The Effects of Life Domains on Cyberbullying and Bullying: Testing the Generalizability of Agnew's Integrated General Theory

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Abstract

In 2005, Robert Agnew published his book *Why Criminals Offend* in which he synthesized an array of

theoretical predictors of crime and delinquency into a parsimonious integrated general theory. He argued

that delinquency is influenced by mechanisms found in five distinct life domains: self, family, peer,

school, and work. Using longitudinal data from South Korea, the current research tested the

generalizability of Agnew's (2005) theory by applying it to bullying and cyberbullying. Results from a

negative binomial regression model provided mixed support for Agnew's theory as a general theory of

crime. The significant effects of life domains were found to differ across types of bullying.

Keywords: Agnew's integrated theory, life domains, bullying, cyberbullying

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Agnew's Integrated General Theory

While Robert Agnew is perhaps best known for his contributions to the revitalization of strain and anomie theory, recently, in an attempt to craft a clearer, more concise, and parsimonious integrated theory of crime, Agnew (2005) published his book *Why Do Criminals Offend? A General Theory of Crime and Delinquency.* According to Agnew (2005) criminal behavior is most likely to occur when the constraints against it are low and the motivations for it are high. Constraints and motivations result from myriad individual traits and socio-environmental factors which he compartmentalizes into five distinct life domains: *self, family, peers, school,* and *work.* These life domains influence criminal behavior both directly and indirectly through their effects on constraints and motivations, as well as subsequent impact on other life domains.

Unfortunately, Agnew's (2005) integrated general theory has received only limited attention. This is likely a reflection of the newness of the theory and the difficulty with obtaining datasets capable of testing all of the propositions presented in integrated general theory. To date, the authors know of only five prior empirical tests of general theory (cf, Cochran, 2017; Muftić, Grubb, Bouffard, & Maljević, 2014; Ngo & Paternoster, 2014; Ngo, Paternoster, Cullen, & Mackenzie, 2011; Zhang, Day, & Cao, 2012). Grouped together, these studies provide only partial tests suggesting moderate support for Agnew's (2005) integrated theory. The goal of the present study is to add to this small area of research by testing concepts of Agnew's (2005) general theory on bullying and cyberbullying, which are two forms of delinquency neglected in prior research. In doing so, this work tests the external validity of general theory as this is the first research to focus on applying general theory to forms of analogous behaviors other than substance use and academic dishonesty. Additionally, this scholarship further tests the generality of Agnew's (2005) theory by applying it to a sample of Korean adolescents. Moreover,

this is the first study to look at the interactive effects between variables using longitudinal data and therefore, offers a more precise estimate of the utility of general theory than that which has been found in previous research.

Agnew's General Theory of Crime and Delinquency

Using the available empirical research, coupled with existing theoretical constructs, Agnew (2005) sought to answer the question that has been the inspiration fueling criminology for centuries: why do criminals offend? To answer this question, Agnew (2005) parted from conventional theoretical integration (i.e., conceptual absorption and propositional integration) and took on a "variable approach" (Bernard, Snipes, & Gerould 2010). In doing so, Agnew (2005) laid the foundation for his integrated theory by first identifying key theoretical correlates of crime and deviance that have been consistently shown to have moderate to large direct effects on crime. He then placed each variable into one of his three underlying constructs: constraints, motivations, and life domains. The paradigm guiding Agnew's (2005) theory is that crime and delinquency, "are most likely when the constraints against crime are low and motivations for crime are high' (p.11). Constraints and motivations are the products of a multitude of individual and social-environmental factors which he organized into five distinct life domains: *self, family, peer, school,* and *work.*

In his discussion of the self domain, Agnew (2005) focused on a number of internal factors including irritability, impulsivity, risk seeking ideation, and low self-control (LSC). The family domain included elements of direct supervision (e.g., parental monitoring) and attachment (e.g., bond between parents and child), as well as neglect, abuse, and family conflict. Likewise, the school domain encompassed attachment to teachers, academic ability, time devoted to school work outside of the classroom, educational aspirations, and support of students by teachers, administrators, and staff at school. The peer domain is concerned with peer delinquency levels, altercations with peers, and time

spent engaging with peers. Much like his focus in the school domain, Agnew's (2005) discussion of the work domain centered on attachment and commitment to work, as well as the supervision, time commitment, and peer interaction that accompanies employment.

He proposed an age-graded theory, suggesting that different factors matter more at different points in one's life. For instance, he hypothesized that the peer domain is more important for explaining crime during adolescence than it is in adulthood (Agnew, 2005, p. 57). This is largely because adolescents spend much of their time with peers in school settings and in extra-curricular activities (i.e., sports, music, religious groups) (Warr, 2002). Conversely, he argued that the work domain has little to no impact on adolescent delinquency because "work does not yet play a central role in their lives" (Agnew, 2005, p. 57).

Regarding bullying, Agnew's (2005) theory suggests that bullies lack effective socialization. To him bullies are individuals who lack adequate supervision and social support or who have experienced negative early childhood experiences—such as harassment, neglect, and abuse at the hands of parents or teachers—which has prevented them from bonding to conventional institutions while simultaneously pressuring them to act out defiantly. This assumption has been supported in longitudinal research (Connell, Morris, & Piquero, 2016; Farrington & Baldry, 2010). Bullies are pushed into delinquent peer circles where they associate with other bullies who serve as models to further enforce antisocial behavior. Overtime, socialization with other delinquents results in the acceptance of definitions favorable to delinquency and the development of low self-control, characterized by impulsiveness and low empathy, which have been found to be strong predictors of bullying (see Farrington & Baldry, 2010). Thus, bullying is the product of a myriad of biological and socio-environmental factors that push or pull an individual into a life of crime.

Moreover, Agnew argued that variables within each domain can have both direct and indirect effects on crime as well as interactive effects with each other (Agnew,2005). For instance, those who experience neglect or child abuse at home may develop low levels of self-control and be less susceptible to attachment in the classroom, which could lead to poor academic performance. As a result, these students may feel bad about themselves and start to pick-on "good" students out of jealousy. At the same time, they may start to develop friendships with other bullies. Once labeled as a bully and a poor student, future opportunities for employment in "good jobs" may be limited for these persons due to a lack of knowledge, skills, and social support needed to acquire and succeed in such positions. As a result, many bullies become trapped in a life of poverty, and thus are more susceptible to future crime.

However, the effects of variables from one domain are moderated by those from another. For instance, as noted in prior research, peer influence differs across levels of self-control (Thomas & McGloin, 2013). Thus, the effect delinquent peers have on bullying is moderated by ones level of self-control. Those students with high levels of self-control are less influenced by deviant peer associates than those with low levels of self-control, and are constrained from committing crime. The same is true for gender. Males have been found to be more likely to be bullies than females (Farrington & Baldry, 2010; Moffitt ,T.E., Caspi A., Rutter, M. & Silva, P.A., 2001). They have also been found to be more influenced by peers than females (McCoy, Dimler, Samuels, Natsuaki, 2018) Building on prior empirical findings Agnew's theoretical assumptions suggests that the effect factors in the peer domain (i.e., peer influence) have on bullying may be moderated by ones gender or level of self-control.

