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# Mobile Phone Technology and Online Sexual Harassment among Juveniles in South Korea: Effects of Self-control and Social Learning

**Kyung-Shick Choi**<sup>1</sup>

Bridgewater State University & Boston University, United States of America

**Seong-Sik Lee**<sup>2</sup>

Soongsil University, Seoul, South Korea

**Jin Ree Lee**<sup>3</sup>

Michigan State University, United States of America

## Abstract

*Mobile phones are increasingly developing into a technology-based device that everyone is dependent on. While previous research has been extensive in examining different theoretical explanations for interpreting juvenile delinquency, research on mobile induced online sexual harassment among juvenile populations have been rather scarce and limited. As a result of this dearth, the present study employs a theoretical approach in rationalizing why juveniles commit online sexual harassment using their mobile phones. Elements from both social learning and self-control theories are used to assess the causes for online sexual harassment using mobile phones. By conducting binomial logistic regression analyses, this study finds that both social learning and low self-control components are salient factors in determining the causes of juvenile sexual harassment in cyberspace. From these findings, policies will be introduced to address the major causes of juvenile online sexual harassment using mobile phones.*

Keywords: Online Sexual Harassment; Mobile Phone Deviance; Social Learning Theory; Self-control Theory; Juvenile Delinquency in Cyberspace.

<sup>1</sup> Associate Professor, Department of Criminal Justice, 10 Shaw Road, Bridgewater State University, Bridgewater, MA 02325, USA & Criminal Justice Cyber crime program coordinator, Boston University, Massachusetts, USA. Emails: [kchoi@bridgew.edu](mailto:kchoi@bridgew.edu) / [kuung@bu.edu](mailto:kuung@bu.edu)

<sup>2</sup> Professor of Information Sociology, Soongsil University, 369, Sang-doro, Sangdo 1(il)-dong, Dongjak-gu, Seoul, South Korea. Email: [lss824@ssu.ac.kr](mailto:lss824@ssu.ac.kr)

<sup>3</sup> Ph.D. Student in Criminal Justice, School of Criminal Justice, 655 Auditorium Road, Michigan State University, East Lansing, MI 48824, USA. Email: [leejin26@msu.edu](mailto:leejin26@msu.edu)

## Introduction

Present day society has increasing juvenile populations who come into contact with technology and electronic devices every day. According to a CNN report, 90% of American children by the age of 2 have some form of online Internet history. When they reach the age of 5, more than 50% have regular interaction with computers and/or tablet devices. The report also indicates that teenagers text an average of 3,400 times a month (Clinton, 2012). While these figures do not explicitly suggest a particular narrative themselves, the increases in youth exposure to technology and electronic devices has been noted as being problematic due to its potential to breed various forms of online deviant behavior such as online sexual harassment (Mitchell, Wolak, & Finkelhor, 2008; Soo, Ainsaar, & Kalmus, 2012). That is, while technology does not increase one's propensity to engage in the aforementioned behavior, it can become a platform for which such conduct can occur.

While the use of technology has undoubtedly seen rapid growth over the past few years, no single gadget has proliferated this expansion more than the introduction of the mobile phone. Mobile phones are electronic, cellular devices that have “operating systems similar to that of computers which allow users to download programs or ‘apps’” and “allow users to download and upload content from the Internet” (National, 2013). However, unlike computers that have monitoring capabilities, parental settings, and parental monitoring programs, mobile phones do not possess any substantial monitoring capacity (Mesch, 2009). That is, while they do possess personalized setting functions, these capabilities are strictly between the mobile device and its principal user.

It is worth noting, however, that despite not having any significant monitoring capacities, there has been an increase in downloadable programs that allow parents and guardians to track their youths' mobile phone activities –some of these applications even allow adults to monitor and block certain activities from continuing on their youths' mobile devices. Although various applications like the aforementioned exist, many of them are subject to privacy issues. Moreover, these monitoring applications can be easily counteracted by other downloadable programs that allow users to engage in various online behaviors in complete privacy without being detected. Due to the absence of a rigorous monitoring system, activities conducted on mobile phones can restrict parents from effectively invigilating their children's online behaviors. In other words, youths and adolescents may be able to use their mobile phones to perform various forms of deviant behaviors clandestinely without ever confronting the consequences of their online behaviors (Choi, 2015).

While cognizant that not *all* youths engage in online sexual harassment behaviors, the point being emphasized here is that youths – given their age, hormonal levels, and frequency of technological use – are more susceptible to such behaviors than other demographic populations (Choi, 2015; Mitchell, Wolak, & Finkelhor, 2008). While this is not a statement declaring youth involvement as inevitable, it is an indictment on the importance of parental care and supervision within this particular demographic group. Ultimately, this inability to perform any significant supervisory monitoring on youths' engagement with mobile technology makes this particular act of online sexual harassment particularly problematic and worrisome (Choi, 2015).

A study conducted by Ybarra and Mitchell (2008) examined the frequency of online sexual harassment via social networking sites. The main outcome measures were unwanted sexual solicitation on the Internet (defined as unwanted requests to talk about sex, provide

personal sexual information, and do something sexual), and Internet harassment (defined as rude or mean comments, or spreading of rumors). The study revealed that fifteen percent of youth reported an unwanted online sexual solicitation in the last year, with 4% reporting an incident on a specific social networking site. Moreover, 33% percent reported online harassment in the last year, with 9% reporting an incident on a social networking site specifically. Among the targeted sample, solicitations were more commonly reported via instant messaging (43%) and in chat rooms (32%), whereas harassment was more commonly reported in instant messaging (55%) than through social networking sites. While this study did not explicitly emphasize online sexual harassment via mobile phones, given that social media, chat rooms, and instant messaging services are increasingly accessed on mobile phones, these statistics can be revealing of the rising prevalence of mobile induced online sexual harassment within the United States.

Another study examining online sexual harassment among juvenile populations is the one conducted by Mitchell and colleagues (2008). This study examined whether online bloggers are at an increased risk of online sexual solicitation and/or harassment. Using a national telephone survey of 1,500 youth Internet users, ages 10-17, the research found that 16% of youth Internet users reported blogging in the past year. Teenagers and girls were the most common bloggers, and bloggers were more likely than other youth to post personal information online; though, posting personal information did not add to risk in this particular study. Youth who interacted with people they met online, regardless of whether or not they blogged, had higher odds of receiving online sexual solicitations (which can be classified under online sexual harassment, cyber stalking, and sexual verbal harassment depending on the exchange and encounter). Bloggers who did not interact with people they met online were at no increased risk for sexual solicitation. In addition, younger bloggers were at an increased risk for online harassment, regardless of whether or not they also interacted with others online.

