

## ABSTRACT

Title of Document: SUBJECTIVE STRAIN, ANGER, AND  
DELINQUENCY: EVIDENCE FROM SOUTH  
KOREA

Daiwon Lee, Master of Arts, 2010

Directed By: Dr. Hanno Petras, Criminology and Criminal Justice

Even though GST presents a comprehensive theoretical framework that includes mediation and moderation effects, most previous GST studies tested only portions of the theory, failing to depict and assess the theoretical mechanism as a whole. Moreover, the majority of previous studies utilized an *objective* and cumulative measure of strain to examine GST, which may have masked the varying individual strain effects on delinquency. Using the longitudinal data of 3,449 South Korean adolescents from the Korea Youth Panel Survey (KYPS) and structural equation modeling techniques, the current study aims to address these important gaps by examining the dynamic relationships among five individual types of *subjective* strains, anger, four potential conditioning factors, and delinquency, so as to more clearly articulate pathways from strains to delinquent externalization. A number of interesting findings have emerged from

the current study. Firstly, not all five types of strain were influential on the delinquency. Only the parental and material strains were strong predictors of future delinquency for South Korean adolescents. Secondly, findings concerning the mediation hypothesis revealed that anger served as a significant intervening factor in the relations between strain and delinquency across all strain models. Lastly, a series of multi-group analyses – aimed to not only examine the moderating effects of various potential factors on the strain-delinquency link, but also to identify their locations of moderation – revealed no support for the GST conditioning hypothesis. Theoretical implications, future inquiry considerations, and policy suggestions are discussed with respect to the findings of current investigations on major tenets of GST.

SUBJECTIVE STRAIN, ANGER, AND DELINQUENCY:  
EVIDENCE FROM SOUTH KOREA

By

Daiwon Lee

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Advisory Committee:  
Dr. Hanno Petras, Chair  
Professor Raymond Paternoster  
Professor Terence Thornberry

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## **Chapter 1: Introduction**

Nearly two decades ago, a fresh theoretical perspective was added to research in crime and delinquency: General Strain Theory (GST). While the impact of strain on delinquent behavior had been recognized and studied since the late 1930s, Agnew (1992) went beyond earlier strain theories in developing what became one of the most influential contemporary explanations of deviance. Classic strain theory had previously been among the most prominent criminological theories but had lost its favor since the 1970s after its proponents were unable to respond effectively to damaging criticisms on both theoretical and empirical fronts (Kornhauser, 1978).

Recognizing these criticisms of theoretical premises and lack in empirical support of classic strain theory (see Kornhauser, 1978; Leonard, 1982), Agnew revised strain theory by expanding and reconceptualizing the sources of strain that are conducive to deviant behavior. Agnew also attempted to clarify operating pathways by identifying negative emotions to mediate and several types of factors to condition the effect of strain on delinquency. Furthermore, by shifting attention from social structural variables to human cognitions, he increased the flexibility and applicability of GST to a broader range of demographic groups and types of anti-social behavior.

Agnew's contemporary version of strain theory inspired much research designed to examine the viability of GST. Unfortunately, the empirical findings on GST are mixed. Although the empirical evidence showing the direct relationship between strain and

deviant outcomes is widely recognized, there is much less agreement regarding other core premises of GST, such as its mediating hypothesis of negative emotions and its moderating hypothesis of conditioning factors (Jang & Johnson, 2003).

So is it time for strain theory to be pushed aside again? Not necessarily. It may be that the inconclusive evidence regarding GST's explanatory value is partly due to limitations in the existing studies designed to examine GST. First, to effectively analyze and assess the complex relationships among strains, negative emotions, conditioning factors, and delinquency, the best empirical approach should embrace all core components of GST so as to encompass the dynamic mechanism of the theory. Even though GST presents a comprehensive theoretical framework, most previous GST studies tested only portions of the theory, focusing on one or two aspects at a time. Studies that focused on the role of negative emotions in the model tended to ignore conditioning aspects, whereas studies of conditioning influences failed to include negative emotions in their analyses. Negative emotions and conditioning factors need to be modeled together in order to depict and assess the theoretical mechanism as a whole.

Second, in his subsequent elaboration of GST, Agnew (2001) has made a compelling argument for the importance of distinguishing subjective strains from objective strains. According to Agnew (2006), objective strain refers to "some events and conditions disliked by most people," while subjective strain involves a particular individual's response to such events and conditions. Seen from this perspective, subjective strain is expected to have a stronger relationship with delinquent outcomes

than objective strain, since it involves subjective evaluations of events that comprehend personal assessments of unjustness and magnitude. Unfortunately, with few exceptions, the existing literature on GST has employed objective measures of strain (Agnew, 2006), precariously substituting researchers' *assumptions* regarding respondents' reactions to straining events for the respondents' actual *perceptions* of such events. This inherent limitation in the research could be one important reason for the inconclusive empirical verification of GST, since objective strains may not necessarily serve as an indicator of subjective strain (Froggio & Agnew, 2007).

The present study aims to address several important gaps mentioned above by offering an empirical evaluation on GST using subjective measures of strain as predictors of delinquency. More specifically, the goal of the current research is to examine the dynamic relationships among five types of strains, anger, four potential conditioning factors, and delinquency, so as to more clearly articulate pathways from strains to delinquent externalization. To do so, the study employs a structural equation modeling (SEM) technique on a nationally representative sample of South Korean adolescents to investigate the tenability of GST hypotheses and explore the applicability of GST in a non-Western context.

The following chapter provides a detailed review of prior literature on strain and delinquency and a brief summary of adolescent behavior and delinquency in South Korea. Chapter 4 details the data, research sample, and variables as well as the analytic strategies used in the present study. Chapter 5 describes the statistical tests and the results

of the analysis. The final chapter contains a discussion of the findings and limitations of the present study and suggests directions for future research.

## **Chapter 2: Literature Review**

In this chapter, I will discuss four aspects of strain theory as they relate to the current research. The chapter begins with a brief portrayal of classical thoughts on strain theories to better explain the role of strain in the history of crime and delinquency research. Second, this chapter focuses on general strain theory's impact on the basic framework of the current study. This is done by providing a general overview of GST, followed by examining its central concepts and relevant empirical evaluations. Third, GST research conducted outside the United States is compared to research conducted in the United States. Finally, a depiction of the social and cultural context of South Korea where subjects for the present study came from is briefly introduced. This portion of the chapter concludes with a discussion of limitations of previous empirical studies on GST.

### **Classic Strain Theories**

Perhaps one of the most widely debated and tested classic of strain theory is Merton's anomie/strain theory (1938). First presented in 1938, this model was the nexus of the strain theory that dominated the sociological explanation of crime for thirty years thereafter. Drawing heavily from Durkheim's theory of anomie (1893), Merton developed his theory of deviance that focuses on the dichotomy between socially defined goals for material success and socially approved institutional means to achieve goals.

Whereas Durkheim states that social deviance or normlessness is incidental to sudden modernization where society fails to regulate insatiable human's wants and desires, Merton states that deviance is a by-product of discrepancy between social goals and the legitimate means to achieve these goals rather than due to inherent human appetites (Smith & Bohm, 2008).

According to Merton, people are pressured into crime. In the United States, people are urged to pursue the universally set goal of economic prosperity, regardless of their social positions. Lower class people are, however, more prone to experience noxious conditions as they have the least access to institutionalized or socially acceptable means of achieving that goal (Merton, 1938). In Merton's view, goal-expectation discrepancies, in combination with social stratification, generates strain among disadvantaged populations, which pressures them to achieve culturally-defined goals by whatever means necessary, including criminal avenues (Merton, 1938).

Following this observation, Merton created a typology of deviance (Conformity, Innovation, Ritualism, and Retreatism, and Rebellion) based on how individuals adapt to culturally induced strain. According to Merton, the most common reaction to strain is *Conformation*. Individuals in this category are generally hardworking people who choose to accept social norms and achieve the goals of the society using socially approved means available to them. The second strain-coping reaction is called *Innovation*. Innovative individuals, like ones in the conformity group, accept the social goal of success and attempt to fulfill that aspiration. However, due to the limited access to legitimate avenues

to achieving that goal (e.g., education, employment), they try to attain their objective through other innovative and often deviant means. The third adaptive mechanism is called *ritualism*. Although individuals in this category have access to legitimate means to accomplish socially constructed goals, they fail to progress toward to these goals and settle for the status quo. The fourth mode of adaptation is *Retreatism*. According to Merton (1938), this type of adaptive strategy is least common. Individuals in this category do not have set goals or means to achieve them and thus, they reject most of the socially desired goals and the reality of life. They often live a life of alcohol and drug abuse, retreating into a non-productive and non-conventional world. The last adaptation, referred to as *Rebellion*, occurs when individuals reject both cultural goals and the legitimate means. Those who choose the way of rebellion substitute socially constructed goals and means to achieve them with their own goals and means. People who belong in this category, such as political radicals, rebel against normative system and try to change it.

In sum, Merton tried to understand deviant behavior within a social structural framework. Merton asserted that the high crime rate in American society can be explained by the disjunction between socially accepted goals and legitimate means of opportunity, in combination with the overemphasis on the American Dream of monetary success. Based on possible adaptation types, Merton created a typology of deviance in terms of goals and means.

In the 1950s, Cohen (1955) extended Merton's theory of crime by focusing on gang delinquency among the working class. Cohen concurred with Merton that juveniles are strained when they are unable to achieve socially desired goals using available means. However, Cohen's subculture of delinquency theory deviates from Merton's in that Cohen believes middle-class values that emphasize education, delayed gratification, and respect for property as well as financial success is the prevailing goal that juveniles are constrained to achieve. According to Cohen, when juveniles fail to gain status in school by attaining good grades, which were considered to be preconditions for middle-class success, they band together to define a new status they can achieve. Their newly-set goal is to repudiate the middle-class values they had craved. Frustrated juveniles gain status among gang members as they commit crime by destroying others' property or expressing aggression toward others. In essence, Cohen borrowed the fundamental framework from Merton that goal blockage generates strain, but elaborated it further in order to explain the purposeless characteristics of gang delinquency.

Similar to Merton and Cohen, Cloward and Ohlin (1960) attempt to explain why certain individuals or groups are more likely to engage in criminal activities. Like Merton, Cloward and Ohlin argue that people are strained when they fail to obtain monetary success through legitimate means. And like Cohen, they embrace the assumption that lower-class juveniles are motivated by the pursuit of status and forming their own subculture represents a solution to their maladjustment to dominant cultural values (Cloward & Ohlin, 1960). Although Merton discusses the absence of a legitimate



opportunity structure for lower classes, Cloward and Ohlin claim that Merton failed to consider the differential access to an illegitimate structures among the disadvantaged (Murphy & Robinson, 2008). Cloward and Ohlin argue that depending on geographic areas in which juveniles reside, different types of illegitimate opportunities may be present, allowing these disadvantaged youths to learn and assimilate varying forms of delinquent subcultures. According to Cloward and Ohlin's differential opportunities theory, three types of subcultures exist depending on their community environment as they provide illegitimate opportunities as well as role models. For example, some frustrated juveniles may join the criminal subculture to achieve monetary success through crime. Others may adopt themselves into a conflict subculture that emphasizes status obtained by showing destructive and aggressive behavior. Still others may seek pleasure from the world by relying on drugs and/or alcohol, without taking any pains to achieve the dominant values of society. This last type of the subculture is called a retreatist subculture.

The works of Cohen (1955) and Cloward and Ohlin (1960) that focus on the subculture of delinquent juveniles appealed to public interest during the 1950s and 1960s (Gilbert, 1986). Juvenile delinquency was one of the most important public issues during that era as general public observed and feared the sharply increasing crime rates of juvenile gangs (Gilbert, 1986). As a result, the works of Cohen and Cloward and Ohlin broadened their influence into crime control public policy during President Johnson's term; they stimulated a handful of projects such as Head Start (1965), Mobilization for

Youth (1961), and Project Follow Through (1967) to equalize legitimate opportunities for disadvantaged social groups (Gilbert, 1986).

However, these early versions of strain theory came under heavy attack for their theoretical limitations and for inconsistent empirical support of their major propositions (Burton, Cullen, & Evans, 1994; Kornhauser, 1978). The central argument of classic strain theories is that people are pressured into crime when they are prevented from achieving culturally-defined goals of material success or middle-class status through legitimate means (Cloward & Ohlin, 1960; Cohen, 1955; Merton, 1938). Traditional strain theorists argue that the pressure to achieve a universal goal under a structural disadvantage creates the discrepancy between aspiration and expectation among lower classes, pushing them to take illegitimate actions. For example, classic strain theorists argue that individuals most susceptible to deviant engagement have high aspirations and low expectations. However, several other researchers have found that crime is most prevalent within groups that adopt both low aspirations and low expectations (Kornhauser, 1978). Moreover, the failure to take into account goals other than monetary success or middle class status, and most importantly, remaining silence on middle-class crime caused strain theory to lose favor as a dominant explanation of crime (Burton & Cullen, 1992).

## **General Strain Theory**

The introduction of general strain theory (GST) in the early 1990s brought strain theory back into the crowded competition of criminological theories. This revitalization of strain theory was led by Agnew (1992, 2001, 2006), who developed the micro-level theory of crime in a series of articles in the late 1980s. Acknowledging the conceptual limitations of classic strain theories, which focused narrowly on structural conditions to explain the source of strain, Agnew attempts to categorize the source of strain within a broader socio-psychological context. Specifically, the core of the revised strain theory concentrates on human perceptions. And this shift can be easily inferred from Agnew's definition of strain as a "relationship in which others are not treating the individual as he or she would like to be treated" (Agnew, 1992, p. 48). By focusing on human interactions, the scope of strain theory could be freed from the fetters of the conventional boundaries of social structure, since almost all individuals experience various types of chronic stress or everyday hassle, regardless of SES status, race, gender, or age. Agnew reconceptualized strain theory by outlining three categories of strain: the failure to achieve positively valued goals, the removal of positively valued stimuli, and the presentation of negatively valued stimuli.

According to GST, the strains generated from negative relationships with others affect delinquent behavior indirectly. Unlike classic strain perspectives, which hypothesize that strains impact an individual's criminal response directly, GST proposes

an indirect effect of strain on delinquency through negative emotions. When individuals are strained, they are likely to experience a range of negative emotions including anger, depression, anxiety, frustration, and pressure to take corrective action (Agnew, 1992). And among these negative emotions, anger has been generally linked with crime and delinquency within GST's domain (Agnew, 1992).

Another important aspect of the revised strain theory rests in its identification of conditional processes between strain and delinquency. Agnew (1992, 2001) recognizes several factors that are expected to enhance or diminish the effect of strain on delinquent outcomes. Specifically, Agnew (2001) posits numerous internal and external factors such as self-esteem, self-efficacy, intelligence, social support, moral beliefs, prior delinquency, and association with delinquent peers, to condition the relationship between strain and delinquency. Including the effects of conditioning on the relationship between strain and delinquency advances GST by helping researchers to help explain who is more likely to respond to strain with delinquent acts.

In sum, in recognition of the damaging criticisms of the concept of strain of classic strain theories, Agnew (1992) re-conceptualized strain by broadening its scope and specifying its types. Furthermore, he develops new functioning mechanisms of strains by incorporating negative emotions and potential conditioning factors. In the following sub-sections, each major component and assumption is illustrated in detail.

## **Central Concepts within General Strain Theory**

### **Three Types of Strains**

One of Agnew's noteworthy contributions from his earlier revised strain theory has been a separation of strains into three categories. While classic strain theorists directed most of their attention to one type of strain, the disjunction between socio-economic goals and legitimate means to achieve those goals, Agnew (1992) redefined and expanded the concept of strain by identifying and describing three types that may lead to illegitimate behavior.

The first type of strain, the failure to achieve positively valued goals, shares some common ground with the original assumptions of classic strain theory, which emphasized that strain arises from goal-blockage of economic success or middle-class values (Agnew, 1992). To help further identify this type of strain, Agnew (1992) proposes two subcategories to capture this concept: (1) measuring the disjunction between expectations and aspirations and disjunction and (2) between just and fair expectations and actual outcomes. Although strain from monetary success is still a sizable portion of this failure, Agnew also acknowledges that strain may arise from blocked opportunities for non-economic goals, such as autonomy and masculinity (Agnew, 2001). The second type of strain is the removal of positively valued stimuli. After reviewing the stress and aggression literature, Agnew (1992) introduced this type of strain as he revealed that

strain-inducing life events, such as a break up with significant other, a transfer to a new school, or the divorce or loss of parents may generate strain. This type of strain can lead to negative emotions and delinquency. The third type of strain, the presentation of negatively valued stimuli, arises when the individual faces adverse situations, such as crime victimization or a physical/emotional assault from loved ones. Drawing from stress and psychological literature that focuses on the adolescent population, Agnew notes that confrontation with such negative life events may drive adolescents to “(1) escape from or avoid the negative stimuli; (2) terminate or alleviate the negative stimuli; (3) seek revenge against the source of the negative stimuli or related targets, ... (4) manage the resultant negative affect by taking illicit drugs (Agnew, 1992, p.58).”

Taken together, in his seminal work in 1992, Agnew primarily focused on categorizing the types of strain that may lead to deviant behavior. And unlike classic strain theory, GST posits that there are multiple sources of strains that cause delinquency.

Past research examining the strain-delinquency link accumulated fairly strong empirical support for the direct effects of one or more types of strain on delinquency<sup>1</sup>

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<sup>1</sup> Although investigating the impact of individual types of strain seems to be most useful to understand which independent type has the strongest influence on delinquent acts, the current study does not attempt to identify the effect of each category of strain separately due to the fact that the majority of strain measures used in previous studies is not type-specific. Most previous studies employed cumulative measure of strain that embraces more than one dimension of strain types. For example, one of the most popular strain measures used in existing strain literature is *negative life events*. Researchers generally gauged this measure of negative life events by counting the number of events experienced by respondents. These events generally tap into more than one dimension of strain such as death of a close friend (loss of positively valued stimuli) and beating by peers (presentation of negative stimuli), which makes it difficult to classify this variable into individual types of strain. The use of a composite measure of strain in existing literature is driven by the theoretical orientation outlined in Agnew's (1992) earlier work. Agnew, in his seminal work in 1992, asserts that subsequent research should employ a composite measure of strain since different types of strain have a cumulative impact on deviant behaviors.

(Agnew & White, 1992; Aseltine, Gore, & Gordon, 2000; Bao, Haas, & Pi, 2004, 2007; Baron, 2004; Brezina, 1996; Broidy, 2001; Capowich, Mazerolle, & Piquero, 2001; Hay, 2003; Hoffmann & Miller, 1998; Jang & Johnson, 2003; Mazerolle, 1998; Mazerolle & Maahs, 2000; Mazerolle, Piquero, & Capowich, 2003; Moon, Morash, McCluskey, & Hwang, 2009; Morash & Moon, 2007; Paternoster & Mazerolle, 1994; Piquero & Sealock, 2000, 2004; Slocum, Simpson, and Smith, 2005). For instance, Agnew and White (1992) examined the direct impacts of several types of strain on delinquency and drug use. Using samples of adolescents from the Rutgers Health and Human Development Project, they found a positive relationship between five types of strain (negative life events, life hassles, negative relationship with adults, parental fighting, and living in an unsafe neighborhood) and two outcome variables. Agnew and White (1992) also report the presence of negative life events and life hassles to be significantly associated with both delinquency and drug use, even after inputting social control and social learning variables such as parental attachment, parental permissiveness, school attachment, peer attachment, and peer delinquency in the model. Similarly, using 1,525 adolescents from two waves of the National Youth Survey, Paternoster and Mazerolle (1994) provide evidence that supports Agnew's basic assumption of a strain-delinquency relationship. Neighborhood problems, negative life events, negative relationships with adults, and hassles at school and with peers were found to be significant predictors of delinquent behaviors (Paternoster & Mazerolle, 1994). Likewise, Hoffmann and Miller (1998), using latent variable structural equation modeling to analyze longitudinal data

from the Family Health Study, found that negative life events are a significant predictor of changes in delinquency. Experiencing negative life events, which tap into the realm of presentation of the negatively valued stimuli and the removal of positively valued stimuli, had noticeable impacts on changes in deviance.

To this point, empirical findings at the early stage of GST revealed strong support for the baseline strain-delinquency model of GST. Overall, the evidence supporting the presence of cumulative or type-specific effect of strain is salient on several types of deviant acts, with the strongest relationship between negative life events and violent delinquency (Aseltine et al., 2000; Jang & Johnson, 2003; Moon et al., 2009; Paternoster & Mazerolle, 1994; Tittle, Broidy, & Gertz, 2008).

### **Objective and Subjective Strain**

While the primary focus of Agnew's initial effort in 1992 was to identify and categorize a broad range of strains into three distinctive, but not mutually exclusive, types, Agnew's 2001 study is more focused on providing guidelines to identify the types of strains that are most conducive to delinquency and crime. As part of these new categories, Agnew distinguishes between subjective strain and objective strain. According to Agnew, objective strains reflect events or conditions that are assumed to be perceived as stressful by most people, while subjective strains refer to events or conditions that are assumed to be disliked by people who have experienced them. After



reviewing the broader literature on stress and strain, Agnew notes that “individuals often differ in their subjective evaluation of the same objective strains (Agnew, 2001; 321).” And he lists range of potential factors, such as irritability, self-efficacy, self-esteem, social support, goals, and identities that are likely to condition such subjective evaluations of events and conditions.

When people experience strains that are generally deemed to be noxious, they find their own way to ease their pain, and consequently, such corrective responses to those situations vary depending on personal subjective evaluations and their resources to cope with these situations. Some may react in a delinquent manner while others find pro-social ways to deal with strains. For example, receiving bad grades in school should be an event typically disliked by most students. However, individuals who do not care much about grades may not be as affected by the experience as other, more committed students. Although both objective and subjective strains may produce negative emotions, Agnew (2001) contends that subjective strains exert a stronger influence on behavioral outcomes than objective strains. Since subjective strains are more prone to generate negative emotions, he suggests future studies to measure both objective strain and subjective strain to separate the effect of presumed negative events by researchers with subjectively perceived negative events by those who experienced.

In short, Agnew (2001) suggests that subjective strains should be more related to delinquent outcomes than objective strains, since the former involves subjective evaluations of events that combine personal assessments of unjustness and magnitude.

Previous research on subjective strain is relatively scarce. In contrast to the abundant empirical attention paid to objective strain (Agnew & White, 1992; Aseltine et al., 2000; Baron, 2004; Broidy, 2001; Capowich et al., 2001; Hoffmann & Miller, 1998; Jang & Johnson, 2003; Mazerolle & Maahs, 2000; Mazerolle & Piquero, 1997; Morash & Moon, 2007; Paternoster & Mazerolle, 1994; Piquero & Sealock, 2000, 2004) only ten existing studies (Baron, 2004, 2007; Botchkovar, Tittle, and Antonaccio, 2009; Ellwanger, 2007; Froggio and Agnew, 2007; Hay, 2003; Landau, 1997; Moon, Blurton, & McCluskey, 2007; Moon et al., 2009 ; Slocum et al., 2005) used *at least* one of their independent variables as a subjective measure of strain.

Research employing subjective measures of strain has generally been supportive of Agnew's argument that this type of measure is a critical component of the GST. Froggio and Agnew (2007), for example, captured strain by allowing respondents to provide subjective evaluations of their past traumatic events. Using a sample of Italian youths between the ages of fifteen and twenty-five, they found positive and significant relationships between subjective strains and crime, as well as notable variations in the respondents' subjective evaluations of negative life events. Specifically, Froggio and Agnew (2007) found that respondents who reported high negativity ratings for "school failure" and "romantic breakup" were significantly more closely associated with crime than those who reported low negativity in the same scale. This result is similar to another study (Moon et al., 2009), which employs three out of eight strain variables to be subjective measures in their model. Results of their analysis indicated that exam-related

strain, which was measured by respondents' subjective evaluations of three items, had a stronger impact on violent delinquency than other objective measures of strain included in the model. (Moon et al., 2009). Although the primary goal of the study was not to explore the relationship between subjective strain and objective strain, using a sample of homeless youths, Baron (2004) reported interesting findings. While "monetary dissatisfaction" and "relative deprivation" which were measured to evaluate respondents' perception of their financial situations were found to have significant effects on both anger and crime, "unemployment," the objective measure that is generally utilized to capture financial difficulty, failed to support GST.

Overall, research examining the subjective measurement of strain and delinquency suggests that experiencing a high level of subjective strain is positively and significantly associated with delinquent outcomes. It should be noted that past studies have a wide range of different emphases in terms of population (Canadian homeless youths by Baron, 2004, 2007; Italian youths by Froggio & Agnew, 2007; licensed drivers in northwestern region of the U.S. by Ellwanger, 2007; residents from Ukraine, Russia, and Greece by Botchkovar et al., 2009; high school students from a southwestern city of the U.S. and South Korean middle school students by Moon et al., 2007), types of subjective strains (driving strain by Ellwanger, 2007; strain from emotional distance from parents or romantic breakup by Froggio & Agnew, 2007; exam-related strain by Moon et al., 2009; family strain by Hay, 2003; monetary strain by Baron, 2004, 2007), and types of delinquency (composite measure of delinquency by Froggio & Agnew, 2007;

projected future delinquency by Hay, 2003; Botchkovar et al., 2009; traffic delinquency by Ellwanger, 2007; property crime, violent crime, total crime, and drug use by Baron, 2004, 2007; violence, property, and status delinquency by Moon et al, 2009 ). As a result, it is hard to generalize from these findings. Nevertheless, these subjective strain research studies revealed promising evidence that subjective measures of strain are more likely to be associated with delinquency than objective measures of strain. To be sure, as suggested by Agnew (2001), future research should employ measures of both objective strain and subjective strain to “examine individual and group differences in both the exposure to external events/conditions likely to cause strain and the subjective evaluation of those events/conditions (Agnew, 2001, p. 322).”