Prior Research of Integrated General Theory

To date, there have been only five partial tests of Agnew's (2005) general theory that, at best, provide little to moderate support for its utility in explaining general crime and delinquency (e.g., Muftić et al., 2014), substance use (Ngo & Paternoster, 2014; Zhang et al., 2012) and academic dishonesty

(Cochran, 2017). In the first test of Agnew's (2005) general theory, Ngo et al. (2011) looked at the effects of Agnew's five life domains on re-arrest data in a sample of predominately African-American adult parolees released from boot camp. In that study, the only life domain to achieve statistical significance was the peer domain. In a follow up study, Ngo and Paternoster (2014) found that the domains of self, family, and peers were all statistically significantly related to adolescent substance use. Similarly, in the only known test of general theory using a non-American sample, Muftić et al. (2014) found statistically significant relationships to exist between self, peer, family, and school domains, and crime. They found that the strongest predictors fell in the self and peer domains.

Zhang et al. (2012) found that while the domains of family, peer, and school had statistically significant baseline effects. However, once measures of constraints and motivations were factored into the model, only the peer domain retained its statistically significant direct effect. They concluded that all other domains were mediated by constraints and motivations. More recently, Cochran (2017) replicated this result with an expanded version of Agnew's (2005) theory which included religiosity as a life domain. In that study, while several of the life domains achieved statistical significance for explaining academic cheating in a baseline model (i.e., self, family, school, religion), all of the observed effects were found to be mediated by constraints and motivations added in later models.

While promising, there is still much of Agnew's (2005) theory that needs to be examined. Particularly, there has been little effort to test the theory on populations outside of the United States, and no research has applied Agnew's (2005) theory to an Asian population. Further, much of the prior research has been cross-sectional, and no published work has examined interaction effects between life domains using longitudinal data. Moreover, with the exception of substance use and academic dishonesty, there has been little effort to see how well general theory explains other forms of deviance, such as bullying and cyber bullying. These shortcomings are particularly concerning given that Agnew

(2005) presents his theory as a general theory of crime and deviance. Thus, research is needed to examine the "generality" of general theory. The present study aims to help fill this dearth in the literature by applying general theory to bullying and cyberbullying perpetration.

Bullying and Cyberbullying

Traditional interpersonal bullying, defined as purposefully and continually causing harm to individuals using either direct or indirect social mechanisms (Payne & Hutzell, 2017), has been a long-standing problem for adolescents around the globe (Olweus, 1993; Payne & Hutzell, 2017). Direct harassment refers to tangible contact made directly by a bully to his/her victim, such as biting, pushing, hitting, or name calling (Farrington & Ttofi, 2009). Indirect bullying, as the name implies, involves less direct behaviors such as spreading rumors about someone (Greeff & Grobler, 2008).

Recent advances in digital technologies have allowed bullies to enter the world of cyberspace. Cyberbullying can be defined as the act of intentionally, aggressively, and, most importantly, repeatedly harassing an individual or group of individuals using electronic mediums (i.e., cell phones, tablets, computers) (Fousiani, Dimitropoulou, Michaelides, & Van Petegem, 2016). Cyberbullying can include sending, posting, and sharing negative images or words about someone electronically. Simply put, it involves any form of online harassment. While cyberbullying is characterized by many of the same phenomena as traditional interpersonal bullying, including aggressiveness, power imbalances, and willful desires to harm others, the two behaviors are distinctly different from each other in several key ways (Fousiani et al., 2016; Kowalski, Giumetti, Schroeder, & Lattanner, 2014). First, cyberbullying usually involves much more indirect bullying, such as spreading rumors (Fousiani et al., 2016) However, it is not exclusively a form of indirect bullying because it can involve perpetrators directly interfacing with a victim to intimidate him/her. Second, information disseminated across the web allows groups of bullies to quickly gang-up on victims and subsequently exacerbate victimization (Fousiani et

al., 2016). Third, and perhaps most important for the context of this study, cyberbullying is much more difficult to detect than traditional bullying (Kowalski et al., 2014).

The effects of bullying perpetration are far-reaching and long-standing (J. M. Lee, Hong, Yoon, Peguero, & Seok, 2018). Research has shown that bullying in general, and cyberbulling in particular, has a plethora of similar negative outcomes for both perpetrators and victims including anxiety, depression, academic stress, the development of low self-control, and suicidal ideation (Arseneault, 2017; Meltzer, Vostanis, Ford, Bebbington, & Dennis, 2011; Yang et al., 2013). Adolescent bullying perpetration is also associated binge drinking, using drugs, being suspended from school, and carrying a weapon later in life (Hemphill, Kotevski, Herrenkohl, Bond, Kim, Toumbourou, & Catalano, 2011). Moreover, bullies are more likely than non-bullies to have a long-term illness later in life, report lower levels of social support, and exhibit higher levels of mental health problems (Stuart & Jose, 2014). Further, 49 percent of victims of bullies perceive the emotional pain suffered from bullying to be beyond tolerable (Foundation for Preventing Youth Violence, 2012) and victims are seven to nine percent more likely to consider suicide (Y. S. Kim & Leventhal, 2008). Clearly, bullying is a serious problem experienced by adolescents. If we can figure out why bullies bully then we might be able to prevent it. Research like this is one small step in that process.

General Theory and Bullying

Although there have not been any explicit tests of Agnew's theory on bullying or cyberbullying perpetration there is some research indicating that early life experiences are associated with bullying perpetration (Bowes et al, 2009; Connell et al., 2016; & Vaughn et al, 2011). For instance, in a longitudinal study of British adolescents Bowes and colleagues (2009) found factors of school environment, neighborhood characteristics, and family settings at age 5 to be associated with bullying perpetration at age 7. In particular, their findings suggest that low maternal warmth, maternal

depression, engaging in few stimulating activities with parents, and witnessing domestic violence at age 5 predict bullying perpetration at age 7. Interestingly, their results indicated a negative relationship between school size and bullying perpetration. In a more recent longitudinal study, Vaughn et al. (2011) found physical abuse to have the strongest effects on bullying later in life. Similarly, Connell, Morris, & Piquero (2016) concluded that early negative life experiences in the family, school, and peer domains, such as having a sibling, being bullied, and receiving failing grades predicted later bullying behaviors. Taken together, these findings suggest that bullying behavior is influenced by many of the individual and environmental factors outlined in Agnew's general theory.