Another prominent juvenile behavior linked to the advancement of mobile phones is that of online pornography – that is, pornography generated by and comprised of juveniles themselves. Holt, Blevins, and Burkert (2010) suggests that 1 in 3 juveniles under the age of 18 are unintentionally exposed to nude photos or see people having sex. This is largely a result of the advancements in media technology – including webcams and digital photography – increasing the ability to present and disseminate nude photos and videos within cyberspace. With the advancement of mobile phones, juveniles are increasingly able to view pornography in cyberspace rather easily using their mobile phone's Internet capabilities. This mobile phone enabled Internet service, however, is capable of doing much more than just allowing juveniles to view available pornography in cyberspace. In fact, the mobile service allows juveniles to also produce, disseminate, and harass other individuals using sexualized material in a portable setting without having to fear being reprimanded or publically exposed of their wrongdoing (Choi, 2015). Given the portability of the mobile phone, such incidents can occur at *anytime*, *anyplace*, and *anywhere* without the gazing supervision of parents, guardians, peers, and other such authority figures (Choi, 2008).

Despite the growth and prevalence of online sexual harassment activities across numerous societies worldwide, theoretical examinations explaining such online behaviors have not yet been exhaustively conducted. As a result, this study will analyze the emergence of mobile phone induced online sexual harassment among juvenile populations

using major criminological theories. The aim is to determine if there are any relationships between the elements of the theories and the noted online behavior. The two major questions being examined in this research inquiry are: (1) Can major criminological perspectives empirically explain mobile induced juvenile online sexual harassment in cyberspace, and (2) can salient factors that influence these behaviors be identified and implemented into effective preventative programs? The major criminological theories that will be used in this study are Akers' (1985) Social Learning Theory and Gottfredson and Hirschi's (1990) Self-Control Theory.

The 3 theoretical measures used to assess online sexual harassment in this study are: (1) differential association, (2) definitions, and (3) self-control. All 3 of these theoretical components will be utilized in collaboration with the online sexual harassment data collected from South Korea to determine their relationship and overall significance. Three major hypotheses are suggested. First, theoretical elements of social learning theory, differential association, and definitions in particular, will predict an increase in mobile induced online sexual harassment behaviors among juveniles in cyberspace. Second, a high degree of self-control may also decrease engagement of mobile induced online sexual harassment. Finally, gender, mobile usage, and age differentially influence online sexual harassment activities.

## **Theoretical Framework**

In this section, both Akers' (1985) adaptation of the Social Learning Theory and Gottfredson and Hirschi's (1990) Self-Control Theory are discussed in relation to how the various theoretical components can be applied to both traditional juvenile delinquent behaviors and cyber crime inquiries. Although social learning theory and self-control theory are considered to be two prominent general theories of crime, there are few research initiatives currently focusing on online sexual harassment among juvenile populations using the aforementioned theoretical principles. As a result of this theoretical shortcoming, this study will attempt to provide a theoretical rationale for mobile phone induced online sexual harassment among juvenile populations.

### ***a. Social Learning Theory***

The basic premise of the social learning theory is that social behavior is a cognitive process in which personality and environment form a continuous process of reciprocal interaction (Akers & Sellers, 2004). The central premise of this idea suggests that behavior is rationalized, learned, internalized, and performed based on the climate of any given situation. Burgess and Akers (1966) initially expanded Sutherland's (1947) Differential Association theory by adding components of both operant and respondent conditioning, as well as components of rational choice theory. Akers (1985) then revised this former theory to conceptualize what is now known as the Social Learning Theory (Vold, Bernard, & Snipes, 2002). While this theory has not yet been used extensively in testing for cyber crime and computer-based deviance, this theory is still highly regarded as being one of criminology's more prominent theories, and has been used for examining a wide-range of traditional crimes including juvenile delinquency.

An example of an earlier study that used social learning components to issues of cyber crime is that of Skinner and Fream (1999). This study examined computer crimes using social learning theory principles. The two major components used were differential association and definitions. The study determined that hanging out with friends who

committed similar crimes was the strongest predictor of computer piracy and computer crime index. Imitation of other sources, family members or friends, also increased the likelihood that an individual will commit similar computer crimes. Despite being an older study, the findings suggested that computer crime is a learned behavior. A more recent study done by Higgins (2005) agrees with the former findings in that social learning principles were found to have a strong effect on determining software piracy behavior (Choi, 2015).

A more relevant study to the current inquiry is that of Soo and colleagues (2012). Soo et al. (2012) examined the risk of receiving online sexual messages and experiencing harm among Estonian children. The Estonian data was from the 'EU Kids Online' survey. A total of 780 children participants, ages 11-16, were collected. The study found that 19% of children who use the Internet have received online sexual messages. Six percent of children felt disturbed when those online sexual messages were received. The probability of receiving sexual messages online was higher among children with risky online and offline behavior. Moreover, children with excessive Internet use, lower levels of parental monitoring, and higher levels of peer mediation of Internet use perceived online messages as sexually harassing more so than those that did not. While this can be associated with routine activity components more so than social learning, the element worth noting is the peer mediation of Internet use and excessive Internet use.

Another example of this theory being applied to a relevant study is that of Jones and colleagues (2013). To briefly summarize, Jones et al. (2013) examined youth online harassment using 3 cross-sectional, nationally representative telephone surveys of youth Internet users. Although the study did not explicitly use elements of the social learning theory as their theoretical framework, the study was able to determine the importance and relevance of peer social relationships in influencing the reported number of youth online harassment. More specifically, the type of social relationship one has with their peers, as well as the activities they commonly engage in, all contributed to the increase in likelihood of the individual committing similar online harassment behaviors. Ultimately, such findings suggest that youth online harassment is a learned behavior from a mixture of personal, social, and environmental sources.

In sum, knowledge from previous studies that use social learning elements has suggested that deviant peer association and definitions are crucial factors in determining juvenile deviance. As a result, the present study hypothesizes that differential association and definitions substantially influences the likelihood of mobile induced online sexual harassment among juvenile populations.

