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Examining the links between general strain and control theories: an investigation of delinquency in south korea

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Abstract

In modifying general strain theory (GST), Agnew has accepted the control-related variables as conditioning variables to moderate or mediate the casual process through strain into delinquency. In this regard, this study aims to empirically and theoretically address the void of connecting traditional and redefined self-control variables to GST. To explore this issue, the current study employed data derived from the Korea Children and Youth Panel Study (KCYPS). Specifically, three waves (2012, 2013, and 2014) were used to test hypotheses from GST and control theories. Both trait-based low self-control and revised self-control partially mediated the relationship between strain and delinquency. However, only redefined self-control significantly interacted with strain in producing delinquency. The current research reveals the possible integration of redefined control theory and GST.

Keywords: redefined self-control, trait-based self-control, general strain theory, Korea Children and Youth Panel Study (KCYPS)

Introduction

Numerous theories have been developed to explain juvenile delinquency and to provide a framework for delinquency prevention (Burgess and Akers, 1966; Agnew, 1992; Hirschi, 1969). While some theorists, particularly in the control domains, have spent considerable time in competition to claim theoretical superiority, recently Robert Agnew has supported theoretical integration by arguing that factors specified in other theories predict delinquency best when combined with strain (Agnew, 2007; 2015). In fact, Agnew (2009) modified his original GST to integrate key strains into a more elaborated model that can capture the effects of various moderating and mediating variables, including elements from other theories such as self-control. For instance, Agnew argued that those with adequate social support and appropriate levels of self-control are better able to cope with strain positively and less likely to resort to criminal responses

At the same time, Agnew was advocating for theoretical integration, Hirschi (2004) proposed a redefined theory of self-control that overcame tautological issues with previous efforts to conceptualize self-control as a personality trait measured through behavioral outcomes (Ward et al., 2015). To do this, his redefined theory merged self-control theory with social bond theory by arguing that self-control refers to the ability of an individual to cognitively consider the potential costs, both short-term and long-term, of an act. Particularly, Hirschi (2004) argued that “self-control and social control are the same thing” (p. 543). Much like Agnew’s modified theory, Hirschi’s modified self-control theory assumes that the effects of other predictors of crime are indirect, entirely mediated by self-control. While prior works, such as Tittle’s (2004) *Control Balance Theory*, have attempted to integrate control theory with GST, to date there has been little effort to integrate the modified versions of Hirschi’s and Agnew’s theories. In fact, despite Agnew’s theoretical assertions, to date, there have been only a few empirical tests of modified General Strain Theory’s (GST) utility for explaining delinquency in tandem with other theories (Agnew, 2007; Sung Joon Jang and Rhodes, 2012; Moon et al., 2011).

Theoretical developments are still ongoing, but the dynamic relationship between strain and control theories remains unresolved. This study aims to address the theoretical and empirical arguments surrounding theoretical integration by testing modified general strain theory and modified self-control theory on delinquency among Korean youth. Specifically, it investigates whether the effects of factors of GST on delinquency persist while controlling for a traditional self-control variable and a revised self-control variable (Grasmick et al., 1993; Jo, 2015). In doing so, this study offers one of only a handful of individual tests of Hirschi’s modified control theory, it is one

of the first to test the two modified theories in tandem, and the first known to the authors to apply modified control theory to an Asian population, thus also serving as a test of the external validity of the modified theory.

Literature Review

GST and Negative Emotions

The basic ontological assumption of GST aligns with traditional anomie theories. That is, the assumption of GST is that delinquency does not originate from individual characteristics or maladjustments, but rather it comes from external variables (Brezina, 1996). As Agnew (1989) substantiated with longitudinal data, delinquency is the product of adverse experiences. His theory stresses three sources of strain; (1) strain from the failure to achieve positively valued goals (traditional strain), (2) strain from the removal of positively valued goals, and (3) strain from the presentation of negative stimuli. Agnew (1992) contended that strain comes not only from economic reasons, as posited by Robert Merton but also from relationships. Rather than focusing on the blockage of monetary success, he examined the incapability of people to avoid aversive and negative situations, resulting in negative emotions, such as frustration and anger. Furthermore, Agnew's GST recognizes other goals outside of economic success, such as status and autonomy (Anderson, 1994; A. K. Cohen, 1955; Moffitt, 1993). Ultimately, GST assumes that an individual engages in criminal behavior to cope with strain created by these situations. Agnew argued that the strains that are most likely to lead to crime are: (1) those which is seen as unjust, (2) those which is high in magnitude, (3) those which creates pressure to engage in deviant coping, and (4) those associated with low social control.

Agnew (2001) has paid special attention to relational strains. Relational strains are aroused when, "others are not treating the individual as he or she would like to be treated" (Agnew, 1992, p. 48). Specifically, Agnew (2001) proposed two types of relational factors. The first factor is the removal of positively valued stimuli, which highlights the loss of positive resources (e.g., the loss of significant others). For instance, if people experience a strain related to the first factor, they commit a crime to substitute, avenge, or prevent the strain (Lilly et al., 2015). On the other hand, the second relational strain originates from a presentation of a negative or noxious stimulus, such as stress from peers or parents, domestic abuse, and victimization (Agnew, 1992). However, not all who experience such strains will cope with criminal behavior. Thus, Agnew (1992) argues that "only some strained individuals turn to delinquency," such as those with low self-esteem (p. 66). Further, an only strain which provokes negative emotions is likely to cause crime. Such negative emotions include anger, depression, and frustration (Mazerolle and Piquero, 1998; Minwoo Yun et al., 2014).

Diverse corrective coping strategies can be effective resources that prevent crime by diverting strains in various ways (Baron, 2004; Brezina, 1996; Sung Joon Jang and Song, 2015). Cognitive coping strategies downplay or eliminate aversive stimuli. Cognitive dissonance is one such cognitive function (Festinger, 1957; Lilly et al., 2015). Generally, emotional coping strategies are more focused on solving the problems of emotion, rather than the origin of the problem (Agnew, 1992; Sealock and Manasse, 2012). These behavioral coping strategies are closely connected to specific types of crime. For example, deviant behavior, such as assault or homicide, is a direct effort to eliminate the interpersonal strain, as is delinquency, such as drinking and running away (Brezina, 1996).