Cyberbullying in South Korea

Bullying is a particularly prevalent problem among adolescents in South Korea (Jang, Song, & Kim, 2014). The educational system in South Korea requires high school students to be in school for an average of 12 hours per day (Shim, 2015), offering more opportunity for incidents of interpersonal bullying among adolescents living in South Korea compared to those living in other regions because of the more frequent contact they have with peers. At the same time, rates of internet use by adolescents in South Korea are so high that the government has declared internet addiction a social health problem (Heo, Oh, Subramanian, Kim, & Kawachi, 2014). Consequently, South Korean students have reported exceptionally high rates of cyber-victimization(C. Lee, Kim, & Chang, 2013). In fact, according the Korea Internet and Security Agency (2012), as many as 76 percent of Korean teenagers have been a victim of cyberbullying, which is more than 30 percent greater than even the highest estimates of rates of cyber-victimization experienced by American students (Bauman, 2010; Payne & Hutzell, 2017) and nearly four times as large as the traditional interpersonal bullying rate in South Korea (23.5%, Yun & Kim, 2016). Moreover, approximately 19 percent of South Korean students in grades 7 through 12 admit to being either a cyberbully or cyberbully and victim (Lee & Shin, 2017, p.352) compared to just 9.3

percent of students in the United States (Rice, Petering, Rhoades, Winetrobe, Goldbach, Plant, Montoya, & Kordic, 2015, p.66).

Cyberbullying may have evolved into a prevalent form of harassment in South Korea because of its discrete nature (You & Lim, 2016). You and Lim (2016) argue that high rates of social bonds deter many South Koreans from committing crime. As members of a collectivist society, South Koreans place importance on preserving the integrity of their family name. Thus, they strive to avoid actions that would tarnish their image within the community. Targeting victims online reduces ones likelihood of getting caught and thus may free South Korean students from the restraints of their familial bonds (Belsey, 2006). Students who are dissuaded from participating in traditional bullying out of fear of getting caught and bringing shame upon their family name may be more likely to engage in cyberbullying because they perceive it as less consequential than traditional bullying. This could offer one explanation for why cyberbullying is so prevalent among adolescents in South Korea.

The ubiquitous nature of cyberbullying in South Korea has led to the proliferation of research intended to explain this phenomenon. Much of this research suggests that some of the same predictors outlined in Agnew's (2005) general theory are associated with bullying and cyberbullying perpetration (Baroncelli & Ciucci, 2014; Jang et al., 2014; I. T. Lee, 2012). As a whole though, this research explains only a few individual pieces to the cyberbullying puzzle. Much like Agnew (2005) argues in *Why Criminals Offend*, we believe that there is a need to look at the unique relationships between these predictors to provide a fuller explanation of cyberbullying in South Korea. The following is an attempt to do so.

Current Study

The current study attempts to add to this small body of research by providing a partial test of general theory using self-reported data from a sample of Korean adolescents. Our work has three main

contributions. First, this study tests the "generality" of general theory by applying the tenets of Agnew's (2005) theory to bullying and cyberbullying. With the exceptions of substance use and academic dishonesty, the application of general theory to behaviors outside of the realm of traditional street crimes has largely been ignored in prior research. Second, this is the first study to assess interaction effects between tenets of general theory using longitudinal data, and thus, our results are more reliable than previous works which have used cross-sectional data. Third, this is only the second study to test Agnew's (2005) general theory with a non-American sample and the first to apply this theory to an Asian population.

Hypotheses

Taken together, we test the following hypotheses:

Hypothesis 1: Life domains directly influence both cyberbullying and bullying.

Hypothesis 2: All life domains interact in causing cyberbullying and bullying (The presence of multiple adverse life domains can positively intensify the probability of cyberbullying and bullying, whereas the presence of multiple favorable life domains can further reduce the probability of cyberbullying and bullying).

Methods

Sample

Data for the current study comes from the second and third wave of the Korean Youth Panel

Survey (KYPS). Using a stratified multistage clustering sampling technique, the National Youth Policy

Institution (NYPI) of South Korea collected data from more than 3,000 of eighth graders (n = 3,449)

living in South Korea in 2003. Similar to the National Youth Survey in the United States, KYPS is a

national survey designed to collect information about adolescents' behaviors to gain an understanding of

conventional and deviant behaviors. Data were collected annually for six years using in-person

interviews with students and phone interviews with participants' parents or guardians. The current study

used Wave 2 (2004) and Wave 3 (2005) data because these particular datasets contained variables of

interest for this study including measures of school life, family life, victimization, delinquency, and

cyber deviance. The details of the design and sampling of this panel can be found on the webpage of

NYPI (http://archive.nypi.re.kr/).

A total of 3,125 participants completed surveys at both Wave 2 and Wave 3 data collection. For

analysis purposes, 134 cases had to be dropped because of extensive missing data (> 6%). Another 81

cases had some missing data; however, the number of missing values was not extensive (< 6%). Because

these 81 cases included all demographic information, a decision was made to replace the missing data

using multiple imputations by chained equations with the "mice" package (ver. 2. 46. 0) in R. All

missing values for each item except for categorical information were imputed. Since multivariate

outliers can distort the findings from statistical analysis (Leys, Klein, Dominicy, & Ley, 2018),

multivariate outliers in combinations of independent variables and dependent were detected. Among the

2,991 students, 183 multivariate outliers were found using Mahalanobis distance with p < .001. These

outliers were deleted, resulting in a final sample of 2,808 students.

Measures

Dependent variables. The primary dependent variable of this study was adolescents'

cyberbullying perpetration, which was constructed by combining measures of adolescents' self-reported

cyberbullying perpetration within the twelve months preceding Wave 3 data collection. The

cyberbullying scale was created using pre-established constructs (Jang et al., 2014; J. Kim, Song, &

Jennings, 2017). Specifically, this scale was created by combining responses to two questions: "How

many times have you intentionally circulated false information on the internet message boards about

others during the last year?" and "How many times have you cursed/insulted other people through

chats/message boards during the last year?" About 10.5 percent of respondents reported that they had

engaged in cyberbullying on at least one occasion within the previous year, which is less than prior

estimates found by Lee and Shin (2017).

        While the focus of the current study is on the utility of Agnew's (2005) integrated general

theory in explaining cyberbullying, a measure of traditional bullying was also created for comparison.

The traditional bullying scale was created by combining responses from three items including: "Have

you bullied others with a group of individuals during the last year?" "Have you severely teased

individuals during the last year?" and "Have you threatened individuals during the last year?" These

questions were chosen to represent traditional bullying because previous published research had found

them to be valid constructs representing bullying (Cho, Hong, Sterzing, & Woo, 2017). About 4.5% of

respondents indicated that they had engaged in traditional bullying at least one time within the previous

year.