### ***b. Self-Control Theory***

Gottfredson and Hirschi's (1990) Self-Control Theory suggests that people develop personal traits that control individuals' inability to refrain from crime. This latent trait, also identified as self-control, appears in early childhood and remains stable over one's lifetime. According to Gottfredson and Hirschi (1990), people with low self-control tend to be impulsive, insensitive, physical, risk-taking, shot-sighted, and non-verbal. Low self-control is also associated not only with crime but also with "analogous behaviors" such as smoking, drinking, and illicit sex (Akers & Sellers, 2004). In addition, Hirschi and Gottfredson (1993) further claim that "the link between low self-control and crime is not deterministic, but probabilistic affected by opportunities and other constraints" – that is,



low self-control is not the motivating force leading to criminal behavior, but the probabilistic affected by other intervening variables.

Higgins (2007) tested for low levels of self-control in relation to digital piracy. The research looked at digital piracy and the role of value in regard to self-control. The research concluded that the lower an individual's level of self-control, the more likely they are to conduct digital piracy. An earlier study conducted by Higgins (2005) looked at cyber piracy as it related to levels of self-control among college students – who were noted as being the demographic most likely to commit software piracy. The study suggested that individuals with low self-control may not be aware of the consequences of their actions (Choi, 2015).

A recent study related to the current inquiry's focus is that of Bossler and Holt (2010). Although not identical to the current behavior in question, the authors of this study attempted to uncover whether or not self-control has a role in explaining cyber crime victimization more generally – one of which included online harassment victimization. The authors concluded that while self-control has a role in explaining various types of cyber crime victimization, this is only the case when victimization is both nonrandom and affected by individual choice. Stated differently, self-control was only a significant predictor of cyber crime victimization if the behavior in question was categorized as a person-based offense, not a computer-based conduct. While self-control theory predicted person-based cyber crime victimization, including the relevant behavior of online harassment, this only happened when offender measures were not controlled for – that is, once the offender measures were controlled (respondent and peer offending), self-control no longer predicted person-based cyber crime victimizations. Ultimately, while the study did not specifically focus on juvenile online sexual harassment behaviors via mobile phones, the study did reveal that those with low self-control are more likely to experience online harassment when controlling for respondent and peer offending measures.

Another recent study that examined a behavior thematically similar to the one proposed in this study is that of Holt, Bossler, and May (2011). The authors examined low self-control and deviant peer associations in order to explain cyber deviant behaviors. These cyber deviant behaviors included media piracy, pornography, harassment, hacking, and software piracy. The sample consisted of 435 middle school and high school students in Kentucky. While positing the notion that deviant peers aggravate the effects of low self-control on cyber deviance, the inquiry concluded that self-control did not predict any form of cyber deviance as they defined it. This differs from the present study's hypothesis in that the current study hypothesizes self-control to predict juvenile online sexual harassment behaviors. Stated differently, while Holt et al. (2011) did not predict any such form of cyber deviance within their analysis, the present study hypothesizes that lack of self-control does play a significant role in influencing the likelihood of committing online sexual harassment. Holt et al. (2011), however, did find that peer offending has a stronger relationship than self-control in determining cyber deviant behaviors; thus, supporting the quintessential elements of the social learning theory – namely, the aspects highlighted within both the social learning theory and the differential association theory.

Ultimately, this study seeks to analyze the mobile induced online sexual harassment behaviors of juveniles by examining individuals' deviant peer association, definitions, and levels of self-control. The statistical method that will be applied to achieve this analysis will be the application of binomial logistic regressions (as conducted by Reyns, Henson, & Fisher (2015) in their empirical study on cyber stalking). Ultimately, this study hopes to

make a contribution to the criminological literature by underscoring the potential relationships between the elements of social learning and levels of self-control, with the resultant levels of online sexual harassment.

## **Methodology**

### ***Sample and Procedure***

This research utilizes secondary data gathered by Lee (2008) of South Korea. The secondary source was initially used to examine different forms of mobile deviance among South Korean juveniles. The reason for choosing this South Korean data set was due to its vast accessibility, appropriateness, and availability of technology: The number of Internet users in South Korea was recorded at 37.02 million people in 2010 (Leading Industries, 2013). Additional studies confirming South Korea's appropriateness as a prime location of online deviance claim that nearly 100% of Korean adolescents reported the use of technology, the Internet, or the computer at least once a month. Moreover, South Korea has also increased their technology advancements over the past few decades – that is, they have become one of the leading nations in communications technology (Moon et al., 2010, p. 768). These South Korean figures are not only significant in the domestic sphere within the Korean peninsula, but are increasingly noticeable in the global scale due to its incomparable rate of Internet users across borders. This heightens and enhances the fact that South Korea has a technology driven society, and is therefore an appropriate spatial location for research regarding cyberspace issues.

In addition to choosing South Korea as the country of analysis, the age group selected within this secondary data was based on the research findings indicating that the age group who uses the Internet the longest (referring to the duration and/or period of time) are those ranging between 20 and 29 years of age, with the second largest segment being those under 19 years old (Lee, 2011) – the survey was therefore designed and developed for middle school youths in the city of Seoul. The original survey examined a board range of deviant behaviors that these children would commit in both the physical world and cyberspace.

The target population for this research is juveniles aged 12 to 16 years old in the city of Seoul, South Korea. The grades that make up this sample consisted of 7<sup>th</sup>, 8<sup>th</sup>, and 9<sup>th</sup> grade students (all of which are considered middle school level in Seoul). The reason for this age and grade level being selected is due to the fact that puberty positions itself around this particular demographic group. Moreover, juveniles reportedly use the Internet and electronic devices on a more regular basis more during those aforementioned age/grade stages – that is, heavier usages of both the Internet and electronic devices happen during those peak age and/or grade levels. Middle schools in Seoul were randomly selected to include 7 public middle schools out of the 377 middle schools in the city of Seoul. The sample population consisted of 718 survey respondents, of which 715 were used in the end due to 3 surveys being incomplete and/or exaggerated. From each school, there were about 100 cases collected that were utilized for the research. General descriptive statistics were taken regarding the sample. The average age of the data set was 13.88 years old. Participant ages ranged from 12 to 16 years old. Males made up 50.9 % of the sample population, whereas females comprised of 47.0% of the sample population.