In later modifications to GST, Agnew hypothesized that there are conditioning effects of other variables that moderate or mediate the relationship between strain and delinquency (Moon and Morash, 2017; Agnew, 2007). For instance, Agnew (2013) argued that if proper social support is provided for the people who are under strain, then they are at a reduced risk of a criminal adaptation. At the same time, as noted above, one's perception of oneself or beliefs about his/her character (i.e., self-image, self-esteem) can play an important role in ameliorating the effects of strain on delinquency. Prior research has proposed that the detrimental effects of strain are diminished by inflating one's self-worth (Baron, 2007).

He also saw self-control as a mediating variable between strain and delinquency (Mazerolle and Maahs, 2000). Essentially, according to Agnew, those with significant social support and adequate levels of self-control are better able to cope with strain positively and less likely to adhere to criminal responses. They are also less likely to be influenced by deviant peer associates. Prior work has supported this claim by showing that repeated strains reduce social control and foster social learning of crime (Bao et al., 2014), thus supporting the integration of GST, Social Control, and Social Learning Theories. Further, much like the involvement component specified by Hirschi (1969), Agnew also recognized that people engage in crime when there is an opportunity coupled with small costs and great benefits from crime commission. Thus, these theoretical assertions indicate that the relationship between strain and delinquency is a complex and indirect path, and suggest that GST and control theories work in tandem to explain delinquency.

Self-Control and Redefined Self-Control

The most distinctive difference between GST and control theories is each theory's underlying assumptions concerning the etiology of crime (Kornhauser, 1978). While GST assumes that people are pushed into crime by strains or stressors, control perspectives argue that individuals are born deviant, and commit crime due to a lack of

control or bonds (Gottfredson and Hirschi, 1990; Hirschi, 1969; Sampson and Laub, 2005). Control theories assume that human beings are naturally motivated to commit crime (Akers et al., 2017). Thus, they are concerned with explaining why some people do not commit crime (Hirschi, 1969; Lilly et al., 2015). That is, control theories assume that people will commit crime unless they develop effective social controls or personal controls which inhibit a human being's innate deviance from manifesting (Gottfredson and Hirschi, 1990; Akers et al., 2017; Lilly et al., 2015).

Traditional self-control theory is based on the assumption that "all human behavior can be understood as the self-interested pursuit of pleasure or the avoidance of pain" (Gottfredson and Hirschi, 1990, p. 5). In their original work, Gottfredson and Hirschi (1990) did little to operationalize the concept of self-control, but instead suggested that low self-control could be exhibited through personality traits such as impulsivity, laziness, shortsightedness, and being drawn to dangerous behaviors (Jones et al., 2015). From this perspective, crime is defined as, "acts of force or fraud undertaken in pursuit of self-interest" (Gottfredson and Hirschi, 1990, p. 15).

Partly in response to such criticism, Hirschi (2004) redefined self-control as, "the tendency to consider the full range of potential costs of a particular act" (p. 543). In doing so, he returned to the tenets of social bonding theory but recanted his earlier assumption that social bonds are relatively stable over the life course. Furthermore, his modified theory suggested that "self-control and social control are the same thing" (p. 543). He argued that self-control acts as a set of inhibitors the one carries with them wherever they go. These inhibitors vary in number and salience. Thus, to appropriately measure redefined self-control Hirschi suggested that one needs to consider the number of costs associated with an act, as well as the salience of those costs. These costs or inhibiting factors are those outlined in traditional social bonding theory. Individuals who have a greater number of costs, and who have a higher tendency to consider them (salience), are seen as having greater self-control. Ultimately, his modified theory assumes that any effects of social control on delinquency are indirect and mediated entirely by self-control.

Hirschi's (2004) new conceptualization has benefits that can, in part, end the controversial issue about the tautology of traditional self-control approaches. However, Hirschi (2004) clearly stated that the redefinition of self-control, "should not be construed as an effort to deal with the tautology issue" (p. 550). On the other hand, the most notable feature of re-conceptualized self-control is that it incorporated the hedonistic aspects of human nature that his early control theory assumed (i.e., social bonding theory). In other words, human beings commit crimes after considering the possible costs and benefits from them. Thus, social bonds are important potential costs that

individuals assess when calculating the potential satisfaction and pain that will be obtained from the crime commission (Bouffard and Rice, 2011).

Before combining these factors in his redefined self-control, Hirschi (1986) previously alluded to the possibility of the compatibility of self-control theory with rational choice theory. These two theories share the same basic assumption about human beings—that people are willing to commit crime when the benefits gained from crime commission surpass the costs associated with crime commission. Hirschi (1986) subsequently classified self-control theory as a theory best suited for understanding the motivation of criminal behavior, but categorized rational choice theory as a theory suited for interpreting general crime commission. A key argument raised by Hirschi is that if an individual's decision is influenced by a circumstance that determines the utility of the act, then opportunity becomes a crucial factor that defines whether they commit crime. Gottfredson and Hirschi (1990) were also aware of the necessity of this element; as such, they too incorporated components of opportunity into their original theoretical frame.

The interface between GST and Self-Control

Despite the apparent differences in etiological assumptions between GST and self-control theory, there are many similarities between the two theories. For instance, in modified GST, Agnew (2013) integrated control-related variables into conditioning variables that moderate association between strain and delinquency. Conditioning variables include the opportunistic element outlined above that can be found in control theories. According to Agnew (2009), people consider the cost of a criminal/non-criminal coping strategy. Simultaneously, the role of disposition for criminal/non-criminal coping strategies was included, which is consistent with the self-control theory (Agnew, 2009; Gottfredson and Hirschi, 1990). Furthermore, Agnew (2013) also specified that social control variables (e.g., parental attachment, moral belief) can condition the effect of strain on delinquency. Such inclusion in GST supports the effort to redefine self-control from personal traits to social control (Hirschi, 2004). Even though Hirschi (1989; 1979) criticized any attempts to integrate theories, incorporating variables from different theories can sometimes better capture human nature, thereby gaining a better understanding of crime (Bernard, 1990; Elliott et al., 1985).

However, while modified GST acknowledges the functioning of social and self-control variables concerning strain variables, this role was confined to conditioning the effect of strain on delinquency (Agnew, 2007). Previous studies examining the role of conditioning factors, including self-control, impacting the relationship

between GST and delinquency have found inconsistent results (Moon and Morash, 2017; Mazerolle and Piquero, 1997; Moon et al., 2009). Agnew (2007) argued that the limited role of conditioning factors, typically examined by introducing interaction terms into the regression equation, does not mean that they are invalid. Rather, he contended that the role of conditioning variables should not be negated as long as some conditioning factors have their explanatory power. Thus, Agnew (2007) suggested that if the explanatory power of GST is diminished after the inclusion of control-related variables (i.e., self-control, redefined self-control), the status of control variables should be illuminated again.