        Life domain variables. The present study focuses on four of the five life domains specified by

Agnew (2005): self, family, peers, and school. The work domain was not included in analysis as Agnew

(2005) suggests that that domain is not as important during adolescence as it is later in life. Further,

education has been greatly emphasized within the context of South Korea, and students are expected to study rather than work (Jang et al., 2014; Moon, Hwang, & McCluskey, 2011). Preliminary analysis supported this decision by revealing that only 11.4% of the students included in the final analysis had any type of work experience in the previous twelve months.

To better establish temporal ordering, all life domain measures mentioned below, except for peer delinquency, came from Wave 2 of the KYPS. This is to ensure the temporal ordering between variables. It should be noted that the reference period of the peer delinquency measure was the year prior to the survey. While the retrospective measure may have some limitations to capture accurate information, it was the most appropriate measure given the data limitations. The self domain was represented with two scales: low self-control (LSC) and belief in norms. The LSC scale consisted of five items derived from Yun and Walsh (2011) including: "I abandon a task soon once it becomes hard and laborious to do," "I am apt to enjoy risky activities," "I enjoy teasing and harassing other people," "I lose my temper whenever I get angry," and "I fight more frequently than others do." This scale ranged from 1 to 5, with higher values indicating lower self-control (see Table 1). While the reliability of the LSC scale ($\alpha = .61$) was slightly lower than the widely accepted standard ($\alpha = .70$, DeVellis, 2012), this alpha is sensitive to the small number of items in the scale. Briggs and Cheek (1986) suggest since the mean inter-item correlation (.25) for the items is above .2, this scale can be regarded as reliable. The belief in norms scale was created by combining the following two items used in prior research (Peterson, Lee, Henninger, & Cubellis, 2016): "If I do something wrong, people around me will blame me much," and "If I do something wrong, I will be put to shame by people around me" Scores ranged from 1 (not supportive of societal rules) to 5 (fully endorsing societal rules). Measures of Cronbach's alpha suggested good internal consistency ($\alpha = .89$).

The family domain was represented using the parental attachment scale developed by J. Kim et al. (2017). This scale included two items which asked participants to report how comfortable they are sharing their thoughts and feelings with their parents and talking to their parents about events that occurred outside of the home. Responses ranged from 1 (not at all) to 5 (very true). The mean of the two items was computed to represent parental attachment with higher values indicating higher levels of attachment to parents. A reliability analysis produced satisfactory results ($\alpha = .77$).

Two scales were created to represent the peer domain: peer attachment and peer delinquency. The peer attachment scale ($\alpha = .83$) was also derived from the work of Kim et al. (2016) and created by combining values reflecting agreement with four statements: "I want to maintain the friendships I have with my close friends," "I am happy with my friends," "I try to have the same thoughts and feelings as my friends", and "I have candid conversations with my friends." The scale ranged from 1 to 5, with higher values representing a greater level of peer attachment. The peer delinquency scale ($\alpha = .76$) was adapted to measure the number of respondents' close friends who had: been arrested, drank alcohol, smoked cigarettes, skipped school, physically assaulted someone, extorted money or goods, and/or stole something in the previous 12 months. The mean of the items was calculated to tap peer delinquency (see Table 1).

A measure of teacher attachment was constructed to represent the school domain (Moon, Morash, & McCluskey, 2012). Respondents were asked to indicate the extent to which adolescents agreed with the following statements: "I can consult my problems and worries to my teacher," "My teacher shows his or her affection and attention for me," and "I want to be a person like my teacher." Responses ranged from 1 (strongly disagree) to 5 (strongly agree). The mean of the three items was calculated to represent teacher attachment with higher values indicating that the respondents are strongly attached to their teachers ($\alpha = .72$).

Control variables. Mirroring Muftić et al's (2014) work, our control variables included sex and neighborhood collective efficacy. Neighborhood collective efficacy consisted of two components: social cohesion and informal social control (J. Lee, Jang, & Bouffard, 2013; Sampson, Raudenbush, & Earls, 1997). This variable was included because Agnew (2005) suggests that larger social environmental factors of one's community: "affect the level and operation of the life domains" (p. 12). The neighborhood collective efficacy scale was created by combining four items representing the extent to which respondents agreed/disagreed to the following four statements: "our neighbors often meet each other," "our neighbors trust each other," "the elderly in the neighborhood would scold me if they see me smoking and drinking alcohol," and "neighbors would be willing to report their violence to the police or intervene if they seem me being assaulted by other kids." The responses to all four of these items were recorded using a 5-point Likert-type (1 = strongly disagree to 5 = strongly agree). The mean of the four items were calculated, and higher values indicate that respondents positively perceived their neighborhood's social cohesion and informal control (α = .79).

[Table 1 here]

Analytical Strategy

The current study is intended to partially examine whether Agnew's (2005) integrated general theory is applicable to cyberbullying. Specifically, it is hypothesized that the life domains affect cyberbullying directly. To test this hypothesis, negative binomial regression was employed to examine the effects of four life domains: self, family, peer, and school on adolescents' cyberbullying while controlling for sex and neighborhood collective efficacy (Agnew, 2005). It is important to note, that because the bullying measures were highly skewed in the positive direction and many students fell into the "zero" category for each bullying outcome, ordinary least-squares (OLS) regression was deemed to

be an inappropriate method of estimation. Thus, negative binomial regression analysis was performed on bullying measures (Moon, Hays, & Blurton, 2009; Osgood, Finken, & McMorris, 2002).

All analysis were conducted in R (ver. 3.4.3). Negative binomial regression was ran with the "MASS" package (ver. 7.3). To determine the most adequate Poisson-based regression model for a dependent variable of interest, the mean and the variance of the Poisson distribution was examined using R. The result indicated that the frequency distribution of cyberbullying was more over-dispersed than expected by a random and independent Poisson distribution (Park & Fisher, 2017). This study, therefore, calculated negative binomial regression models to consider that the expected variances of cyberbullying exceeded the variance of the Poisson distribution. In addition, traditional bullying was also regressed onto the life domain variables using negative binomial regression technique to compare the effects of four life domains on cyberbullying.

Our second hypothesis involved assessing interaction effects between the life domains in causing cyberbullying and bullying. To test this hypothesis, a series of interaction terms were created and entered in an additional set of analyses. All interaction terms were mean-centered to avoid the potential for multicollinearity issues. Then, a series of negative binomial models were estimated including the interaction terms between the life domains and control variables. According to Ai and Norton (2003), interaction effects in nonlinear models cannot be simply interpreted "by looking at the sign, magnitude or statistical significance of the coefficient of the interaction term" (p. 129). Therefore, interaction terms were also examined using OLS regression and then compared with the results from negative binomial regressions. However, results revealed that both methods of estimation were consistent, especially in terms of the interactions between life domains.