## **Measures**

The 3 theoretical measures used to assess online sexual harassment in this study are: (1) differential association, (2) definitions, and (3) self-control. All 3 of these theoretical components will be utilized in collaboration with the online sexual harassment data collected from South Korea to determine their relationship and overall significance. The survey contained a series of questions gauging respondents' deviant peer association in cyberspace, perception towards online deviant behaviors, self-reported online sexual harassment activities, and demographic characteristics.

Three major hypotheses are suggested. First, theoretical elements of social learning theory, differential association, and definitions in particular, will predict an increase in deviant behaviors among juveniles in cyberspace. Second, a high degree of self-control may also decrease engagement of online sexual harassment. Finally, gender, mobile usage, and age differentially influence online sexual harassment activities.

## **Dependent Variables**

Choi (2015) defines online sexual harassment as the sending of messages, including images and video files, which are unwanted and sexual (be it implicit or explicit) in nature. Wolak et al. (2006) furthers this definition by positing that online sexual harassment is the sending of unwanted explicit images of people's naked bodies or asking others to send their own intimate digital images online with or without posing a credible threat of harm. This type of harassment includes continuously asking an individual for naked pictures and continuously knowing what he/she is doing and where he/she is going through the use of social media sites and platforms. Given the broadness in scope of the term, this study used four specific items to measure online sexual harassment. The items all reflected respondents' personal experiences.

The four items used to measure mobile induced online sexual harassment are: (1) Sexual harassment; (2) cyber stalking; (3) sexual verbal harassment; and (4) pornographic materials. The first item of sexual harassment specifically referred to an individual's request to see and/or receive private, intimate images despite the continued rejection of requests. While the term sexual harassment can be operationalized to denote many general behaviors, this particular form of sexual harassment was defined as harassment generated from requesting intimate digital images of an individual via mobile phone in spite of a refusal to do so. Respondents were specifically asked if they have ever sexually harassed someone on the Internet by asking for an individual's naked photo(s) despite the rejection of such requests. The second item of cyber stalking was defined as repeatedly pursuing and monitoring private information through the use of social media sites. Respondents were asked if they have been constantly checking and/or asking very personal information through social media sites. With regards to the third item, sexual verbal harassment was defined as assaulting and intimidating others online using words and phrases that denote sexual connotations on social media platforms. These words and phrases can be both implicit and explicit in nature, so long as it produces an intimidating effect towards the recipient. Respondents were asked if they had repeatedly used both sexually implicit and explicit swearwords to threaten others on social networking forums. The last item of pornographic materials was defined as the non-consensual distribution of sexual content online. Respondents were asked if they had consistently sent sexual content/pornographic materials through the Internet without consent. Each of responses to these survey items



were dichotomized (0=No, 1=Yes) and formed four dependent measures. Table 1 indicates the descriptive statistics for each dependent measure.

### **Independent Variables**

This study examines the effects and elements of criminological theory on mobile phone induced juvenile online sexual harassment. Three sets of independent measures were used in the subsequent analyses: (a) differential association and definitions, (b) self-control, and (c) control variables: gender, mobile usage, and age.

### **Social Learning Theory: Differential Association and Definitions**

Differential association and definitions are the two social learning components that are tested in this research inquiry. Deviant peers were tested as the differential association element. The deviant peers measure is the association between the juvenile and any peer who engages in any of the listed deviant behaviors identified within this research. Juveniles were asked how many of their friends have committed any of the online sexual harassment behaviors that were presented in this study. The numbers of friends were placed into four categories. The range of deviant peers was 0-4 (0= 0 friends, 1=1 friend, 2=2-3 friends, 3=4-10 friends, and 4=11+ friends). A higher rating indicated a greater number of deviant peers. The mean of the differential association for this sample was .79, with a standard deviation of 1.19, a skewness of 1.06, and a kurtosis of -.56.

For definitions, juveniles were asked how they perceive the listed online sexual harassment behaviors based on the seriousness of the behavior. This provides insight into how juveniles perceive the deviant behaviors in relation to the behaviors they partake in. This was measured by asking how juveniles perceive crimes that they have seen committed before. The item was anchored into a 5-point Likert scale with strongly disagree, disagree, neutral, agree, and strongly agree. The scale indicated that the higher the agreement, the more they agreed the online sexual harassment behavior was unacceptable. The mean of the definitions for this sample was 4.11, with a standard deviation of 1.02, a skewness of -1.35, and a kurtosis of 1.69.

### **Self-control**

Twelve items were measured for the level of self-control. Juveniles' level of self-control is evaluated in 6 categories: (a) impulsiveness, (b) preference for physical activities, (c) risk seeking, (d) self-centeredness, (e) preference for simple tasks, and (f) volatile temper (Connor et. al, 2009:137). When Grasmick and colleagues (1993) published their well-used scale, the measurement debate seemed to ebb, but not without objections. Many have critiqued the use of the Grasmick et al. (1993) scale claiming that it does not measure a unidimensional construct (e.g., DeLisi et al. 2003; Winfree, Taylor, He, Esbensen 2006). Thus, these 6 categories (the total of 12 items) encompass Grasmick et al.'s (1993) items and the concept of Allahyerdipour et al.'s (2006) measures that were adopted in the survey. The items were anchored with strongly disagree, disagree, neutral, agree, and strongly agree. These were measured on a 5-point Likert scale and reversely recorded. The scale's possible aggregate range is 1 to 60, with higher scores reflecting higher levels of self-control. The mean of the self-control for this sample was 38.67, with a standard deviation of 8.91, a skewness of .09, a kurtosis of .70, and a Cronbach's Alpha of .845. The scale based on these items had satisfactory skewness and kurtosis levels, and the

assessment of principal factor analysis and a Scree test validated the scale items as a unitary construct.

### **Control Variable**

Gender, age, and mobile usage were used as control variables in the current analysis. Gender is a dichotomous variable differentiating male (52%) and female (48%) respondents (0=female and 1=male). Respondents were also asked to identify their age and indicate daily hours of mobile phone usage by checking one of the five categories (1=Less than 1 hour, 2=About 2 hours, 3=About 3 hours, 4=About 4 hours, 5=5 hours or Over). Table 1 shows descriptive statistics for each control variable.