### **Negative Emotions**

According to GST, individuals who experience strain are likely to respond to this with a broad range of negative emotions including anger, depression, frustration, fear, and anxiety. In particular, when one or more negative emotions are developed in response to strain, internal pressure for corrective action activates multiple types of coping behavior, including delinquent forms (Agnew, 1992). In other words, when individuals are depressed or angered as a result of strains, they may be compelled to adopt criminal coping behaviors if legitimate strain-alleviating means are not present or if illegitimate means with more anticipated benefits are present (Agnew, 1992). In this way, GST

deviates from classic strain theories by positing an indirect influence of strain on delinquency. Whereas classic theories hypothesize the impact of strain is direct, GST suggests that negative emotions mediate the relationship between strain and delinquency.

Of the various types of negative emotions, anger is known to stimulate criminal behavior (Agnew, 1992). Agnew states that anger may increase a criminal response because it “creates a desire for retaliation/vengeance, energizes the individual for action, and lowers inhibitions, in part because individuals believe that others will feel their aggression is justified” (p.60). Agnew (2001) adds later that anger may motivate delinquent behaviors because “it disrupts cognitive processes in ways that impede noncriminal coping (p. 327).” In other words, anger blocks an individual’s capacity to deal with strain in a constructive manner.

The revised contemporary strain perspective recognizes that negative emotions create an important link between strain and delinquency, and specifies how a wide range of strains trigger offensive behaviors by intervening negative emotions between strain and crime.

Empirical evaluations examining the intervening effects of negative emotions offer somewhat mixed support. Brezina (1996) investigated the effectiveness of delinquent coping as an adaptation to relieve unpleasant situations. In doing so, he examined changes of negative emotions in response to strains, using samples from the second and third waves of the Youth in Transition study. Brezina (1996) discovered that strains do lead to a variety of negative emotions such as anger, depression, anxiety, and

resentment. He also found that the youths who report involvement in various types of delinquency were able to assuage negative emotions propelled by negative experiences, as compared to youths who did not adopt delinquent coping (Brezina, 1996).

Subsequent studies that have included a measure of negative emotion mostly focused on the mediating premise of GST. More recently, Mazerolle et al. (2003) observed that anger operates as a mediator between strain and intentions to assault. In addition, Bao et al. (2004), using a sample of 615 Chinese students, also confirmed the significant mediating role of anger between negative stimuli and delinquent behaviors such as violent, property, and school related deviance. Furthermore, research has attempted to assess GST hypotheses with various populations. For example, Piquero and Sealock (2000) sampled adjudicated youths to assess the mediation effect of negative emotions, particularly anger and depression, on both violent and property offenses. Using a composite scale of strain, they found that anger had positive correlation with violent offenses, while it failed to influence property crime (Piquero & Sealock, 2000).

However, other researchers have called into question the hypothesis that negative emotions mediate the influence of strain on crime. Inconsistent with the aforementioned studies, other research found a weak or null effect of mediation from negative emotions. Mazerolle and Piquero (1998), for example, attempted to determine whether strain operates through negative emotions to influence respondents' intentions to deviate using offense scenario methodology. In an analysis using 429 undergraduate students, a negative emotion, specifically anger, failed to emerge not only as a mediator to explain

the intention to drink and drive or shoplift but also as a significant predictor of intentions to fight (Mazerolle & Piquero, 1998). In the case of intention to fight, the impact of strain operated through anger as GST posits; however, this mediating hypothesis was not true for other deviant outcomes. Moreover, inclusions of other variables, such as weakened moral beliefs and exposure to delinquent peers, rendered the initially significant association between strain and shoplifting an insignificant relationship, suggesting that strain may rather operate through other factors than anger (Mazerolle & Piquero, 1998). Mazerolle, Burton, Cullen, Evans, and Payne (2000) used self-reported data of high school students to test whether strain has direct or indirect effects. They found, however, that anger did not have a mediating effect between strain and delinquency outcomes. Contrary to theoretical expectations, they discovered that strain mediated the impact of anger on violence. Later work by Tittle and his colleagues also questioned this GST premise. In a test of a mediating hypothesis, they revealed that negative emotions do not mediate the relationship between a general measure of strain and a composite measure of projected offenses (Tittle et al., 2008).

For GST, negative emotions are an important mediating construct that link strain with deviant acts. Unfortunately, previous studies on the mediating effect of negative emotions seem to provide only limited support and call for further research to understand a clear pathway of GST formulation. However, drawing from the accumulated findings on the role of negative emotions so far, empirical findings seem to be supportive, at least, on the mediating effect of anger on violent offenses (Bao et al., 2004; Broidy, 2001;

Paternoster & Mazerolle, 1994; Mazerolle et al., 2003; Mazerolle & Maahs, 2000; Moon et al., 2009). Prior literature on GST that utilized negative emotions in the model generally report that strain-induced anger provides motivation for violent offenses (Moon et al., 2009).

### **Conditioning Influences**

The effect of strain on delinquent acts is not deterministic. Strain does not necessarily yield criminal outcomes. Generally, strained individuals make positive and legitimate choices to alleviate discomfort from strains and negative emotions. For example, individuals may minimize discomfort by talking to close family members (emotional coping), engaging in physical activity (behavioral coping), or by comforting oneself that “it is not that bad” (cognitive coping). Unfortunately, not all individuals possess internal coping skills or the external resources to cope with strain in a nondelinquent manner. Those with limited skills or resources may rely on illegitimate means to cope. Moreover, if use of delinquent coping is favored over nondelinquency coping in terms of benefits of outcome, they may resort to anti-social manner.

Agnew (1992) discusses several personal resources that are likely to amplify or suppress the effect of strain on delinquency and crime depending on types of resources. According to Agnew (1992, 2001), the adaptation of delinquent coping depends on several factors of personal characteristics or social resources, such as self-esteem, self-



efficacy, intelligence, social support, moral beliefs, prior delinquency, and association with delinquent peers. For example, individuals with a high level of self-esteem, self-efficacy, intelligence, social support, and/or moral beliefs are more likely to embrace a conventional manner to cope with strain; these traits are known to be negatively associated with delinquency and crime. On the other hand, individuals with a history of delinquency or with strong affiliations to delinquent peers are more likely to adopt deviant coping behaviors since they may be no stranger to the easy benefit of delinquency from past experiences, or because they are more exposed to “role models” and opportunities for crime.

In essence, GST contends that the impact of strain on delinquency may increase or decrease depending on the availability of various internal and external resources.

In trying to affirm the conditionings mechanisms proposed by Agnew, researchers focused on self-efficacy (Agnew & White, 1992; Bao et al., 2007; Baron, 2004; Jang & Johnson, 2003), self-esteem (Aseltine et al., 2000; Bao et al., 2007; Baron, 2004; Jang & Johnson, 2003), parental attachment (Moon & Morash, 2007; Moon et al., 2009), peer attachment (Piquero & Sealock, 2004), peer delinquency (Agnew & White, 1992; Aseltine et al., 2000; Bao et al., 2007; Baron, 2004; Mazerolle & Maahs, 2000; Moon & Morash, 2007; Moon et al., 2009; Piquero & Sealock, 2004, Tittle et al., 2008), and religiosity (Botchkovar et al., 2009; Jang & Johnson, 2003) as potential moderating factors. Although a number of studies examined this GST hypothesis, previous empirical research on GST can offer only tentative support for this hypothesis. Agnew and White

(1992) conducted the first study to analyze conditioning influences in the model and found that two interactional terms, strain with self-efficacy and strain with delinquent peers, conditioned the impact of strain on delinquency in the hypothesized direction. Adolescents with many associations with delinquent peers reported more involvement in delinquency and drug use than those with fewer associations (Agnew & White, 1992). Hoffmann and Miller (1998) attempted to scrutinize conditioning effects on the relationship between strain and delinquency using a structural equation modeling technique. Though the findings reported by Hoffmann and Miller confirm the basic hypothesis that strain affects the probability of delinquency, analysis of conditioning effects using self-efficacy, self-esteem, and delinquent peers fails to support GST's conditioning predictions. Contrary to the findings from Agnew and White (1992), the conditioning assumption of GST was not supported by Hoffmann and Miller's test using three year longitudinal data. Similarly, using a sample of 150 adjudicated youths, Piquero and Sealock (2000) assessed the conditioning influences of five types of coping skills with depression and anger by adding multiplicative interaction terms in the model. Their cross-sectional analysis revealed no significant effect of interactional terms for interpersonal delinquency, failing to support the conditioning aspect of GST (Piquero & Sealock, 2000). More recently, pinpointing social support and criminal peer associations as potential conditioning factors that may change the effects of strains on projected offenses, Tittle et al., (2008) created interactional terms between each strain with the two aforementioned conditioning factors. Their interactional terms failed to support the

conditioning hypothesis of GST. However, the study has a shortcoming regarding measuring variables. They relied on single item indicators to measure three types of strain as well as some of the other relevant variables, potentially failing to capture a complete picture of the underlying construct.

Unlike the studies referred to above, other findings have supported the conditioning hypothesis. Mazerolle et al. (2000) have made the argument that youths who were exposed to strain were more likely to engage in deviant behavior when they had low levels of social bonds and higher levels of interaction with delinquent peers. Mazerolle and Maahs (2000) conducted a study using samples from the National Youth Survey to test the conditioning hypothesis. Like Mazerolle et al. (2000), the authors found that exposure to delinquent peers, lack of moral beliefs, and a behavioral propensity toward delinquency condition the association between composite strain and delinquent acts, both cross-sectionally and longitudinally (Mazerolle & Maahs, 2000). Using the first two waves of a longitudinal panel study on South Korean students and applying negative binomial regression and zero-order correlation statistical models, Moon et al. (2009) found results consistent with prior literature supporting the conditioning influences. Moon and his colleagues reported empirical evidence for the conditioning influence of positive relationships with parents and problem solving ability on property delinquency.

In sum, researchers have not reached a consensus regarding the moderating hypothesis – a subject that warrants further investigation. One possible reason for these mixed findings could be the fact that several prior studies that investigated conditioning

effects used measures that are comprised of a single item, failing to fully embrace the full range of the concept. Another reason regarding measurement issues could be related to the prevailing use of cumulative strain index in previous studies; this index may camouflage interactional effects between certain types of strain within this overall strain scale and conditioning factors (Baron, 2004). The last methodological reason could be associated with measurement error since the majority of the existing research employed several types of regression techniques that are vulnerable to measurement error which may result in attenuation of regression coefficients.

There is another possible reason, a theoretical gap, why many studies revealed mixed findings. This inconsistency may reflect the shortcomings of a theoretical construct. Agnew (1992, 2001) proposes that several internal and external factors condition the effect of strain on delinquency. However, considering the fact that negative emotions are hypothesized to intervene in the causal relationship between strain and delinquency, two opportunities for a moderating impact exist: (1) between strain and negative emotions and (2) between negative emotions and delinquency. It is possible that, depending on types of conditioning factors, the location of moderation may vary. For example, we can speculate that self-efficacy may exert its influence between strain and anger in that a high level of self-efficacy may restrain the emergence of negative emotions by boosting an individual's confidence that he or she has the capability to handle such trouble. On the other hand, we can contemplate that peer delinquency may cause a different relationship between negative emotions and delinquency because strong

affiliations with delinquent peers may provide opportunities and “role models” for strained individuals to cope in a delinquent manner. Inconsistent findings from previous studies that investigated this hypothesis may be due to this unspecific nature of GST. Agnew does not provide a clear mechanism where exact moderations are expected to occur. Future studies should examine this issue by assessing whether the conditioning influence of several factors is likely to occur within the strain-delinquency link or anger-delinquency link in a factor-specific manner.

### **Gender and GST**

Important recent extensions in the study of GST center on two themes. The first major derivative approach is to focus on gender differences in understanding crime and delinquency within the GST context. Broidy and Agnew (1997) attempt to explain gender differences in crime rate using GST. They propose three hypotheses why males tend to commit more crimes than females (Broidy & Agnew, 1997). According to Broidy and Agnew (1997), (1) females and males may experience different types and/or amounts of strain, (2) females and males may have a different emotional response to strain, (3) males are more likely to respond to strain and negative emotions in an illegitimate manner. In other words, one explanation why females’ exhibit less deviant behavior might be related to the amount and/or types of strain they experience. It is possible, also, that, females may have different emotional response to strain, compared to males. Females may feel

less angered than males or feel different types of negative emotions, such as guilt, shame, or depression when both groups are exposed to similar types and/or levels of strain.

In sum, Broidy and Agnew (1997) contend that females and males follow similar pathways as hypothesized by GST in that strains generate several types of negative emotions that may lead to delinquency, and that this relationship can be conditioned by various personal and social factors (Piquero & Sealock, 2004). That is, typically, strains that females experience tend to be less criminogenic, and females tend to blame themselves and internalize anger rather than expressing it outwardly and blaming someone else. Furthermore, having high self-efficacy and conventional support from the surroundings, as well as low opportunities to commit crime, females may react in a more legitimate manner in dealing with strains than males (Broidy & Agnew, 1997).

A number of researchers have examined the hypothesized premises set by Broidy and Agnew (1997). Using 1,498 samples from first two waves of the National Youth Survey, Mazerolle (1998) explored gender differences by analyzing models separately for males and females and found that measures of negative life events, neighborhood problems and traditional strains are similar in level of exposure to both gender groups, implicating that gender gap in crime rates may depend on different quality of strain females and males experience. Mazerolle (1998) compared the mean differences across gender groups to see whether males are exposed to higher levels of strains than females, and found that measures of negative life events, neighborhood problems and traditional strains are similar in the level of exposure to both gender groups. Negative relations with

adults were the only reported strain that suggested males are substantially more exposed to strain compared to females (Mazerolle, 1998). At the second stage of the analysis, Mazerolle (1998) compared predictors of delinquency for both females and males. The analysis provided evidence that negative relations with adults had a positive effect on delinquency for females and negative life events had a positive effect on males.<sup>2</sup> At the final stage of the analysis, Mazerolle (1998) subdivided a measure of delinquency into two sets of dependent variables: property and violent delinquency, and found that negative life events are a significant predictor of violent delinquency for males while not necessarily for females.

In a related study, Piquero and Sealock (2004) tested Broidy and Agnew's (1997) gender hypotheses using samples of youths with history of involvement with juvenile justice system. They included two types of negative emotions (anger and depression) to further explore the previously untested Broidy and Agnew's (1997) hypothesis that females may experience different types of negative emotions compared to males. Using mean difference test between both gender groups, Piquero and Sealock (2004) found consistent findings from Mazerolle (1998) that there is no significant gender differences in terms of the amount of strain each gender group experiences. Contrary to a theoretical expectation, however, they found that females tend to report higher levels of both anger and depression than males (Piquero & Sealock, 2004). Again, the mediating role of

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<sup>2</sup> However, these results only show that each predictor is significant within gender groups. By comparing the regression coefficients of females and males for predictors, Mazerolle (1998) did not find any significant results at a conventional p-level of 0.05.. "Negative life events" was a stronger predictor of delinquency for males at lower level of significance of .10 (Mazerolle, 1998).

negative emotions was not found or was very weak for both gender groups (Piquero & Sealock, 2004).

According to Broidy and Agnew (1997), the effect of strain on delinquency may vary by gender groups depending on several types of conditioning factors. In an attempt to assess this prediction, Jang (2007) recently explored the role of conditioning influences using cross-sectional data from the National Survey of Black Americans. Jang (2007) found evidence from 1,250 female African Americans that females and males differ in the types of strain they experience. However, similar to the findings of Piquero and Sealock (2004), empirical evidence did not support the conditioning hypothesis as most of the potential factors, including self-esteem, self-efficacy, social support, and religiosity, failed to function as Broidy and Agnew expected (Jang, 2007).

Morash and Moon (2007) provide another test on gender and conditioning factors using a sample of South Korean youth and employing a broader range of strains (i.e., negative life events, emotional and physical abuse by parents, emotional and physical abuse by teachers, exam-related stress, grade, and financial strain) and delinquency measures (i.e., property, violence, and status delinquency). The interaction terms between abuse by teachers and affiliation with delinquent peers were found to be the strongest predictor of violent offenses for both females and males (Morash & Moon, 2007). This is an interesting finding because strain from teacher abuse, which was found to be a significant predictor of delinquency for both gender groups, was rarely used in the U.S.



context whereas it was consistently reported to be a strong indicator in the South Korean context.

### **International Efforts**

The other contemporary theme in GST research involves testing GST hypotheses in different cultural contexts outside the U.S. Agnew (1992) developed a general theory that posits that a broad range of strains lead to negative emotions and ultimately to deviant behavior. He believes that under this mechanism, GST should be applicable to all types of offenses and all socio-demographic classes under any circumstances. Much previous evidence confirms a correlation between strain-induced anger and violent crime (Agnew & White, 1992; Aseltine et al., 2000; Mazerolle et al., 2000; Paternoster & Mazerolle, 1994; Piquero & Sealock, 2000) and strain-induced depression and drug use (Ford & Schroeder, 2009) as well as strain and some types of white-collar crime (Langton & Piquero, 2007). Prior research has also indicated that GST is applicable to a broad range of populations. Many studies revealed supportive findings using domestic youth populations (Agnew & White, 1992; Aseltine et al., 2000; Brezina, 1996; Mazerolle & Maahs, 2000; Paternoster & Mazerolle, 1994), college students (Broidy, 2001; Capowich et al., 2001; Mazerolle & Piquero, 1998), homeless youths (Baron, 2004), and offender populations (Hoffmann & Miller, 1998; Piquero & Sealock, 2000; Slocum et al., 2005). Moreover, a number of researchers have tested GST on issues

regarding gender (Broidy & Agnew, 1997; Hay, 2003; Jang, 2007; Morash & Moon, 2007; Slocum et al., 2005) and race (Jang & Johnson, 2003).

If the theory is as general as its name suggests, GST should be also able to explain the nature and variation of crime outside the U.S. context. Although a cross-national approach to understand the nature of crime is not new in criminology, it has only played a marginal role so far, receiving little empirical attention (Bennett, 2004; Liu, 2007). However, quantitative interest in a cross-national approach has increased significantly in past two decades (Howard, Newman, & Pridemore, 2000). While a substantial proportion of criminological theories that have originated in the U.S context attempt to explain crime variation by emphasizing the U.S.-unique structural or subcultural mechanisms, GST allows researchers to replicate its major propositions with minimum structural constraints as it tries to locate the source of strain from human interactions (Bao et al., 2004).

Similar to other U.S.-originated criminological theories, quantitative tests of GST have been greatly concentrated in Western contexts until the dawn of the twenty-first century. However, a line of studies within the past ten years has been devoted to testing GST propositions in different cultural settings. Seven studies are known to use samples from foreign populations. And among those seven studies, two are from European countries (Botchkovar et al, 2009; Froggio & Agnew; 2007) and five are based in Asian nations (Bao et al., 2004, 2007; Botchkovar et al., 2009; Moon et al., 2007; Moon et al., 2009; Morash & Moon, 2007).

Interestingly, studies conducted with foreign samples tend to report more conclusive and consistent findings compared to those from a U.S. context, thereby supporting most of major hypotheses of GST. When testing the baseline model of GST, international studies generally found consistent and positive relationships between several types of strain and delinquent behaviors (Bao et al., 2004, 2007; Moon et al., 2008; Moon et al., 2009; Morash & Moon, 2007). For example, Moon et al. (2008) found that both older and recent strains including parental punishment, teacher punishment, financial strain, bullying, and criminal victimization were significant predictors of the general measure of delinquency (Moon et al., 2008). In terms of the mediating role of negative emotions, among five prior studies that assessed a mediating tenet, three reported findings that support the GST prediction. When Bao et al. (2004) tested the intervening effects of negative emotions such as anger, resentment, anxiety, and depression, they found that anger functions as the strongest mediator between strains that originate from negative relations and delinquent variables. Similarly, Moon et al. (2009) recently, noted that situation-based negative emotions, which were measured by asking respondents about their emotional reaction to each type of strain they experienced, found significant mediating effects on the relationship between negative emotions and three types of offenses (violent delinquency, property delinquency, and status delinquency).

On the other hand, two other research streams provided only limited evidence of the role of negative emotions. For instance, Botchkovar et al. (2009) tested a mediating model using random samples from three European countries with projection methodology

which were used to capture criminal probability under several types of scenarios and found that anger does not have a significant mediating effect on the connection between objective strain and projected criminal acts nor on the connection between subjective strain and projected criminal acts.

Four recent studies examined the conditioning effect between strain and delinquency using foreign samples (Bao et al., 2007; Botchkovar et al., 2009; Moon et al., 2009; Morash & Moon, 2007), and they offer tentative support for the conditioning influences that the effect of strain on delinquency may vary depending on internal or external factors available to individuals.

Using samples of South Korean youth, Morash and Moon reported that the effect of multiplicative interactional term between teacher abuse and delinquent peers, which was created to observe the moderating effect, is the strongest predictor of violence for both males and females (Morash & Moon, 2007). Moon et al.'s 2009 study also supports Agnew's conditioning hypothesis. Using longitudinal data on 659 South Korean youth, authors found that positive relationships with parents condition the relationship between various strains and both violent and status delinquencies. That is, youths who report a positive relationship with their parents tend to engage less in both types of delinquency than those who reported less attachment to their parents (Moon et al., 2009). Unlike the studies referenced above, other studies showed mixed support for the hypothesis. For instance, Botchkovar et al. (2009) used random samples from Russia, Ukraine, and Greece to examine the conditioning influences of religiosity and self-control by creating

interactional terms with two types of strains; objective or subjective. Among 24 possible combinations between strain measures and potential conditioning factors for all three countries, only two coefficients were observed to be significant, providing almost null support for the conditioning hypothesis of GST (Botchkovar et al., 2009). Thus, their findings reveal that the effect of strain may be a direct predictor crime probability regardless of individuals' level of self-control or religiosity.

As can be seen above, studies based on samples from outside the U.S. enrich the strain literature by providing empirical evidence on major propositions of GST. However, the contribution of these comparative perspectives provides a much greater contribution than theory verification by pioneering unexplored aspects of GST. For example, the study by Froggio and Agnew (2007), which used samples from an Italian population, is the first and only research that has attempted to explore variation in the subjective evaluation of objective strain, and how well objective strain can function as subjective strain. Moreover, only Bao et al. (2007) applied matching perspectives to investigating the conditioning influences of three domains of social support; family, school, and peer groups. That is, Bao et al explored conditioning effects by connecting the source of strain (e.g. stress from school) with the source of social support that corresponds to the same domain with the source of strain to identify whether in-domain sources of social support buffer the effect of strain on delinquency more efficiently than cross-domain or all-domain social support. Furthermore, the most recent study by Moon et al. (2009) advanced GST by providing the most comprehensive GST model yet, which attempts to

examine all key premises by including eight types of objective and subjective strains, trait-based and situational-based negative emotions, and potential conditioning factors (Moon et al., 2009).

Thus, a comparative approach is necessary to develop GST. It will not only provide ample empirical evidence to verify existing hypotheses of GST, but will elaborate and refine the theory as well.

### **GST in a South Korean Context**

The present study argues that South Korean society offers a distinctive social and cultural setting for examining the relationships among strain, anger, conditioning influences and delinquency. Based on the fact from comparative education literature, South Korean youths are under higher levels of chronic and substantial pressure during adolescence as compared to those in U.S (Lee & Larson, 2000), and thus it is expected that empirical findings of the current study will be more supportive to GST hypotheses than U.S-based studies.

One of the strongest characteristics of South Korean culture involves its intense emphasis on education. According to the recent report by the Program for International Student Assessment (PISA), which was developed by the Organization for Economic Cooperation and Development (OECD), South Korean students were among the highest performers in mathematics, reading, and science in 2006. South Korean students at age

fifteen spend approximately eight hours a day studying, placing them at the top of the lists of all OECD countries in studying time (PISA, 2006). Another study revealed that 12<sup>th</sup> grade South Korean students spend approximately 14 to 18 hours a day preparing for the college entrance exam (Chung, 1991). Such high fervor toward academic success emanates from the Confucian values of South Korea, which consider academic success a condition for success in many aspects of life, including employment, marriage, and high social status (Cho, 1995). Hence, there is great deal of pressure on South Korean students to outperform others academically. Lee and Larson (2000) found that compared to American adolescents, those in South Korea spend twice as much time studying and show higher levels of stress and depression in daily activities, such as doing homework and class work. The effect of significant emphasis on education is not only limited to the academic realm. The influence of such focus on education is extensive in South Korean youths' lives.

A few studies have explored the applicability of GST using data collected in South Korea. For example, Moon and his colleagues used 659 South Korean youths to examine the relationships among key strains, situational emotions, trait-based emotions, conditioning influences, and delinquency. Interestingly, they included strain variables that deemed to be relevant in South Korean context, such as a subjective measure of exam-related strain and teachers' use of physical or emotional punishment. Consistent with a previous study that used South Korean samples (Moon & Morash, 2004), both exam-related strain and teachers' use of physical or emotional punishment were found to

be positively and significantly related to violent and property delinquency (Moon et al., 2009). The comprehensive study by Moon et al. takes an important step by accounting for both mediation and moderation processes in their analytic model. However, their study is not without limitations. Among the eight types of strain indicators, three (financial stress, exam-related stress, and gender discrimination) are based on respondents' subjective evaluations, whereas other strain indicators are measured as objective strains. The use of two different scales may make interpretation of the results complex.