Results

Table 2 shows the results of the negative binomial regression with cyberbullying and traditional bullying. In each model, all of the life domain variables were entered along with sex and the neighborhood collective efficacy. For ease of interpretation, results will be shown in terms of the incidence rate ratio (IRR). In predicting cyberbullying, all four life domains included at least one statistically significant variable. Increases in low self-control were associated with a 51% increase in the incidence of cyberbullying. Increases in belief in norms was also significantly linked to cyberbullying (IRR = 1.25). However, the direction of association was the opposite of the hypothesized relationship between belief in norms and cyberbullying, suggesting that those with stronger ties to conventional norms are actually more likely to engage in cyberbullying. Interestingly, increases in parental attachment was also associated with higher levels of cyberbullying (IRR = 1.33). Having more delinquent peers was significantly related to an increased likelihood of cyberbullying, and this measure had the second largest effect in the model (IRR = 2.18). Peer attachment significantly reduced the likelihood of cyberbullying (IRR = 0.65). Similarly, a greater degree of teacher attachment predicted lower levels of cyberbullying (IRR = 0.60). Being male was the strongest predictor of involvement in cyberbullying (IRR = 5.43).

[Table 2 here]

The results under the traditional bullying model in Table 2 show that lower self-control predicted higher levels of involvement in traditional bullying (IRR = 3.40). The magnitude of the effect of low self-control was more pronounced in the traditional bullying model in comparison to the cyberbullying model. Peer delinquency was a significant predictor of traditional bullying (IRR = 2.12). Increases in peer delinquency were associated with a 112% increase in the incidence of traditional bullying. While marginally significant, increases in teacher attachment were associated with a 36% decrease in the

incidence of traditional bullying (IRR = 0.73). As with the cyberbullying model, being male was the

strongest predictor in traditional bullying model (IRR = 4.11).

Across the two bullying models, the self domain, the peer domain, and the school domain

demonstrated consistent effects. In the self domain, low self-control was a consistent predictor across

models. Similarly, peer delinquency exerted a positive effect on both cyberbullying and traditional

bullying. Finally, in the school domain, teacher attachment significantly reduced the likelihood of the

two types of bullying. Results indicated that overall model fits well for cyberbullying (χ^2 = 83.949, p <

.001) and traditional bullying (χ^2 = 74.198, p < .001).

Interaction Effects Between the Life Domain Variables

Agnew (2005) argued that the life domains can interact in causing crime. According to Agnew

(2005), the effect of life domains can be stronger if the other life domains are also conducive to crime.

To test this hypothesis with regard to cyberbullying and bullying, fifty-six mean-centered multiplicative

interaction terms were created. They were entered into the model individually to determine if the impact

of one life domain variable was moderated by another life domain variable or control variable.

Table 3 presents the results of negative binomial regression analyses of interaction terms in

addition to the independent variables in predicting cyberbullying. Although most of the interaction

effects were not statistically significant, two interaction terms between the life domains and sex had a

significant effect on cyberbullying. Specifically, peer attachment and low self-control interacted to

predict cyberbullying. The negative impact of peer attachment on cyberbullying was stronger at

moderate or higher levels of self-control. In other words, the protective effects of peer attachment were

diminished for students with low levels of self-control. Additionally, being male interacted with peer

delinquency in predicting cyberbullying. The influence of peer delinquency was weaker for females in

comparison to males. Overall model fit for each of the interaction models was satisfactory (Peer

attachment × LSC, χ^2 (9) = 92.63, p < .001; Male × Peer delinquency, χ^2 (9) = 87.318, p < .001). When including interaction effects, the model fit increased and the difference compared to our baseline model was significant. An example interaction plot between peer attachment and self-control predicting cyberbullying is displayed in figure 1.

[Table 3 here]

[Figure 1 here]

Finally, Table 4 depicts results from interaction effects in the negative binomial regression model. For traditional bullying, there were no significant interactions between life domains themselves. Still, the interactions between sex and several life domains stood out. First, sex and low self-control interacted to predict traditional bullying. Specifically, the impact of low self-control was weaker for males as compared to females. Similarly, the impact of peer delinquency was also moderated by sex. Female students tended to be more susceptible to the influence of peer delinquency in comparison to their male counterparts. Results showed that overall model fit for each of the interaction models were statistically reliable in predicting traditional bullying (Male × LSC, χ^2 (9) = 85.95, p < .001; Male × Peer delinquency, χ^2 (9) = 78.50, p < .01). There was significant improvement in each model fit when an interaction term was included. An example interaction plot between peer attachment and self-control predicting cyberbullying is displayed in figure 2.

At the request of reviewers, to test further for robustness of effects a series of zero-inflated negative binomial regression models and logistic regression models were also ran. Overall, the results were fairly consistent with those from the negative binomial regression models. However, when the dependent variable was dichotomized (0= did not bully in last year, 1=bullied in last year)in the traditional bullying model no significant relationship between peer delinquency and sex was found. Please contact the authors if you would like to see outputs from these supplementary analyses.

[Table 4 here]

[Figure 2 here]

Conclusion

The above findings contribute to extant research in three ways. First, to attain the status of a general theory of crime and delinquency, it is imperative to test a theory on different types of delinquency (Cochran, 2017). The current study extended previous works by examining Agnew's (2005) general theory in explaining cyberbullying and bullying. Second, this study lends credence to the predictive efficacy of life domain variables across cultural boundaries by employing a South Korean sample, who are theoretically distinct from Western samples. Third, the present study is one of a only a few studies to test integrated general theory with longitudinal data, and it is the first to look at interaction effects using longitudinal data, thus better addressing concerns with temporal ordering than has prior research (Zhang et al., 2012).

Overall, the results from analysis lend some support for Agnew's (2005) integrated theory. While some findings were in line with those from previous empirical studies testing the utility of Agnew's (2005) theory on substance use, violent crime, and property offending (Muftić et al., 2014; Ngo & Paternoster, 2014), overall mixed support was found for direct effects of the life domains. Specifically, the present study found that South Korean adolescents who were male, had low levels of self-control (self domain), and had delinquent friends (peer domain) were more likely to engage in both forms of bullying. Interestingly though, the significance of the effects of some life domain variables varied by types of bullying. This finding is consistent with prior research suggesting that the life domains function in different ways depending on types of deviant behaviors examined (Cochran, 2017; Ngo & Paternoster, 2014). For instance, while peer attachment (peer domain) and teacher attachment (school domain) were significantly related to cyberbullying, these effects were not found in the bullying

model. Also, belief in norms was found to have significant positive effects on cyberbullying perpetration but was not significant in the bullying model.

Another interesting finding was that the directional impact of the life domains differed according to types of bullying. For example, the direction of the effect of parental attachment (family domain) was positive and significant in the cyberbullying model but negative and non-significant in the bullying model. Adolescents who were adequately bonded to their parents were more likely to engage in cyberbullying than those who were not. These findings are inconsistent with empirically-derived expectations presented by both Agnew (2005) and Hirschi (1969). However, at the same time, strong attachment to teachers was found to be a deterrent of cyberbullying perpetration.