**Table 1. Descriptive Statistics for Study Measures**

<b>VARIABLES</b>	<b>Mean</b>	<b>SD</b>	<b>Minimum</b>	<b>Maximum</b>
<b>Dependent Variables</b>				
Sexual Harassment	.04	.20	0	1
Cyber-stalking	.02	.15	0	1
Sexual Verbal Harassment	.56	.02	0	1
Porn Materials	.10	.30	0	1
<b>Independent Variables</b>				
<b>SOCIAL LEARNING</b>				
<b>Differential Association</b>				
Deviant Peer Association	.79	1.19	0	4.00
<b>Definition</b>				
Perception of Deviant Behavior	4.11	1.02	1.00	5.00
<b>SELF-CONTROL</b>				
12 Self-control Traits	38.67	8.91	12	60.00
<b>Control Variables</b>				
Gender	.51	.50	.00	1.00
Mobile Usage	2.64	1.55	1	5
Age	13.88	.96	12	16

### **Analytic plan**

In order to examine how social learning and self-control variables influence the four sexual harassment activities, four regression models were accessed. The analytic plan employed in this study was taken from Reyns, Henson, and Fisher's (2015) study on cyber stalking victimization. While the former study examined the guardianship concept from routine activity theory with respect to its utility in reducing the risk for cyber stalking victimization, the current study uses the same analytic process but with mobile induced juvenile online sexual harassment behaviors among a South Korean sample. The reason for adopting the Reyns and colleagues (2015) analytic plan was because of its clarity and effectiveness in conceptualizing theory to online behaviors.

Through an application of the SPSS package, logistic regression models were employed to assess the engagement of mobile induced online sexual harassment. This is due to the dichotomous nature of the dependent measure, and not a continuous scale. The binary

logistic regression models that show respondents' engagement in the four categories of online sexual harassment activities are displayed in Table 2.

## Results

**Table 2. Binary Logistic Regression for Cyber Sexual Harassment Behaviors**

Variables	Model 1: Sexual Harassment			Model 2: Cyber- stalking			Model 3: Sexual Verbal Harassment			Model 4: Porn Materials		
	Coef.	SE	Exp(B)	Coef.	SE	Exp(B)	Coef.	SE	Exp(B)	Coef.	SE	Exp(B)
<b>Self- Control</b>	-0.45	0.03	0.96	-0.09*	0.04	0.92	-0.06***	0.01	0.94	-0.10***	0.02	0.91
<b>Social Learning</b>												
Deviant Peers	0.22	0.17	1.25	0.11	0.25	1.11	0.46***	0.09	1.58	0.46***	0.13	1.58
Definitions	-0.61***	0.18	0.54	-0.79**	0.26	0.46	0.003	.010	1.00	-0.44**	0.16	0.64
<b>Control Variables</b>												
Gender	0.70	0.52	2.02	0.64	0.74	1.89	0.49*	0.21	1.64	1.04**	0.40	2.82
Mobile Usage	-0.10	0.17	0.91	-0.07	0.23	0.94	0.12	0.07	1.13	-0.10	0.12	0.91
Age	0.10	0.24	1.10	0.67	0.39	1.95	0.04	0.10	1.04	0.49*	0.19	1.62
-2 Log Likelihood	153.69			84.06			606.69			232.99		
Nagelkerke $R^2$	0.134			0.219			0.176			0.252		
n	493			491			491			493		

\*p≤.05.\*\*p≤.01.\*\*\*p≤.001.

Table in parentheses are p-values of Wald  $\chi^2$  statistics, computed as squares of the parameter estimates divided by their estimated standard errors.

### **Sexual Harassment**

In Model 1 of Table 2, the online sexual harassment behavior was measured by reflecting social learning and self-control theoretical elements. The findings indicate that definition is only a statistically significant factor in Model 1. When juveniles perceive sexual harassment activity, particularly, asking for an individual's naked photo(s) despite the rejection of such requests, as being forms of serious behavior, they are less likely to commit that behavior (b = -.61 and Odds Ratio =.61 with p < .001). The current study hypothesized that high self-control is an indicator of juveniles being less likely to partake in online sexual harassment activities. However, self-control was not a significant factor in Model 1. Control variables were also not statistically significant.

### **Cyber stalking**

Similar to the previous model, Model 2 indicates that the high level of definition substantially minimizes the likelihood of engaging in cyber stalking activity such as constantly checking and/or asking for personal information through social media sites (b = -.79 and Odds Ratio =.46 with p < .01). In addition, the findings show that juveniles who display higher levels of self-control are also less likely to commit cyber stalking when

compared to juveniles with lower levels of self-control ( $b = -.09$  and Odds Ratio = .92 with  $p < .05$ ). Control variables were not significant factors in this relationship.

### ***Sexual Verbal Harassment***

The findings revealed that the number of deviant peers and associates a juvenile has is an indicator of that individual's likelihood of participating in online sexual harassment behaviors. Model 3 in Table 2 shows that the differential association measure has substantial influence on the likelihood of engaging in online sexual verbal harassment activity such as repeatedly using sexual-related swearwords and/or threatening others on social networking forums. The suggested model indicates that individuals who have higher engagements with deviant peers are approximately 1.6 times more likely to engage in online sexual verbal harassment ( $b = .46$  and Odds Ratio = 1.58 with  $p < .001$ ). As with the previous model, a negative and statistically significant relationship was found between the levels of self-control and online sexual verbal harassment. Juveniles with high self-control are less likely to engage in online sexual verbal harassment activity ( $b = -.06$  and Odds Ratio = .94 with  $p < .001$ ). Furthermore, gender was significantly associated with the engagement of online sexual verbal harassment activity. Males were 1.6 times more likely to engage in the sexual verbal harassment activity when compared to females ( $b = .49$  and Odds Ratio = 1.64 with  $p < .05$ ). However, no significant relationships were found in other control variables.