Despite the developments in GST combining diverse aspects from other criminological theories, a redefinition of self-control did not lead to further incorporations with GST. Rather, researchers have been more attached to the traditional concepts of GST and self-control theories. Accordingly, a more valid test of GST in tandem with modified control theory is necessary. Further, to date, only a few studies have even attempted to test redefined self-control theory (see Ward et al., 2015; Intravia et al., 2012; Brown and Jennings, 2014; Jones et al., 2015; Higgins et al., 2008; Morris et al., 2011). As a whole, these studies have found mixed support for the theory in terms of explaining digital piracy (Higgins et al., 2008), substance use (Jones et al., 2015; Ward et al., 2015), and general crime and delinquency (Brown and Jennings, 2014; Morris et al., 2011; Intravia et al., 2012). At the same time, while these tests of modified control theory have assessed the relationships with social learning theory (Higgins et al., 2008; Ward et al., 2015) and deterrence theory (Brown and Jennings, 2014), there has been a call to examine applications of modified control theory with GST (Bouffard and Rice, 2011; Higgins et al., 2008; Jo, 2015; Piquero and Bouffard, 2007).

Current Study

Researchers have noted that conditioning variables, including self-control, may have direct effects on deviant behavior (Lilly et al., 2015; Agnew, 2013). For example, Agnew (2013) stated that “strain and negative emotions not only lead directly to criminal coping but may indirectly lead to crime by fostering traits such as low constraint and negative self-control, reducing social control” (p. 656). In other words, strain may have indirect effects on deviant coping through trait-based self-control and redefined self-control. As such, we hypothesize that self-control variables mediate the relationship between strain and delinquency, at least in part.

We also hypothesize that self-control variables moderate the relationship between strain and delinquency. Agnew (2007) argued that those who cannot cope with strains legally are more likely to cope with strains through

deviant behaviors; he also notes that the ability to cope legally is partly a function of personality traits and social control. Considering his arguments, strain and self-control, whether trait-based or redefined, interact in producing delinquency. Specifically, we predict that juveniles with strains will engage in more delinquency when they have low redefined self-control reflecting Agnew's proposition that, "[s]trains are more likely to lead to crime when they are associated with low social control" (p. 65).

Methods

Sample

This study used a sample derived from the Korea Children and Youth Panel Study (KCYPS). The KCYPS was conducted to collect diverse information related to the development of children and adolescents from three different cohorts (first graders, fourth graders, and seventh graders) of Korean youth. Each cohort is comprised of about 2,200 students (Park et al., 2017). As a cohort study, it has followed participants for seven years now; currently, only six years of data collection have been completed (i.e., 2010, 2011, 2012, 2013, 2014, and 2015). However, only the first five years of data are publicly available. A stratified multistage sampling procedure was employed to create a nationwide representative sample of children and adolescents. Students, as well as caregivers, were surveyed to gather information on educational commitment, parental relationships, and general delinquency. For data collection, trained interviewers performed individual interviews with students at selected schools, and surveys were administered to caregivers (Park et al., 2017). For complete information on the KCYPS methodology, please see Kim et al. (2010). Specifically, this study used Wave 3 (2012), Wave 4 (2013), and Wave 5 (2014) data to maximize the benefit of the longitudinal data (Simons et al., 2002). Descriptive statistics for the study sample are detailed in Table 1 below.

Measures

Dependent measure. The delinquency measure was derived from Park et al. (2017) who conducted their study using the KCYPS data set. The data for the dependent measure in this study were drawn from Wave 5 (2014). The KCYPS surveyed respondents about how often they had been involved in 13 types of delinquent and criminal behaviors in the last year. These acts included (1) smoking, (2) drinking, (3) unexcused absence, (4) running away from home, (5) serious and malicious teasing, (6) bullying, (7) group fighting, (8) serious violent assault, (9) threatening others, (10) robbing, (11) stealing, (12) sexual intercourse, and (13) sexual harassment. The frequency response options for each item were recoded such that 0 (never), 1 (1 or 2 times), 2 (3 or 4 times), and 3 (5 or more times). Following Park et al.'s (2017) operationalization, the scores for the latter six—more serious—items were weighted by multiplying by 2 to reflect the seriousness of different forms of deviance.

Strain measures. Strain-related variables were drawn from Wave 4 (2013), and Wave 5 (2014) of KCYPS. This was done in response to the availability of measures and better control for temporal ordering of variables. Based on prior studies (Agnew, 2001, 2006, 2013), three broad types of strains were operationalized: (1) inability to

avoid aversive and negative situations, (2) presentation of a negative or noxious stimulus, and (3) removal of the positively valued stimulus. When creating the strain related variables, specific attention was given to studies that have applied GST to South Korean samples to reflect the possible differences between American and Korean cultures (Park et al., 2017; Moon and Morash, 2017; Moon et al., 2015; Minwoo Yun et al., 2014). Researchers have noted that the collective culture and Confucianism in South Korea have played significant roles in shaping family values in that country (Lew et al., 2011; Ryu and Cervero, 2011). These ideologies may have been conducive to fostering more cohesive and harmonious family cultures in South Korea than in other regions of the world. Traditionally, in South Korea family values were prioritized while each family member's interest was considered secondary (Moon et al., 2014; Ilhong Yun, 2008). However, with changes in modern Korean society associated with industrialization, relationships between family members have started to transform. Younger generations have begun to pursue more individual rights and value their own goals over that of the family (Lew et al., 2011). As such, the transition in family relationships has become a significant source of conflict between South Korean parents and their children. Agnew (2006, 2009) pointed out that the parental role can be a significant source of strain in five different ways: (1) family structure, (2) parental abuse, (3) excessive parental expectation, (4) parental neglect, and (5) erratic parenting. Thus, given the nature of our sample, uniqueness of Korean culture, and theoretical assertions posited by Agnew, our measures of GST attempt to capture these five variables.