### **Gaps in Prior Studies**

Although previous GST research has made important contributions to understanding the dynamic relations among various components of the theory, there are several gaps to be addressed. The first shortcoming involves measurement issues. Most GST tests so far have measured strain by polling respondents on whether they have experienced adverse events or not, assuming that those events will be equally disliked by respondents (Agnew, 2001). According to Agnew (2001), this use of objective strain may have underestimated the effect of strain on crime. Many prior studies also attempted to measure strain by using a single indicator or failing to operationalize the full concept. Although focusing on a small segment of strain (i.e., negative relations with adults) is not without its own advantages, but the inclusion of diverse sources of strain is preferred so as to further identify which types of strains are related to anti-social behaviors.



Second, GST makes predictions about criminal behavior by allowing negative emotions to mediate the effect of strain and several types of personal and social factors to condition the relationship between strain and criminal behavior. Despite of clear theoretical processes, many studies have empirically evaluated GST partially, failing to assess theory as a whole construct. Among over thirty previous studies that assessed the utility of GST, only nine (Aseltine et al., 2000; Baron, 2004; Botchkovar et al., 2009; Broidy, 2001; Jang, 2007; Jang & Johnson, 2003; Moon et al., 2009; Piquero & Sealock, 2000, 2004) analyzed both mediating effect and moderating effect in their model.

Third, many prior studies have utilized various types of regression techniques, such as ordinary linear regression (Bao et al., 2004; Botchovar et al., 2009; Piquero & Sealock, 2000), Poisson regression (Froggio & Agnew, 2007), Tobit regression (Tittle et al., 2008), Logistic regression (Capowich et al., 2001; Mazerolle & Piquero, 1998), Negative Binomial regression (Moon et al., 2009), Multinomial Logistic regression (Langton & Piquero, 2007) to test GST. Unfortunately, multiple linear regression models are susceptible to several problems. Although the core key components of GST (e.g., strain, anger, parental attachment, and self-efficacy) are underlying constructs that cannot be directly observed, most prior strain literature used single indicators or composite measures of indicators in their multiple regressions. This approach may not accurately measure the relationship between constructs because regression techniques are not able to take measurement error into account (Bollen, 1989), and it is well known that ignoring measurement error results in an attenuation of regression coefficients. Furthermore,

standard regression techniques are not well suited to comprehensively study all aspects of GST<sup>3</sup>.

Fourth, among large volume of existing research testing GST, much of it has failed to control important indicators of crime and delinquency such as SES, family structure, urbanity, or past delinquency, to isolate their potential influences on delinquency (Piquero & Sealock, 2000). Controlling factors that are well-recognized as affecting delinquent outcome need to be restrained so that the impact of strain can be properly estimated (Agnew et al., 2002).

Finally, cross-sectional studies are limited in their ability to establish correct causality of GST. Because of the nature of the theory, each component of GST is proximate in terms of time span: strains, negative emotions, conditioning factors, and delinquency are contemporaneous. More specifically, GST posits that stressful events or conditions are less likely to exercise influence after three months (Agnew, 1992). The imminent nature of these conditions made it difficult for GST research to establish a correct temporal order and provided good reason for the prior research using cross-sectional data.

It is important, however, that the alternative option is not without drawbacks since the contemporaneous dynamics among GST components posits a lagged effect of strain to be minimal on delinquency. Even taking the time-sensitive nature of the theoretical construct and difficulty in finding longitudinal datasets with a short time gap between

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<sup>3</sup> For example and discussions on the use of SEM technique to test GST, see Slocum, 2005.

waves into account, using a longitudinal study, or at least a one year follow-up study, is desired.

To sum up, although previous studies documented findings that expanded the understanding of GST, they are not without limits.

## **Chapter 3: The Present Study**

The current study attempts to present an empirical examination of GST by exploring the structural relationships among subjective strains, anger, conditioning factors, and delinquency. While many prior studies on GST generally provided support for its key hypotheses, others raised questions on certain propositions on Agnew's revised theory, calling for more comprehensive investigations that better measure strains (Aseltine et al., 2000; Baron, 2004; Piquero & Sealock, 2004; Moon et al., 2007; Tittle et al., 2008) and negative emotions (Hay, 2003), use clearer theoretical pathways (Morash & Moon, 2007; Piquero & Sealock, 2004), use longitudinal data (Bao et al., 2007; Jang, 2007; Moon et al., 2007; Piquero & Sealock, 2000), take advantage of advanced statistic strategies (Mazerolle & Maahs, 2000), and have a more representative sample (Aseltine et al., 2000; Baron, 2004; Hay, 2003; Jang & Johnson, 2003; Mazerolle & Piquero, 1998). Keeping these suggestions in mind, I employ data from the Korea Youth Panel Survey (KYPS) to construct a more elaborate measurement model of the key components and provide a nationally representative sample of 3,449 students to better understand specific GST mechanisms. A structural equation modeling technique is used to examine GST-specified relationships between both observed (e.g., gender, urbanity) and unobserved (e.g., strains, anger) measures.

The ultimate contribution of the current study lies in its attempt to explore GST using a structural equation model with subjective measures of strains, anger, and several

types of internal and external conditioning factors. Moreover, this study will contribute to both strain literature in the U.S. and delinquency literature in South Korea by utilizing nationally representative sample of youths collected outside the U.S.

Based on GST and on the literature review, the model (see Figure 1) includes the following GST hypotheses:

*H<sub>1</sub>*: Higher level of five types of subjective strain will predict higher level of delinquency.

*H<sub>2</sub>*: Anger will mediate the relationships between five types of subjective strain and delinquency.

*H<sub>3a</sub>*: Students' level of parental attachment will condition the relationship between parental strain and anger as well as the relationship between anger and delinquency.

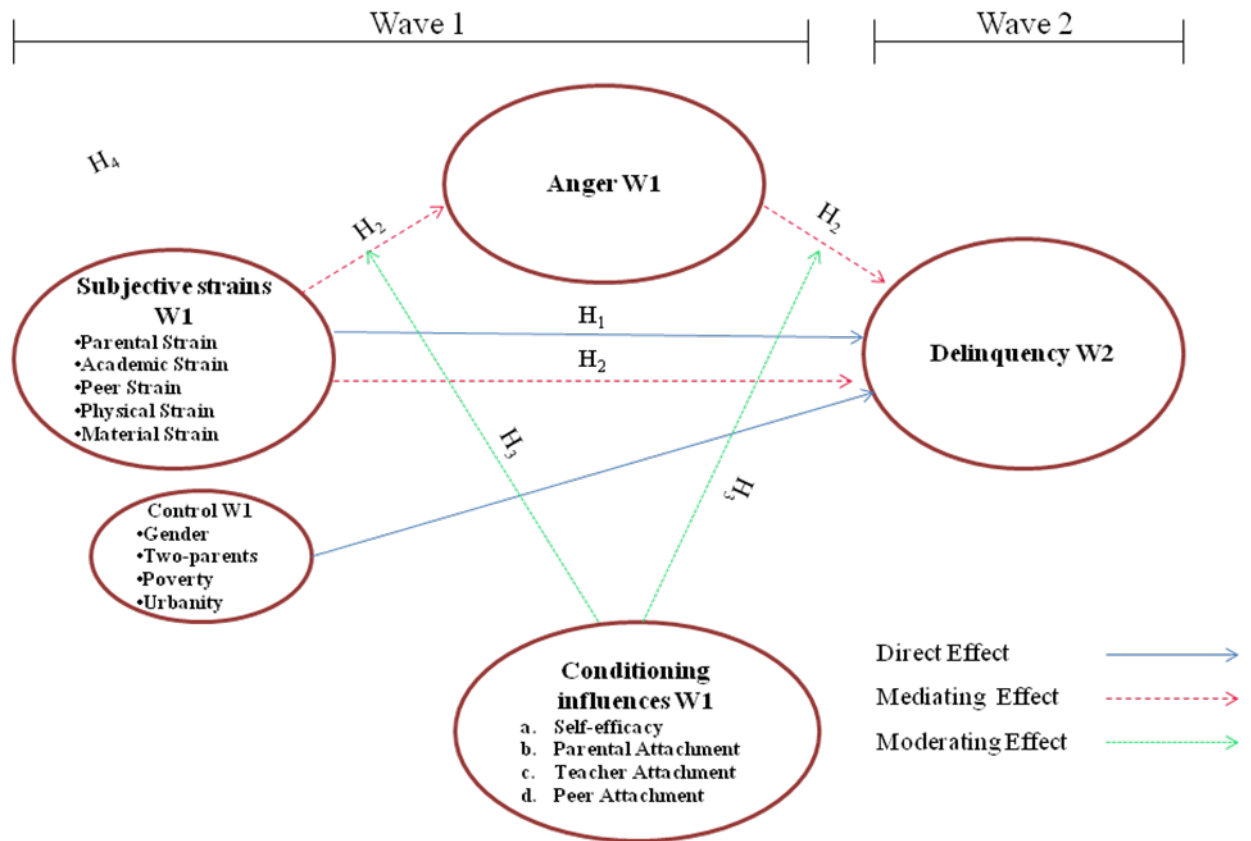
*H<sub>3b</sub>*: Students' level of teacher attachment will condition the relationship between academic strain and anger as well as the relationship between anger and delinquency.

*H<sub>3c</sub>*: Students' level of peer attachment will condition the relationship between peer strain and anger as well as the relationship between anger and delinquency.

*H<sub>3c</sub>*: Students' level of self-efficacy will condition the relationship between peer strain and anger as well as the relationship between anger and delinquency

$H_{3d}$ : Students' level of parental attachment/teacher attachment/peer attachment will condition the relationship between material strain and anger as well as the relationship between anger and delinquency.

Figure 1. Theoretical Model



## Chapter 4: Data and Methodology

### Data<sup>4</sup>

Data for the current study come from the Korea Youth Panel Survey (KYPS; Kyeong-Sang Lee). The KYPS is a nationwide project funded and developed by the National Youth Policy Institute (NYPI) of South Korea. The fundamental purposes of the study are to develop a detailed, longitudinal information base regarding South Korean students and to observe changes in their behaviors, experiences, and attitudes over time in six domains: career selection, education, leisure activities, deviations, ego, and neighborhood environment. This study has collected information annually since 2003. The KYPS contains two cohorts of students; the first cohort is composed of students who were eighth-graders at the time of the study's initiation, and the second cohort entered the study one year later as fourth-graders. Thus far, six waves of data on the first group and five waves on the second group are available to the public.

Each wave of data consists of two survey instruments: face-to-face interviews with participating students (to obtain information about their lives, experiences, and attitudes) and phone interviews with their parents or guardians (to secure demographic information on the students). For the present analyses, data drawn from the first study

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<sup>4</sup> Information presented here regarding the Korea Youth Panel Survey is drawn from the study's web site: <http://panel.nypi.re.kr/eng/>. This site contains more detailed information on the purpose of the study and its data collection methods.

cohort (i.e., students who entered the study as eighth-graders) and their parents or guardians in the first two waves of the KYPS were used.

### **Sampling Procedure**

The target population of the KYPS is extremely large because the study aims to be representative of the whole nation's youth. To launch its first cohort group, the study began by identifying 618,100 eighth-grade students (290,316 females and 327,784 males) registered with the Korean Ministry of Education in 2003. This number represented all eighth graders in the country of South Korea except those residing on Jeju Island.

To create the sampling frame, 2,808 public and private middle schools attended by those 618,100 eighth-grade students were identified from the Report on Education Statistics as of April 1, 2003. Then, a stratified multi-stage cluster sampling technique was applied to the data from all those middle schools. More specifically, the schools in the nation were, first, divided into 12 regions based on their official administrative districts. Next, the number of students to be targeted in each region was set prior to sampling in accordance with that region's proportion of the total student population. Then, the number of schools to select from each region was set based on the target sampling of students. From the complete list of middle schools for each region, a total of 104 schools were selected, using a stratified multi-stage cluster sampling method, for participation in the KYPS project. In the final stage, within each selected school, a whole class was randomly chosen and invited to become part of the study.



Data collection for wave 1 took place between mid-October and mid-December 2003 through face-to-face interviews at the students' convenience.<sup>5</sup> Each interview included questions about behaviors, feelings, careers, educations, friends, and delinquent behaviors. Additionally, as part of each wave, phone interviews with parents or guardians were conducted to obtain demographic information about the students, such as family structure and socioeconomic status. Among the 3,697 students originally contained in the sample, 3,449 successfully completed individual interviews, yielding a response rate of 93%. These original participating students can be regarded as a representative sample of South Korean students at a similar age. The wave 2 data was collected one year later in 2004.

### **Sample Attrition**

As shown in Table 1 below, there was some attrition in the sample between wave 1 and wave 2. Among the 3,449 subjects with valid data from both students and their parents at wave 1, 32 subjects were unavailable for follow-up approximately 12 months later, most of them because they were studying abroad or had emigrated. Of the remaining 3,417 students, about 300 (students or their parents or guardians) refused to continue participating in the KYPS project, reducing the final sample size for wave 2 to 3,106. (See Table 1 for more details regarding the retention rate and reasons for attrition.)

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<sup>5</sup> Field survey work was conducted by the Media Research Company, the contractor hired by the National Youth Policy Institute.

In social science research, missing values are a common problem. Of the 3,106 subjects in wave 2, 390 had at least one value missing from their data. The present study addresses this problem using the expectation-maximization (EM) algorithm (Dempster, Laird, & Rubin, 1977).

According to Schafer and Graham (2002), “The formulation of the EM algorithm made it feasible to compute maximum likelihood (ML) estimates in many missing-data problems.

Table 1. Description of Sample Reduction and Attrition

Survey	Valid <i>N</i>	<i>n</i> (%) of Case Lost	Cumulative <i>n</i> (%) of Case Lost	Reason for Drop Out
Wave 1	<b><i>N</i> = 3,449</b> (The number of eligible panel subjects for Wave 1)			
		32 (1.00)	32 (1.00)	Overseas study or emigration (27) Loss of contact (4) Admission to hospitals (1)
	<b><i>N</i> = 3,417</b> (The number of eligible panel subjects for Wave 2)			
Wave 2		229 (6.70)	261 (7.57)	Refusal (153) Loss of contact after initial contact (51) Proxy answering (23) Athlete camp (2)
	<b><i>N</i> = 3,188</b> (Number of students with valid data)			
		82 (2.64)	343 (9.94)	Refusal of parents (71) Wrong telephone number of parents (8) Prolonged absence of parents (3)
	<b><i>N</i> = 3,106</b> (Number of students with valid data from both students and their parents)			

Rather than deleting or filling in incomplete cases, ML treats the missing data as random variables to be removed from (i.e., integrated out of) the likelihood function as if they were never sampled” (p.148). To minimize the effect of differences between included and excluded cases that may produce biased estimates, missing values in the current study were efficiently handled by employing the EM approach.<sup>6</sup> Previous research on missing data has demonstrated that the EM technique is superior to other conventional solutions such as listwise deletion and pairwise deletion because this emergent strategy shows its strengths in estimating covariance structure in the data over traditional techniques (Schafer & Graham, 2002).

## **Demographic Characteristics**

Demographic information for the sample can be found in Table 2. The participants in this sample were between 13 and 14 years of age, with an average age of 13.75.<sup>7</sup> Of the 3,441 participants, 50.01% were male and 49.99% were female, showing

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<sup>6</sup> Initially, a listwise deletion method was used in the current study to handle missing values. Unfortunately, the use of independent *t* tests (Pearson’s chi-squared for dummy variables) to compare pre-deletion and post-deletion samples indicated that the pattern of missing items in the variables was not completely at random. This result suggests that non-selected students cannot be considered to be a representative subsample of the whole sample. Significant differences were observed in a number of variables between selected subjects and non-selected subjects, illustrating that systematic selection bias could result in biased statistical estimates. Non-selected students reported higher levels of delinquent involvement, peer strain, anger, peer delinquency, and past delinquency, whereas selected students reported higher levels of self-efficacy and parental attachment. In terms of demographic characteristics, non-selected students were less likely to be living with both parents and more likely to live in an urban area than their counterparts. These statistical differences limit the generalizability of the findings of this study.

<sup>7</sup> Although 744 (21.57%) students were aged 13 at the time of the survey, the effect of age gap in terms of involvements in delinquent behaviors is expected to be negligible. The Korean education system has a

an almost even distribution of a gender composition. Approximately, 46% of the students were living in urban areas, with just over half of the students (53.84%) living outside one of the seven largest Metropolitan areas in South Korea. Furthermore, the majority of respondents in the study (96.62%) were living with two parents. Only about 3.4% of students were living with one parent or living alone. Finally, the socioeconomic status indicator suggests most participants (93.84%) were not suffering from financial difficulty in their home.

Importantly, the analysis found statically significant differences between the excluded group and included group on only one (family intactness) of the listed demographic characteristics. In addition, only three out of twelve constructs used in the current study showed statistical differences, indicating that the impact of missingness was marginal at best. Appendix A provides the descriptive statistics and statistical difference between the included and excluded students for each measure used in the current study.

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fixed academic calendar that has the opening day for all mandatory schools set on March 2. Students who have their birthdays prior to this date are required to attend school with students whose birthdays fall in the previous calendar year. In other words, those who were born between January 1st and March 1st enter elementary school a year earlier than those who were born later in the year. Thus, although students beginning school at the same time are born in different years, they are considered to be the same age. In such cases, estimating the age effect on delinquency is unnecessary.

Table 2. Demographic Characteristics and Statistical Difference between Included and Excluded

<b>Variable</b>	<b>N (missing values)</b>	<b>Frequency</b>	<b>%</b>	<b>Significance between included and excluded <math>\beta</math> (<i>p</i>- value)</b>
<b>Age</b>	3,441 (0)			No missing
13		744	21.62	
14		2,697	78.38	
<b>Gender</b>	3,449 (0)			No missing
Male		1,715	50.01	
Female		1,714	49.99	
<b>Urbanity</b>	3,449 (0)			No missing
Urban		1,592	46.16	
Non-Urban		1,857	53.84	
<b>Family Intactness</b>	3,229			-0.221 (.447)*
Two-parent family	(220)	3,120	96.62	
One or less parent family		109	3.38	
<b>Poverty</b>	3,029			0.000 (.000)
Below poverty	(429)	186	6.16	
Above poverty		2,834	93.84	

## Measures

### Independent Variables

#### *Subjective Strains*<sup>8</sup>

In GST, several types of subjective strains are hypothesized to be related to anger and delinquency. To test this proposition, five subjective strains, including parental strain, academic strain, peer strain, appearance strain, and material strain, are presented in the present analysis to investigate the strain-anger-delinquency link<sup>9</sup>. To measure each subjective strain, South Korean students were asked a range of questions concerning their subjective evaluations on five categories of stressors. Five sets of subjective strains are drawn from wave 1 of KYPS data.

*Parental strain.* Considerable empirical attention has been devoted to testing the effect that negative relationships with parents on delinquency. Most of those studies have

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<sup>8</sup> It should be noted that although some researchers may raise a concern on “subjective nature” of subjective strains used in the current study, since some overlap between objective strain and subjective strain does exist. However, since strain measure used in KPYS study is determined by asking respondents *how stressed* they feel when exposed to general noxious events or conditions – not by asking respondents *how often* they experience those events or conditions – subjective strain measures used here are deemed a suitable representation of Agnew’s subjective strain. For example, rather than assuming that respondents will experience strain on receiving poor grades, by employing objective grade measure to capture academic strain, the KPYS study poses the question “how often they feel stressed from receiving poor school grades” to examine respondents’ subjective perspective. Thus, the measure of strain used in the current study should be viewed as subjective. Hence, for comparison, results of previously reported subjective measures can be found in several published studies (Botchkovar et al., 2009; Ellwanger, 2007; Froggio & Agnew, 2007; Hay, 2003; Moon et al., 2007).

<sup>9</sup> An initial pool of 17 items that were intended to capture the degree of stress Korean adolescents were experiencing was entered into a factor analysis to identify the number of factors to be retained for further analyses. Initially, factor analysis identified four factors with having a fifth factor having an eigenvalue of less than 1.0 (.989). However, I decided to use a five factor solution given that fit preferred a five factor solution over four factor solution.

found that this type of strain, which was generated from poor relationships with parents, was an important predictor of delinquent behaviors (Agnew et al., 2002; Agnew & White, 1992; Aseltine et al., 2000; Bao et al., 2004, 2007; Mazerolle and Maahs, 2000; Moon et al., 2009; Paternoster & Mazerolle, 1994). In line with previous studies, a measure of strain that gauges strain generated from relationships with parents is included to reexamine its influence on offenses. A measure of parental strain is created to reflect the extent to which respondents have difficulty in interacting with their parents. Adolescents were asked generally how often they experienced stress from “parents’ concerning school grades,” “dispute with parents,” “excessive meddling of parents,” and “bad communication with parents.” Responses ranged from (1) *never* to (5) *almost always*. Therefore, higher scores on this scale indicate that adolescents are more strained from negative relationships with parents. (Cronbach’s  $\alpha = .864$ ).

*Academic strain.* According to Agnew (2001), strain caused by poor school performance is one of the salient predictors of delinquency. To support this argument, Agnew (2001) noted that experiencing school as boring and a waste of time is strongly related to delinquency since “the compulsory nature of school and the dependent status of juveniles contribute to external blame. Also, juveniles may feel that school personnel to ask much of them but give little in return—which contributes to feelings of distributive injustice (Agnew, 2001, p. 345).” Given the exceptionally high emphasis on academic success in South Korean culture for adolescents from early ages, the effect of academic strain on South Korean students is expected to be a significant risk factor for delinquency.

Academic strain is assessed with a scale of four items. Adolescents were asked how often they experienced stress from “poor school grades,” “homework and examinations,” “preparation for college or occupation,” and “boredom of studying.” Response categories ranged from (1) *never* to (5) *almost always*. A higher score on this scale indicates a greater level of academic strain that respondents are under. (Cronbach’s  $\alpha = .771$ )

*Peer strain.* According to Agnew (2001), peer abuse, which was operationalized as “teasing or ignoring from friends” in the current study, is expected to have a positive relationship with deviant behaviors since it is likely to be seen as unjust and high in magnitude. However, unpopularity with the peer group, which adds up to other portions of the peer strain scale in the current study, is evidenced to have little impact on delinquency since experiencing unpopularity with peers does not create an incentive for crime as they tend to have few delinquent peers (Agnew, 2001; Agnew & Brezina, 1997; Agnew & White, 1992). Thus, general inferences regarding the association between peer strain and delinquency require an additional caution since although these two items are a salient source of peer strain, they are expected to have opposing influence on delinquent acts. Adolescents were asked how often they experienced strain from “teasing and ignoring from friends,” “failing to gain recognition among friends,” and “sensing inferiority from friends.” A five-point Likert scale was used, which ranged from (1) *never* to (5) *almost always*. (Cronbach’s  $\alpha = .835$ ).

*Physical strain.* Although such strain can be seen as high in magnitude, it is unlikely to be seen as unjust or to be considered as associated with low social control.



However, the present study attempts to explore the role of appearance strain since an individual's physical appearance is known to affect social interaction with others (Kennedy, 1990). Although the study was not intended to examine GST, the work by Agnew in 1984 found a significant relationship between appearance and school-related delinquency. According to Agnew (1984) unattractive individuals may resort to criminal coping because they are more likely to be "delinquent in situations where the stereotypes and discrimination against them are most prevalent" (p. 435). In the social psychology area, physically attractive individuals are more likely to be treated as sincere, noble, and honest (Dion, Berscheid, & Walster, 1972). Thus, less attractive individuals may get less respect from others and this negative relationship with others, which stems from the individuals' subjective evaluation that they have been disrespected, may create pressure for corrective action through engaging in delinquency, as GST suggests. In order to capture a strain that reflects the extent to which respondents experience strains from how they look, a strain scale was created that contains the following three items: "strain from over or under weight," "over or under height," and "their appearance". Responses ranged from (1) *never* to (5) *almost always*. The higher the score, the higher the level of stress that respondents are under (Cronbach's  $\alpha = .728$ ).

*Material strain.* The failure to achieve a monetary goal is a longstanding focal point for both the classic and the contemporary strain theory realms. Experiencing financial or material strain is likely to increase the probability of criminal coping since this type of strain creates incentives or pressures for crime (Agnew, 1992). In order to

assess the stress level due to respondents' frustrations from lack of material possessions, they were asked to report how often they felt strained due to the following reasons: "not being able to wear stylish clothes," "lack of pocket money," and "not being able to get goods they want." Responses ranged from (1) *never* to (5) *almost always*. Higher scores indicate a greater level of strain. Because the current scale of material strain attempts to measure subjective evaluation on their financial status and encompasses subjective assessment of both unjustness and magnitude, this measure of material strain is expected to represent respondents' material/financial dissatisfaction more clearly than objective measures of material strain that were used in prior studies (Cronbach's  $\alpha = .819$ ).

