

Will I get paid to be in the study?
For taking part in this research study, you will receive a small snack, consisting of a bag of chips or candy bar with a can of soda.

Do my parents or guardians know about this? (If applicable)
This study information has been given to your parents or guardian, and they were given the opportunity to decline your participation. You can talk this over with them before you decide whether you wish to participate. However, nobody will ever be allowed to see your answers.

What about confidentiality?
This study is completely anonymous. You will ***not*** write your name on the survey, so none of the information you provide can be linked back to you. We will keep your records private unless we are required by law to share any information. The law only says that we have to tell someone if you might hurt yourself or someone else.

What if I have any questions?
For questions about the study please call David Gregg at (248) 808-3875. If you have questions or concerns about your rights as a research participant, the Chair of the Institutional Review Board can be contacted at (313) 577-1628.

Do I have to be in the study?
You don't have to be in this study if you don't want to or you can stop being in the study at any time. Please discuss your decision with your parents and researcher. No one will be angry if you decide to stop being in the study.

APPENDIX E

Survey Instrument

SECTION 1: Demographics

1. I am _____ years and approximately _____ months old right now

2. Gender: _____ Male _____ Female

3. Grade: _____

4. Ethnicity: _____ African American _____ Hispanic American/Latino-Latina?

_____ Caucasian _____ Asian/Pacific Islander

_____ American Indian _____ Other: _____

5. What grades do you most often receive? Circle the response below that most accurately describes your grades overall:

As	As and Bs	Bs	Bs and Cs	Cs	Cs and Ds	Ds	Ds and Es	Es (failing)
1	2	3	4	5	6	7	8	9

6. What were your most recent grades in each of the following classes (circle):

English/Language Arts:	A	B	C	D	E
Math:	A	B	C	D	E
Science:	A	B	C	D	E
Social Studies:	A	B	C	D	E

SECTION 2:

These questions ask about HOW OFTEN you text and use social media. Please read the following definitions and questions, and then circle your response below each question.

Social media refers to any internet program where you can communicate with other people, such as Facebook, Twitter, or Tumbler.

Text messages refer specifically to messages you send using your cell phone's texting feature.

1. About how long do you spend using **social media** on a normal **school** day?

None at all	A few minutes	About half an hour	About an hour	About two hours	About three hours	About four hours	More than four hours
0	1	2	3	4	5	6	7

2. About how long do you spend using **social media** on a normal **non-school** day (weekend or holiday)?

None at all	A few minutes	About half an hour	About an hour	About two hours	About three hours	About four hours	More than four hours
0	1	2	3	4	5	6	7

3. About how many **text messages** do you send in a day?

I don't text	Less than 24	25 to 49	50 to 99	100 - 199	200-299	More than 300
0	1	2	3	4	5	6

SECTION 3.1: Please answer the following questions about your friends

1. How would your peers react if you sent sexual **photos or videos** of yourself to someone?

Strongly Disapprove	Disapprove	Neither	Approve	Strongly Approve
1	2	3	4	5

2. How would your peers react if you sent sexual **text messages** to someone?

Strongly Disapprove	Disapprove	Neither	Approve	Strongly Approve
1	2	3	4	5

3. How important is it to have a group of friends and be included in their activities?

Not Important	Not too Important	Somewhat Important	Pretty Important	Very important
0	1	2	3	4

4. How much do your friends influence what you think and do?

Very Little	Not too much	Some	Quite a bit	A great deal
0	1	2	3	4

5. On average, how many weekday afternoons, Monday through Friday, from the end of school or work to dinner, do you spend with your friends?

1	2	3	4	5

6. On average, how many weekday evenings, Monday through Friday, from dinnertime to bedtime, do you spend with your friends?

1	2	3	4	5

7. On the weekends, how much time do you generally spend with your friends?

Very little	Not too much	Some	Quite a bit	A Great Deal
0	1	2	3	4

Section 3.2: Please answer the following questions about your friends

1. In general, how often do you think your friends send sexual **photos or videos** of themselves to other people? Circle your answer on the scale below:

Never	Once or twice a year	Once every few months	Once or twice a month	Once or twice a week	About once a day	More than once a day
0	1	2	3	4	5	6

2. In general, how often do you think your friends send sexual **text messages** to other people? Circle your answer on the scale below:

Never	Once or twice a year	Once every few months	Once or twice a month	Once or twice a week	About once a day	More than once a day
0	1	2	3	4	5	6

SECTION 4.1: Please answer the questions below by circling the option that best applies to you.