First, a measure of family structure was created to capture the structure of the environment in which a child lives. The family structure variable was derived from Wave 4. Those who were living with both biological parents were assigned a value of 0, and those who were not living with both biological parents were assigned a value of 1. This operationalization was done because previous literature showed that having both biological parents present in a child's life is an insulator from delinquency (Park et al., 2017). Second, parental abuse was operationalized as the extent to which adolescents agreed with the following statements taken from Wave 4: (1) "My parents are quick to beat me when I do something wrong;" (2) "My parents frequently beat me, leaving bruises and scars on my body;" and (3) "My parents frequently curse at me such as, 'Go kill yourself' or 'I wish you were dead'" (Park et al., 2017). These items can be compared with the parental punishment scale used by Piquero and Sealock (2000). Responses ranged from very much so (1) to never (4). Each score for the statements was summed to construct the parental abuse scale (Cronbach's $\alpha = .76$). A principal components analysis with a direct oblimin rotation was conducted to check the potential grouping of three items. The Kaiser-Meyer-Olkin measure of sampling adequacy was above the

conventional .6 and Bartlett's test of sphericity was statistically significant ($p < .05$), thus supporting the factorability of the items (Pallant, 2016). Results indicated an emergence of one factor that had an eigenvalue of 1.00 or higher. This method of principal components analysis was also used for all of the variables described below. Results from those analyses supported the creation of the scales included.

The third strain variable considered was excessive parental expectation. Parental excessive expectation can be a more influential source of strain in the context of South Korea than other Western cultures because parents in Asian countries tend to equate their children's success with their success, and there is a strong push to excel in academics, thus arousing extreme fervor for education (Minwoo Yun et al., 2014). The excessive parental expectation scale was created by combining values reflecting agreement to four statements collected at Wave 4: (1) "I feel burdened because the high expectation of my parents is beyond my ability," (2) "I want my parents to be less concerned about me," (3) "My parents are enthusiastic about my studies more than other things about me," and (4) "My parents always stress that I have to be better than other people in every aspect." Response options ranged from very much so (1) to never (4). Each score was summed to form the parental excessive expectation scale with higher scores reflecting a higher degree of excessive parental expectation. Reliability test results showed a relatively low measure of internal consistency ($\alpha = .68$). However, this variable is likely sensitive to the number of items in the scale as scales with less than ten items are prone to show low alpha scores (Remler and Van Ryzin, 2015). Briggs and Check (1986) suggested that since the mean inter-item correlation ($r = .35$) for the items is above .2, then this scale can be regarded as reliable.

The fourth strain variable, parental neglect, was measured by combining responses from the following three statements presented at Wave 4: (1) "My parents care about how I am doing at school;" (2) "My parents always take care to keep my body and clothes clean;" and (3) "My parents always arrange appropriate medical service whenever I am sick." The scale ranges from 1 to 4 with higher values represented greater parental neglect. The scale was found to have good internal consistency (Cronbach's $\alpha = .77$).

The final strain variable was erratic parenting. Colvin (2000) contended that erratic parenting can be more detrimental to the development of children, thereby leading to chronic criminality. Furthermore, this harmful effect can be intensified when combined with coercion. To grasp the effect of erratic parenting, three items from Wave 4 were used: (1) "My parents, sometimes, scold me for the same thing that they did not scold at other times," (2) "My parents treat me on a whim," and (3) "My parents' attitude is different when there are guests, or we go out."

Responses were Likert in design ranging from (1) very much so to (4) never. Responses were reverse-coded and then combined in an additive scale, with higher numbers representing greater erratic parenting. Again, while the reliability test indicated a relatively low Cronbach's α ($= .68$), results from principal components analysis suggested that these items grouped appropriately and the mean inter-item correlation was above the widely accepted standard ($r = .42$, Briggs & Cheek, 1986).

Moreover, the influence of victimization as a source of strain has been included in prior studies of GST (Park et al., 2017; Minwoo Yun et al., 2014). A wealth of research on GST has shown that victimization is a robust predictor of crime and delinquency (Baron, 2009; Jennings et al., 2012). Consistent with prior research victimization was measured with seven different questions at Wave 5 about respondents' previous experiences with victimization incidences over the past year: (1) seriously and malevolently teased, (2) bullied, (3) assaulted, (4) threatened, (5) robbed, (6) sexually harassed, and (7) seriously cursed or sworn at (Park et al., 2017). The response options were yes or no. Victimization experience was created by summing and dichotomizing the responses (0 = non-victim, 1 = victim).

Agnew (2007) differentiated between objective strains (e.g., victimization) and subjective strains (e.g., perceived matters) in terms of how individuals react to strains. The current study, therefore, considers both objective and subjective strains. In particular, how respondents perceive their own health condition, their grade in school, their subjective household economic status, and their peer relationships were included in the statistical models. These scales are also compared with the goal blockage scales from Broidy (2001), which constructed four items asking whether respondents were successful at achieving a health goal, an academic goal, a financial goal, and a social life goal. For evaluation of a health goal, participants were asked to report their level of health on a scale from 1 (very healthy) to 4 (very unhealthy). Academic satisfaction was also included as a source of strains. This variable was included because, in South Korea, academic achievement is highly valued, resulting in a substantial amount of time devoted to education (Moon et al., 2009). Because of these unique environments, Korean students are exposed to pressures related to gaining admission to highly ranked universities at an early age (Moon et al., 2014). Educational satisfaction was measured by asking respondents to report their satisfaction with his/her grade (1 = very satisfied; 4 = very unsatisfied). Stress from economic sources was measured from a variable asking participants where their household income status fell on a continuum ranging from 1 = very wealthy to 7 = very poor. Lastly, strain from perceived relationships between peers (Cronbach's $\alpha = .72$) was measured in a scale consisting of three items,

measuring respondents' feelings relating to being left out. Items included: (1) "I want to make new friends different from current friends," (2) "I feel alone even when I am with my friends," and (3) "My friends don't know how well I am doing." The response options for each item ranged from 0 (very much so) to 4 (never). This composite scale was recoded and summed so that a higher score indicates a higher sense of isolation from peers.

Negative emotions. Anger and depression were used to tap into negative emotions. Unlike Agnew's (2009; 2007) suggestion of using situational negative emotions, this study employed trait-based negative emotions for two reasons. First, situational negative emotions were not surveyed in the data available from KCYPS. Second, while some studies have found a non-significant impact of trait-based anger, many other studies have shown that trait-based negative emotions have strong impacts on delinquency (Baron, 2007; Mazerolle et al., 2003; Patchin and Hinduja, 2011). Indeed, anger has been posited as the most influential emotion (Agnew, 2007), prompting its inclusion in this study.