### **Mediating Variable**

#### *Anger*

Although GST recognizes several types of negative emotions that are expected to increase the probability of criminal coping, GST assumes the strongest link to be between anger and delinquency. In keeping with prior studies that have amassed considerable empirical support on the importance of anger on delinquency, (Bao et al., 2004; Mazerolle & Piquero, 1998; Mazerolle et al., 2003; Piquero & Sealock, 2000) the current study includes a six-item summated scale from wave 1 that reflects respondents' trait-based anger.<sup>10</sup> The scale is comprised of the following items:<sup>11</sup> "I may hit other people

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<sup>10</sup> According to GST, strain-rooted anger is situational and, thus, the effects of strain and anger are contemporaneous. Although GST considers both trait-based and situational anger to be important, past studies that examined the effects of both measures of anger tend to report more robust findings with a measure of situational anger (Mazerolle et al., 2003; Moon et al., 2009). However, due to the structure of

when I feel annoyed,” “I will hit back at a person who hit me,” “I fight more frequently than others do,” “I am often seized by an impulse to throw an object whenever I get angry,” “Sometimes I can’t suppress an impulse to hit other people,” and “I consider myself as an explosive soon to be blown off.” Answers were based on a five-point Likert scale ranging from (1) *strongly disagree* to (5) *strongly agree*. The higher scores on this scale reflect a more frequent experience of anger (Cronbach’s  $\alpha = .762$ ).

## **Conditioning Variables**

### *Self-efficacy*

Although there is some debate whether self-efficacy actually increases or decreases the influence of strain on delinquency as GST predicts (Jang and Johnson, 2003), GST maintains that self-efficacy will affect individuals’ likelihood of delinquent responses to strain. According to Agnew (2006), high self-efficacy tends to reduce the effect of strain on delinquency since high level of self-efficacy boosts one’s capabilities to master difficulties effectively. Also this high self-efficacy may allow individuals to avoid selecting delinquent coping methods by internally encouraging strained individuals

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the KYPS data, the current research relies on trait-based measures of anger, which can be characterized as stable and enduring personal disposition (Spielberger, Johnson, Russell, & Crane, 1985). As Mazerolle et al. (2003) point out, “[C]eteris paribus, individuals who report high levels of trait anger will be more likely to exhibit anger given exposure to strain.” I expect the indicator of trait-based anger to fully function as an important intervening construct as GST posits.

<sup>11</sup> It should be noted that while four out of six indicators to develop the measure of anger are consistent with anger indicators previous GST tests have used, two indicators (“I will hit back at a person who hits me” and “I fight more frequently than others do”) seem to overlap in some degree with contents of aggressive behavior. These two indicators can be also characterized as tools for assessing expressed aggressive behaviors rather than relatively constant angry state. However, EFA and CFA analyses confirmed the validity of this measure of anger with high factor loadings as well as good model fits (see Table 4).

to find legitimate means to alleviate the negative effect of strain before they experience anger or frustration. On the other hand, low self-efficacy is likely to increase the influence of strain on delinquency since it lowers one’s confidence to challenge difficulties and, therefore, allows one to find an easier way out, usually by taking a criminal channel. Self-efficacy is comprised of three items: “I have a confidence in my own decision,” “I believe that I can deal with problems myself,” and “I am taking full responsibility of my own life.” Answers were based on a five-point Likert scale ranging from (1) *strongly disagree* to (5) *strongly agree*. A higher score on this scale indicates stronger belief in one’s capability to successfully achieve goals, tasks, or challenges (Cronbach’s  $\alpha = .823$ ). The factor score for self-efficacy was computed and split into two categories of high and low using the median. This cut point was used to compare the structural estimates across each group (see Table 3).

Table 3 Descriptive statistics of factor scores

	Parental attachment	Teacher attachment	Peer attachment	Self-efficacy
N	3,441	3,441	3,430	3,441
Median	-.011	.022	-.064	-.025
SD	.606	.484	.528	.560
Range	-1.559 – 1.196	-.892 – 1.383	-.2.711 - .606	-1.864 – 1.153

### *Parental Attachment*

The domain of a positive relationship with parents has been well recognized as an important factor in the history of criminology. Most often the role of parental attachment was understood within the framework of control theory. According to control theory, “delinquent acts result when an individual’s bond to society is weak or broken” (Hirschi, 1969, p.16). Adolescents who are strongly attached to their parents are less likely to engage in delinquent activities since they do not want to disappoint their parents. Strain perspective views parental attachment as a conditioning factor that shifts the impact of strain on delinquency. Although the mechanism how this positive relationship with parents suppress the negative outcome from strained individuals is unclear still in vague, existing reviews suggests that perceived emotional support such as beliefs that they are being loved and accepted, and received support such as providing money or advices they need (Thoits, 1995). Whether through emotional support or instrumental support high attachment to parents are expected to function as a moderator that buffers the effect of strain on delinquency by providing internal and/or external resources strained individuals necessitate.

Acknowledging the importance of a relationship with parents, the measure of parental attachment, which reflects students’ affection and closeness toward their parents, is included in the present study using six items that measure this domain. Respondents were asked to assess their relationship with parents by responding to the following items: “Parents and I try to spend much time together,” “Parents always treat me with love and

affection,” “Parents and I understand each other well,” “Parents and I candidly talk about everything,” “I frequently speak out my experiences and my thought to parents,” and “Parents and I have frequent conversations.” Responses range from (1) *very untrue* to (5) *very true*, on a five-point Likert scale, with higher values indicating higher levels of positive relationship with parents (Cronbach’s  $\alpha = .852$ ). The factor score for parental attachment was computed and split into two categories of high and low using the median as the cut point (see Table 3).

#### *Teacher Attachment*

Similar to the case with parental attachment, positive attachment to a teacher plays an important role in GST. Relationship with teacher is a critical context to be discussed since students spend most of day time within school where teacher serve a mentor as well as a role model. Expecting similar operating mechanism with parental attachment, teacher attachment is anticipated to constrain the delinquent outcome from strains by promoting other legitimate coping options for strained students to take.

To verify this intervening mechanism, the measure of teacher attachment serves as one of the conditioning factors in the current study. Teacher attachment was measured by asking adolescents questions regarding the nature of their relationship with teachers. Adolescents were asked to respond to how true the following questions were: “I can talk about my troubles and worries to my teachers without reservation,” “Teachers treat me with love and affection,” and “I hope to become a person just like my teacher.”

Responses range from (1) *very untrue* to (5) *very true*, on a five-point Likert scale, with higher values indicating higher levels of attachment to teachers (Cronbach's  $\alpha = .709$ ). The factor score for teacher attachment was computed and divided into two categories of high and low using the median as the cut point (see Table 3).

### *Peer Attachment*

GST posits that high levels of social support will buffer the impact of strain on delinquency by providing supportive resources to constrain offensive coping and broadening opportunities for positive coping outlets. Although, Agnew (1992) does not spell out peer attachment as a potential conditioning factor in his seminal work, peer attachment is expected serve as moderator in GST since peers serve as one of favorite spheres of social support along with family members and teachers. In order to examine whether the moderating effect of peer attachment is observed between strain and delinquency, a measure of peer attachment is included. Respondents were asked to rate their feelings toward close friends on following items: "I hope to maintain the close relationships for a long time," "I am happy whenever I get together with them," "I try to have a same thoughts and feelings to them," "we can frankly talk about our troubles and worries." Responses were based on five-point Likert scale ranging from (1) *very untrue* to (5) *very true*, with higher score indicating the respondents have higher affection on their close friends (Cronbach's  $\alpha = .852$ ). The factor score for peer attachment was

computed and split into two categories of high and low using the median as the cutting point (see Table 3).

### **Control Variables<sup>12</sup>**

#### *Gender*

Five variables from wave 1 are included as control variables. Gender is one of the strongest predictors of delinquency and needs to be controlled to account for the confounding impact on deviant behavior. Although identifying gender differences in the effects of different types of strain, negative emotions, and coping mechanisms on delinquency is a critical aspect that needs to be further explored, full discussion on gender issues is beyond the scope of this study. Thus, gender is included to hold its effect constant across analysis. The gender variable is coded as follows: 0 = female and 1 = male.

#### *Two-Parent Family*

This variable is included as a control variable to isolate the effect of family intactness on adolescent's self-reported delinquency. Questionnaires for parents included items that intended to measure the living situation of the youth. Response was coded so that 0 = not living with both parents and 1 = living with both parents.

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<sup>12</sup> A measure of age is not included in the model as a control variable since KYPS study is a panel study based on eighth grade middle school cohorts and due to the lack in variability due to the sample restrictions (i.e., 13 & 14).



## *Poverty*

According to Agnew (2006), individuals with low SES are more likely to engage in criminal coping since they often cannot afford resources to cope with strain, they lack the social position to ask for help when needed, and they have less to lose by taking illegitimate measures. Although previous strain literature failed to find a significant impact for low income on the strain-crime link (Hoffmann & Cerbone, 1999), generally criminological studies found low SES to be a salient indicator of crime (Agnew, 2006). In response to the call for the further understanding of the role of low SES in GST, I include a measure of poverty as a proxy to SES to control the potential effect of low SES. This measure was created by utilizing two items from KYPS data and an external index developed by the Ministry of Health, Welfare, and Family Affairs of Korea (MIHWAF). First, the parent/guardian was asked to identify the monthly household income<sup>13</sup> as well as the number of household members. Then the respondent's monthly income was juxtaposed with the MIHWAF-set minimum cost of living based on the number of household members. For example, the poverty threshold for a family of four was 1,019,411 Korean won in 2003 MIHWAF data. Therefore, if the income of a family of four was lower than 1,019,411 won, the case was valued as 1 (poverty), and when household income was higher than the threshold, the case was valued 0 (non-poverty),

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<sup>13</sup> Parents/guardians were asked to answer the monthly income of their household in ten thousand Korean won (10,000 Korean won approximately matches with 11.80 U.S. dollars in October, 2003, when the survey was conducted). For more information regarding past exchange rate, see [http://ebank.keb.co.kr/exchange/exchange\\_old\\_view.htm](http://ebank.keb.co.kr/exchange/exchange_old_view.htm)

allowing the poverty threshold to vary depending on the number of members in the household.<sup>14</sup>

### *Urbanity*

Although a location of residency was not discussed within the GST paradigm, broader criminology literature cited differences between urban and rural communities in nature and degree of offense (Osgood & Chambers, 2000). Therefore, a measure of residency location is included in the present analyses as a dichotomous variable in which “0” represents non-urban and “1” represents an urban area. The parent/guardian was asked to pick one of the 247 regional codes that cover the whole geographic area of South Korea. Regional codes that reflect seven metropolitan cities including Seoul, Daejeon, Incheon, Gwangju, Busan, Ulsan, and Daegu are coded as (1) urban, and regional codes that cover the rest of the country are coded as (0) non-urban.

## **Dependent Variable**

### *Delinquency*

To assess youth’s engagement in a variety of offenses, 12 self-reported items from wave 2 of the KYPS study were used. Respondents were originally asked to identify the number of times they had committed each of following offenses in the past 12 months:

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<sup>14</sup> Full information regarding the minimum cost of living based on the number of household members can be found at

[http://www.mw.go.kr/front/jb/sjb0402vw.jsp?PAR\\_MENU\\_ID=03&MENU\\_ID=030402&BOARD\\_ID=220&BOARD\\_FLAG=03&CONT\\_SEQ=27336&page=1](http://www.mw.go.kr/front/jb/sjb0402vw.jsp?PAR_MENU_ID=03&MENU_ID=030402&BOARD_ID=220&BOARD_FLAG=03&CONT_SEQ=27336&page=1)

“smoking,” “drinking,” “having unexcused absence,” “running away,” “severely beating other people,” “participating in gang fight,” “robbing,” “stealing,” “severely teasing,” “threatening,” “collectively bullying,” and “committing sexual harassment or assault.” These responses were recoded into dichotomous structure so that adolescents who reported at least one involvement in each item were coded as 1 while those who reported no involvement in each item were coded as 0. These responses were then added together to create a count variable that assessed how many different types of offenses respondents engaged in during the past 12 months. This wave 2 delinquency scale ranges from 0 to 12 (Cronbach’s  $\alpha = .723$ ).

## **Analytic Plan**

Drawing upon the work of Agnew (1992, 2001, 2006), the present study has its investigative focus on examining several types of pathways proposed by GST. In order to probe the simultaneous direct, mediating, and moderating relations of these GST elements, the current study applied structural equation modeling (SEM) to a nationally representative sample of South Korean students by using the statistical analysis package, MPLUS (Version. 6.0; Muthén and Muthén, 1998-2010).

SEM is a particularly useful analytic tool used in the social and behavioral sciences to specify complex models. Kaplan (2000) defined SEM as “a class of methodologies that seek to represent hypotheses about means, variances, covariances of

observed data in terms of a smaller number of structural parameters defined by a hypothesized underlying model” (p. 1); therefore, SEM shows great strength in analyzing hypothesized interrelationships among latent constructs.

Among the many advantages that SEM maintains over regression techniques are two major benefits to this present study. First, the complexity of the GST process makes it difficult to rely on equation-by-equation analyses using regression techniques. When a structural model is complex, involving a series of regression models in which some measures operate as both independent and dependent variables (e.g., anger), a step-by-step approach applying each multiple regression model separately can be tedious and ineffective (Kaplan, 2000). Unlike multiple regression models, SEM provides a more flexible framework that estimates model parameters simultaneously, using a class of regression models (Kaplan, 2000).

Second, like all other social science studies that employ survey data, the present study is subject to measurement errors. In general, observable indicators accompany measurement errors that originate from several factors. For example, errors can result from the way questionnaires are designed or structured. Errors can also be associated with respondents’ situational feelings or misunderstanding of items on questionnaires. In this respect, all social or behavioral science survey studies are error prone and require appropriate response to reduce the effect of measurement error on parameter estimates.

Regression models are based on the assumption that observed indicators are measured without error. Unfortunately, this assumption is never the case in the real world,

and neglecting the effect of measurement errors tends to affect the regression coefficients, thereby possibly yielding biased or unclear predictions. On the other hand, SEM accounts for measurement error in the estimation process, thus returning less biased estimates. However, as Tomarken and Waller (2005) have cautioned, it is important to be aware of several limitations of SEM that are often ignored by researchers. Even if a model fits well, there is by no means a guarantee that the model includes all relevant variables without omitting variables that are implicated in a causal process of theory. Moreover, SEM cannot detect the nature of a causal direction, and it has to be specified by researchers (Tomarken & Waller, 2005). Finally, when the specified model is incorrect, it may estimate biased path estimates as well as standard errors (Tomarken & Waller, 2005). In sum, the SEM approach appears to be a useful analytic tool when a model is correctly constructed and specified, and it is expected to perform better with a SEM model that includes mediation and moderation pathways.

Taking into account the aforementioned advantages of SEM over regression models, the current study attempts to assess the structural model of the hypothesized causalities and associations among various types of strains, anger, conditioning factors, and delinquency by having measurement error under control. To do so, the current study employed the 2-step modeling process of SEM: (a) building and testing the measurement model and (b) testing the structural model. It should be note that, since 3,449 students were clustered in 102 different schools, standard errors were computed using a sandwich estimator implemented in Mplus prior to any statistical analysis.

## **Building the Measurement Model**

The measurement model was designed to correspond with the theoretical structure of GST. As a first step to building a measurement model using observable indicators, exploratory factor analysis (EFA) was used to set up the relations between indicators and underlying constructs. Formulating the measurement model was an important first step for the current thesis because most of the measures used in this study, such as subjective strains, anger, several types of conditioning factors, and delinquency, are latent constructs that cannot be directly observed and need to be inferred from numerous other observable items. Thus, factor analysis is a prerequisite first step of SEM in order to create valid measurements of unidimensionality. Maximum Likelihood (ML) estimation was used for models with indicators having continuous values whereas the weighted least squares method (WLSM) estimation was used for models with indicators having dichotomous values.<sup>15</sup>

To develop the measurement model, the factorability of each item in terms of its designated latent construct was examined in order to identify and retain items that are strongly correlated to their assigned underlying concepts. So as to retain only those items that strongly load on their primary factor, items with less than .50 loadings were dropped. Furthermore, to specify the number of factors to extract, the factor extraction criteria proposed by Kaiser (1960)—that factors with an eigenvalue greater than one should be

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<sup>15</sup> Since Mplus does not provide model-fit indices such as RMSEA, SRMR, or CFI when ML was used on dichotomous variables, the WLSM was applied to variables with dichotomous values (e.g., delinquency at wave 1, delinquency at wave 2, and peer delinquency).

extracted—was adopted. Along with these quantitative criteria, conceptual clarity as well as interpretability was also considered in developing the measurement model for the current analysis.

### **Testing the Measurement Model**

At the second stage of the measurement model development, the adequacy of the model was assessed using confirmative factor analysis (CFA). To evaluate the reliability of the measurement model, several types of general indices for goodness-of-fit of the model, including the comparative fit index (CFI; Bentler, 1988), the Tucker-Lewis index (TLI; Tucker & Lewis, 1973), the root mean square error of approximation (RMSEA; Browne & Cudeck, 1993), the standardized root mean squared residual (SRMR; Bentler, 1995), and factor determinacy were reported.

### **Building and Testing the Structural Model**

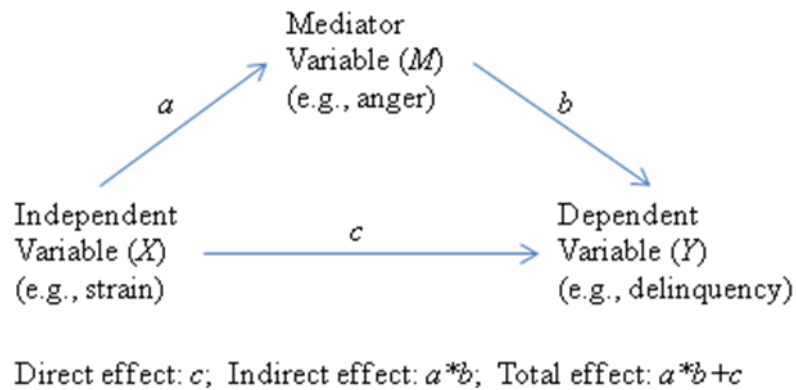
Upon validation of the measurement model adequacy, a series of structural equation models were designed, aimed at testing the main hypotheses derived from GST. Five separate subjective strains were assumed to be directly positively correlated with delinquency, as well as indirectly through anger. At the same time, these impacts were hypothesized to vary depending on the social or personal factors, including self-efficacy as well as parental, peer or teacher attachment.

The direct effect Hypothesis 1 was tested through a series of five regression models, while controlling for background variables (i.e., gender, urbanity, poverty, and family intactness). To test Hypothesis 2, mediation analysis was used to determine the effect of strain on delinquency through anger. According to MacKinnon, Fairchild, and Fritz, “Mediation is one way that a researcher can explain the process or mechanism by which one variable affects another.” (2007, p. 595). The focal point of the mediation analysis is to understand “how” and “by what means” hypothesized relations between independent and dependent variables can be explained (Preacher & Hayes, 2008). It is predicted in GST that students who report higher stress should subsequently report higher anger. Moreover, higher anger may, in turn, make students more likely to engage in delinquent behaviors. To understand this hypothesized causal process by which the independent variable (strain) affects the dependent variable (delinquency) through the intervening variable (anger), the current study employed the mediation analysis method.

The mediation model is illustrated in Figure 2, where  $X$ ,  $M$ , and  $Y$  are variables and  $a$ ,  $b$ , and  $c$  represent relations among variables. Path  $c$  is called the direct effect. Path  $a$  depicts the effect of  $X$  on the hypothesized mediator, whereas path  $b$  is the effect of  $M$  on  $Y$ , adjusting for the effect of  $X$ . The size of the indirect effect of  $X$  on  $Y$  through  $M$  can be computed as the product of  $a$  and  $b$ . Finally, the total effect can be estimated as the sum of the direct and indirect effects.



**Figure 2** Mediation model



GST postulates that individuals under strain are more likely to experience anger and react offensively. The test of mediation is deemed an appropriate approach to evaluate the intervening role of anger, revealing the potential causal mechanism between strain and delinquency.

Traditionally, to test for a mediation effect, researchers followed a four-step approach developed by Baron and Kenny (1986). According to the authors, (1) the independent variable must be significantly related to dependent variable, (2) the independent variable must be significantly related to the mediator, (3) the mediator must be significantly related to the dependent variable, and (4) the effect of the independent variable on the dependent variable should be zero or at least reduced. Until recently, this method was widely accepted as a norm in mediation assessment for the single-mediator model. Thus, in many cases, when the first step revealed no statistically significant relationship between two variables, no further mediation analysis was performed. However, according to recent work by MacKinnon et al. (2007), a focus on meeting this

first requirement may substantially reduce the ability to detect mediation effects, thus missing some true mediation effects (i.e., complete mediation). In order to widen the potential scope of this approach, the present study attempted to test for mediation, even in the absence of a significant direct relation, whenever the requirements for step two and three were met. Thus, this indirect effect was investigated using the significance tests on specific and total indirect effect provided by Mplus output (estimates of specified indirect effects and their corresponding t-values are provided by Mplus 6.0).

Finally, to test Hypothesis 3 that strain's impact on delinquency is conditioned by several factors, moderation analysis was conducted. As Frazier, Tix, and Barron (2004) argue, moderation analysis involves addressing "when" or "for whom" independent variable is more strongly related to dependent variable. If GST is correct, the impact of strain on delinquency should be reduced "when" individuals possess high level of social or personal resources, and enhanced "when" levels are low. Thus, moderation analysis, based on a multiple group framework, was utilized to assess the coefficient estimate variability implied by the level of conditioning factors. That is, multiple-group analysis was conducted using two-level (high and low) conditioning factors as grouping variables to evaluate the effect of social and personal factors in moderating relationship between strain and delinquency. Thus, the students were divided into high and low groups based on their factor scores for each conditioning factor.

Following suggestions of Meredith (1993), factor loadings, intercepts, variances, and covariances were constrained to be equal (except residual variances), to

simultaneously examine statistical differences of the structural path coefficients across two groups. This structural invariance was imposed on the KYPS data to constrain the measurement models of the group to be identical to guarantee that tests of the differences in structural path coefficients are not affected by differences in measurement parameters across the two groups.

Building on the “strong invariance” multi-group SEM models, where the factor loadings, the observed variable intercepts, the measurement errors, and measurement residual variances are constrained to be equal across groups, all direct and indirect paths were analyzed for both high and low group of social or personal factors respectively. Finally, a Wald test was performed using Mplus 6.0 to assess the significant difference of magnitude of path coefficients between two groups, and the same procedure was repeated on each of five different strain models.

The current study partially replicates Bao et al.’s (2007) analytic strategy of a “matching perspective” to examine the possibility of mitigating an effect of strain in interaction with specific factors that stem from the same domain as the strain itself. According to Bao et al., “the source of support must correspond to the source of strain that individuals encounter, to act as an effective buffer to life stress (2007; p. 12).”

To apply this matching perspective in moderation hypothesis evaluation, parental attachment was hypothesized to have an inter-domain buffering effect on the relationship between parental strain and delinquency. Matching teacher attachment to academic strain and peer attachment to peer strain was done accordingly. In addition to social resources –

parental, teacher and peer attachment; GST also posits that the likelihood of deviant outcomes is conditioned by personal factors such as self-efficacy, self-esteem, moral belief, or intelligence (Agnew, 1992). In this vein, appearance strain was matched with self-efficacy, as it is perceived that students' strong beliefs about their ability to succeed are likely to buffer the effect of strain stemming from feeling of inferiority in their physical appearance. For example, students with high self-efficacy are expected to be more effective in coping with strain arising from dissatisfaction with their physical appearance, due to their self-regulation ability regarding sensitive issues.

Unfortunately, the KYPS data does not yield a conditioning factor measure that can be matched with material strain, as was done with the other inter-domain moderators (i.e., family, teacher and peer). There are no obvious factors belonging to the same social or personal resource domain that can be matched to material strain. Therefore, an exploratory approach was taken to determine which factors are likely to impact the relationship between material strain and delinquency. Three different types of social support (parental, teacher and peer attachment) were considered to investigate the moderation hypothesis of social support on the relationship between material strain and delinquency.

In summary, the moderating hypothesis of GST was evaluated by applying a matching perspective using a median split (high and low) approach and testing whether path coefficients differed across the two groups<sup>16</sup>.

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<sup>16</sup> To test whether the influence of strain measures on general delinquency depends on levels of social or personal factors, employing multiplicative interaction terms between independent variables and

Structural model adequacy was tested akin to the measurement model, using general goodness-of-fit indices, including the comparative fit index – chi-square test, CFI (Bentler, 1988), and the root mean square error of approximation – RMSEA (Browne & Cudeck, 1993).

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conditioning variables is an alternative approach to a multi-group analysis. However, this interaction approach is limited in two important ways. First, as mentioned in the *conditioning influences* section in the literature review in chapter 2, one of the major open issues of GST involves identifying the location of moderation, since there exist two locations where the impact can be moderated: (1) between strain and negative emotions and (2) between negative emotions and delinquency. To identify whether moderations occur in path (1) or (2) using multiplicative approach, numerous separate interactional terms have to be created, making analyses tedious and ineffective. A second problem with this approach is that interactions between latent continuous variables require numeric integration, which is computational intensive and may frequently create convergence problems. However, by applying multi-group analysis, it is feasible to compare the strength of the estimates and pinpoint moderating effects as well as avoid convergence problems.