### ***Pornographic Materials***

Model 4 in Table 2 shows that all the suggested self-control and social learning theoretical elements produce a statistically significant effect on the likelihood of spreading sexual contents/ pornographic material without consent. Similar to previous model, juveniles with higher numbers of online deviant peers were approximately 1.6 times more likely to spread sexual contents/pornographic material to others without consent ( $b = .46$  and Odds Ratio = 1.58 with  $p < .001$ ). In addition, negative and statistically significant effects accordingly confirmed the hypotheses that juveniles who have higher levels of self-control and view online sexual harassment activities as serious are less likely to engage in online sexual harassment activity ( $b = -.10$  and Odds Ratio = .91 with  $p < .001$ ;  $b = -.44$  and Odds Ratio = .64 with  $p < .01$ ). Moreover, two control variables, gender and age, were positively and significantly associated with the engagement of the online sexual harassment. Males were 2.8 times more likely to engage in spreading pornographic material, and older juveniles were about 60% more likely to engage in this particular online sexual harassment activity, respectively ( $b = 1.04$  and Odds Ratio = 2.82 with  $p < .01$ ;  $b = .49$  and Odds Ratio = 1.62 with  $p < .05$ ).

In sum, the major research findings indicate that social learning factors, definition, and self-control substantially influence juveniles committing online sexual harassment activities. Moreover, juveniles who were associated with having a greater number of deviant peers exhibited a significant tendency to commit online sexual harassment activities such as engaging sexual verbal harassment and spreading pornographic materials. Furthermore, definitions provided more substantial contributions to engaging in online sexual harassment activities when compared to differential association.

More importantly, the self-control measure also has a statistically significant impact on committing most of the online sexual harassment activities. This is an extremely important

finding because many studies have failed to identify low self-control as a crucial factor that contributes to online sexual harassment.

Overall, older male youths with low self-control who associate with a large number of deviant peers, and who positively view committing online sexual harassment, are the most susceptible to engaging in online sexual harassment. These results show that social learning and low self-control factors can be used to predict mobile induced juvenile sexual harassment in cyberspace.

### **Discussion and Implications**

This study sought to establish a firm understanding of mobile phone induced online sexual harassment among juveniles within South Korea. What can be extracted from this study is that the theoretical elements from social learning theory and self-control theory *can* explain and predict mobile induced online sexual harassment. Just as how social learning theory has been used in previous research as a major factor in explaining criminal and deviant behaviors among juveniles, this research also supports the use of social learning theory to explain online sexual harassment conducted via a mobile device. The reason for this is in how juveniles progress in life – that is, they learn by following what others do and how they behave. For instance, if they see friends committing online sexual harassment behaviors using mobile phones, they will be more likely to engage in those behaviors as well. In short, these juveniles learn through their surroundings and if they perceive a behavior as being non-severe, then they are more inclined to commit that behavior.

The findings also indicate that low levels of self-control will increase mobile induced online sexual harassment behaviors among juveniles. Juveniles who have higher self-control are likely to have the ability to resist the urge of impulsiveness, preference for physical activities, risk seeking, self-centeredness, preference for simple tasks, and volatile temper.

Overall, this empirical study suggests that social learning theory and self-control theory can broadly explain interpersonal crimes in cyberspace, including cyber stalking and cyber-harassment among many others. These theoretical elements could contribute to the development of crime prevention programs in various ways. Even though self-directed decisions by juveniles for learning adequate online pro-social behaviors have become increasingly important, contemporary criminal justice crime prevention programs tend to neglect the importance of these issues. Cyber crime prevention programs, however, can be logically categorized as school-based crime prevention programs. Gottfredson (1998) asserted that interventions to establish norms and expectations for behavior are some of the most effective strategies in the school based crime prevention programs.

Programs must therefore be implemented to address the issue of mobile induced online sexual harassment behaviors among juvenile populations. Albeit directed towards a more generalized conceptualization of cyber deviance, a program that is already in place that addresses the issue of online deviant behaviors is the “I-Safe” program. This program is aimed at educating children on how to safely and responsibly conduct activities in cyberspace – including mobile phone and other portable devices. The program offers a curriculum to utilize in schools across the globe. Since 2002, the program has been initiated in more than 34 million pre-primary and secondary schools worldwide. The curriculum covers a variety of cyberspace issues including cyber bullying, cyber security

(spam mail, viruses), personal safety (ID safety), and digital literacy (understanding and using media) (The I-Safe Foundation, 2013). The program was created so that it can be easily implemented in school settings and most importantly, within the classroom atmosphere.

Ultimately, the aim of the I-Safe program is to prevent juveniles from beginning any of the online sexual harassment activities discussed in this research. While the program is robust and effective in its current focus, an additional element that would greatly benefit this program is to address the issue of peer pressure. No matter how much one learns about the consequences of committing said behaviors in school, their associations with peer groups will have a major effect on them. As a result, youths must learn to make the right decisions and learn to avoid peer pressure. If this could be incorporated into the I-Safe program, it could provide to be very helpful in possibly reducing the amount of mobile induced online sexual harassment behaviors that occur among juveniles.

Among the numerous preventative programs that can be derived from self-control theory's key concept, the one most noteworthy is that of proactive child-care initiatives. That is, effective child-care management during childhood can create high self-control in the child that will inhibit deviant behavior (Gottfredson & Hirschi, 1990). Programs, therefore, need to focus on early intervention measures and effective child-care initiatives. They aim of this program would be to teach not only the children involved, but also offer programs for teachers and parents that would address the issues revolving around peer pressure, sexual harassment, and cyber stalking. In sum, the hope is that parents and teachers would learn signs of cyber deviance and techniques for preventing their children from falling victim to various forms of online sexual harassment.

## Conclusion

The problem of mobile phone induced juvenile online sexual harassment behavior in cyberspace has been explained using the elements derived from both the social learning and self-control theories. The hope of this research was to bring attention to the growing technology problem as it pertains to the juvenile populations. It has been concluded that a majority of juvenile online sexual harassment behaviors can be predicted by social learning theory and self-control theory. Social learning theory and self-control theory are the two major theories that had the most significant impact for predicting online sexual harassment using a mobile device. The findings here can be utilized in future research in regards to juvenile delinquency in cyberspace. The hope is that juveniles will be able to conduct business and/or activities in cyberspace without the threat of being victims or perpetrators of deviant behaviors.

## Limitations

With regards to the study's limitations, this study had a number of shortcomings that should be considered for future research. One of the limitations is the threat to external validity. It cannot be made certain that the findings from this research, if and when applied to another population, will yield the same results. Since the study was conducted on South Korean juveniles, it is not certain that if the study were to be conducted in other countries, that it would yield similar results. The rationale behind this claim is that people of different nations and cultures may differ in social learning values and early child-care intervention management. Since cultural values and nuances are not uniform across human society, these differences may affect the values and behaviors being socially

promoted. Furthermore, different views and capacities in effective childhood parenting may also result in varied results across populations.