Anger (Cronbach's $\alpha = .70$) was measured with a scale variable created from data collected at Wave 4 that asked participants to report their level of agreement with the following three statements: (1) "I become aggressive and fight when I cannot do what I want to do," (2) "I sometimes fight for nothing," and (3) "I am sometimes upset all day long." These items are comparable to the items used by Derogatis (1977). Some researchers also noted that depression can mediate the effects of strain on delinquency (Moon et al., 2011; Piquero and Sealock, 2004). For this study, depression was measured by summing four items collected at Wave 4 that asked respondents to report their level of agreement with the following statements; (1) "I feel sad and depressed by the thought that I am unfortunate," (2) "I want to die," (3) "I feel lonely," and (4) "Everything is difficult for me." These items were equivalent to the trait-based depression scale used by Piquero and Sealock (2000), which tapped information related to participants feelings of worthlessness or depression (Cronbach's $\alpha = .81$).

Self-Control Variables. In the current study, both measures of traditional self-control and modified self-control were included to see if the conditioning role of traditional self-control was still valid after the inclusion of the redefined self-control in the statistical models (Agnew, 2009; Hirschi, 2004).

To measure trait-based self-control, eleven items from Wave 3 were used. These items included: (1) "I don't want to do assignments that require long concentration;" (2) "I can't concentrate on one work steadily;" (3) "I do other things during the study time;" (4) "I disturb what other people are doing;" (5) "I disturb what friends are doing;" (6) "I pick on others for small things;" (7) "I like playing, so it is difficult to start studying;" (8) "I can't

study because of unnecessary thoughts;" (9) "I finish my study even if it is boring and not fun;" (10) "I focus on studying until I finish;" and (11) "I finish what I plan to study even when it is boring." The response categories ranged from (1) very much so to (4) never. Responses from the first eight items were reverse-coded and summed with the latter three items to construct the self-control scale with higher scores indicating a higher level of self-control (Moon et al., 2013; Hyunseok Jang et al., 2014). While results from principal components analysis suggested the emergence of a two-factor solution, the current study used a unitary measurement of self-control for three reasons. First, the reliability test indicated a high Cronbach's α ($= .77$), and this value decreased upon separating items into separate scales. Second, an additive self-control scale showed high correlation with the first extracted factor (sharing 89.3%) (Moon et al., 2013). Third, previous studies consistently suggested that a uni-dimensional characteristic of self-control is most appropriate (Cheung and Cheung, 2008; Wright et al., 1999; Grasmick et al., 1993).

The current study also employed inhibition items that were used to capture Hirschi's (2004) redefined self-control (Bouffard and Rice, 2011; Piquero and Bouffard, 2007; Jo, 2015). The elements relating to bonding in redefined self-control were measured through nineteen items from Wave 5 that asked participants to report their level of agreement with statements reflecting the four sub-dimensions of redefined self-control including: (1) educational commitment (e.g., "Studying has a very important meaning to me" and "I think what I learn from school is important"), (2) school attachment (e.g., "I am happy to greet my teacher" and "I feel comfortable talking to my teacher"), (3) parental attachment (e.g., "My parents care about my opinion" and "My parents often express their love toward me" (4) parental monitoring (e.g., "My parents know where I go after school" and "My parents know how I spend time").

Despite the lack of cost-related items, the current operationalization measures the reconceptualization of self-control by tapping into inhibitors and their hedonistic aspects of adolescents (e.g., "I think the school life will play the crucial role in my self-development"). Each item was measured on a four-point Likert scale (1 = very much so to 4 = never) that was recoded following Hirschi's (2004) operationalization of redefined self-control by dichotomizing the variables. Our redefined self-control scale was then produced by summing the number of inhibitors. The degree of reliability was above the acceptable range ($\alpha = .79$).

The current study also employed three types of cognitive coping techniques: (1) self-esteem, (2) self-resiliency, and (3) negative self-image (Minwoo Yun et al., 2014). As mentioned, a positive coping strategy can

ameliorate the potential effect of strain on delinquency by restoring inner equilibrium, whereas a negative coping strategy aggravates the problem. Specifically, Baron (2007) proposed that the detrimental effects of strain can be diminished by inflating the perception about their success and exaggerating the outcome from experience. This process aligns with the effect of self-esteem that governs their image positively and interprets things in a positive way (Jennings et al., 2009). The self-esteem scale was adjusted from Morash and Moon (2007). It was created by summing three items asking the following statements: (1) "I am satisfied with myself," (2) "I feel that I have many strengths," and (3) "I have a positive attitude toward myself" (1 = very much so to 4 = never; Cronbach's $\alpha = .76$). The self-esteem scale was recoded so that a higher score indicates higher self-esteem. Self-resiliency was represented by a composite measure of recoded items asking how participants perceived the following statements: (1) "I will be okay and get over things soon even when I wasn't ready for what happened," (2) "I can confidently say that I have a strong will," and (3) "I will be okay soon even if someone makes me upset" (1 = never to 4 = very much so; Cronbach's $\alpha = .55$, mean inter-item $r = .29$). To measure negative self-image, participants were asked whether they perceive themselves as "useless," "worthless," or a "failure." Responses for each item (1 = very much so to 4 = never) were recoded to reflect that a higher score indicated a higher negative self-image (Cronbach's $\alpha = .80$).

Control Variables.

Consistent with prior research, sex (female = 1) was included as a control variable to eliminate the bias that can be generated from the difference in the amount of deviance and level of self-control (Gottfredson and Hirschi, 1990; Piquero et al., 2004).

Analytic Strategy

Of the eighteen variables input in the statistical model, no variable was free from missing values. However, the proportion of missing values ranged from 4% to 10%, thus falling in the acceptable minimum missing value observation range (Raymond and Roberts, 1987). A series of negative binomial regression models are estimated to examine the effects of all strain measures and self-control measures on delinquency. Since our delinquency measure captured counts of self-reported norm-breaking behaviors with large numbers of zeros and variance greater than the mean, negative binomial regression models were found to be the most appropriate statistical technique for the current investigation (Long and Freese, 2014).

To test the proposed hypotheses concerning GST and self-control, the GST model was examined first. Specifically, the first baseline model focused on the direct effect of strain. The second model examined the mediation effects of negative emotions. The third model examined the effect of self-control and redefined self-control by regressing delinquency on the composite indices of these control variables. Finally, the moderation effects of the self-control variable and redefined self-control as conditioning variables were tested in a fourth model. It should be noted that our moderation analysis is estimated based on ordinary least squares (OLS) regression because interactions in negative binomial models are not as straightforward in interpretation as OLS regression models.