## **Chapter 5: Results**

### **Building the Measurement Model**

The first step in the EFA process was to identify items to include in the EFA. Fortunately, items that were intended to capture the underlying construct were conveniently bundled together in the original questionnaire, based on their conceptual entities. This grouped nature of the survey made it easier to specify which indicators measure which underlying factors.

An exploratory analysis was performed on every latent construct to assess the factorial validities of observed indicators in terms of their hypothesized latent constructs. For instance, using the latent construct of parental strain, four observed items (PAS1, PAS2, PAS3, and PAS4) were specified as having loadings on this underlying construct. In this model, a two-factor solution was performed to determine whether a model with one latent construct fit the data well. As can be seen from Table 4 below, the results indicate that four observed items loaded strongly onto one factor, with loadings ranging from .678 to .871. Moreover, the analysis produced one factor with an eigenvalue greater than 1.00, indicating that a one-factor solution is optimal for this latent measure of parental strain. This same specification procedure was repeated on other latent constructs to test underlying factorial structures.

Table 4. Factor Loadings and Eigen Values for the Measurement Model

Constructs	Items	Loading	Eigenvalue	Cronbach's $\alpha$	Constructs	Items	Loading	Eigenvalue	Cronbach's $\alpha$	
Parental strain	PAS1	0.689	1- 2.895	0.864	Parental attachment	PAA1	0.688	1- 3.536	0.852	
	PAS2	0.858	2- .550			PAA2	0.634	2- .792		
	PAS3	0.872				PAA3	0.717			
	PAS4	0.766				PAA4	0.727			
Academic strain	ACS1	0.682	1- 2.398	0.771		PAA5	0.704			0.709
	ACS2	0.742	2- .599			PAA6	0.799			
	ACS3	0.615			Teacher attachment	TEA1	.560	1- 1.889		
	ACS4	0.691				TEA2	.814	2- .650		
Peer strain	PES1	0.770	1-2.256	0.835		TEA3	.636			
	PES2	0.933	2 - .484		Peer attachment	PEA1	0.779	1- 2.430	0.759	
	PES3	0.682				PEA2	0.888	2 - .680		
Physical strain	PHS1	0.702	1-1.949	0.728		PEA3	0.544			
	PHS2	0.655	2 - .550			PEA4	0.533			
	PHS3	0.710			Delinquency	DEL1	0.785	1- 6.896	.723	
Material strain	MAS1	0.660	1- 2.219	0.810		DEL2	0.716	2- 1.491		
	MAS2	0.863	2 - .493			DEL3	0.688			
	MAS3	0.823				DEL4	0.745			
Anger	ANG1	0.600	1 - 2.806	0.762		DEL5	0.821			
	ANG2	0.498	2 - .980			DEL6	0.830			
	ANG3	0.592				DEL7	0.844			
	ANG4	0.533				DEL8	0.684			
	ANG5	0.676				DEL9	0.725			
	ANG6	0.693				DEL10	0.836			
Self-efficacy	EFF1	0.721	1-2.223	0.823		DEL11	0.632			
	EFF2	0.836	2-.442			DEL12	0.701			
	EFF3	0.790								

Table 4 presents the unstandardized factor loadings of 51 items on their assigned constructs. Except for the delinquency scale<sup>17</sup>, each construct yielded a one-factor solution with a first factor having an eigenvalue over 1.00. Also, all items loaded satisfactorily on their designated conceptualized constructs with average loadings of .732 for 71 items. More specifically, all items maintained a factor loading above .50 on their designated constructs, ranging from .505 (“I will hit back at a person who hits me” on anger) to .929 (“I get stressed by lack of recognition from friends” on peer strain). Overall, the majority of the latent constructs maintained conceptual validity with one-factor solutions based on the common criteria of eigenvalues and factor loadings.

The internal reliability of item responses was assessed by Cronbach’s  $\alpha$  for every measure with several subscale indicators. The internal consistency was substantially high for every measure, with a Cronbach’s  $\alpha$  greater than .70 in all cases (see Table 4).

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<sup>17</sup> In a two-factor solution, twelve items loaded significantly onto two factors, suggesting that this hypothesized model may consist of two distinct underlying factors. Six indicators (smoking, drinking, unexcused absence, running away, gang fighting, and robbery) strongly loaded on the primary factor, whereas the remaining six indicators (beating, stealing, teasing, threatening, bullying, and sexual harassment) strongly loaded on the second factor. Although this empirical finding suggests a two-factor solution for the hypothesized measure of delinquency, this solution is problematic in terms of conceptual validity since the bundled nature of both factors does not lend easy interpretation. Items such as smoking, drinking, stealing, absence, running away, gang fighting, and robbery altogether lead to less interpretable factor. This first factor cannot be labeled as a status offense, property offense, or violence offense. Thus, I will use the one-factor solution rather than less interpretable two-factor solution for the measure of delinquency. A high factor correlation (.597) between the primary and the second factors also gives a justification for the use of the one-factor solution.



## Testing the Measurement Model

To determine the quality of factor structure, confirmatory factor analysis was performed on the measurement models that were generated during the EFA phase. Although the results from the EFA stage returned consistent evidence of high loadings between observed items and hypothesized latent constructs, EFA does not provide information to test for their statistical validity (Kline, 1998). However, this validity test can be carried out through the CFA phase.<sup>18</sup>

Five goodness-of-fit indices were used to evaluate the measurement model: the chi-square test, the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean squared residual (SRMR). Ideally, scores above .95 for CFI and TLI (with 1.0 indicating a perfect fit), scores below .06 for RMSEA, and scores below .08 for SRMR (with .000 indicating a perfect fit) are desired to indicate models with strong goodness-of-fit (Hu & Bentler, 1999).

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<sup>18</sup> In general, every latent construct should have at least three associated items in order to perform any kind of factor analysis (Reilly, 1995). When three items are present in the model, a model is referred to as *just-identified* because the number of unknown parameters equals the number of observations (for detailed discussion on identification and model fit, see Kline, 2005). In this study, peer strain, physical strain, material strain, and teacher attachment are “just identified” models. When a model is just-identified, however, the results from goodness-of-model-fit indices become useless because, when there is just enough information (number of unknown parameter = number of observation) to derive a unique estimation, a model shows perfect fit to the data. This perfect fit yields perfect model-fit indices, regardless of its actual fitness because there is no particular hypothesis to test (Brown, 2006). Therefore, in the case with three items in the model, goodness-of-model-fit statistics become meaningless.

A just-identified model may be untestable, but it does not make the model invalid. According to Brown (2006), when less than four indicators are used in the model, the “model can still be evaluated in terms of the interpretability and strength of its parameter estimates (e.g., magnitude of factor loadings).” In this fashion, the quality of three-item factors is evaluated based on three pieces of information: factor loadings, eigenvalues, and factor determinacy.

Separate confirmatory analysis was conducted on each measure to test the model fit. However, this analysis generally produced somewhat disappointing fits across goodness-of-model criteria considering consistent evidence of high validity of each measure identified in EFA process. These poor fits to the data is likely to be the consequence of a model misspecification. When a baseline measurement model is formulated, error terms are defaulted to have no correlations with other variable error terms, requiring a researcher to specify the nature of the relations among observed items. This model specification can be done by using modification indices (MI), which indicates how much a overall model's chi-square would decrease if a fixed or constrained parameter were freely estimated in the model (Raykov & Marcoulides, 2006). In the current analysis, MI was used to detect and correct the problems of specification errors of each construct. To do so, large values of modification indices were first considered for an error term specification since large values indicate a substantial model misfit (Kline, 2005). In examining the MI values for example, the proposed construct of anger had the largest MI of 559.924 for the "hit back at a person who hits me" and "hit someone when annoyed," followed by MI of 244.566 for the "can't suppress impulse to hit other person" and "consider myself as an explosive." Although statistical sensibility clearly demonstrates that freeing these two sets of parameters to covary will yield much better model fit, there is another important criteria to consider prior to any model specifications. The correlation between error terms should be based on theoretical grounds, or at least on conceptual considerations. For example, if there are studies that revealed that "can't

suppress impulse to hit other person” and “consider myself as an explosive” are not likely to be related, adding error covariance between two may be inappropriate. Fortunately, it is highly likely that observed indicators of hypothesized anger share the same dimension since it is reasonable to assume that students who use violent when they are annoyed would likely to react in violent manner when they are attacked. Moreover, it is also reasonable to speculate that a person with high level of impulsivity would also exhibit high level of explosiveness. After adjusting misfit by freeing “hit” to covary with “hitback” and “impulsive” to covary with “explosiveness,” overall model-fit improved significantly. Table 5 shows the improvement of the overall model-fit criteria after adding error covariances.

This same two-step model specification procedure that consider both statistical and theoretical sensibility, was repeated on other latent constructs to improve overall fitting, and each construct generally showed satisfactory fit after adding the covariances. The CFA results are summarized in Table 6.

In terms of chi-square values, 10 out of 11 factors found to have significant chi-square values, indicating that the estimated model should be rejected in favor of the  $H_0$  model, i.e., the correlation matrix. However, the statistics literature has consistently found that chi-square estimates are highly sensitive to large sample sizes, often making it difficult not to reject the null hypothesis (Kline, 2005). Therefore, a combination of model-fit statistics was used to evaluate the quality of each measurement model.

Table 5. Improvement of the Overall Model-Fit Criteria of “Anger” after Adding Error Covariances

Construct	N (# of missing)	$\chi^2$	SRMR	RMSEA	CFI	TLI
Anger <i>Base model</i>		725.791 <i>df - 9</i> <i>p - .000</i>	.059	.152 <i>p-.000</i>	.855	.759
Anger <i>1 residual correlation added (hitback1 with hit1)</i>	3,441 (3)	163.691 <i>df - 8</i> <i>p - .000</i>	.033	.075 <i>p-.000</i>	.969	.941
Anger <i>2 residual correlation added (hitback1 with hit1 &amp; impulse with blowoff1)</i>		104.540 <i>df - 7</i> <i>p - .000</i>	.023	.064 <i>p-.017</i>	.980	.958

As can be seen in Table 6, the overall results indicated an acceptable fit of the proposed model to the data across all measurement models. For example, the proposed measure of anger appeared to fit data moderately well according to four out of five model-fit indices by meeting all the cut-off values for the acceptable fit. Although chi-square was poor with 104.540 ( $df = 7, p = .000$ ), other fit statistics indicated the model was acceptable (CFI = .980, TLI = .958, SRMR = .023, RMSEA = .064). Again, the same specification procedure was repeated on other measurement models to assess the validity of the underlying factorial structures, and these analyses showed moderate to satisfactory fit to the data for every measure used in the study.

Prior to testing the hypothesized structural relations among the latent and observed variables, the two-stage measurement model was developed by identifying the

underlying factor structures and testing their unidimensionality. The results across 11 underlying constructs suggest that 51 items are good indicators with high reliability in terms of their latent factors and can be used to assess the theory-driven structural relations among these latent constructs.

Table 6. Summary of Goodness-of-Fit Indices for the Measurement Model

Construct	N (frequency of missing)	Model Fit Indices					
		$\chi^2$ (df, p-value)	CFI	TLI	SRMR	RMSEA	Factor Determinacy
Parental strain	3,441 (2)	53.936 (df - 1, p - .000)	.993	.956	.013	.124 p-.000	.949
Academic strain	3,441 (4)	3.923 (df - 2, p - .141)	.999	.998	.005	.017 p-.990	.885
Peer strain	3,441 (5)	0.000 (df - 0, p - .000)	1.000	1.000	.000	.000 p-.000	.949
Physical strain	3,441 (3)	0.000 (df - 0, p - .000)	1.000	1.000	.000	.000 p-.000	.856
Material strain	3,441 (1)	0.000 (df - 0, p - .000)	1.000	1.000	.000	.000 p-.000	.924
Anger	3,441 (3)	105.134 (df - 7, p - .000)	.980	.958	.023	.064 p-.017	.856
Self-efficacy	3,441 (1)	0.000 (df - 0, p - .000)	1.000	1.000	.000	.000 p-.000	.914
Parental attachment	3,441 (4)	61.395 (df - 4, p - .000)	.993	.976	.011	.065 p-.040	.999
Teacher attachment	3,441 (4)	0.000 (df - 0, p - .000)	1.000	1.000	.000	.000 p-.000	.869
Peer attachment	3,441 (13)	103.369 (df - 2, p - .000)	.976	.929	.031	.122 p-.000	.927
Delinquency W2	3,181 (0)	207.790 (df - 30, p - .000)	0.948	0.963	n/a	.043 p- n/a	n/a

Note.  $\chi^2$  = Chi-square; CFI = comparative fit index; TLI = Tucker-Lewis index; SRMR = standardized root mean square residual; RMSEA = root mean square error of approximation.

## Building and Testing the Structural Models

### Parental Strain

#### *Direct Effect Hypothesis*

To test the first hypothesis that an increase in the level of parental strain is related to an increase in delinquency (direct effect)—while controlling for the effects of gender, urbanity, family intactness, and poverty—the baseline latent structural models were developed.

The results for the full sample (N=3,223) are presented in the first column of Table 7. The hypothesized full model provided a good fit to the data ( $\chi^2=687.539$ ,  $df=264$ ,  $p<.001$ ; CFI=.953; RMSEA=.022)—scoring above .9 in CFI and below .05 in RMSEA—satisfying the minimum thresholds of adequate model fits suggested by Bollen (1989).

According to this overall model, parental strain at wave 1 significantly and positively predicted delinquent behavior at wave 2, with a one-unit increase of parental strain (e.g., sometimes → often), resulting in a .136 (unstandardized structural coefficient) increase in the log odd of engaging in delinquency, holding the control variables constant. This finding fully supports the first hypothesis of a direct effect of parental strain on delinquency.

### *Indirect Effect Hypothesis*

Since it was hypothesized that anger would mediate the strain (measured at wave 1) and delinquency (measured at wave 2) relationship, a mediation model 1 was examined to determine whether anger mediates the impact of parental strain on delinquency. The results for the overall model are summarized in the first column of Table 7. As postulated, the path coefficient for the indirect effect revealed that the path from parental strain to delinquency is significantly mediated through anger ( $\beta=.138, p<.0001$ ), and it accounted for 50.4% of the total effect in delinquency. This suggests that the impact of parental strain was partially mediated by anger, thus providing partial support for Hypothesis 2. Still, this finding implies that students under a high level of parental stress at wave 1 are generally more likely to experience strain, resulting in higher rates of engagement in deviant behavior at wave 2.

### *Conditioning Effect Hypothesis*

To test the third hypothesis that the effect of parental strain on delinquency varies with the level of students' attachment towards their parents, a measure of parental attachment was split at its median to create a multi-group SEM with the high (N=1,719) and low parental attachment groups (N=1,722). The structural model was run simultaneously for high and low attachment groups, with measurement model estimates constrained to be identical across groups.



Table 7. Summary of Structural Equation Models for Parental Strain: Multi-Group Analysis using Parental Attachment

	Full sample	Group-specific		Differences between groups (Wald test)
	(N=3,223)	High parental attachment (N=1,722)	Low parental attachment (N=1,719)	
<b>Hypothesized relationships</b>	Unstandardized coefficients	Unstandardized coefficients	Unstandardized coefficients	
Parental strain → Delinquency (Direct effect)	.136* (.029) <i>p</i> <.0001	.038 (.044) <i>p</i> =.388	.187* (.048) <i>p</i> <.0001	6.454* ( <i>p</i> <.005)
Parental strain → Anger	.349* (.019) <i>p</i> <.0001	.361* (.027) <i>p</i> <.0001	.361* (.027) <i>p</i> <.0001	0.000 ( <i>p</i> =.997)
Anger → Delinquency	.396* (.036) <i>p</i> <.0001	.466* (.067) <i>p</i> <.0001	.342* (.048) <i>p</i> <.0001	2.357 ( <i>p</i> =.125)
Indirect effect	.138* (.014) <i>p</i> <.0001	.168* (.021) <i>p</i> <.0001	.123* (.020) <i>p</i> <.0001	
Total effect	.274* (.031) <i>p</i> <.0001	.207* (.039) <i>p</i> <.0001	.311* (.039) <i>p</i> <.0001	
(% explained by indirect effect)	50.4%	80.9%	39.4%	
<b>Fit statistics</b>				
$\chi^2$ ( <i>df</i> , <i>p</i> -value)	687.539 ( <i>df</i> =264, <i>p</i> <.001)		1017.852 ( <i>df</i> =559, <i>p</i> <.001)	
Free parameters	64		101	
CFI	.953		.950	
RMSEA	.022		.022	

*Note.* Standard errors are in parentheses. \**p* < .0001 Degree of freedom for Wald test is 1 for all models.

As shown in the fit statistics of Table 7, this multi-group model showed a good fit of the model to the data ( $\chi^2=1017.852$ ,  $df=559$ ,  $p<.001$ ; CFI=.950; RMSEA=.022). The significant difference between the two groups was found in the direct path between parental strain and delinquency at the  $p < .005$  level. For students with high parental attachment, parental strain failed to predict future delinquency ( $\beta=.038$ ,  $p\leq.388$ ); however, parental strain was a strong predictor of future delinquency for students with low parental attachment ( $\beta=.187$ ,  $p<.0001$ ). Unlike the direct path coefficient, no significant differences were identified for path coefficients between parental strain and anger ( $\beta=.361$ ,  $p<.0001$  for high,  $\beta=.361$ ,  $p<.0001$  for low), nor between anger and delinquency ( $\beta=.466$ ,  $p=.000$  for high,  $\beta=.342$ ,  $p<.0001$  for low), suggesting that parental attachment failed to function as a moderator of the parental strain-anger link and the anger-delinquency link. However, it is noteworthy that the indirect effect for the high group was twice as strong as that for the low group. While the indirect effect in the high group accounted for 80.9% of the total effect, it only accounted for 39.4% in the low group. This finding can imply that although students with high parental attachment are generally less criminally oriented compared to students with lower parental attachment, when they experience stress from a relationship with their parents, their parental strain-induced anger is more likely to trigger delinquency. The finding demonstrated a strong mediating effect of anger on the parental strain-delinquency link, especially for students with high attachment to their parents.

## **Academic Strain**

### *Direct effect hypothesis*

To determine whether delinquency at wave 2 was significantly related to academic strain at wave 1, while controlling the effects of background variables, the direct path between academic strain and delinquency was tested.

The model indices presented in Table 8 indicate adequate fit between the full sample model (N=3,223) and the data ( $\chi^2 = 763.936$ ,  $df=265$ ,  $p<.001$ ; CFI=.941; RMSEA=.023). Contrary to the expectations, the model test results showed that the impact of academic strain on delinquency was insignificant ( $\beta = .042$ ,  $p\leq.159$ ), failing to support Hypothesis 1. A detailed discussion pertaining to this association is examined later in the following discussion chapter.

### *Indirect Effect Hypothesis*

The hypothesized indirect relationship of academic strain to delinquency via anger was assessed from the path coefficients reported in Table 8. In contrast to the previous direct effect model results—where an insignificant direct path between two variables was found—the results of the structural model with the added indirect path between academic strain and delinquency revealed that the influence of academic strain at wave 1 on future delinquent behavior at wave 2 was significant when the measure of anger at wave 1 was introduced as a mediator ( $\beta=.121$ ,  $p<.0001$ ).

Table 8. Summary of Structural Equation Models for Academic Strain: Multi-Group Analysis Using Teacher Attachment

	Full sample		Group-specific		Differences between groups (Wald test)		
	(N=3,223)		High teacher attachment (N=1,677)	Low teacher attachment (N=1,764)			
<b>Hypothesized relationships</b>	Unstandardized coefficients		Unstandardized coefficients	Unstandardized coefficients			
Academic strain → Delinquency (Direct effect)	.042	(.030) $p=.159$	.048	(.054) $p=.383$	.023	(.035) $p=.517$	.146 ( $p=.702$ )
Academic strain → Anger	.282*	(.019) $p<.0001$	.296*	(.027) $p<.0001$	.260*	(.025) $p<.0001$	1.111 ( $p=.292$ )
Anger → Delinquency	.430*	(.037) $p<.0001$	.473*	(.063) $p<.0001$	.432*	(.048) $p<.0001$	.295 ( $p=.587$ )
Indirect effect	.121*	(.012) $p<.0001$	.140*	(.022) $p<.0001$	.112*	(.015) $p<.0001$	
Total effect	.164*	(.028) $p<.0001$	.187*	(.050) $p<.0001$	.135*	(.035) $p<.0001$	
(% explained by indirect effect)	73.8%		74.9%		83.0%		
<b>Fit statistics</b>							
$\chi^2$ (df, p-value)	763.936 (df=265, $p<.001$ )		1065.635 (df=560, $p<.001$ )				
Free parameters	65		100				
CFI	.941		.937				
RMSEA	.023		.023				

*Note.* Standard errors are in parentheses. \* $p < .0001$  Degree of freedom for Wald test is 1 for all models.

This finding supports Hypothesis 2 that future delinquency can be indirectly (i.e., through anger) linked to academic strain. The high percentage of indirect effect in the total (73.8%) also supports the postulation that impact of academic strain on delinquency is highly mediated through anger. In summary, stress resulting from academic performance pressure had no significant direct effect on delinquency, but this academic strain did lead to increased states of anger, which, in turn, increased the likelihood of delinquency.

#### *Conditioning Effect Hypothesis*

To test Hypothesis 3, a multi-group comparison was used by splitting a measure of teacher attachment at its median to create a high (N=1,677) and low teacher attachment group (N=1,764) and constraining the model estimates in order to make them similar across groups. As shown on fit statistics in Table 8, this multi-group model provided a good fit to the data ( $\chi^2=1065.635$ ,  $df=560$ ,  $p<.001$ ; CFI=.937; RMSEA=.023).

Akin to the full sample model, academic strain was not significantly related to general delinquency across two attachment groups. Furthermore, the Wald test indicated no significant differences between the high and low groups in terms of path coefficient magnitudes. According to Table 8, path coefficients between academic strain and anger ( $\beta=.301$ ,  $p<.0001$  for high,  $\beta=.254$ ,  $p<.0001$  for low), as well as anger and delinquency ( $\beta=.455$ ,  $p<.0001$  for high,  $\beta=.427$ ,  $p<.0001$  for low) were not significantly different. Thus, teacher attachment failed to function as a moderator of either the academic strain-anger link or the anger-delinquency link; therefore, Hypothesis 3 was not supported. In

summary, these findings suggest that a student's high level of attachment towards his/her teachers is not an important factor in reducing instances of anger and delinquency.

## **Peer Strain**

### *Direct Effect Hypothesis*

*To test Hypothesis 1, direct effect was modeled between peer strain at wave 1 and delinquency at wave 2. As shown in the first column of Table 9, the full sample model (N=3,223) showed good fit to the data ( $\chi^2=807.319$ ,  $df=242$ ,  $p<.001$ ;  $CFI=.929$ ;  $RMSEA=.026$ ). According to this overall model, the direct path from peer strain at wave 1 to delinquency at wave 2 was statistically significant, but in the direction opposite to expectations ( $\beta=-.145$ ,  $p<.0001$ ). A one-unit increase of peer strain (e.g., sometimes  $\rightarrow$  often) resulted in a .145 (unstandardized structural coefficient) decrease in log odds of engaging in delinquency, holding the control variables constant. In other words, those students who are under stress from relationships with their friends at wave 1, on average, were less likely to engage in delinquency at wave 2.*

Table 9. Summary of Structural Equation Models for Peer Strain: Multi-Group Analysis Using Peer Attachment

	Full sample	Group-specific		Differences between groups (Wald test)
	(N=3,223)	High peer attachment (N=1,703)	Low peer attachment (N=1,727)	
<b>Hypothesized relationships</b>	Unstandardized coefficients	Unstandardized coefficients	Unstandardized coefficients	
Peer strain → Delinquency (Direct effect)	-.145* (.029) $p < .0001$	-.104* (.038) $p < .01$	-.151* (.051) $p < .0001$	1.278 ( $p = .258$ )
Peer strain → Anger	.200* (.019) $p < .0001$	.187* (.021) $p < .0001$	.211* (.022) $p < .0001$	1.077 ( $p = .299$ )
Anger → Delinquency	.518* (.041) $p < .0001$	.521* (.064) $p < .0001$	.494* (.065) $p < .0001$	.418 ( $p = .517$ )
Indirect effect	.103* (.011) $p < .0001$	.097* (.015) $p < .0001$	.111* (.017) $p < .0001$	
Total effect	-.042 (.028) $p = .139$	-.007 (.036) $p = .853$	-.047 (.048) $p = .329$	
(% explained by indirect effect)	41.5%	48.3%	42.4%	
<b>Fit statistics</b>				
$\chi^2$ (df, p-value)	807.319 (df=242, $p < .001$ )		1080.143 (df=512, $p < .001$ )	
Free parameters	62		96	
CFI	.929		.922	
RMSEA	.026		.026	

*Note.* Standard errors are in parentheses. \* $p < .0001$  Degree of freedom for Wald test is 1 for all models.