1. How often do your friends push you to do things that you don't want to do?

Almost Never	Rarely	Sometimes	Often	Almost Always
1	2	3	4	5

2. How often do your friends try to get you to do things that you don't like?

Almost Never	Rarely	Sometimes	Often	Almost Always
1	2	3	4	5

3. How often do your friends pressure you to do the things they want?

Almost Never	Rarely	Sometimes	Often	Almost Always
1	2	3	4	5

SECTION 4.2:

1. Who usually pressures you to send sexual images of yourself? *Please provide and answer for each of the options below:*	**Never**	**Rarely** few times	**Occasionally** (2-3/month)	**Often** (2-3/week)	**Frequently** (daily)
a. Girlfriend/boyfriend	1	2	3	4	5
b. Ex-girlfriend/ex-boyfriend	1	2	3	4	5
c. Someone I'm attracted to (is ***not*** and never was a girlfriend/boyfriend)	1	2	3	4	5
d. Friends	1	2	3	4	5
e. Someone I only know online	1	2	3	4	5

2. How strongly do you feel pressured to send sexual images of yourself?

Not at all	**Slightly**	**Somewhat**	**Moderately**	**Very Pressured**
1	**2**	**3**	**4**	**5**

SECTION 5: Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.

1. On the whole, I am satisfied with myself.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

2. At times I think I am no good at all.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

3. I feel that I have a number of good qualities.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

4. I am able to do things as well as most other people.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

5. I feel I do not have much to be proud of.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

6. I certainly feel useless at times. Self-Report Measures for Love and Compassion Research: Self-Esteem

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

7. I feel that I'm a person of worth, at least on an equal plane with others.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

8. I wish I could have more respect for myself.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

9. All in all, I am inclined to feel that I am a failure.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

10. I take a positive attitude toward myself.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

SECTION 6: Below are a number of statements that describe ways in which people act and think. For each statement, please indicate how much you agree or disagree with the statement. If you **agree strongly**, circle **1.** If you **agree somewhat**, circle response **2**. If you **disagree somewhat**, circle response **3**. If you **disagree strongly**, circle **4**. Be sure to indicate your agreement or disagreement for every statement below. Also, there are questions on the following pages.

Sensation Seeking

	Agree Strongly	Agree Some	Disagree Some	Disagree Strongly
1. I generally seek new and exciting experiences and sensations.	1	2	3	4
2. I'll try anything once.	1	2	3	4
3. I like sports and games in which you have to choose your next move very quickly.	1	2	3	4
4. I would enjoy water skiing.	1	2	3	4
5. I quite enjoy taking risks.	1	2	3	4
6. I would enjoy parachute jumping.	1	2	3	4
7. I welcome new and exciting experiences and sensations, even if they are a little frightening and unconventional.	1	2	3	4
8. I would like to learn to fly an airplane.	1	2	3	4
9. I sometimes like doing things that are a bit frightening.	1	2	3	4
10. I would enjoy the sensation of skiing very fast down a high mountain slope.	1	2	3	4
11. I would like to go scuba diving.	1	2	3	4
12. I would enjoy fast driving.	1	2	3	4

Premeditation

	Agree Strongly	Agree Some	Disagree Some	Disagree Strongly
1. I have a reserved and cautious attitude toward life.	1	2	3	4
2. My thinking is usually careful and purposeful.	1	2	3	4
3. I am not one of those people who blurt out things without thinking.	1	2	3	4
4. I like to stop and think things over before I do them.	1	2	3	4
5. I don't like to start a project until I know exactly how to proceed.	1	2	3	4
6. I tend to value and follow a rational, ``sensible'' approach to things.	1	2	3	4
7. I usually make up my mind through careful reasoning.	1	2	3	4
8. I am a cautious person.	1	2	3	4
9. Before I get into a new situation I like to find out what to expect from it.	1	2	3	4
10. I usually think carefully before doing anything.	1	2	3	4
11. Before making up my mind, I consider all the advantages and disadvantages.	1	2	3	4

Negative Urgency

	Agree Strongly	Agree Some	Disagree Some	Disagree Strongly
1. I have trouble controlling my impulses.	1	2	3	4
2. I have trouble resisting my cravings (for food, cigarettes, etc.).	1	2	3	4
3. I often get involved in things I later wish I could get out of.	1	2	3	4

4. When I feel bad, I will often do things I later regret in order to make myself feel better now.	1	2	3	4
5. Sometimes when I feel bad, I can't seem to stop what I am doing even though it is making me feel worse.	1	2	3	4
6 When I am upset I often act without thinking.	1	2	3	4
7 When I feel rejected, I will often say things that I later regret.	1	2	3	4
8. It is hard for me to resist acting on my feelings.	1	2	3	4
9. I often make matters worse because I act without thinking when I am upset.	1	2	3	4
10. In the heat of an argument, I will often say things that I later regret.	1	2	3	4
11. I always keep my feelings under control.	1	2	3	4
12. Sometimes I do impulsive things that I later regret.	1	2	3	4

Positive Urgency

	Agree Strongly	**Agree Some**	**Disagree Some**	**Disagree Strongly**
1. When I am very happy, I can't seem to stop myself from doing things that can have bad consequences.	1	2	3	4
2. When I am in great mood, I tend to get into situations that could cause me problems.	1	2	3	4
3. When I am very happy, I tend to do things that may cause problems in my life.	1	2	3	4
4. I tend to lose control when I am in a great mood.	1	2	3	4
5. When I am really ecstatic, I tend to get out of control.	1	2	3	4