INSERT TABLE 1 ABOUT HERE

Results

Table 2 demonstrates the result of zero-order correlations among strains, negative emotions, self-control, and conditioning factors. Most strain measures yielded significant relationships with depression and anger as predicted by GST. As expected, except for the parental neglect scale, these relationships were statistically significant and positive. Second, many strain measures (i.e., parental abuse, parental neglect and erratic parenting, perceived health condition, perceived household financial status, perceived academic achievement, and peer stress) showed a statistically significant correlation with both trait-based self-control and redefined self-control. As anticipated, a majority of strain variables were significantly and negatively related to trait-based self-control and redefined self-control. Notably, Hirschi (2004) argued that trait-based self-control and redefined self-control are the same things. However, our result indicated the strength of correlation between two concepts of control was small to medium according to Cohen's (1988) convention. Although this finding contradicted Hirschi's proposition, empirical evidence from the existing literature also supported our finding that trait-based self-control and redefined self-control are related but distinct concepts (Jones et al., 2015; Higgins et al., 2008; Intravia et al., 2012). Accordingly, we entered these two variables into multivariate models together.

INSERT TABLE 2 ABOUT HERE

Three negative binomial regression models were run to test the empirical effect of strains, negative emotions, control-related variables and conditioning factors (i.e., self-esteem, self-resiliency, and negative self-image). At each step, gender was included to control masking effects in the model. Collinearity diagnostics using the

variance inflation factor (VIF) for each variable were less than 3, which is the widely accepted standard (Kennedy, 1985). In short, there were no multicollinearity issues in the study.

Table 3 presents the results of negative binomial regression models with delinquency as the dependent variable. The result in Model 1 shows that four of the ten strains were significantly related to delinquency in the predicted direction. For ease of interpretation of the results from negative binomial regression, significant findings were reported in terms of the incidence rate ratio. Students who had been victimized were more likely to commit delinquency (IRR = 2.085). Along with victimization, students who experienced erratic parenting were more likely to commit delinquency (IRR = 1.251). Perceived household financial status was positively and significantly related to delinquency (IRR = 1.138). Students with higher peer stress were more likely to engage in delinquency (IRR = 1.222). In Model 2, anger and depression were added to test their mediating role in the causal process through strain to delinquency. As predicted, anger and depression had significant positive effects on delinquency, meaning that students who had higher levels of anger (IRR = 1.238) and depression (IRR = 1.379) were more likely to engage in delinquency. Considering that the effects of several strains became insignificant once anger and depression were included in the model, it appears that negative emotions partially mediated the relationships between strains and delinquency.

In Model 3, five conditioning factors were included in Model 2. The results showed that only two of five conditioning factors had significant effects on delinquency, but the directions of these variables were mixed. Self-resiliency was significantly related to delinquency in the positive direction (IRR = 1.600), which is opposite the relationship that GST would predict. While GST proposes that people with good coping skills will be less likely to engage in deviant deviance (Agnew, 2007), the result of this analysis indicates that self-resiliency did not work in that manner to predict delinquency. Notably, trait-based self-control was negatively related to delinquency as expected, but this relationship was not statistically significant. On the other hand, students who had higher redefined self-control were less likely to engage in delinquency (IRR = .948). That is, those with more inhibitors committed fewer delinquent acts (Hirschi, 2004). Once conditioning variables were entered into the model, only one of the ten strains, (i.e., victimization) remained a significant predictor of delinquency. Interestingly, negative emotions maintained their statistical significance in Model 3. To estimate overall model fit for each of the models, we calculated pseudo R^2 test statistics using the “BaylorEdPsych” package in R. The results indicated that Model 3 explained between 10.52% (McFadden’s R^2) 13.04% (Nagelkerke’s R^2) of variance in delinquency.

INSERT TABLE 3 ABOUT HERE

In Table 4, the moderating role of redefined self-control was examined in the relationship between victimization and delinquency. As previously noted, the interpretation of interaction in negative binomial regression models is not straightforward, so we used OLS regression to examine the interaction between strain and control measures. Considering that only victimization experience was statistically significant among strain variables in Model 3 and that the redefined self-control variable was statistically significant, we examined whether victimization and redefined self-control interacted in producing delinquency. To do this, we entered an interaction term between victimization and redefined self-control in the final model. Results presented in Table 4 shows that victimization was associated with redefined self-control in predicting delinquency. The interaction term was negative and significant. This pattern suggests that victims were more likely to engage in delinquency when they had lower redefined self-control. This is consistent with Agnew's (2007) contention that strains, accompanied by low social control, diminish one's ability to engage in legal coping. Figure 1 illuminates this finding. The plot illustrates that the slopes for redefined self-control and delinquency differ depending on one's victimization experience. Higher levels of redefined self-control were associated with a lower likelihood of involvement in delinquency, but this relationship was more pronounced among victims.

INSERT TABLE 4 ABOUT HERE

INSERT FIGURE 1 ABOUT HERE

Discussion and Conclusions

The goal of this study was to see if control-related variables interact with strain-related variables in the causal process of explaining delinquency among a sample of Korean youth. Overall, our results showed marginal support for trait-based self-control and revised self-control mediating the relationship between strain and delinquency. Specifically, a series of negative binomial regression models found that only four of the ten strains were significantly and positively related to delinquency. Students who experienced erratic parenting tended to engage in delinquency, and students who had been victimized were more likely to engage in delinquency.

Additionally, consistent with GST, subjective strains such as perceived household financial status and peer stress were positively related to delinquency. However, other parental factors (i.e., parental abuse, excessive parental expectation, and parental neglect) were not significantly related to delinquency. Also, other subjective strains such as perceived health status and perceived academic achievement were not significantly associated with delinquency.

When negative emotions were included in the baseline model, the results partially supported Agnew's (2007) mediation hypothesis. The significant effects of strains diminished once negative emotions were entered into the model. However, some strains (i.e., victimization and perceived household financial status) had their direct effects on delinquency regardless of experiencing negative emotions. Nonetheless, anger and depression had significant effects on delinquency in a positive direction; students who experienced higher levels of anger and depression were more likely to engage in delinquency.