Another notable limitation of this study is the outdated nature of the prescribed data source – namely, the archaic version of the mobile phone used in the survey. The date at which the data source was published (2008) is of paramount importance because of the fundamental element embedded within this particular research inquiry – this study focuses on the online behaviors induced via a mobile phone. The mobile phone, while retaining the functions of calling and texting other individuals, has exhibited monumental changes in its capabilities since the data source was initially published. The implications of this change are that mobile phones today possess a completely different set of added functions than what was initially prescribed in the given data source. In other words, while the temporal period at which the data source was conducted may not be so relevant in other various research inquiries, given that this particular study focuses on online sexual harassment behaviors induced by a mobile phone, the evolution of the electronic device in question has the utmost potential to alter the findings outlined in this current study. In other words, the mobile phone's evolution to what is now commonly referred to as the *smartphone* may bring forth different results if the study were to be redone today. Again, while this is not to denounce the legitimacy of the research findings within this particular inquiry, the fact that mobile phones have changed considerably in function and capacity over the past few years warrants a thought implying the possible differences in potential findings and research outcomes if the research were to be repeated today.

Finally, measuring online sexual harassment is still somewhat enigmatic because cyber-harassment terms are very broad and interchangeable with cyber bullying and cyber stalking. The hope is to eventually see more refined measures for the assessment of online sexual harassment in future research inquiries.

## References

- Akers, R. L. (1985). *Deviant behavior: A social learning approach* (3<sup>rd</sup> ed.). Belmont: Wadsworth.
- Akers, R. L., & Sellers, C. S. (2004). *Criminological theories: Introduction, evaluation, and application* (4<sup>th</sup> ed.). Los Angeles: Roxbury Publishing.
- Allahverdipour, H., Hidarnia, A., Kazamnegad, A., Shafii, F., Fallah, P., & Emami, A. (2006). The status of self-control and its relation to drug abuse-related behaviors among Iranian male high school students. *Social Behavior & Personality: An International Journal*, 34(4), 413-423.
- Anwar, S., & Loughran, T.A. (2011). Testing a Bayesian learning theory of deterrence among serious juvenile offenders. *Criminology*, 49(3), 667-698. doi:10.1111/j.1745-9125.2011.00233.x.
- Brauer, J. R. (2009). Testing social learning theory using reinforcement's residue: A multilevel analysis of self-reported theft and marijuana use in the national youth survey. *Criminology*, 47(3), 929-970. doi:10.1111/j.1745-9125.2009.00164.x.
- Brenner, S.W. & Koops, B. (2004). Approaches to cybercrime jurisdiction. *Journal of High Technology Law*, 4(1), 1-46. Retrieved from [http://www.jhtl.org/docs/pdf/JHTL\\_Brenner\\_Koops\\_Article1.pdf](http://www.jhtl.org/docs/pdf/JHTL_Brenner_Koops_Article1.pdf).
- Cernkovich, S. A. & Giordano, P.C. (1992). School bonding, race, and delinquency. *Criminology*, 30(2), 261-291.



- Chapple, C. L. (2005). Self-control, peer relations, and delinquency. *Justice Quarterly*, 22(1), 89-106. doi:10.1080/0741882042000333654.
- Choi, K. (2008). Computer crime victimization and integrated theory: An empirical assessment. *International Journal of Cyber Criminology*, 2(1), 308-333.
- Choi, K. (2015). *Cybercriminology and digital investigation*. El Paso: LFB Scholarly Publishing LLC.
- Clinton, C., & Steyer, J. P. (2012, May 21). Is the internet hurting children? In *CNN*. Retrieved from <http://www.cnn.com/2012/05/21/opinion/clinton-steyer-internet-kids/index.html>.
- Cox Communication in Partnership with National Center for Missing & Exploited Children. (2009, May). Teen online and wireless safety survey: Cyberbullying, sexting, and parental controls. Retrieved from [http://ww2.cox.com/wcm/en/aboutus/datasheet/takecharge/2009-teen-survey.pdf?campcode=takecharge-research-link\\_2009-teen-survey\\_0511](http://ww2.cox.com/wcm/en/aboutus/datasheet/takecharge/2009-teen-survey.pdf?campcode=takecharge-research-link_2009-teen-survey_0511).
- Conner, B. T., Stein, J. A., & Longshore, D. (2009). Examining self-control as a multidimensional predictor of crime and drug use in adolescents with criminal histories. *Journal Of Behavioral Health Services & Research*, 36(2), 137-149. doi:10.1007/s11414-008-9121-7.
- Evans, D. T., Cullen, F. T., Burton Jr., V. S., Dunaway, G. R., & Benson, M. L. (1997). The social consequences of self-control: Testing the general theory of crime. *Criminology*, 35(3), 475-504.
- Gottfredson, D. (1998). School-based crime prevention. In L. W. Sherman, D. C. Gottfredson, D. MacKenzie, J. Eck, P. Reuter, & S. Bushway. (Eds.), *Preventing crime: What works, what doesn't, what's promising: A report to the United States Congress*. Washington, DC: U.S. Department of Justice, Office of Justice Programs, National Institute of Justice.
- Gottfredson, M., & Hirschi, T. (1990). *A general theory of crime*. Stanford: Stanford University Press.
- Hirschi, T., & Gottfredson, M. (1993). Commentary: Testing the general theory of crime. *Journal of Research in Crime and Delinquency*, 30, 47-54.
- Grasmick, H.G., Tittle, C. R., Bursik, R. J., & Arneklev, B. J. (1993). Testing the core empirical implications of Gottfredson and Hirschi's general theory of crime. *Journal of Research In Crime & Delinquency*, 30(1), 5-29.
- Grenoble, R. (2012, October 11) .Amanda Todd: Bullied Canadian teen commits suicide after prolonged battle online and in school. In *Huff Post Crime*. Retrieved from [http://www.huffingtonpost.com/2012/10/11/amanda-todd-suicide-bullying\\_n\\_1959909.html?utm\\_hp\\_ref=amanda-todd](http://www.huffingtonpost.com/2012/10/11/amanda-todd-suicide-bullying_n_1959909.html?utm_hp_ref=amanda-todd).
- Hart, C. O., & Mueller, C. E. (2013). School delinquency and social bond factors: Exploring gendered differences among a national sample of 10<sup>th</sup> graders. *Psychology In The Schools*, 50(2), 116-133. doi:10.1002/pits.21662.
- Hay, C., & Forrest, W. (2008). Self-control theory and the concept of opportunity: The case for a more systematic union. *Criminology*, 46(4), 1039-1072. doi:10.1111/j.1745-9125.2008.00135.x.
- Higgins, G. E., Wilson, A. L., & Fell, B. D. (2005). An application of deterrence theory to software piracy. *Journal of Criminal Justice and Popular Culture*, 12(3), 166-184.
- Higgins, G. E. (2005). Can low self-control help with the understanding of the software piracy problem?. *Deviant Behavior*, 26(1), 1-24. doi:10.1080/01639620490497947.