We offer two plausible explanations for these findings. First, these results may provide support for research which suggests that the internet provides a new platform which frees non-traditional bullies from the restraints of social bonds by reducing ones likelihood of getting caught (Belsey, 2006; I. T. Lee, 2012). This would imply that cyberbullies have qualitatively distinct characteristics which distinguishes them from traditional bullies and that Agnew's theory may be better suited for explaining traditional bullying than cyberbullying (Hinduja & Patchin, 2013). Given the different directions, significances, and effect sizes of life domain predictors between the models, this would be a reasonable conclusion to draw.

A second an equally reasonable explanation is that the domains of peer and school are the most influential life domains during adolescence while other life domains influence criminality more earlier and later in life. This would explain why in this sample teachers deterred cyberbullying more so than did parents. Interestingly though, this result is inconsistent with previous research using American students which found parents to be more effective at deterring cyberbullying than schools (Patchin, & Hinduja, 2018). Perhaps this is a reflection of the longer school days in South Korea. It might be that increased

duration with teachers results in South Korean students being more attached to them. It may be that South Korean students value the opinions of their teachers even more than that of their parents. This would support Agnew's (2005) claim of an age-graded theory in the context of South Korea. Further support for this explanation comes from the fact that the predictive power of peer delinquency was equally robust across the different models. Future research should explore this finding.

Regardless of how or why, the finding that teacher attachment significantly reduces cyberbullying perpetration provides support for directed anti-bullying campaigns in the classroom. The first step in such an anti-bullying campaign would be to train teachers and raise awareness. Teachers should complete a comprehensive workshop intended to increase knowledge of prevention and intervention strategies. Then teachers could be tasked with facilitating group-based exercises with their students designed to raise awareness about the adverse impacts of bullying and to show students how to intervene when they see bullying. Curriculum should encourage reporting of all types of bullying and be designed to build rapport with students and let students know that such behaviors will not be tolerated.

The second portion of our analysis dealt with interaction effects occurring within and between various life domains and sex in predicting cyberbullying and bullying. A key contribution of Agnew's (2005) integrated theory is that different life domains interact with one another in affecting crime. Some evidence was found supporting this claim as the impact of some life domains on deviance depended on the levels of other measures of life domains. For example, the influence of the negative effect of peer attachment on cyberbullying was weakened as an individual's level of self-control was lowered. Nonetheless, the remaining significant interaction effects were limited to sex and other life domain variables. Regarding cyberbullying, male students were less likely to be influenced by peer delinquency than were female students. Further, in the bullying model, the effects of low self-control and peer delinquency were conditioned by sex, and females were more subject to the influences of the life

domains (self domain and peer domain). These observations support Agnew's (2005) hypothesis that

"[c]ertain biological factors… affect the level and operation of the life domains" (p. 12).

Notwithstanding, several limitations of this study are worth noting. First, some limitations stem

from the data used. This study measured proxy variables due to data constraints. While all measures

were derived from instruments used in previous studies (Jang et al., 2014; J. Kim et al., 2017; Muftić et

al., 2014; Peterson et al., 2016), these measures are by no means the most ideal operationalizations of

the constructs assessed. Particularly, using a dependent measure which asks respondents to recall

behavior over the last 12 months is at risk for memory and recall errors. Also, this data is a bit dated.

Cyberbullying has evolved due to the advent of social media (Garrett, Lord, & Young, 2016), and so the

findings from a more updated sample could be different. The increase in cyberbullying with the

appearance of social media warrant further studies testing the validity of Agnew's (2005) general

integrated theory. Further, while Agnew (2005) proposed that life domains can be represented with

latent constructs by performing a second-order factor analysis, the current study could not conduct such

an analysis due to limited availability of measures in the secondary data. Future research should address

this concern by employing better measurements to capture each life domain. Moreover, the available

data lacked adequate measures for variables within Agnew's constraints and motivations category, and

thus this is not a test of his theory in its entirety.

Additionally, while one of the purposes of this study was to test the external validity of

integrated general theory, it is possible that Koreans are so culturally distinct that it may be tough to

draw any hard conclusions about the utility of Agnew's (2005) integrated theory. We are unable to

determine if the observed differences between bullying and cyberbullying are a product of the theory's

lack of generalizability across forms of deviance or if they are just a reflection of the uniqueness of

Korean culture. Future research should replicate this research using a sample Western adolescents to answer that question.

Overall, the current study provides mixed support for Agnew's (2005) general integrated theory. Findings show that some subcomponents of the life domains (i.e., low self-control and peer delinquency) performed well in predicting cyberbullying and traditional bullying alike, supporting the predictive efficacy of Agnew's (2005) integrated theory as a general theory of crime and deviance. However, some life domain variables did not have significant effects on both cyberbullying and bullying. Furthermore, some variables were only found to be significant in the cyberbullying model. The deterring effects of peer attachment (peer domain) and teacher attachment (school domain) were only significant in the cyberbullying model. By investigating the contributing roles of the life domains on various types of delinquency and criminal behaviors, the adequacy of Agnew's (2005) general theory and its limitations will be made clear. There is still much more future research that needs to be done to expand and test Agnew's (2005) variable-centered approach in order to draw any definitive conclusions about its utility as a general theory of crime and delinquency. Still though, results from this exploratory research are promising.

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Table 1.
Descriptive Statistics

Variables	Percentage	Mean (*SD*)	Range
Cyberbullying (Previous year)		1.36 (9.18)	0–200
Traditional bullying (Previous year)		0.19 (1.73)	0–60
Sex			
Male	48.4		
Female	51.6		
Self domain			
LSC		2.47 (0.62)	1–5
Belief in norm		2.88 (1.12)	1–5
Family domain			
Parental attachment		3.30 (0.91)	1–5
Peer domain			
Peer delinquency		0.44 (0.79)	0–7.71
Peer attachment		4.18 (0.64)	1–5
School domain			
Teacher attachment		2.63 (0.80)	1–5
Neighborhood collective efficacy		3.05 (0.82)	1–5

Note: LSC = low self-control; *SD* = standard deviation.