Notably, only victimization experience maintained statistical significance across statistical models, which is inconsistent with predictions from GST and findings from previous studies (Jennings et al., 2012; Park et al., 2017; Minwoo Yun et al., 2014). Agnew (2007) identified victimization as an important strain that is likely to cause crime and deviant behaviors because, "[v]ictims believe the strain they experienced is undeserved," and the strain from victimization is not perceived in, "the service of some greater good" (p. 63- 64).

Perhaps the most notable finding was the mediating and moderating role of trait-based self-control and redefined self-control in predicting delinquency. Our findings showed that the effects of some strains became insignificant when conditioning variables, including self-control variables, were included in the model. In other words, the causal relationship between strain and delinquency was partially explained by trait-based self-control and redefined self-control, suggesting indirect effects of strains (Agnew, 2013).

We also found some evidence in favor of the moderating role of self-control in the relationship between strain and delinquency (Agnew, 2007). Victimization and redefined self-control interacted in predicting delinquency. The relationship between redefined self-control and delinquency was stronger among victims in comparison to non-victims. Victims were more likely to engage in delinquency when they possessed less redefined self-control. The interaction effect with strain on delinquency can imply the chance of theoretical integration of GST and redefined self-control. Specifically, it appears that redefined self-control helps students to cope with strain positively, and thus renders them less likely to resort to criminal responses. This supports prior work by Bao and colleagues (2014) which indicated that it might also be best to integrate GST and Control Theories with Social Learning Theory. As self-control influences the relationship between strain and delinquency, it could also influence the relationship between strain and peer influence. As this study was exploratory, we did not include any measures of Social Learning. Future research should examine this possible integration.

Moreover, the current study supports prior research suggesting that trait-based self-control and redefined self-control are related, but distinct concepts (Intravia et al., 2012; Higgins et al., 2008; Jones et al., 2015). It is possible that the two measures of self-control “present themselves differently at different points in the life course” (Morris et al., 2011, p. 597). Morris et al.’s work suggested that self-control in childhood is a function of social bonds, whereas in adulthood it is a function of a personality trait. Thus, consistent with their hypothesis given that our sample was comprised of adolescents, our results found that redefined self-control and trait-based self-control operated independently in terms of predicting delinquency. This conclusion is further supported by the finding that redefined self-control played the role of a moderating variable linking strains to delinquency whereas no interaction effect was found between strain and trait-based self-control. Future research should explore this possibility of testing the concepts using a sample of adults and youth.

This study is not without limitations. First, even though the current study attempted to estimate the causal effect of variables by employing longitudinal data when available (e.g., the usage of Wave 3 for trait-based self-control), data limitations from the secondary source restricted the availability of some variables to cross-sectional data. Second, and also related to the use of secondary data, surround problems with the operationalization of key variables and research design. Despite efforts to use measures incorporated by previous studies, there were numerous variables that the researchers could not include in the model. Such omission of variables can produce the overestimation of coefficients. On particular problem with the data was the use of trait-based measures of negative emotions as opposed to situational-based negative emotions. Agnew (2006) himself has argued that trait-based measures equate to emotional traits, which essentially refer to one’s tendency to experience certain emotions.

Conversely, Agnew (2006) suggested that situational-based measures refer to one’s response to negative emotions, and thus are a better measure of the concept. Prior research has found that trait-based measures may operate differentially than situational-based measures, and may not accurately reflect responses to strain (Moon et al., 2009). Thus, future primary research should employ both measures.

Further, the data also did not include measures of the cost aspect of redefined-self-control. Future research should employ this variable into models when testing redefined-self-control and revised GST. Third, while principal components analysis and inter-item correlations suggest that the scales used in this study were appropriate, some scales were weak. Future primary research should take efforts to employ better measures of key variables to

construct stronger scales. Despite these limitations, results from this study support the integration of GST and redefined self-control theory.

Compliance with Ethical Standards

Data is publicly accessible from the National Youth Policy Institute (NYPI) data archive, which is a national youth research institute in Korea established to provide the empirical and scientific foundations necessary for national youth policies.

Informed Consent Parental consent was obtained from student participants' parents by the NYPI interviewers.

Conflict of Interest The authors declare that they have no conflict of interest.

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Table 1

Descriptive statistics of strains, negative emotions, self-control variables, and delinquency

	Mean (SD)	Range
<i>Strains</i>		
Family structure	.128 (.01)	0 – 1
Parental abuse	4.18 (.03)	3 – 12
Parental excessive expectation	6.88 (.05)	4 – 16
Parental neglect	5.77 (.07)	3 – 12
Erratic parenting	4.83 (.03)	3 – 12
Victimization	.03 (.003)	0 – 1
Perceived health condition	1.76 (.58)	1 – 4
Perceived household financial status	3.94 (.02)	1 – 7
Perceived academic achievement	2.75 (.02)	1 – 4
Peer stress	4.76 (.03)	3 – 12
<i>Negative emotions</i>		
Anger	4.61 (.03)	3 – 12
Depression	5.92 (.04)	4 – 16
<i>Conditioning variables</i>		
Self-esteem	5.19 (.06)	3 – 12
Self-resiliency	5.08 (.05)	3 – 12
Negative self-image	4.57 (.03)	3 – 12
Trait-based self-control	27.06 (.10)	11 – 42
Redefined self-control	14.66 (.08)	0 – 19
<i>Delinquency</i>	.37 (1.10)	0 – 13
Total number = 2351		

Table 2

Correlation matrix among strains, negative emotions, and conditioning variables, including self-control measures.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	1																
2	.05*	1															
3	-.03	.28*	1														
4	-.11*	-.24*	.05*	1													
5	.04	.50*	.44*	-.23*	1												
6	-.02	.02	.02	-.01	.01	1											
7	.03	.01	-.05*	-.12**	.02	.06*	1										
8	.24*	.06*	-.03	-.16*	.06*	.04	.13*	1									
9	-.04	.02	.04	-.04	.02	.05*	.10**	.07*	1								
10	.02	.21*	.11*	-.17*	.20*	.02	.11*	.08*	.08*	1							
11	.03	.24*	.09*	-.14*	.20*	.08*	.08*	.07*	.10*	.16*	1						
12	.03	.25*	.09*	-.27*	.24*	.08*	.23*	.17*	.17*	.24*	.45*	1					
13	-.02	-.10*	.001	.24*	-.06*	-.003	-.26*	-.18*	-.23*	-.29*	-.17*	-.34*	1				
14	-.06*	-.02	.07*	.23*	-.03	-.01	-.23*	-.12*	-.12*	-.16*	-.16*	-.25*	.34*	1			
15	.04	.19*	.08*	-.22*	.18*	.01	.18*	.16**	.17**	.41*	.26*	.42*	-.57*	-.23*	1		
16	-.05*	-.14*	-.02	.24*	-.17*	-.04	-.11*	-.14*	-.09*	-.14*	-.28*	-.23*	.18*	.19*	-.25*	1	
17	-.08*	-.19*	.07*	.37*	-.13*	-.02	-.15*	-.13*	-.12*	-.13*	-.19*	-.28*	.32*	.22*	-.24*	.29*	1