- Higgins, G. E. (2007). Digital piracy, self-control theory, and rational choice: An examination of the role of values. *International Journal of Cyber Criminology*, 1(1), 33-55.
- Hinduja, S., & Patchin, J. W. (2010). Lifetime cyberbullying victimization and offending rates. In Cyberbullying Research Center. Retrieved from <http://www.cyberbullying.us/research.php>.
- Hinduja, S., & Patchin, J. W. (2007). Offline consequences of online victimization: School violence and delinquency. *Journal Of School Violence*, 6(3), 89-112.
- Holt, T. J., Blevins, K. R., & Burkert, N. (2010). Considering the pedophile subculture online. *Sexual Abuse: A Journal of Research and Treatment*, 22(1), 3-24.
- Holt, T. J., Bossler, A. M., & May, D. C. (2011). Low self-control, deviant peer associations, and juvenile cyberdeviance. *American Journal of Criminal Justice*, 37(3), 378-395. doi:10.1007/s12103-011-9117-3.
- Hussain, R. (2011). Cyberspace task force for child protection. *International Journal of Academic Research*, 3(2), 1001-1007.
- Ingram, J. R., & Hinduja, S. (2008). Neutralizing music piracy: An empirical examination. *Deviant Behavior*, 29(4), 334-366. doi:10.1080/01639620701588131.
- Jenson, G. F., Erickson, M. L., & Gibbs, J. P. (1978). Perceived risk of punishment and self-reported delinquency. *Social Forces*, 57(1), 57-78. doi: 10.1093/sf/57.1.57.
- John, Y. J., & Gorman, G. E. (2002). Internet use in South Korea. *Online Information Review*, 26(5), 335-344.
- LaGrange, T. C., & Silverman, R. A. (1999). Low self-control and opportunity: Testing the general theory of crime as an explanation for gender differences in delinquency. *Criminology*, 37(1), 41-72. doi: 10.1111/j.1745-9125.1999.tb00479.x.
- Leading Industries. (2013). In Korea.net: Gateway to Korea. Retrieved from <http://www.korea.net/AboutKorea/Economy/Leading-Industries>.
- Lee, S. (2011). Testing both Risk and Control Factors of Juvenile Delinquency in Offline, Internet, and Cell Phone Media. *Korean Criminological Review*, 85, 112-135.
- Matsueda, R. L. (1982). Testing control theory and differential association: A causal model approach. *American Sociological Review*, 47, 489-504.
- Matsueda, R. L., & Heimer, K. (1987). Race, family structure, and delinquency: A test of differential association and social control theories. *American Sociological Review*, 52(6), 826-840.
- Mesch, G. S. (2009). Parental mediation, online activities, and cyberbullying. *CyberPsychology & Behavior*, 12(4), 387-393.
- Mitchell, K. J., Wolak, J., & Finkelhor, D. (2008). Are blogs putting youth at risk for online sexual solicitation or harassment? *Child Abuse & Neglect*, 32(2), 273-294.
- Moon, B., Blurton, D., & McCluskey, J.D. (2008). General strain theory and delinquency. *Crime & Delinquency*, 54(4), 582-613. doi:10.1177/0011128707301627.
- Moon, B., McCluskey, J. D., & McCluskey, C. P. (2010). A general theory of crime and computer crime: An empirical test. *Journal of Criminal Justice*, 38, 767-772. doi:10.1016/j.jcrimjus.2010.05.003.
- Moon, B., Morash, M., & McCluskey, J. D. (2012). General strain theory and school bullying: An empirical test in South Korea. *Crime & Delinquency*, 58(6), 827-855. doi:10.1177/0011128710364809.
- Nagin, D. S., & Paternoster, R. (1993). Enduring individual differences and rational choice theories of crime. *Law & Society Review*, 27(3), 467-496.



- National Center for Missing & Exploited Children. (2013). Cellphones. In *NetSmartz Workshop*. Retrieved from <http://www.netsmartz.org/CellPhones>.
- Pratt, T. C., Cullen, F. T., Sellers, C. S., Winfree, T. L., Madensen, T. D., Daigle, L. E., Fearn, N. E., & Gau, J. M. (2010). The empirical status of social learning theory: A meta-analysis. *Justice Quarterly*, 27(6), 765-802. doi:10.1080/07418820903379610.
- Skinner, W. F., & Fream, A. M. (1997). A social learning theory analysis of computer crime among college students. *Journal of Research in Crime & Delinquency*, 34(4), 495-518.
- Soo, K., Ainsaar, M., & Kalmus, V. (2012). Behind the curtains of e-state: Determinants of online sexual harassment among Estonian children. *Studies of Transnation States and Societies*, 4(2), 35-48.
- Stack, S., Wasserman, I., & Kern, R. (2004). Adult social bonds and use of internet pornography. *Social Science Quarterly (Blackwell Publishing Limited)*, 85(1), 75-88. doi:10.1111/j.0038-4941.2004.08501006.x.
- The I-Safe Foundation. (2013). In *I-Safe*. Retrieved from [http://isafe.org/wp/?page\\_id=211](http://isafe.org/wp/?page_id=211).
- Wiatrowski, M. D., Griswold, D. B., & Roberts, M. K. (1981). Social control theory and delinquency. *American Sociological Review*, 46(5), 525-541.
- Wolak, J., Mitchell, K. J., & Finkelhor, D. (2006). Online Victimization of Youth: Five Years Later.
- Yar, M. (2005). Computer hacking: Just another case of juvenile delinquency?. *Howard Journal of Criminal Justice*, 44(4), 387-399. doi:10.1111/j.1468-2311.2005.00383.x.