### *Indirect Effect Hypothesis*

To test Hypothesis 2 that peer strain would indirectly increase the likelihood of engagement in general delinquency by increasing the likelihood of experiencing anger, the indirect pathway from peer strain to delinquency via anger was specified. Although peer strain was significantly, but inversely, related to delinquency in the direct effect model ( $\beta = -.145, p < .0001$ ), a positive and significant effect was observed between peer strain and delinquency in the indirect effect model ( $\beta = .103, p < .0001$ ). Specifically, Table 9 demonstrates a direct positive link between peer strain and anger ( $\beta = .200, p < .0001$ ), and between anger and delinquency ( $\beta = .518, p < .0001$ ), thus creating a significant and positive indirect effect of .103 ( $.200 \times .518 = .103$ ). In other words, peer strain did lead to a positive increase in anger, which, in turn, exerted a strong and positive influence on delinquency, neutralizing the negative direct impact of peer strain such that it was no longer significant ( $\beta = -.042, p \leq .139$ ). In addition, the ratio of the indirect effect to the total effect (41.5%) supports the significance of the mediation hypothesis. Hence, Hypothesis 2 that the effect of peer strain on delinquency is mediated through anger is supported.

### *Conditioning Effect Hypothesis*

Table 9 shows the model fit results and structural path coefficients for the peer strain model. For this multi-group hypothesized model, the result of model fit indices was adequate ( $\chi^2 = 1080.143, df = 512, p < .001$ ; CFI = .920; RMSEA = .026). As shown in Table 9, the two models were not statistically different. The Wald test indicated no significant



differences in the direct path coefficient (peer strain → delinquency,  $-.104, p<.0001$  for high,  $-.151, p<.0001$  for low) and the two specified indirect path coefficients (peer strain → anger,  $\beta=.182, p<.0001$  for high,  $\beta=.213, p<.0001$  for low; anger → delinquency,  $\beta=.475, p<.0001$  for high,  $\beta=.523, p<.0001$  for low) between the high and low peer attachment groups. This result indicates that the operating mechanisms amongst peer strain, anger, and delinquency are similar for the high and low group, implying that peer attachment failed to function as a moderator of the two indirect paths. Therefore, Hypothesis 3 was not supported.

## **Physical Strain**

### *Direct Effect Hypothesis*

It was hypothesized that physical strain at wave 1 would have positive and significant impact on delinquent outcomes at wave 2. The first column of Table 10 includes model fit statistics as well as unstandardized structural path coefficients (N=3,223). Goodness-of-fit indices revealed that this hypothesized model provided an adequate data fit ( $\chi^2=824.450, df=240, p<.001$ ; CFI=.918; RMSEA=.019). Interestingly, the direct path coefficient demonstrated that a unit increase in physical strain results in a .065 decrease in the log odds to engage in deviant behavior. This indicated that, contrary to the expectation, physical strain was inversely associated with delinquency. Those students who were more concerned about their physical appearance at wave 1, on average, were less likely to report minor involvement in general delinquency at wave 2.

### *Indirect Effect Hypothesis*

The results of modeling the indirect effect of physical strain on delinquency via anger are detailed in the first column of table 10. As can be seen, there is a positive and significant indirect link between physical strain and delinquency through anger ( $\beta=.099$ ,  $p<.0001$ ). Hence, the 60.4% of total effect of physical strain on deviant outcomes can be explained via this mechanism.

Although the direct effect of physical strain on delinquency was negatively significant at the  $p < .0001$  level ( $\beta=-.145$ ), in contrast, the indirect effect was positive and significant ( $\beta=.103$ ,  $p<.0001$ ). Specifically, Table 10 shows that there is a direct positive link between physical strain and anger ( $\beta=.205$ ,  $p<.0001$ ), and between anger and delinquency ( $\beta=.484$ ,  $p<.0001$ ), producing a significant and positive indirect effect of .099 ( $.205 \times .484=.099$ ). In other words, directly, physical strain was negatively related to delinquency. Nevertheless, peer strain did lead to a positive increase in anger, which, in turn, exerted a strong and positive influence on delinquency, neutralizing the negative impact of physical strain such that it was longer significant ( $\beta=-.034$ ,  $p\leq.197$ ). In fact, the indirect positive links between physical strain and delinquency confirmed the hypothesis that physical strain has an indirect effect on deviant outcomes through the negative emotion of anger.

Table 10. Summary of Structural Equation Models for Physical Strain: Multi-Group Analysis using Self-Efficacy

	Full sample	Group-specific		Differences between groups (Wald test)
	(N=3,223)	High self-efficacy (N=1,709)	Low self-efficacy (N=1,732)	
<b>Hypothesized relationships</b>	Unstandardized coefficients	Unstandardized coefficients	Unstandardized coefficients	
Physical strain → Delinquency (Direct effect)	-.065* (.024) $p < .05$	-.028 (.031) $p = .366$	-.105* (.039) $p < .01$	.545 ( $p = .460$ )
Physical strain → Anger	.205* (.019) $p < .0001$	.177* (.026) $p < .0001$	.243* (.026) $p < .0001$	1.041 ( $p = .308$ )
Anger → Delinquency	.484* (.040) $p < .0001$	.510* (.056) $p < .0001$	.443* (.054) $p < .0001$	.805 ( $p = .370$ )
Indirect effect	.099* (.010) $p < .0001$	.088* (.013) $p < .0001$	.108* (.015) $p < .0001$	
Total effect	.034 (.024) $p = .197$	.062* (.031) $p < .044$	.003 (.038) $p = .937$	
(% explained by indirect effect)	60.4%	75.9%	50.7%	
<b>Fit statistics</b>				
$\chi^2$ (df, p-value)	824.450 (df=240, $p < .001$ )		1176.484 (df=512, $p < .001$ )	
Free parameters	62		96	
CFI	.918		.916	
RMSEA	.019		.027	

Note. Standard errors are in parentheses. \* $p < .0001$  Degree of freedom for Wald test is 1 for all models.

### *Conditioning Effect Hypothesis*

As shown in Table 10, the validity of the hypothesized multi-group SEM model was confirmed ( $\chi^2=1176.484$ ,  $df=512$ ,  $p<.001$ ; CFI=.916, RMSEA=.027). The unstandardized coefficient estimates revealed that the links between physical strain and anger ( $\beta=.177$ ,  $p<.0001$  for high;  $\beta=.243$ ,  $p<.0001$  for low), and anger and delinquency ( $\beta=.520$ ,  $p<.0001$  for high;  $\beta=.443$ ,  $p<.0001$  for low) were positive and significant for both groups. In addition, the indirect effect percentage of participation in the total effect was greater for the high than for the low group (accounting for 75.9% and 50.7%, respectively). However, a Wald test indicated no statistical differences for the high and low group, suggesting that the impacts of peer strain and anger on delinquency were indistinguishable between the two levels of self-efficacy. In summary, self-efficacy failed to function as a moderator of either physical strain-delinquency or anger-delinquency link. Therefore, Hypothesis 3 was not supported.

## **Material Strain**

### *Direct Effect Hypothesis*

Table 11 presents the goodness-of-fit results and unstandardized path coefficients of the direct/indirect structural model for material strain. The model fit indices were acceptable overall ( $\chi^2=870.134$ ,  $df=242$ ,  $p<.001$ ; CFI=.923; RMSEA=.027). As predicted, a significant direct effect of material strain at wave 1 on delinquency at wave 2 was found for the full sample model ( $\beta=.148$ ,  $p<.0001$ ), demonstrating the strongest impact on

delinquency among five strain types used in the current study. Those students who were more concerned about their financial problems at wave 1, on average, were more likely to engage in delinquency at wave 2. This finding supports the first hypothesis of direct effect of material strain on delinquency.

### *Indirect Effect Hypothesis*

To examine the mediating role of anger on the relationship between material strain and delinquency, a hypothesized model with an added indirect path was imposed on the data. Hypothesis 2 predicts that material strain will predict delinquency by producing feelings of anger. The unstandardized path coefficients for the overall model are summarized in the first column of Table 11.

As expected, the path coefficient for the indirect effect revealed that the pathway from material strain to delinquency is positive and significant ( $\beta=.129, p<.0001$ ), accounting for 46.6% of the total effect on delinquency. This suggests that the impact of material strain was partially mediated by anger. In respect to the total effect, the direct effect of material strain on delinquency was .148, while the indirect effect via anger was .129, yielding a total of .277; indicating that a unit increase in material strain results in a .277 increase in likelihood to engage in deviant behavior both directly and indirectly. In essence, increases in anger in response to financial problems were significantly related to delinquent behaviors one year later, supporting Hypothesis 2.

Table 11. Summary of Structural Equation Models for Material Strain: Multi-Group Analysis using Parental Attachment

	Full sample	Group-specific		Differences between groups (Wald test)
	(N=3,223)	High parental attachment (N=1,719)	Low parental attachment (N=1,722)	
<b>Hypothesized relationships</b>	Unstandardized coefficients	Unstandardized coefficients	Unstandardized coefficients	
Material strain → Delinquency (Direct effect)	.148* (.032) $p < .0001$	.112* (.044) $p < .05$	.157* (.038) $p < .0001$	.440 ( $p = .507$ )
Material strain → Anger	.326* (.019) $p < .0001$	.334* (.021) $p < .0001$	.328* (.029) $p < .0001$	.030 ( $p = .864$ )
Anger → Delinquency	.395* (.038) $p < .0001$	.440* (.068) $p < .0001$	.367* (.050) $p < .0001$	.799 ( $p = .372$ )
Indirect effect	.129* (.015) $p < .0001$	.147* (.025) $p < .0001$	.120* (.020) $p < .0001$	
Total effect	.277* (.029) $p < .0001$	.259* (.049) $p < .0001$	.277* (.038) $p < .0001$	
(% explained by indirect effect)	46.6%	56.8%	43.3%	
<b>Fit statistics</b>				
$\chi^2$ (df, p-value)	870.134 (df=242, $p < .001$ )		1174.770 (df=512, $p < .001$ )	
Free parameters	62		96	
CFI	.923		.921	
RMSEA	.027		.027	

*Note.* Standard errors are in parentheses. \* $p < .0001$  Degree of freedom for Wald test is 1 for all models.

*Conditioning Effect Hypothesis (Parental attachment)*

To investigate the moderating role of parental attachment on the material strain-anger-delinquency relations, indirect structural paths among these latent constructs were simultaneously estimated and compared after dividing the students into high (N=1,719) and low (N=1,722) groups based on parental attachment factor score.

As shown in Table 11, the validity of the hypothesized multi-group SEM model was confirmed ( $\chi^2=1174.770$ ,  $df=512$ ,  $p<.001$ ; CFI=.921; RMSEA=.027). For students who were in the high parental attachment group, it was expected that material strain would exert a stronger impact on anger and delinquency, and anger would exert a stronger impact on delinquency, compared to the students who were in the low attachment group. In contrast to the GST hypothesis, the Wald test revealed that there were no statistical differences between the two groups with respect to the structural path coefficients. For both groups, anger was significantly predicted by material strain ( $\beta=.334$ ,  $p<.0001$  for high;  $\beta=.328$ ,  $p<.0001$  for low), and, in turn, anger had a significant effect on the general measure of delinquency ( $\beta=.440$ ,  $p<.0001$  for high;  $\beta=.367$ ,  $p<.0001$  for low). In addition, significant material strain indirect effects on delinquency were found through increased negative emotions of anger for both groups ( $\beta=.147$ ,  $p<.0001$  for high;  $\beta=.120$ ,  $p<.0001$  for low), suggesting that operating mechanisms amongst material strain, anger, and delinquency are similar across the high and low groups. Findings from this multi-group analysis, therefore, suggest that parental attachment does not moderate the effect of material strain on anger or the effect of anger on delinquency.

*Conditioning Effect Hypothesis (Peer attachment)*

As shown in the second column of Table 12, this multi-group model provided a good fit to the data ( $\chi^2=1108.201$ ,  $df=512$ ,  $p<.001$ ; CFI=.927; RMSEA=.026). For students with high peer attachment, material strain at wave 1 was significantly associated with delinquency at wave 2 ( $\beta=.180$ ,  $p<.044$ ); however, for the low peer attachment group, it was not significant at the .05 p-level ( $\beta=.095$ ,  $p=.058$ ). Still, the Wald test did not indicate any significant differences between the high and low groups in terms of the magnitude of the path coefficients. Table 11 presents the results for both groups, where a significant indirect effect linking material strain with delinquency was identified ( $\beta = .136$ ,  $p<.0001$  for high;  $\beta = .118$ ,  $p<.0001$  for low), accounting for 43.0% and 55.1% of the total effect, respectively. According to Table 12, path coefficients between material strain and anger ( $\beta=.341$ ,  $p<.0001$  for high;  $\beta=.302$ ,  $p<.0001$  for low), as well as anger and delinquency ( $\beta=.398$ ,  $p<.0001$  for high,  $\beta=.392$ ;  $p<.0001$  for low), were not significantly different across the two groups. Thus, peer attachment failed to function as a moderator of either the material strain-anger link or anger-delinquency link, and, therefore, Hypothesis 3 was not supported.

Although the coefficients were not statistically significant, it is important to note that their values in all structural paths for the high attachment group (material strain → anger, material strain → delinquency, and anger → delinquency) were greater than those



Table 12. Summary of Structural Equation Models for Material Strain: Multi-Group Analysis using Peer Attachment

	Full sample	Group-specific		Differences between groups (Wald test)
	(N=3,223)	High peer attachment (N=1,703)	Low peer attachment (N=1,727)	
<b>Hypothesized relationships</b>	Unstandardized coefficients	Unstandardized coefficients	Unstandardized coefficients	
Material strain → Delinquency (Direct effect)	.148* (.032) <i>p</i> <.0001	.341* (.021) <i>p</i> <.0001	.302* (.024) <i>p</i> <.0001	1.565 ( <i>p</i> =.211)
Material strain → Anger	.326* (.019) <i>p</i> <.0001	.180* (.042) <i>p</i> <.044	.095 (.050) <i>p</i> =.058	1.839 ( <i>p</i> =.175)
Anger → Delinquency	.395* (.038) <i>p</i> <.0001	.398* (.057) <i>p</i> <.0001	.392* (.061) <i>p</i> <.0001	.005 ( <i>p</i> =.942)
Indirect effect	.129* (.015) <i>p</i> <.0001	.136* (.022) <i>p</i> <.0001	.118* (.019) <i>p</i> <.0001	
Total effect	.277* (.029) <i>p</i> <.0001	.316* (.044) <i>p</i> <.0001	.214* (.047) <i>p</i> <.0001	
(% explained by indirect effect)	46.6%	43.0%	55.1%	
<b>Fit statistics</b>				
$\chi^2$ ( <i>df</i> , <i>p</i> -value)	870.134 ( <i>df</i> =242, <i>p</i> <.001)		1108.201 ( <i>df</i> =512, <i>p</i> <.001)	
Free parameters	62		96	
CFI	.923		.927	
RMSEA	.027		.026	
<i>Note.</i> Standard errors are in parentheses. * <i>p</i> < .0001 Degree of freedom for Wald test is 1 for all models.				

of the low attachment group, suggesting that students with high attachment to their peers are more likely to resort to delinquent behavior in response to material strain.

*Conditioning Effect Hypothesis (Teacher attachment)*

The second column of Table 13 presents the results for the disaggregated model. The results indicate a reasonable model fit to the data ( $\chi^2=1162.140$ ,  $df=512$ ,  $p<.001$ ; CFI=.919, RMSEA=.027). The results showed that while the effects of material strain on delinquency ( $\beta=.168$ ,  $p<.0001$  for high;  $\beta=.131$ ,  $p<.0001$  for low), material strain on anger ( $\beta=.168$ ,  $p<.0001$  for high;  $\beta=.131$ ,  $p<.0001$  for low), and anger on delinquency ( $\beta = .428$ ,  $p<.0001$  for high;  $\beta=.399$ ,  $p<.0001$  for low) were all significant in the expected direction for both groups, those paths were not statistically different across the high and low attachment groups.

Table 13 presents the results of the indirect effect for both groups. A significant indirect effect linking material strain with delinquency was identified ( $\beta=.145$ ,  $p<.0001$  for high;  $\beta=.118$ ,  $p<.0001$  for low) for both groups, accounting for 46.3% and 47.4% of the total effect, respectively. In conclusion, consistent with previous findings on conditioning effects of social or personal factors (Agnew et al., 2002; Aseltine et al., 2000; Mazerolle & Maahs, 2000; Mazerolle & Piquero, 1997; Piquero & Sealock, 2000; Sigfusdottir et al., 2004), teacher attachment had no buffering effect on any of the pathways, failing to provide evidence to support Hypothesis 3.

Table 13. Summary of Structural Equation Models for Material Strain: Multi-Group Analysis using Teacher Attachment

	Full sample	Group-specific		Differences between groups (Wald test)
	(N=3,223)	High teacher attachment (N=1,677)	Low teacher attachment (N=1,764)	
<b>Hypothesized relationships</b>	Unstandardized coefficients	Unstandardized coefficients	Unstandardized coefficients	
Material strain → Delinquency (Direct effect)	.148* (.032) $p < .0001$	.328* (.021) $p < .0001$	.296* (.026) $p < .0001$	1.569 ( $p = .210$ )
Material strain → Anger	.326* (.019) $p < .0001$	.168* (.049) $p < .001$	.131* (.040) $p < .001$	0.344 ( $p = .558$ )
Anger → Delinquency	.395* (.038) $p < .0001$	.428* (.066) $p < .0001$	.399* (.048) $p < .0001$	.135 ( $p = .713$ )
Indirect effect	.129* (.015) $p < .0001$	.145* (.023) $p < .0001$	.118* (.018) $p < .0001$	
Total effect	.277* (.029) $p < .0001$	.313* (.045) $p < .0001$	.249* (.038) $p < .0001$	
(% explained by indirect effect)	46.6%	46.3%	47.4%	
<b>Fit statistics</b>				
$\chi^2$ ( <i>df</i> , <i>p-value</i> )	870.134 ( <i>df</i> =242, $p < .001$ )		1162.140 ( <i>df</i> =512, $p < .001$ )	
Free parameters	62		96	
CFI	.923		.919	
RMSEA	.027		.027	
<i>Note.</i> Standard errors are in parentheses. * $p < .0001$ Degree of freedom for Wald test is 1 for all models.				

## **Chapter 6: Discussions and Conclusions**

The purpose of this study was to examine whether five types of subjective strains arising from five integral aspects of Korean adolescents' lives affect their delinquent behavior via anger. Furthermore, it also assessed whether the specific factors that stem from the same domain as the strain itself, condition the theoretical pathways of strain to delinquency. More specifically, the current study focused on whether (1) higher levels of subjective strain predict higher levels of delinquency (Hypothesis 1), (2) anger mediates the relationship between the subjective strain and delinquency (Hypothesis 2), and (3) students' level of social or personal resource conditions the relationship between the subjective strain and anger, as well as the relationship between anger and delinquency (Hypothesis 3). These three major tenets of GST were tested on 3,449 South Korean middle school students using latent structural equation modeling techniques.

Another purpose of the current investigation was to address gaps in the existing literature. First, the current study used a multi-group SEM model to test a mediation and moderation hypothesis concurrently. This is an important extension to the existing GST literature, since previous research often failed to examine mediation and moderation hypotheses simultaneously and served as a partial test of GST. This failed to depict and assess the theoretical mechanism as a whole. Second, in an attempt to assess Agnew's recent argument that the subjective measure of strain may be more strongly related to delinquency (2001), the present study used five separate measures of a subjective strain

instead of the traditionally used cumulative measure of objective strain. The findings of each analysis are detailed below along with theoretical, future research, and practical policy implications.

### **Direct effect (Hypothesis 1)**

First, the direct causal relationships between five different types of subjective strains at wave 1 and delinquency at wave 2 were investigated while controlling for socio-demographic factors. The SEM analysis revealed that only two strains were related to delinquency as expected. Specifically, parent-related and monetary-related strains strongly influenced delinquency in the hypothesized direction. This suggests that Korean students who experienced stress from the relationship with their parents or that from monetary problems were more likely to commit delinquency in the following year. This finding is consistent with previous studies that employed individual strain measures to explore the effect of separate strain measures on delinquency (Agnew et al., 2002; Bao et al., 2004, 2007; Baron, 2004, 2007; Jang, 2007; Morash & Moon, 2007; Moon et al., 2009). For example, Moon et al. (2009) found that Korean youths who experienced a high level of parent-related strain were more likely to participate in both violent and status delinquencies, while those who experienced high level of income-related strain were more likely to participate in property delinquency.

Second, contrary to theoretical expectations, the results indicate that strain generated from peer relationship or appearance dissatisfaction was negatively related to delinquency. This suggested that students with high peer or physical strain are less likely to report delinquency than their less affected counterparts. It is not clear why peer or physical strain was inversely related to delinquency. This contrasts Agnew's (2001) expectation as well as to findings from previous GST literature that identified peer-related (i.e. bullying or victimization) strain as a significant predictor of delinquency (Agnew & Brezina, 1997; Wallace, Patchin, & May, 2005). A possible explanation could be that students who are being teased, ignored, or feeling inferior to their friends are likely to be unpopular youths who are socially isolated from their school surroundings (Pellegrini, Bartini, & Brooks, 1999). Thus, their social standing makes them more likely to become victims of peer conflict rather than offenders themselves.

Lastly, the present study also found that academic strain is not an important factor in future delinquency for Korean middle school students. Given the exceptionally high emphasis on academic success in South Korean culture for adolescents from an early age, the insignificant effect of academic strain on students is unexpected. Although this finding is surprising, it is in agreement with similar previous studies that also had high expectations on the positive and significant link between academic-related stress and students' reported deviance (Morash & Moon, 2008; Moon et al., 2009; Morash et al., 2007). The following question needs to be asked: Is the academic-related stressor, the one of strain type that need to be filtered out from the Agnew's long list of potential types of

strain likely to lead to crime? Not necessarily. Although exam-related stress was not useful in explaining student deviant behaviors respective of their gender (Morash & Moon, 2008); regardless of whether the strain was old, recent, or perceived as an injustice (Moon et al., 2007), Moon et al (2009) reported that exam-related strain was positively and significantly associated with both violent and property delinquency, while no significant effect was found on status delinquency. Thus, at least for Korean students, academic strain may be associated with specific types of delinquency only.

However, findings can be cautiously generalized considering the age (mean=13.75) of sample students who are at their pubertal stage. It has been well documented in adolescence research that parent-child relationships change during puberty (Hofer et al, 1997). Previous studies in puberty literature documented that pubertal changes have an influence on adolescents' delinquent behaviors because of increased parent-adolescent conflicts (Steinberg & Morris, 2001; Hofer & Sassenberg, 1997). More specifically, adolescents at puberty demand more regulatory control and standing in opposition to parents' opinion. As a result, when they failed to get what they want, they expressed negative emotions toward their parents, often increasing stressful social interactions with their parents (Bosma et al, 1996; Montemayor et al, 1993; Weichold et al, 2008). Thus, future studies should investigate whether this finding that stress from negative relationship with their parents is an important predictor of deviant behaviors that can be generalized across different age groups, race, and cultural contexts.

In the case of academic strain, one possible explanation for the insignificant result could be that although Korean middle school students are under pressure of achieving high levels of academic performance, the age of thirteen may be too early for them to be stressed out enough to externalize their stress in a deviant manner. Future studies should investigate whether older students (e.g., high school students) are more likely to engage in delinquent activities because of academic strain.

After recognizing that not all strains have a similar impact on delinquency; in his recent extension of GST, Agnew (2001) listed various types of strain that are expected to be more related to delinquency than other strain types. At the same time, he also stressed the importance of using individual measures of strain over a single cumulative measure that is comprised of different types of strain. This is because the use of cumulative measure may mask the varying individual strain effects on delinquency. In this regard, the current analysis not only provided evidence on Agnew's (2001) suggestion but also went beyond past studies in finding that not all strains influence offensive behavior in the same way.

In summary, findings showed that parental and material strain at wave 1 are risk factors on delinquency at wave 2. On the other hand, peer strain and physical strain at wave 1 function as protective factors on delinquency at wave 2, suggesting the importance of identifying specific strain types that are more conducive to offending and filtering out those that are not relevant to predicting delinquency. Thus, future GST



research should employ type-specific strain and delinquency measures to better understand which individual strains are connected to which types of delinquency.

### **Mediating Effect (Hypothesis 2)**

In keeping with GST and previous research (Agnew et al., 2002; Aseltine et al., 2000; Mazerolle & Maahs, 2000; Mazerolle & Piquero, 1997; Piquero & Sealock, 2000; Sigfusdottir et al., 2004) that stipulated the indirect effect of strain on delinquency through increasing level of anger, results from a series of mediation analyses clearly supported the hypothesis that anger is an important factor that explains the operating pathways of strains on delinquency.

It appears that across all of the subjective strain measures, the associations between strains and delinquency were – to a great extent – mediated through anger. This is evidenced by both significant values of the Sobel test and a high proportion of indirect effects in the total effect for each five individual models, which range from 41.5% (peer strain) to 73.8% (academic strain). For example, anger operated as a strong mediator, linking parent-related strain to general delinquency. More specifically, this longitudinal study has shown that exposure to parent-related stress increased experience of anger, and that anger, in turn, resulted in the increased likelihood of delinquent behavior. This indirect effect (parental strain → anger → delinquency) accounted for a relatively large proportion (50.4%) of the total effect of parental strain on delinquency. The case of

material strain was very similar to parental strain in terms of the magnitudes of all direct and indirect path estimates. As shown in Table 6 and 10, parental and material strains maintained their statistical significances in their separate indirect effect models after controlling for the mediator of anger. Hence, anger acted as a partial rather than complete mediator. This further supports the previous findings that demonstrated the existence of, at least partial, indirect effects of negative emotions in strain-delinquency links (Agnew et al., 2002; Mazerolle & Maahs, 2000; Mazerolle & Piquero, 1997; Piquero & Sealock, 2000; Sigfusdottir et al., 2004). In essence, the parental and material strain analysis findings demonstrated that the presence of anger explains the relationship between parental/material strains and delinquency to a significant extent.