Note. 1 = family structure, 2 = parental abuse, 3 = parental excessive expectation, 4 = parental neglect, 5 = erratic parenting, 6 = victimization, 7 = perceived health condition, 8 = perceived household financial status, 9 = perceived academic achievement, 10 = peer stress, 11 = anger, 12 = depression, 13 = self-esteem, 14 = self-resiliency, 15 = negative self-image, 16 = trait-based self-control, and 17 = redefined self-control.

* $p < .05$.

Table 3
 Negative binomial models of strains, negative emotions, self-control, and conditioning factors on delinquency

	Model 1	Model 2	Model 3
	b (SE)	b (SE)	b (SE)
<i>Control variables</i>			
Gender (female =1)	-.81 (.10)***	-.91 (.10)***	-.87 (.11)***
<i>Strains</i>			
Family structure	.13 (.14)	.14 (.14)	.19 (.15)
Parental abuse	.08 (.09)	.01 (.09)	-.07 (.09)
Parental excessive expectation	-.10 (.10)	-.13 (.10)	-.11 (.10)
Parental neglect	-.10 (.10)	-.03 (.10)	-.07 (.11)
Erratic parenting	.22 (.10)*	.19 (.10)	.15 (.10)
Victimization	.74 (.21)***	.66 (.21)**	.72 (.22)*
Perceived health condition	-.07 (.09)	-.14 (.09)	-.13 (.09)
Perceived household financial status	.13 (.05)*	.11 (.05)*	.10 (.06)
Perceived academic achievement	.04 (.07)	-.003 (.07)	.04 (.07)
Peer stress	.20 (.08)*	.14 (.08)	.17 (.09)
<i>Negative emotions</i>			
Anger		.21 (.09)*	.22 (.10)*
Depression		.32 (.10)***	.31 (.11)**
<i>Conditioning variables</i>			
Self-esteem			.06 (.12)
Self-resiliency			.47 (.12)***
Negative self-image			-.03 (.10)
Trait-based self-control			-.02 (.01)
Redefined self-control			-.05 (.02)***
Nagelkerke's R ²	0.09	0.11	0.13

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4
Interaction between victimization and redefined self-control in estimating delinquency

	Delinquency
	b (SE)
Control variables	
Gender (female =1)	-0.28 (.05)***
<i>Strains</i>	
Family structure	.11 (.08)
Parental abuse	-.04 (.05)
Parental excessive expectation	-.05 (.05)
Parental neglect	-.02 (.06)
Erratic parenting	.07 (.05)
Victimization	.45 (.14)**
Perceived health condition	-.07 (.05)
Perceived household financial status	.04 (.03)
Perceived academic achievement	.03 (.04)
Peer stress	.09 (.05)
<i>Negative emotions</i>	
Anger	.10 (.05)
Depression	.10 (.05)
<i>Conditioning variables</i>	
Self-esteem	.03 (.06)
Self-resiliency	.15 (.06)
Negative self-image	-.04 (.05)*
Trait-based self-control	-.01 (.01)
Redefined self-control	-.02 (.01)**
<i>Interaction variables</i>	
Victimization × Redefined self-control	-.02 (.04)*
<i>F</i>	5.43***

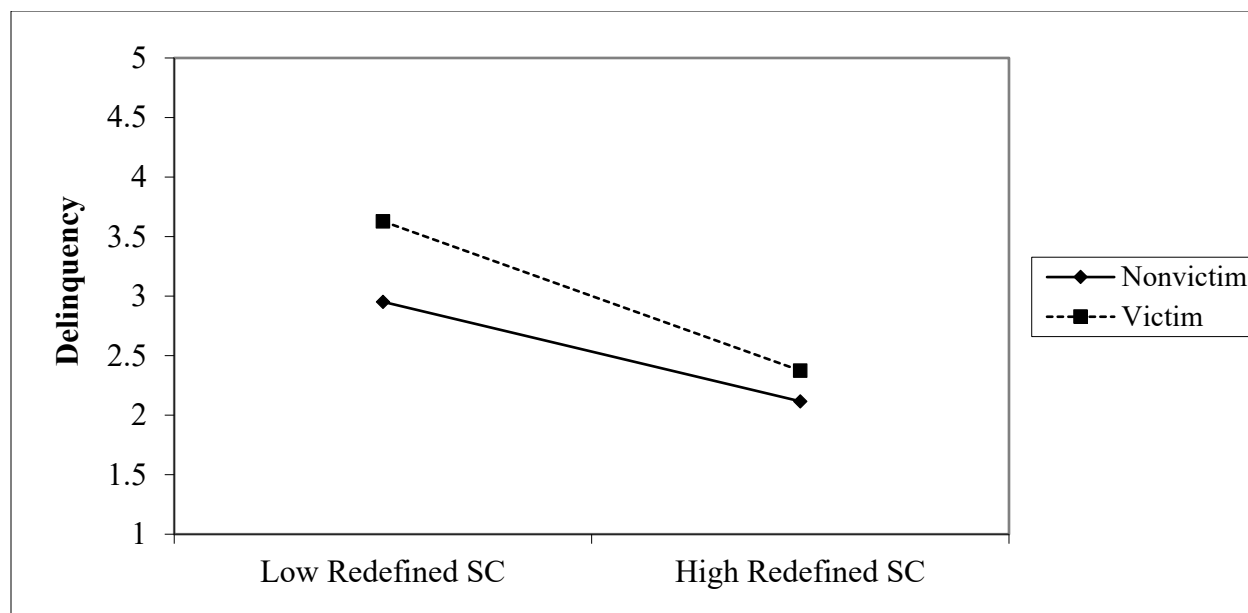


Figure 1 The effects of redefined self-control on delinquency by victimization experience