Table 2.
The results from negative binomial regression for the effects of each domain on cyberbullying and traditional bullying

Variables	Cyberbullying (n = 2808)		Traditional Bullying (n = 2808)	
	b (*SE*)	Incidence rate ratio	*b* (*SE*)	Incidence rate ratio
Male	1.69*** (0.216)	5.43	1.41*** (0.273)	4.11
Self domain				
LSC	0.41* (0.172)	1.51	1.22*** (0.220)	3.40
Belief in norm	0.22* (0.095)	1.25	0.17 (0.121)	1.18
Family domain				
Parental attachment	0.30* (0.121)	1.33	–0.14 (0.151)	0.87
Peer domain				
Peer delinquency	0.78*** (0.133)	2.18	0.75*** (0.150)	2.12
Peer attachment	–0.44** (0.166)	0.65	–0.29 (0.205)	0.75
School domain				
Teacher attachment	–0.52*** (0.136)	0.60	–0.31+ (0.172)	0.73
Neighborhood collective efficacy	0.02 (0.132)	1.02	0.06 (0.166)	1.06
Model χ^2	83.949***		74.198***	
McFadden's R^2	0.117		0.197	

Note: LSC = low self-control; *SE* = standard error. +p < .10. *p < .05. **p <.01. ***p < .001.

Table 3.
Negative binomial regression models predicting cyberbullying with interactions (n = 2808)

Variables	Model 1		Model 2	
	b (*SE*)	Incidence rate ratio	*b* (*SE*)	Incidence rate ratio
Male	1.77 (0.216)	5.90***	1.68 (0.216)	5.37***
Self domain				
LSC	0.35 (0.172)	1.41*	0.29 (0.172)	1.34+
Belief in norm	0.24 (0.095)	1.27*	0.21 (0.095)	1.24*
Family domain				
Parental attachment	0.26 (0.121)	1.29*	0.26 (0.121)	1.29*
Peer domain				
Peer delinquency	0.75 (0.131)	2.12***	0.45 (0.176)	1.57*
Peer attachment	−0.55 (0.167)	0.58**	−0.41 (0.166)	0.66*
School domain				
Teacher attachment	−0.47 (0.136)	0.62***	−0.44 (0.136)	0.65**
Neighborhood collective efficacy	0.16 (0.133)	1.18	0.02 (0.132)	1.02
Peer attachment × LSC	0.83 (0.252)	2.29***		
Male × Peer delinquency			0.75 (0.259)	0.46**
Model χ^2	92.630***		87.318***	
McFadden's R^2	0.127		0.121	

Note: LSC = low self-control; *SE* = standard error. +*p* < .10. *p < .05. **p <.01. ***p < .001.

Table 4.
Negative binomial regression models predicting bullying with interactions (n = 2808)

Variables	Model 1		Model 2	
	b (*SE*)	Incidence rate ratio	*b* (*SE*)	Incidence rate ratio
Male	6.45 (1.286)	632.26***	1.85 (0.324)	6.34***
Self domain				
LSC	4.32 (0.799)	74.98***	1.06 (0.219)	2.88***
Belief in norm	0.16 (0.121)	1.18	0.15 (0.122)	1.15
Family domain				
Parental attachment	−0.11 (0.152)	0.90	−0.07 (0.153)	0.93
Peer domain				
Peer delinquency	0.61 (0.152)	1.84***	2.26 (0.505)	9.66***
Peer attachment	−0.30 (0.205)	0.74	−0.31 (0.206)	0.72
School domain				
Teacher attachment	−0.25 (0.172)	0.78	−0.33 (0.174)	0.72+
Neighborhood collective efficacy	0.12 (0.167)	1.12	0.10 (0.167)	1.11
Male × LSC	−1.89 (0.464)	0.15***		
Male × Peer delinquency			−0.90 (0.305)	0.40**
Model χ^2	85.95***		78.50***	
McFadden's R^2	0.228		0.210	

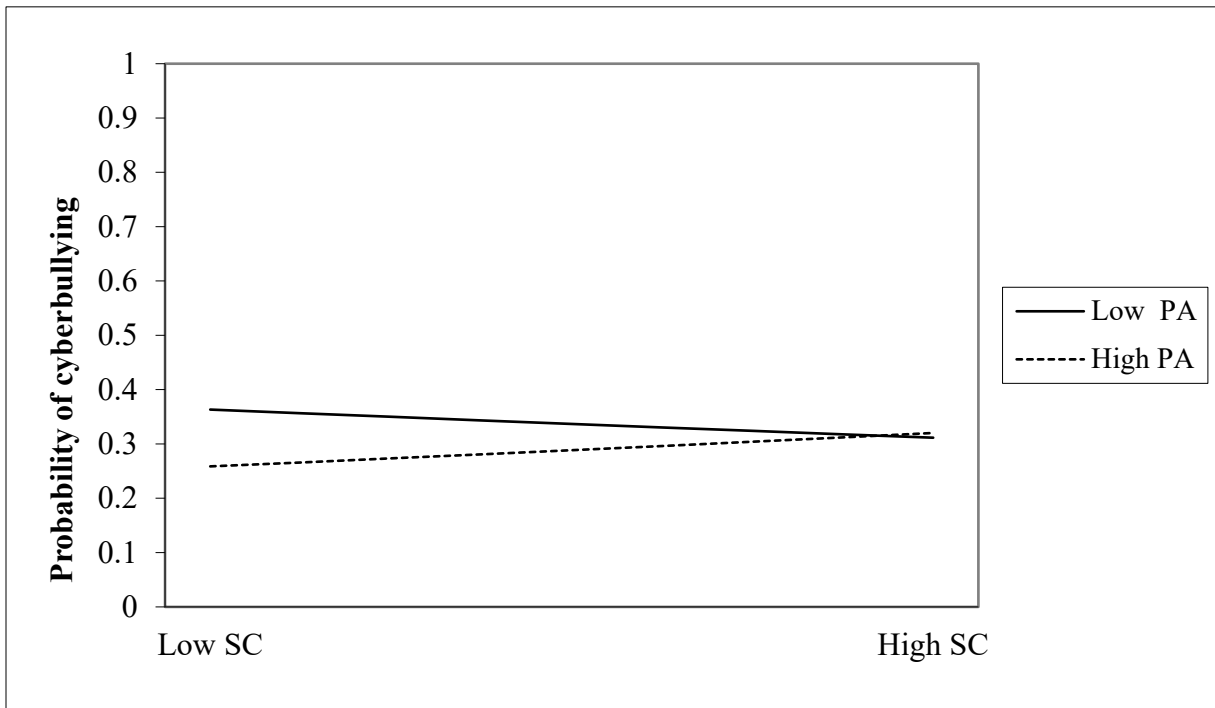*Note*: LSC = low self-control; *SE* = standard error. +*p* < .10. **p <.01. ***p < .001.