Particularly interesting mediation effects were found for separate models of peer and physical strain. Recall that, peer and physical strains were negatively and directly related to their delinquent behaviors. This indicated that the more students experience strain from peer relationships or appearance dissatisfaction, the less likely they are to engage in deviance in the following year. However, the exact opposite is true in cases of indirect effect of peer and physical strains in terms of sign of direction. Unlike the direct effect of these strains, the indirect causal pathway from peer/physical strain to delinquency via anger was positive and significant, implying that peer/physical strain increases anger levels, and that increased anger also increases the likelihood of delinquent behavior.

According to MacKinnon et al. (2007), this interesting type of mediation is a form of “inconsistent mediation (or suppression)” where the direct effect is negative and the indirect effect is positive, thus eventually cancelling out each other’s impact on dependent variable. MacKinnon, Krull, and Lockwood (2000) also noted that if direct and indirect effects hold opposite signs, and the total effect is smaller than the direct effect, inconsistent mediation or suppression on data can be found. In this study, anger is an inconsistent mediator of a negative relationship between peer/physical strain and delinquency.

The interpretation of this relatively rare and unexpected phenomenon – that anger functions as a suppressor variable, repressing the effect of peer/physical strain on delinquency – is complex. Furthermore, extensive literature review found no prior reports of inconsistent mediation amongst GST variables. Thus, providing a theoretical rationale for an inconsistent mediation effect from GST standpoint is difficult, as there seems to be no definitive explanation for this effect. However, similarly to the unexpected negative direct effect of peer/physical strain in the direct effect discussion above, it is arguable that students under strain due to their peer relationships or dissatisfying physical appearance may have a timid and passive personality. This could prohibit them from outwardly projecting anti-social behavior. However, at the same time, those students would also experience anger internally, which would be positively related to delinquency. Thus, direct effect of peer/physical strain would be negative, while the indirect effect via anger

would be positive. Those opposing effects counterbalance each other, resulting in an insignificant total effect.

Overall, the findings of the indirect Hypothesis for peer and physical strain models highlighted the complexity of a strain-anger-delinquency pathway mechanism. Consistent with GST arguments, although anger was shown to play a key mediator role as in peer/physical strain link to delinquency, these findings warrant further research on the mediation effect to clarify a functioning mechanism of strain-specific models.

Another interesting finding of the current study was the discovery of a significant indirect link between academic strain and delinquency. Although the direct effect of academic strain on delinquency was insignificant, the indirect effect through anger was statistically significant. In other words, academic strain was associated with increased levels of anger, resulting in higher participation in delinquency during the following year. This indicates a complete mediation of the relationship between academic strain and delinquency by anger. Thus, in strong support of Hypothesis 2, the results from the academic strain model indicate that school performance-related strain is associated with delinquency via anger. Recall the note by MacKinnon et. al. (2007) in the previous section that mediation can exist even if the initial relationship between independent and dependent variables is not significant. The finding from this study supports their argument and points to the need for further GST efforts to look for a mediation effect, even if initial direct link between strain and delinquency was not established.

One important advantage of building a separate model for each type of subjective strain is in its utility to identify and juxtapose the magnitudes of mediation effects to each other, by calculating “proportion explained”. This indicates the proportion of the total effect of an independent variable on a dependent variable that is explained by the indirect path through a mediator variable (Hafeman, 2009). Results of indirect effect analyses suggested that across all strain models, the ratio of the indirect effect to the total effect provided favorable evidence on GST. Indirect path via anger explained 50.4% for parental strain, 73.8% for academic strain, 41.5% for peer strain, 60.4% for physical strain, and 46.6% for material strain, implying that anger transmitted substantial effect of strains on delinquency. Notably, the largest proportion was found on the academic strain model. It may be that students who are stressed because of poor grades, homework and examinations, preparation for college or occupation, or boredom of studying are more likely to experience difficulty satisfying their goals. As delineated earlier, South Korean students are consistently under heavy pressure to perform better than their cohorts. However, given that they are only about 14 years old, they have been only been half way through to the end of education fever. Korean students’ and their parents’ ultimate goal is to get into prestigious universities (Lee, 2006), suggesting that they have not only been experiencing *chronic* academic strain but also been experiencing *anticipated* strains. Agnew (2006) defines this as the “individuals’ expectations that their current strains will continue into the future (p.12).” This both chronic and anticipated nature of academic

strain is significantly more related to trait-based anger that is known to trigger delinquency compared to other types of strains used in the present research.

Furthermore, turning to the result of parental strain, the study showed that about 50 percent of the impact of stress from a bad relationship with their parents on delinquency is mediated through anger. This finding is somewhat in line with the work of Hay (2003) that reported the proportion of strain's indirect effect on delinquency via anger on the total effect. More specifically, focusing on five different types of family strain on adolescents' delinquency using 182 non-random high school sample students, Hay (2003) reported that the indirect effect through anger on the total effect accounted 44 % for physical punishment, 31 % for parental rejections, 67 % for psychological control, and 58 % for unfair discipline. Taken together, though a large portion of parent/family related stress mediated through anger on delinquency, there is also a considerably large unexplained portion. This could be due to the fact that the current study as well as Hay's (2003) study did not include other types of negative emotions simultaneously using a multiple mediation model. Although anger is the most influential type of negative emotion suggested by GST, it has been consistently reported that other negative emotions, such as depression, anxiety, and frustration also have their particular contributions on specific types of deviant behaviors. Thus, the recommendation for future research is quite clear for the mediation hypothesis. By employing a multiple mediator model, future research may uncover the unique and simultaneous contributions of

mediators and magnitudes of the indirect effects in proportion to the total transmitted effect.

Statistically, the findings from five different mediation models provided solid support for Agnew's assumption that individuals under stress are pressured into delinquency by experiencing anger. The respective relationships between five types of strain and delinquency were significantly explained by the negative emotion of anger. When considered in light of other findings that used trait-based measure of anger (Aseltine et al., 2000; Brezina, 1996; Capowich et al., 2001; Piquero & Sealock, 2000, 2004), the findings of the present study are encouraging. They support the idea that uses a measure of dispositional anger that may successfully function as an alternative to situational measured anger. Past studies that utilized both trait-based and situational anger tend to a report more salient mediation effect with a latter measure (Broidy, 2001; Jang & Johnson, 2003; Mazerolle et al., 2003; Moon, et. al., 2009). This suggests that the use of trait-based measure of anger should be discouraged since this measure may operate as a confounder that affects both strain and delinquency (Mazerolle, et. al., 2003). However, in order to capture situation-related anger resulting from strain-generating situations, data have to be specifically designed to test GST. In this case, generalization potential of their findings is somewhat limited due to relatively small sample size and characteristics (i.e., students from a university located in the Western U.S.). Thus, observing that trait-based anger fully functions as an important intervening construct, as GST posits, is important for finding future studies that examine mediation effects on GST framework.

Conceptually, however, it should be noted that the effect of this third variable of anger is closer to suppression rather than mediation in some cases, since the indirect and direct effects have opposite signs, making the signs and magnitude of the total effects ambiguous (MacKinnon et al., 2000). It is highly likely that this unprecedented case of anger being a suppressor that buffers the *protective effect* of peer/physical strain on deviance is a special case of a more general phenomenon. However, further research should explore the role of anger in both mediation and suppression contexts to further clarify true underlying mechanism of anger, strain and delinquency relationship.

### **Moderating Effect (Hypothesis 3)**

Flexibility is one of the most significant GST characteristics, as it allows for a varying correlation measure between the effect of strain and different factors affecting an individual. Unfortunately, previous conditioning hypothesis findings have not been able to fully support this aspect of GST (see Aseltine et al., 2000; Capowich et al., 2001; Hoffman & Miller, 1998; Mazerolle & Piquero, 1997; Paternoster & Mazerolle, 1994). The results of the present study further support the existing findings on the limited conditioning effect on the relationship between strains and delinquency, as across all strain models, the operating strain mechanisms were not influenced by the levels of their corresponding external or internal factors. Perhaps students' differential exposures to



strain and anger are more important components of GST than the availability and level of coping resources affecting delinquent externalization of strains.

*Parental strain*

According to GST, high levels of parental attachment should attenuate the effect of strain on offending, either by reducing the effect of strain on anger and/or the effect of anger on offending. However, the multi-group parental strain model indicates that after controlling for background variables, neither the relationship between parental strain and anger, nor the relationship between anger and delinquency was moderated by parental attachment. Highly attached students, dissatisfied with their relationship with their parents, reported similar tendencies to experience anger compared to their less attached peers suffering similar parental strain.

In contrast, the direct effect of parental strain on delinquency provided evidence of moderation in the parental strain model. However, as GST primarily postulates an indirect relationship rather than a direct one, confirmation of the moderation hypothesis between parental strain and delinquency difficult. This is in agreement with previous study by Bao and colleagues (2007) that suggested that family support did not buffer the effect of negative relations with parents.

Hence, the following question needs to be asked: Why do students with markedly different parental attachment levels report similar delinquent behavior? The question is not easy to answer, as this relationship cannot be directly juxtaposed with results of other findings, largely due to the lack of previous studies pertaining to the moderating effects

of parental attachment on this specific strain source<sup>19</sup> (except Bao et al., 2007). Based on this study, it is not possible to ascertain if the lack of support for this hypothesis is confined to special cases of East Asians, or whether this is the case for all middle and high school students, irrespective of their nationality. However, it is possible to consider common life patterns of South Korean students and determine their impact on the relationship between delinquency and strain. According to the recent report of Annual Korean Education Statistics, over 75 percent of South Korean middle school students receive private tutoring, and spend approximately nine hours a day studying<sup>20</sup> (Annual Korean Education Statistics, 2010). South Korean Middle school students typically start their days very early in the morning, firstly attending school, followed by private tutoring or library study until late at night. Thus, they have very little time left in the day to spend with their parents. Hence, parental attachment, irrespective of its level, has very little opportunity to exercise significant influence on students' behaviors outside their homes. Considering their daily schedule, students are more likely to be affected by their peer or teacher attachment. Thus these relationships may be more salient strain/anger reducing vehicles on delinquency.

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<sup>19</sup> It should be noted, however, that five prior studies included individual measures of strain that are associated with negative relationships with parents. Unfortunately, however, three of them used the cumulative single measure of strain by encompassing several different-domain strain types mainly to simplify interactional terms when evaluating conditioning hypotheses (Agnew & White, 1992; Morash & Moon, 2007; Moon et al., 2009). Two other studies that used this specific strain measure focused more on testing different aspects of GST, failing to assess this conditioning hypothesis (Hay, 2003; Moon et al., 2007).

<sup>20</sup> For more information, see

[http://www.kostat.go.kr/nso\\_main/nsoMainAction.do?method=sub&catgrp=eng2009&catid1=g03&catid2=g03a&catid3=g03aa&catid=g03aa](http://www.kostat.go.kr/nso_main/nsoMainAction.do?method=sub&catgrp=eng2009&catid1=g03&catid2=g03a&catid3=g03aa&catid=g03aa)

### Academic strain

Focusing on the impact of teacher attachment on the academic strain-delinquency link, if GST is correct, high attachment levels should directly and indirectly buffer the impact of academic strain on delinquency, since students who maintain positive relationships with their teacher may not want to jeopardize the relationships by engaging in anti-social activities. Despite the sound logic of this postulate, the analyses found no evidence of teacher attachment as a delinquency moderator. The effect of academic strain on anger and delinquency as well as the effect of anger on delinquency were of similar magnitude for both teacher attachment groups, indicating that this relationship failed to moderate the impact of academic strain on delinquency.

Unfortunately, only one previous study has examined the influence of teacher attachment as a likely conditioning factor that mitigates the effect of strain on delinquency (see Morash & Moon, 2007). Therefore, it is difficult to assess the implications of the current findings in a broader context, based on existing GST literature. Still, null findings from parental and academic strain models are in line with empirical conclusions from Morash and Moon (2007) in that positive relationships with parents and teachers did not condition the effects of parental and academic strains on delinquency. In order to extrapolate and generalize these findings, cross-cultural research is necessary to further examine whether these findings are particular to Korean students or have broader implications.

### Peer strain

In terms of the influence of peer attachment on the peer strain and delinquency relation, GST suggests this social bond variable would ameliorate strain influence by enhancing conventional support and constraining urges to react in anger and engage in delinquent behavior. However, multi-group analysis of peer strain, using peer attachment as a grouping variable, failed to validate Hypothesis 3 that peer attachment would affect the connections between peer strain and delinquency. More specifically, the path coefficients – linking peer strain to anger, linking anger to delinquency, and directly linking peer strain to delinquency – were not significantly different across the two attachment groups, suggesting that students under peer-related stress are likely to experience anger, which, in turn, increases the likelihood of offending, regardless of their level of attachment to their peers.

These null results, while speculative, could stem from the fact that the current study did not explore gender differences when investigating the impact of peer attachment as a moderator. Previous studies have reported evidence in support of a gender-specific impact of peer attachment. Canter (1982), as well as Cernkovich and Giordano (2001) suggest that boys' behavior is more affected by peer attachment than that of girls. Agnew and Brezina (1997), and Chapple, McQuillan, and Berdahl (2005) also found that the impact of peer relations on delinquency is more salient for boys, reporting gender differences in the formation and maintenance of peer relationships that affect the likelihood of engaging in deviant behaviors. Given these findings, future

research should further investigate whether moderating effects of peer attachment differ across gender. Furthermore, although it was beyond the scope of this study, future research should also consider investigating whether the impact of peer attachment varies by the adolescent's level of exposure to delinquent peers. Agnew's (1991) work on the interactive effects of peer variables on delinquency has shown that attachment to peers is the important factor that conditions the effect of delinquent peers on deviant outcomes. In this vein, the conditioning effect of high peer attachment is expected to reveal contrasting influences depending on the nature of adolescents' intimate friendship networks. To put it differently, whereas the high level of peer attachment is likely to function as a risk factor that increases the chances of delinquent engagements, this same variable is likely to function as a protective factor that buffers the effects of strains on delinquency for those who are close to non-delinquent peers. Continued efforts are needed to improve the understanding of peer influence within the GST context.

#### *Physical strain*

As with the peer strain model, the physical strain model displayed no significant conditioning effects; coefficient estimates for both direct and indirect effect between physical strain and delinquency did not statistically differ for the high and low self-efficacy groups. It has been found that stress from peer relations may lead to feelings of anger, which in turn affects the likelihood of delinquent response, regardless of self-efficacy levels. Although GST recognizes the fact that self-efficacy conditions the effect of strain on delinquency (Agnew, 1992), findings from subsequent studies that used self-

efficacy challenged this proposition (Aseltine et al., 2000; Jang & Johnson, 2003). The findings from this study also failed to provide evidence in support of the assumption that individuals with high levels of self-efficacy are less likely to cope with strain by engaging in illegal activities.

### *Material strain*

The analyses on material strain models revealed a similar result pattern. This is in contrast with the GST postulate that a high level of social support may alleviate individuals' criminal response to strain and anger through emotional and practical support aimed at providing appropriate strain coping mechanisms (see Agnew, 1992). However, three different types of social support – parental, peer, and teacher attachment – did not influence effects of material strain on anger and, strain or effects of anger on delinquency. Regardless of their level of social support, as exposure to material strain increased, all students experienced more anger, resulting in more offensive behavior. Surprisingly, very few studies have investigated the potential interaction between financial strain and parental/peer/teacher attachments, making it difficult to infer whether the present findings can be generalized to a broader context of different cultural settings. Thus, the ability to systematically compare and contrast across studies is limited. In summary, although the three types of social support were theorized to affect strain-anger-delinquency relations, by increasing or decreasing the impact of strain and/or anger, this was not supported by the findings of the current study. Here, the relationship between

material strain and deviance was not conditioned by any of the social supports. Thus, Hypothesis 3 was not supported.

It is possible, however, that the null findings of the moderation effect on all seven models may be associated with how the current study structured the measure of conditioning factors. To test the conditioning hypothesis, the present study used a multi-group comparison method by splitting a measure of the conditioning factor at its median to create high and low groups. As discussed in the footnote 16, although using a dichotomized factor score as a proxy to a continuous latent variable has its obvious benefits, it should be noted that the majority of researchers in the field of research methodology generally discourage using this approach. This is due to the fact that the dichotomization of continuous variables tends to underestimate the magnitudes of the conditioning influences, decrease the power to detect moderation, and inflate the chance of type 2 error (see Irwin & McClelland, 2003 for further discussion on the side effects of dichotomization).

However, since creating interactional terms between latent constructs that consist of multiple items may yield a computationally intensive statistic and create frequent convergence problems, and dichotomizing continuous variables also has previously mentioned disadvantages, taking the middle ground by employing a multiple-category variable such as a trichotomized variable might be an alternative option to assess this hypothesis. In addition, it has been well recognized in the methodological literature that

use of multiple categories is generally preferable to the binary-split strategy (Royston, Altman, & Sauerbrei, 2006)

Justification of using the multiple-category approach can be also found within the criminology literature. Although their study was not directly intended to test conditioning influences within the GST context, Thaxton and Agnew (2004) indirectly provide a valid rationale to support a practice of creating several ordinal-level categories. In an effort to test competing predictions between GST and social control theory, Thaxton and Agnew examined whether parental and teacher attachment has a nonlinear effect on delinquency. Results of their analysis indicated that the relationship between parental/teacher attachment and delinquency is nonlinear, suggesting the importance of separating negative attachment from neutral attachment.

Following the logic of their findings, when dichotomization is practiced on conditioning variables, the impact of neutral response may seriously mask the effect of negative attachment responses, yielding an insignificant impact of attachment factors on delinquency.

An insufficient, yet interesting, inference can be made from three previous GST studies in which null findings on moderation were found in studies that used dichotomized conditioning factors (see Hoffmann & Miller, 1998) and supportive findings were found in studies that used three-level categorization on conditioning factors (see Mazerolle & Maahs, 2000; Moon et al., 2010). For example, testing the moderation hypothesis derived from GST using three waves of data from the Family Health Study



and SEM technique, Hoffmann and Miller (1998) divided the value of conditioning factors (e.g., self-efficacy, self-esteem, and delinquent peers) at the standardized mean of zero to split the sample into two groups in order to analyze group differences. Their longitudinal results found that participants' high or low level of self-efficacy, self-esteem, and delinquent peers were not important factors in reducing instances of anger and delinquency. In contrast, Mazerolle and Maahs (2000) — using a three-level scale of high, medium, and low by selecting at one standard deviation above and below the mean for four conditioning factors — found statistically significant differences in delinquency across groups. In summary, future studies that examine the moderation hypothesis should consider creating more than two categories to determine if different outcomes are observed based on varying numbers of categories or selecting cut-off points.

### **Implications for GST and Future Research**

So far, a number of important implications have already been discussed above based on the findings of each hypothesis. However, given the relatively comprehensive nature of the current study (involving testing direct, indirect, and conditioning effects using five different strain models), the major implications for both general strain theory and future research will now briefly organized and interpreted.

First, the key implication for GST is the need to continue refining operating mechanisms of conditioning influences between strains-negative emotions-delinquency

links. Unfortunately, the majority of the existing GST literature that investigated the conditioning effect utilized multiplicative interaction terms between strain and conditioning factors, failing to explore exactly where moderations would occur, largely due to the limited theoretical information on the conditioning influence mechanisms. Thus, identifying which social or personal factors would likely to moderate what kind of specific types of strain on which paths is a central theoretical topic that may reveal accurate pathways by which conditioning factors moderate the effects of strains on delinquency. To do so, borrowing ideas from extended literature might be a plausible approach. For example, the larger body of literature on psychiatry, adolescence, or social bond on parental attachment could be tapped into and the clear theoretical connections to parental stress, several types of negative emotions, and delinquency could be traced. In addition, integrating these well-established findings on GST may help develop more explicit conditioning mechanisms of several of the hypothesized factors.

Second, it is possible that the four conditioning factors used in the present study may exert their influences more strongly on other strain types than those chosen (same-domain). As the study by Bao et al. (2007) already demonstrated positive empirical findings on diffusive conditioning effects on strains generated from other domains, future research might consider replicating the cross-domain conditioning effect to see if there are other types of social (e.g., peer attachment, teacher attachment) or personal (e.g., intelligence, moral belief, self-esteem, self-control, self-efficacy) coping resources in different cultural contexts, especially in Western culture.

Third, this study has broadened the understanding of which individual measures of strain are important predictors of delinquency and which are not. The types of strain focused on include parental, academic, peer, physical, and material strain. However, there are a number of strain types that have been left unattended by the current study as well as previous GST research (e.g., feeling inferior to brothers/sisters). Future efforts would benefit from incorporating other types of individual strain measures that were not considered in the present analysis. In addition, the majority of existing GST studies employed cumulative or composite measures of strain to test Agnew's assertion that the impact of strain becomes more significant when different types of strain are accumulated. However, after recognizing that not all strains have a similar impact on delinquency, in his recent extension of GST, Agnew (2001) listed various types of strain that are expected to be more related to delinquency than other strain types. At the same time, he also stressed the importance of using individual measures of strain over a single cumulative measure that is comprised of different types of strain. This is because the use of cumulative measures may mask the varying individual strain effects on delinquency. In this regard, the current analysis not only provided evidence supporting Agnew's (2001) suggestion but also went beyond past studies in finding that not all strains influence offensive behavior in the same way.

Fourth, although GST clearly postulates that strained individuals are likely to experience a range of negative emotions including anger, depression, anxiety, and frustration, the present study only examined the mediating role of anger because of the

unavailability of other types of negative emotions in the KYPS data. It is important for further research to specify other negative emotions in future models, since the inclusion of different types of negative emotions may reveal which types of strains are related to specific negative emotions and deviant behavior patterns (Bao et al., 2004; Broidy, 2001). Given GST's assumptions that anger is likely one of several negative emotions that links strain to offending, it might be wise to explore multiple mediator models in future efforts in order to uncover the unique and simultaneous contributions of mediators and the magnitudes of the indirect effects in proportion to the total transmitted effect.

Lastly, although validating Broidy and Agnew's (1997) gendered strain theory was beyond the scope of the present thesis, further studies should develop gender-specific models to demonstrate the usefulness of GST in explaining gender variation in crime rates. Expanding upon Agnew's hypothesized pathways of strain, Broidy and Agnew (1997) elaborated on Agnew's theoretical framework by specifying that males and females will differ in both the type and the amount of strains, negative emotions, conditioning factors, and delinquency.

By separately analyzing each gender, instead of controlling its effect by substituting it with dummy values in the models, further investigations will be able to identify each gender's unique pathway of strain to delinquency. More specifically, subgroup analysis may provide detailed reports on their unique reactivity on mediation and moderation across gender categories, while disregarding gender by using one combined model may mask its effect in the process of mediation and moderation. Further

efforts will be needed to examine the gender differences in the underlying functioning mechanisms by running a separate model for each gender.

Future work would do well to employ Multi-group SEM using gender as a grouping variable to examine gender differences in the underlying functioning mechanisms that include mediating and moderating effects.

### **Limitations**

It must be noted, however, that there are several limitations to KYPS data in assessing GST. Firstly, the five measures used in the present study do not exhaust all three types of strain proposed by Agnew in his initial work in 1992. Although KYPS data embrace various sources of strains, the dimension of the removal of the positively valued stimuli is not addressed, namely an aspect included in the previous studies by polling respondents about their past negative life experiences. Seventeen items in the KYPS study that were utilized to evaluate strain are mostly related to strain generated from failure to achieve positively valued goals or that were generated by the presentation of negatively valued stimuli. However, it should be recalled that Agnew developed the three-source strain categorization in order to “ensure that the full range of strainful events is considered” (Agnew, 1992, p.51) in future empirical GST tests. Since the KYPS data appear to embrace a full range of stress-inducing events surrounding important aspects of Korean teenagers’ lives, the omission of this type of strain does not seem to raise many

concerns. Rather, focusing on Agnew's (2001) more recent claim that delinquency is more strongly related to subjective rather than objective strains, using these five most relevant sources of strain is expected to merit GST development and refinement further than it would be possible using the earlier three-type classification argument, since separate subjective measures of strain can examine varying contributions of the different types of strain on delinquency.

Secondly, there is good reason to believe that specific types of strains might be related to specific types of delinquent outcomes, as past studies revealed that strain has different effects on different types of delinquency (Piquero & Sealock, 2004).

Unfortunately, as noted previously in footnote 16, the two factors extracted from factor analysis using 12 delinquency indicators did not yield an easy interpretation of this two-factor solution, and necessitated development of one general measure of delinquency.

Specifically, the behavioral patterns that strongly loaded the first factor – e.g., smoking, drinking, stealing, absence, running away, gang fighting and robbery – could not be labeled as either status offenses, property offenses or violence offenses. Further studies should focus on crime-specific models by developing diverse measures of delinquency, such as status delinquency, property delinquency, interpersonal delinquency or violent delinquency, since the different findings from varying combinations between several types of strain and several acts of delinquency may suggest different implications.

Finally, due primarily to data limitations as well as Agnew's (1992) claim that there is a temporal proximity element of GST, many previous GST studies relied on

cross-sectional data, making it difficult to ascertain a correct causal inference between strain and delinquency. Although the present study was able to address this sequential order between strain and delinquency, there is a question about the temporal/sequential ordering between strain and anger. Items that measure five types of subjective strains and anger were both collected in the same data collection wave. As a result, the causal relationship between strain and anger could not be established.