6. Others would say I make bad choices when I am extremely happy about something.	1	2	3	4
7. Others are shocked or worried about the things I do when I am feeling very excited.	1	2	3	4
8. When I get really happy about something, I tend to do things that can have bad consequences.	1	2	3	4
9. When overjoyed, I feel like I can't stop myself from going overboard.	1	2	3	4
10. When I am really excited, I tend not to think of the consequences of my actions.	1	2	3	4
11. I tend to act without thinking when I am really excited.	1	2	3	4
12. When I am really happy, I often find myself in situations that I normally wouldn't be comfortable with.	1	2	3	4
13. When I am very happy, I feel like it is ok to give in to cravings or overindulge.	1	2	3	4
14. I am surprised at the things I do while in a great mood.	1	2	3	4

SECTION 7: (SEXTING; Adapted from National Campaign, 2008)

Please respond to the following questions regarding sexting behaviors based on how it has been defined below. Please rate each of the following items using the 1-5 scale.

We define **Sexting** as: sending or receiving sexually sexual images or sexual text messages via mobile phone, Facebook and/or other social networking sites.

We define **Sexual images** as: any photo or video that someone took of his or her self, and all or most of the person's exposed genitals or buttocks (breasts for females) is visible.

We define **Sexual text messages** as: any electronic message where the sender comments on the receiver's sexiness/attractiveness, or expresses sexual desires to the receiver.

		Never	Rarely few times	Occasionally (2-3/month)	Often (2-3/week)	Frequently (daily)
1.	How often have you received sexual text messages?	1	2	3	4	5
2.	How often have you received sexual ***images*** by cell phone?	1	2	3	4	5
3.	How often have you responded to sexual text messages or images you received?	1	2	3	4	5
4.	How often have you received sexual images or text messages over the ***internet*** (i.e. Facebook, e-mail, MySpace)?	1	2	3	4	5
5.	How often have you sent sexual text messages?	1	2	3	4	5
6.	How often have you sent sexual ***images*** by cell phone?	1	2	3	4	5
7.	How often have you sent sexual images or text messages over the ***internet*** (i.e. Facebook, e-mail, MySpace, etc.)?	1	2	3	4	5
8.	How often have you publicly posted sexual images on Facebook, Twitter, or MySpace?	1	2	3	4	5
9.	How many people have you exchanged sexual images or texts with? _____					

10. Who do you usually sext with? *Please provide and answer for each of the options below:*

	Never	Rarely **few times**	Occasionally **(2-3/month)**	Often **(2-3/week)**	Frequently **(daily)**
a. Girlfriend/boyfriend	1	2	3	4	5
b. Ex-girlfriend/ex-boyfriend	1	2	3	4	5
c. Someone I'm attracted to (is ***not*** and never was a girlfriend/boyfriend)	1	2	3	4	5
d. Friends	1	2	3	4	5
e. Someone I only know online	1	2	3	4	5

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ABSTRACT

TEEN PERCEPTIONS OF CELL PHONE AND INTERNET SEXUAL MESSAGING: TRENDS AND PREDICTORS

by

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Advisor: Dr. Cheryl Somers

Major: Educational Psychology

Degree: Doctor of Philosophy

The current study proposed, tested, and confirmed a predictive model for high school sexting for the purpose of better understanding rates, trends, influences, and predictive characteristics related to high school sexting. Sexting was defined as either sending or receiving photos, videos, or text messages that contained full nudity, partial nudity, sexual requests, or comments of a sexual nature. Reported recipients of this sexual content were also examined in this study. A sample of 314 high school students in an urban area of Southeast Michigan were surveyed. Males were found to more frequently report engaging in nearly all forms of sexting. Impulsivity, frequency of electronic communication, peer pressure, peer sexting, and peer imitation significantly predicted sexting beyond demographic factors alone. Self-esteem was not associated with sexting, nor did it moderate the effect of peer pressure to sext. Two unique predictive models were estimated for sending and receiving sexts, and both attained good fit to the data. The findings may help parents, teens, and educators take appropriate measures to inform and encourage the safe use of technology.

AUTOBIOGRAPHICAL STATEMENT

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EDUCATION

2016 Doctor of Philosophy (PhD), Wayne State University – Detroit, MI
Major: Educational Psychology

2011 Master of Arts, Wayne State University – Detroit, MI
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2009 Bachelors of Science, Western Michigan University – Kalamazoo, MI
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RESEARCH EXPERIENCE

Oct 2011 - Present Research Assistant, Educational Psychology
Wayne State University – Detroit, MI
Supervisor – Dr. Cheryl Somers
Data entry, editing, reassessing, and publishing research material.
Perform cognitive assessments and behavioral observations.
Conduct a literature review: Students bullied by teachers.

June 2012 – Sept 2013 Research Coordinator
Wayne State University, Merrill-Palmer Skillman Institute – Detroit, MI
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Supervised behavioral observations of camp members.
Planned, implemented, and evaluated behavioral interventions.

PROFESSIONAL EXPERIENCE

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