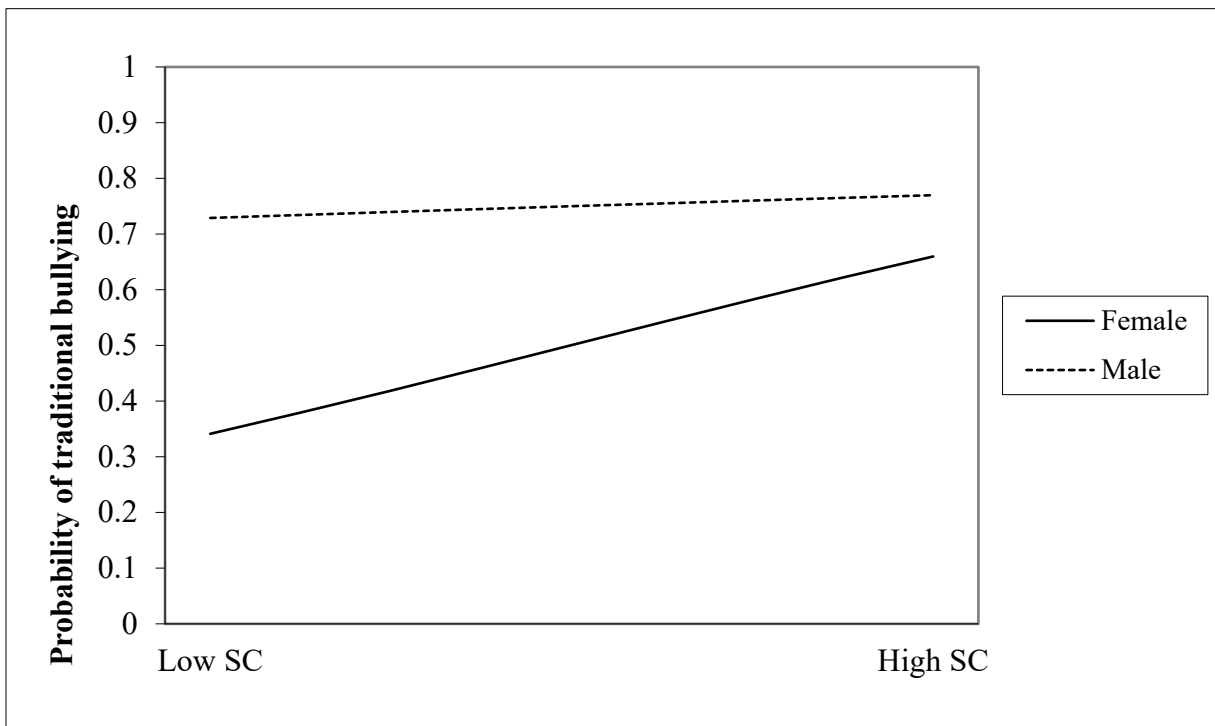*Figure 1*. Interaction plot (Peer Attachment × Self-Control) for cyberbullying model.

Figure 2. Interaction plot (Sex × Self-Control) for traditional bullying.

Table 5.

The results from logistic regression for the effects of each domain on cyberbullying and traditional bullying

Variables	Cyberbullying (n = 2808)		Traditional Bullying (n = 2808)	
	b (*SE*)	Odds ratio	*b* (*SE*)	Odds ratio
Male	0.71 (0.083)	2.03***	0.84 (0.203)	2.31***
Self domain				
LSC	0.03 (0.066)	1.03	0.51 (0.146)	1.67***
Belief in norm	0.15 (0.037)	1.16***	0.13 (0.087)	1.14
Family domain				
Parental attachment	0.02 (0.046)	1.02	0.03 (0.108)	1.03
Peer domain				
Peer delinquency	0.13 (0.051)	1.13*	0.50 (0.078)	1.65***
Peer attachment	–0.10 (0.064)	0.89	0.16 (0.148)	1.17
School domain				
Teacher attachment	–0.09 (0.052)	0.92†	–0.11 (0.121)	0.89
Neighborhood collective efficacy	–0.04 (0.051)	0.97	0.04 (0.116)	0.96
Constant	–0.81 (0.381)	0.45	–5.90 (0.908)	0.003
Model χ^2	107.200***		77.261***	

Note: Dependent variable is "0"= non-bully, "1" = bully; LSC = low self-control; *SE* = standard error. †$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

Table 6.
The results from logistic regression predicting cyberbullying models with interactions

Variables	Model 1(n = 2808)		Model 2 (n = 2808)	
	b (*SE*)	Odds ratio	*b* (*SE*)	Odds ratio
Male	0.71 (0.083)	2.03***	0.716 (0.083)	2.05***
Self domain				
LSC	0.03 (0.066)	1.03	0.023 (0.066)	1.02
Belief in norm	0.15 (0.037)	1.16***	0.144 (0.037)	1.16***
Family domain				
Parental attachment	0.02 (0.046)	1.02	0.013 (0.046)	1.01
Peer domain				
Peer delinquency	0.12 (0.051)	1.13*	0.26 (0.077)	1.30***
Peer attachment	–0.11 (0.064)	0.89	–0.10 (0.064)	0.90
School domain				
Teacher attachment	–0.08 (0.052)	0.92†	–0.08 (0.052)	0.92
Neighborhood collective efficacy	–0.03 (0.051)	0.97	–0.04 (0.051)	0.96
LSC x Peer attachment	0.21 (0.097)	1.24*	—	—
Sex x Peer Delinquency	—	—	–0.23 (0.103)	0.79
Constant	–0.79 (0.380)	0.45	–0.83 (0.382)	0.43
Model χ²	112.110***		112.640***	

Note: Dependent variable is "0"= non-bully, "1" = bully; LSC = low self-control; *SE* = standard error. †*p* < .10, **p* < .05, ***p* <.01, ****p* < .001.

Table 7.
The results from logistic regression predicting bullying models with interactions

Variables	Model 1(n = 2808)		Model 2 (n = 2808)	
	b (*SE*)	Odds ratio	*b* (*SE*)	Odds ratio
Male	.913 (0.217)	2.68***	1.010 (0.235)	3.00***
Self domain				
LSC	0.499 (0.147)	1.65***	1.058 (0.234)	2.88***
Belief in norm	0.127 (0.087)	1.14***	0.126 (0.086)	1.13
Family domain				
Parental attachment	0.021 (0.108)	1.02	0.009(0.107)	1.01
Peer domain				
Peer delinquency	0.605 (0.126)	1.83***	0.483 (0.078)	1.62***
Peer attachment	0.158 (0.148)	1.17	0.173 (0.148)	1.19
School domain				
Teacher attachment	–0.107 (0.121)	0.90	–0.098 (0.120)	0.91
Neighborhood collective efficacy	–0.040 (0.116)	0.96	–0.037 (0.116)	0.96
Sex x Peer Delinquency	–0.169 (0.159)	0.84	—	—
Sex x LSC	—	—	–0.883	0.41
Constant	–5.953 (0.909)	0.003	–0.883 (0.296)	0.001**
Model χ^2	78.397***		86.161***	

Note: Dependent variable is "0"= non-bully, "1" = bully; LSC = low self-control; *SE* = standard error. *p < .05, **p <.01, ***p < .001.