Future GST research would likely benefit from developing GST-specific data sets that have shorter reference periods between individual sampling waves. Ideally samples would have a less than six-month lag between waves, since Agnew contends that negative events or conditions may not exert significant and measurable effects after three months (Agnew, 1992). Development of such data sets will allow researchers to fully capture the effect of strain before its influence on negative emotions and deviant behaviors dissipates. Almost all previously reported studies utilized longitudinal data (with a reference period ranging from one to three years) to evaluate GST (except Slocum et al., 2005). It is likely that the effects of stressful life events on the following year's delinquency would be minimal and make statistical significance very conservative at best. In addition, this effort to develop GST data is likely to open the avenue for researchers to explore the temporal aspect of GST. Although Agnew (1992) posits that the effect of strain will be higher when noxious events occurred within three months or during a long period of exposure to strain, the majority of previously reported studies (except Moon et al., 2007; Slocum et al., 2005) — including the current study — left these temporal

characteristics (recentness and duration) of strains unaddressed. In an effort to identify strain types that are more likely to lead to crime, Agnew (2001) emphasized the magnitude of strain, which can be measured by identifying several factors, such as recentness, centrality, duration, and clustering. Despite the recognition of the importance of the magnitude hypothesis, past research was somewhat limited in exploring the temporal aspect of GST, mostly due to the unavailability of data that allow researchers to scrutinize short-term individual changes.

### **Policy Implications**

Based on the current study, several important policy measures can be recommended. Firstly, exposure to strains that are conducive to delinquency should be reduced and ideally removed (Agnew, 2006). As seen above, findings suggest that Korean middle school students are more likely to engage in delinquent behavior when suffering from bad relationships with their parents or when dissatisfied with their financial situation. Removing all sources of strains is an unrealistic expectation. However, helping adolescents to minimize the effect of strains through preventive intervention programs is feasible and proven to be effective (Barlow & Decker, 2009). A meta-analysis by Farrington and Welsh (2003) on the effectiveness of a parenting training program suggests that intervention programs involving parental behavioral training were superior to school-based programs in not only improving parent-child relationships, but



in preventing delinquency as well. In that respect, parent-child interactional therapy, organized by the Korean Youth Counseling Institute ([http://www.kyci.or.kr/eng\\_youth/e-kyci.html](http://www.kyci.or.kr/eng_youth/e-kyci.html)) and implemented by relevant local agencies, would be a good starting point for lowering the stress stemming from negative relationships with parents.

Secondly, the current investigations identified anger as a significant impact mediator of strains on delinquent behaviors. Given these findings, breaking the chain that links strains with delinquency could be an alternative strategy in preventing escalation of negative emotions into deviance. Specifically, prevention and intervention strategies focusing on helping individuals who tend to become upset easily when stressed may provide appropriate and socially acceptable coping mechanisms. In Korea, training camps incorporating anger management programs have been successfully implemented in the past (Choi, 2006). However, since the School-based Anger Management Program (SAMP) for adolescents – an effective program that helps adolescents to manage their anger and stress, and to adopt problem-solving skills (Park et al., 2009) – is gaining empirical support in Korea, it is considered that implementing SAMP throughout the public schools would be beneficial.

Appendix A. Descriptive Statistics and Statistical Difference between Included and Excluded

<b>Construct</b>	<b>N</b> <i>(missing values)</i>	<b>Items</b>	<b>Item wording</b>	<b>Mean</b>	<b>Min / max</b>	<b>Significance between included and excluded <math>\beta</math> (<i>p</i>- value)</b>
Parental Strain	3,449 (2)	PAS1	I get stressed by parental concerns on my school grades (3)	3.059	1 / 5	.508 (.340)
		PAS2	I get stressed by disputes with parents (3)	2.876	1 / 5	
		PAS3	I get stressed by excessive meddling of parents (3)	2.780	1 / 5	
		PAS4	I get stressed by infertile communication with parents (3)	2.601	1 / 5	
Academic Strain	3,449 (4)	ACS1	I get stressed by poor school grades (1)	3.217	1 / 5	-.092 (.825)
		ACS2	I get stressed by home assignments or examinations (3)	3.392	1 / 5	
		ACS3	I get stressed by preparation for college or occupation (3)	2.807	1 / 5	
		ACS4	I get stressed because it is boring to study (3)	3.173	1 / 5	
Peer Strain	3,449 (5)	PES1	I get stressed by friends' teasing and overlooking (3)	2.070	1 / 4	0.275 (.122)
		PES2	I get stressed by lack of recognition from friends (1)	2.049	1 / 4	
		PES3	I get stressed by sense of inferiority to friends (1)	2.193	1 / 4	
Physical Strain	3,449 (3)	PHS1	I get stressed by overweight or underweight (1)	2.534	1 / 4	0.167 (.277)
		PHS2	I get stressed by overheight or underheight (1)	2.562	1 / 4	
		PHS3	I get stressed by my appearance (1)	2.671	1 / 4	
Material Strain	3,449 (1)	MAS1	I get stressed by not being able to wear nice clothes (1)	2.548	1 / 4	-0.005 (.594)
		MAS2	I get stressed by lack of pocket money (1)	2.488	1 / 4	
		MAS3	I get stressed by not being able to get good that I want (1)	2.695	1 / 4	
Anger	3,449 (3)	ANG1	I may hit at a person when I feel annoyed	3.320	1 / 5	-0.470 (.002)*
		ANG2	I will hit back at a person who hits me	3.644	1 / 5	
		ANG3	I fight more frequently than others do	2.027	1 / 5	
		ANG4	I am often seized by an impulse to throw an object whenever I get angry	2.961	1 / 5	
		ANG5	Sometimes I can't suppress an impulse to hit other people	2.356	1 / 5	

		ANG6	I consider myself as an explosive soon to be blown off	2.223	1 / 5	
Self-efficacy	3,449 (1)	EFF1	I have a confidence in my own decision	3.429	1 / 5	
		EFF2	I believe that I can deal with my problems myself	3.507	1 / 5	
		EFF3	I am taking full responsibility of my own life	3.455	1 / 5	
Parental Attachment	3,449 (4)	PAA1	Parents and I try to spend much time together	3.239	1 / 5	1.065 (0.000)*
		PAA2	Parents always treat me with love and affection	3.707	1 / 5	
		PAA3	Parents and I understand each other well	3.346	1 / 5	
		PAA4	Parents and I candidly talk about everything	3.062	1 / 5	
		PAA5	I frequently speak outside experiences and my thoughts to parents	3.249	1 / 5	
		PAA6	Parents and I have frequent conversations	3.440	1 / 5	
Teacher Attachment	3,449 (4)	TEA1	I can talk about all my troubles and worries to my teachers without reservation	2.184	1 / 5	0.380 (0.575)
		TEA2	Teachers treat me with love and affection	2.746	1 / 5	
		TEA3	I hope to become a person just like my teacher	2.448	1 / 5	
Peer Attachment	3,449 (13)	PEA1	I hope to maintain the close relationships for a long time	4.375	1 / 5	
		PEA2	I am happy whenever I get together with them	4.355	1 / 5	
		PEA3	I try to have the same thoughts and feelings to them	3.714	1 / 5	
		PEA4	We can frankly talk about our troubles and worries	3.776	1 / 5	
Peer Delinquency	3,449 (136)	PED1	Among your close friends, how many were disciplined, suspended, or expelled from school?	.109	0 / 1	0.533 (.000)*
		PED2	Among your close friends, how many were arrested by the police?	.080	0 / 1	
		PED3	Among your close friends, how many did each of the followings during the last year? (drinking)	.277	0 / 1	
		PED4	Among your close friends, how many did each of the followings during the last year? (smoking)	.190	0 / 1	
		PED5	Among your close friends, how many did each of the followings during the last year? (severely beating other people)	.123	0 / 1	

		PED6	Among your close friends, how many did each of the followings during the last year? (robbing)	.113	0 / 1	
		PED7	Among your close friends, how many did each of the followings during the last year? (stealing)	.092	0 / 1	
		PED8	Among your close friends, how many did each of the followings during the last year? (Running away)	.100	0 / 1	
Delinquency	3,449 (261)	DEL1	Have you ever done the following acts during the last year? (drinking)	.105	0 / 1	
		DEL2	Have you ever done the following acts during the last year? (smoking)	.290	0 / 1	
		DEL3	Have you ever done the following acts during the last year? (having unexcused absence)	.060	0 / 1	
		DEL4	Have you ever done the following acts during the last year? (running away)	.038	0 / 1	
		DEL5	Have you ever done the following acts during the last year? (severely beating other people)	.046	0 / 1	
		DEL6	Have you ever done the following acts during the last year? (gang fight)	.021	0 / 1	No missing other than attrition
		DEL7	Have you ever done the following acts during the last year? (robbing)	.034	0 / 1	
		DEL8	Have you ever done the following acts during the last year? (stealing)	.033	0 / 1	
		DEL9	Have you ever done the following acts during the last year? (severely teasing and bantering)	.062	0 / 1	
		DEL10	Have you ever done the following acts during the last year? (threatening other people)	.021	0 / 1	
		DEL11	Have you ever done the following acts during the last year? (collectively bullying)	.035	0 / 1	

\* $p < .05$

## Bibliography

- Agnew, Robert A. 1984. Appearance and delinquency. *Criminology* 22:421–440.
- Agnew, Robert A. 1992. Foundation for a general strain theory of crime and delinquency. *Criminology* 30:47–87.
- Agnew, Robert A. 2001. Building on the foundation of general strain theory: Specifying the types of strain most likely to lead to crime and delinquency. *Journal of Research in Crime and Delinquency* 38:319–361.
- Agnew, Robert A. 2006. *Pressured into Crime. An Overview of General Strain Theory*. Los Angeles, CA: Roxbury.
- Agnew, Robert A., Timothy Brezina, John P. Wright, and Frances T. Cullen. 2002. Strain, personality traits, and delinquency: Extending general strain theory. *Criminology* 40:43–70.
- Agnew, Robert A. and Helene R. White. 1992. An empirical test of general strain theory. *Criminology* 30:475–498.
- Aseltine, Robert H., Susan Gore, and Jennifer Gordon. 2000. Life stress, anger and anxiety delinquency: An empirical test of general strain theory. *Journal of Health and Social Behavior* 41:256–275.
- Bao, Wan-Ning, Ain Haas, and Yijun Pi. 2004. Life strain, negative emotions, and delinquency: An empirical test of general strain theory in the People's Republic of China. *International Journal of Offender Therapy and Comparative Criminology* 48:281–297.

Subjective Strain, Anger, and Delinquency: Evidence from Korea

Bao, Wan-Ning, Ain Haas, and Yijun Pi. 2007. Life strain, coping, and delinquency in the People's Republic of China. *International Journal of Offender Therapy and Comparative Criminology* 51:9–24.

Barlow, Hughes, Scott H. Decker. 2009 *Criminology and Public Policy: Putting Theory to Work*.

Temple University Press. Philadelphia. PA.

Baron, Stephen W. 2004. General strain, street youth and crime: A test of Agnew's revised theory. *Criminology* 42:457–484.

Baron, Stephen W. 2007. Street youth, gender, financial strain, and crime: Exploring Broidy and Agnew's extension to general strain theory. *Deviant Behavior* 28:273–302.

Bennett, Richard R. 2004. Comparative criminology and criminal justice research: The state of our knowledge. *Justice Quarterly* 21:1–21.

Brezina, Timothy. 1996. Adapting to strain: An examination of delinquent coping responses. *Criminology* 34:39–60.

Broidy, Lisa M. 2001. Test of general strain theory. *Criminology* 39:8–32.

Broidy, Lisa M. and Robert A. Agnew. 1997. Gender and crime: A general strain theory perspective. *Journal of Research in Crime and Delinquency* 34:275–306.

Brown, Timothy.A (2006), *Confirmatory Factor Analysis for Applied Research*. Guildford Press, London

Browne, M.W and Cudeck, R (1989), "Single sample cross validation indices for covariance structures", *Multivariate Behavioural Research* 24 (4):445-455

Burton, Velmer S., Jr. and Francis T. Cullen. 1992. The empirical status of strain theory. *Journal of Crime and Justice* 15:1–30.

Burton, Velmer S., Jr., Francis T. Cullen, and David T. Evans. 1994. Reconsidering strain theory: Operationalization, rival theories, and adult criminality. *Journal of Quantitative Criminology* 10:213–239.

Capowich, George E., Paul Mazerolle, and Alex Piquero. 2001. General strain theory, situational anger, and social networks: An assessment of conditioning influences. *Journal of Criminal Justice* 29:445–461.

Canter, Rachelle J. 1982 Family correlates of male and female delinquency. *Criminology* 20:149-167.

Cernkovich, Stephen A. and Peggy C. Giordano. 2001. Stability and change in antisocial behavior: The transition from adolescence to early adulthood. *Criminology* 39:371–410.

Chapple, Constance L., Julia A. McQuillan, and Terceira A. Berdahl. 2004. Gender, social bonds, and delinquency: A comparison of boys' and girls' models. *Social Science Research* 34:357-383

Cho, Hae-Joang. 1995. Children in the Examination of War in South Korea: A Cultural Analysis. Pp. 141–168 in *Children and the Politics of Culture*, edited by S. Stephens. Princeton, NJ: Princeton University Press.

Subjective Strain, Anger, and Delinquency: Evidence from Korea

Choi, C. J. (2006). The effects of meditation programs in the reduction of school life maladjustment and anger of junior high school students. Unpublished master's thesis, Chungang University, Seoul.

Chung, B., Kim H., Lee S., Kwon K., and Lee J. 1993. *Restoring Korean Education from the Bondage of Entrance Examination Education*. Nanam Publication, Seoul.

Cloward, Richard and Lloyd Ohlin. 1960. *Delinquency and Opportunity: A theory of delinquent gangs*. Glencoe, IL: Free Press.

Cohen, Albert K. 1955. *Delinquent boys: The Culture of the Gang*. Glencoe, IL: Free Press.

Dempster, A.P., N.M. Laird, and D.B. Rubin. 1977. Maximum likelihood from incomplete data via the EM algorithm. *Journal of the Royal Statistical Society, Series B* 39:1–38.

Dion, Karen, Elan Berscheid, and Elaine Hatfield. 1972. What is beautiful is good. *Journal of Personality and Social Psychology* 24:285–290.

Durkheim, Emile. 1893. *The Division of Labor in Society*. New York: The Free Press.

Ellwanger, Steven J. 2007. Strain, attribution, and traffic delinquency among young drivers: Measuring and testing general strain theory in the context of driving. *Crime and Delinquency* 53:523–552.

Farrington, D. P. & Welsh, B. C. (2003). Family-based prevention of offending: A meta-analysis. *Australian and New Zealand Journal of Criminology* 36 127-151



Subjective Strain, Anger, and Delinquency: Evidence from Korea

Froggio, Giacinto and Robert A. Agnew. 2007. The relationship between crime and “objective” versus “subjective” strains. *Journal of Criminal Justice* 35:81–87.

Gilbert, James. 1986. *A Cycle of Outrage: America's Reaction to the Juvenile Delinquent in the 1950s*, Oxford University Press.

Hafeman, Danella M., 2009 “Proportion explained”: A causal interpretation for standard measures of indirect effect? *American Journal of Epidemiology* 170:1443-1448

Hay, Carter. 2003. Family strain, gender, and delinquency. *Sociological Perspectives* 46:107–135.

Hirschi, Travis. 1969. *Causes of Delinquency*. Berkeley, CA: University of California Press.

Hofer, M., & Sassenberg, K. (1997). Relationship and family discourse in different situations. In M. Hofer, J. Youniss, & P. Noack (Eds.), *Verbal interaction and development in families with adolescents*. Ablex: New York.

Hoffmann, John P. and Felicia G. Cerbone. 1999. Stressful life events and delinquency escalation in early adolescence. *Criminology* 37:343–373.

Hoffmann, John P. and Alan S. Miller. 1998. A latent variable analysis of general strain theory. *Journal of Quantitative Criminology* 14:83–110.

Hoffmann, John P. and Susan S. Su. 1997. The conditional effects of stress on delinquency and drug use: A strain theory assessment of sex differences. *Journal of Research in Crime and Delinquency* 34:46–78.

Howard, Gregory J., Graeme Newman, and William A. Pridemore. 2000. Theory, method, and data in comparative criminology. *Criminal Justice* 4:139–211.

Jang, Sung Joon. 2007. Gender differences in strain, negative emotions, and coping behaviors: A general strain theory approach. *Justice Quarterly* 24:523–553.

Jang, Sung Joon and Byron R. Johnson. 2003. Strain, negative emotions, and deviant coping among African Americans: A test of general strain theory. *Journal of Quantitative Criminology* 19:79–105.

Kaplan, David. 2000. *Structural Equation Modeling: Foundations and Extensions*, Thousand Oaks, CA: Sage.

Kennedy, Janice H. 1990. Determinants of peer social status: Contributions of physical appearance, reputation, and behavior. *Journal of Youth and Adolescence*. 19:233-241.

Kline, Rex B. 2005. *Principles and Practices of Structural Equation Modeling*. New York: The Guilford Press.

Kornhauser, Ruth R. 1978. *Social sources of delinquency*. Chicago: University of Chicago Press.

Landau, Simha F. 1997. Crime patterns and their relation to subjective social stress and support indicators: The role of gender. *Journal of Quantitative Criminology* 13:29–56.

Langton, Lynn and Nicole L. Piquero. 2007. Can general strain theory explain white-collar crime? A preliminary investigation. *Journal of Criminal Justice* 35:1–15.

Subjective Strain, Anger, and Delinquency: Evidence from Korea

Lee, Chong Jae, 2005. Korean education fever and private tutoring. *Journal of Educational Policy* 2:99-107

Lee, Meery and Reed Larson. 2000. The Korean 'examination hell': Long hours of studying, distress, and depression. *Journal of Youth and Adolescence* 29:249-71.

Leonard, Eileen B. 1982. *Women, crime, and society*. New York: Longman.

Liu, Jianhong. 2007. Developing comparative criminology and the case of China. *International Journal of offender Therapy and Comparative Criminology* 51:3-8.

MacKinnon, David P., Jennifer L. Krull, and Chondra M. Lockwood, 2000, Equivalence of the mediation, confounding, and suppression effect. *Prevention Science* 1:173-181

Mazerolle, Paul. 1998. Gender, general strain, and delinquency: An empirical examination. *Justice Quarterly* 15:65-91.

Mazerolle, Paul and Jeff Maahs. 2000. General strain and delinquency: An alternative examination of conditioning influences. *Justice Quarterly* 17:753-778.

Mazerolle, Paul and Alex R. Piquero. 1997. Violent responses to strain: An examination of conditioning influences. *Violence and Victims* 12:323-343.

Mazerolle, Paul and Alex R. Piquero. 1998. Linking exposure to strain with anger: An investigation of deviant adaptations. *Journal of Criminal Justice* 26:195-211.

Mazerolle, Paul, Alex R. Piquero, and George E. Capowich. 2003. Examining the links between strain, situational and dispositional anger, and crime: Further specifying and testing general strain theory. *Youth & Society* 35:131–157.

Mazerolle, Paul, Velmer S. Burton, Jr., Francis T. Cullen, David T. Evans, and Gary L. Payne. 2000. Strain, anger, and delinquent adaptations: Specifying general strain theory. *Journal of Criminal Justice* 28:89–101.

Menard, Scott and Delbert S. Elliott. 1994. Delinquent bonding, moral beliefs, and illegal behavior: A three-wave panel model. *Justice Quarterly* 11:173–188.

Merton, Robert K. 1938. Social structure and anomie. *American Sociological Review* 3:672–682.

Moon, Byongook and Merry Morash. 2004. Adaptation of theory for alternative cultural contexts: Agnew's general strain theory in South Korea. *International Journal of Comparative and Applied Criminal Justice* 28:76–104.

Moon, Byongook, David Blurton, and John McClusky. 2008. General strain theory and delinquency: Focusing on the influences of key strain characteristics on delinquency. *Crime and Delinquency* 54:582–613.

Morash, Merry and Byongook Moon. 2007. Gender differences in the effects of strain on the delinquency of South Korean youth. *Youth & Society* 38:300–321.

Moon, Byongook, Merry Morash, John McCluskey, and Hye-Won Hwang. 2009. A comprehensive test of general strain theory: Key strains, situational-and trait-based negative emotions, conditioning factors, and delinquency. *The Journal of research in crime and delinquency* 46:182–212.

Murphy, Daniel S. and Mathew B. Robinson. 2008. The maximizer: Clarifying Merton's theory of anomie and strain. *Theoretical Criminology* 12:501–521.

Muthén, Linda K. and Bengt O. Muthén. 2009. *Mplus User's Guide*. Fifth Edition. Los Angeles, California: Muthén & Muthén.

Nagin, Daniel and Raymond Paternoster. 1991. On the relationship of past to future delinquency. *Criminology* 29:163–189.

Organisation for Economic Cooperation and Development. 2006. Programme for International Student Assessment (PISA). Paris: OECD.  
(<http://www.pisa.oecd.org/dataoecd/15/13/39725224.pdf>)

Osgood, Wayne D. and Jeff M. Chambers. 2000. Social disorganization outside the metropolis: An analysis of rural youth violence. *Criminology*, 38:81–115.

Paternoster, Raymond and Paul Mazerolle. 1994. General strain theory and delinquency: A replication and extension. *Journal of Research in Crime and Delinquency* 31:235–263.

Park, Young-Joo, Ho-Sihn Ryu, Keum-Sun Han, Jung Hye Kwon, HanKyeom Kim, Yoon Jung Cho, Hyun-Cheol Kang, Suk-Hee Cheon, and Ji-Won Yoon. 2009 *Journal of Korean Academy of Nursing* 39 (1):145-156

Piquero, Nicole L. and Miriam D. Sealock. 2000. Generalizing general strain theory: An examination of an offending population. *Justice Quarterly* 17:449–484.

Piquero, Nicole L. and Miriam D. Sealock. 2004. Gender and general strain theory: A preliminary test of Brody and Agnew's gender/GST hypotheses. *Justice Quarterly* 21:125–158.

Preacher, K. J., & Hayes, A. F. 2008. *Contemporary approaches to assessing mediation in communication research*. In A. F. Hayes, M. D. Slater, & L. B. Snyder (Eds.), *The Sage sourcebook of advanced data analysis methods for communication research* (pp. 13-54). Thousand Oaks, CA: Sage.

Raykov, Tenko and George A. Marcoulides. 2006. *A First course in Structural Equation modeling*. Mahwah, NJ: Lawrence Erlbaum.

Reilly, Terence, 1995. A Necessary and Sufficient Condition for Identification of Confirmatory Factor Analysis Models of Factor Complexity One. *Sociological Methods and Research* 23:421-441

Royston, Patrick, Douglas G. Altman, and Willi Sauerbrei. 2006. Dichotomizing predictors in multiple regression: A bad idea. *Statistics in Medicine* 25:127-141.

Sampson, Robert J. and John H. Laub. 1993. *Crime in the Making: Pathways and Turning Points through Life*. Cambridge, MA: Harvard University Press.

Schafer, Joseph L. and John W. Graham. 2002. Missing data: Our view of the state of the art. *Psychological Methods* 7:147–177.

Sigfusdottir, Inga-Dora, George Farkas, and Eric Silver, 2004, The role of depressed mood and anger in the relationship between family conflict and delinquent behavior. *Journal of Youth and Adolescence* 33:509-622

Subjective Strain, Anger, and Delinquency: Evidence from Korea

Slocum, Lee A. 2007. *General strain theory and stability in offending and substance use over time: A dynamic approach*. (Doctoral dissertation). University of Maryland, College park, MD.

Slocum, Lee A., Sally S Simpson, and Douglas A Smith. 2005. Strained lives and crime: Examining intra-individual variation in strain and offending in a sample of incarcerated women. *Criminology* 43:1067–1110.

Smith, Hayden P. and Robert M. Bohm. 2008. Beyond anomie: Alienation and crime. *Critical Criminology* 16:1–15.

Spielberger, C. D., Johnson, E. H., Russell, S. F., & Crane, R. J. 1985. *The Experience and Expression of Anger: Construction and Validation of an Anger Expression Scale*. In M. A.

Chesney & R. H. Rosenman (Eds.), *Anger and hostility in cardiovascular and behavioral disorders* (pp. 5-30). Washington, DC: Hemisphere.

Thoits, Peggy A. 1995. Stress, coping, and social support processes: Where are we? What next? *Journal of Health and Social Behavior* 35:53–79.

Tittle, Charles R., Lisa M. Broidy, and Marc C. Gertz. 2008. Strain, crime, and contingencies. *Justice Quarterly* 25:283–312.

United Nations Development Programme. 2006. *United Nations Human Development Report*. <http://hdr.undp.org>.

United Nations Office on Drugs and Crime. 2000. *United Nations Surveys on Crime Trends and Operations of the Criminal Justice System*. <http://www.unode.org>.

Subjective Strain, Anger, and Delinquency: Evidence from Korea

Wallace, Lisa, H., Justin W. Patchin, and Jeff D. Day. 2005. Reactions of victimized youths: Strain as an explanation of school delinquency. *Western Criminology Review* 6(1):104-116

Warr, Mark. 1993. Age, peers, and delinquency. *Criminology* 31:17-40.

Warr, Mark. 2002. *Companions in Crime: The Social Aspects of Criminal Conduct*. Cambridge, UK: Cambridge University Press