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**EXAMINING THE CONDITIONING EFFECT OF SELF-CONTROL ON STRAIN  
USING A WITHIN-INDIVIDUAL CHANGE APPROACH**

A Thesis in

Criminology

by

Christopher C. Palmore

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The thesis of Christopher C. Palmore was reviewed and approved\* by the following:

Julie Horney  
Professor of Sociology and Criminology  
Thesis Advisor

Richard B. Felson  
Professor of Sociology and Criminology

Jeffrey T. Ulmer  
Professor of Sociology and Criminology  
Associate Head of the Department of Sociology and Criminology

John Iceland  
Professor of Sociology and Demography  
Head of the Department of Sociology and Criminology

\*Signatures are on file in the Graduate School

## **Abstract**

Agnew's (1985; 1992) general strain theory posits that strains increase the likelihood of criminal coping. Generally, research has found that strains are associated with an increase in delinquent behaviors. One of the key assumptions of general strain theory asserts that various factors, including personality and social resources, condition the effect of strain on delinquency or crime. Agnew et al. (2002) argues that self-control should provide individuals with a protective factor against the negative effects of strain. While many studies have empirically examined this relationship, the evidence has been largely inconclusive. A major shortcoming in these studies is the utilization of designs that are unable to rule out selection prior to testing for conditioning effects. Recent examinations of strain have also highlighted the instrumental nature of coping (Felson et al. 2012) and argued that criminal coping should only be predicted when it is aimed directly at the source of the strain. In the current study, I extend the work of Felson et al. (2012) to determine whether or not the influence of self-control depends on the particular crimes and strain involved. In order to address the limitations of previous work, I utilize data that contain 3 years of monthly measurements and use a within-individual change approach to control for selection effects. Results indicate that self-control moderates the relationship between family strain and assaults in the predicted direction, but has little to no effect on the relationship between illness/injury strain and assaults or financial strain and dealing drugs. Furthermore, while the results indicate the self-control moderates the relationship between financial strains and property crimes, it was in the opposite predicted direction. The results indicate examining conditioning effects need to look closely at the nature of the hypothesized conditioning factor and the nature of the strain-crime relationship.

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## **Introduction**

Since its inception, Agnew's (1985; 1992) general strain theory has received a lot of attention in the criminological literature and is one of the most widely known theories in the field. General strain theory asserts that certain strains increase the likelihood of crime, with strains referring to events or conditions disliked by the individual. In the empirical literature, general strain theory has established a fair amount of support for its main tenet as research consistently demonstrates that some strains are associated with juvenile delinquency.

A central issue of general strain theory is explaining why certain individuals are more likely than others to turn to criminal coping under similarly stressful conditions. Recent work by Agnew et al. (2002; see also Agnew 2013) posits that personality traits, especially the core trait of self-control, are vital to understanding the variation found between individuals in response to strain. Despite this claim, the research on the conditioning effect of self-control on strain has thus far proved inconclusive. One shortcoming of these studies is a reliance on between-persons analyses utilizing cross-sectional data, or longitudinal data with long time-intervals between measurements (Agnew 2007). This study aims to address this issue by examining the conditioning effect of self-control on strain by employing a within-individual change approach with three years of monthly measurements for each respondent. In order to determine whether within-person relationships between strain and crime depend on the individual's level of self-control, I use a hierarchical analysis.

The current study builds on the work of Felson et al. (2012) who applied a within-individual analysis to study the relationship between specific stressors and specific crimes. Results of their analysis indicated that individuals experiencing strain rationally use criminal coping to attack the source of the strain, rather than turning to general forms of criminal coping.



The current study extends the analyses of Felson and colleagues by examining whether or not the influence of self-control depends on the particular crimes and strains involved.

Additionally, most studies of general strain theory have made use of adolescent samples that capture more minor forms of deviance. More recently, researchers investigating strain have shifted focus to adult samples and have found evidence that strains also influence more serious forms of crime (e.g., Ackerman and Sacks 2012; Slocum, Simpson, and Smith, 2005). This study contributes to the strain literature by making use of an incarcerated male inmate sample in order to assess 1) the generalizability of GST's core tenet (i.e., strain causes crime); and 2) whether or not self-control conditions strain in serious offenders.

### **General Strain Theory**

Agnew's general strain theory (1985; 1992) builds on previous strain theories (e.g., Merton 1938) by expanding on the types of situations and experiences that produce individual strain. Instead of primarily focusing on structural factors, general strain theory uses a social psychological approach and emphasizes the subjective experience of individuals and their interpretations of strain. The core assumption of general strain theory states that certain strains increase the likelihood of crime, with strains referring to negative events or conditions experienced by the individual (Agnew 1992). General strain theory posits that strain causes an individual to experience a negative emotional reaction and in order to cope with the strain and alleviate the negative emotions, the individual either turns to noncriminal or criminal coping. More specifically, strains experienced by the individual lead to a range of negative emotions, the most important of which are anger and frustration. These emotions create pressure for "corrective action," with crime being one of the available methods of coping (Agnew 1992).

## **The Conditioning Effect of Self-Control**

According to GST, for criminal coping to occur, individuals must possess a set of related characteristics that come together when the individual encounters certain types of strain in certain types of social environments (Agnew 2007). The crux of GST lies in trying to explain why some individuals are more likely to turn to criminal coping than others when faced with similar types of strain. The conditioning hypothesis of GST states that individual and environmental characteristics have the ability to increase the likelihood of criminal coping (Agnew and White 1992; Agnew 2007; see also Agnew et al. 2002). These “conditioning factors” increase the likelihood of criminal coping by reducing the individual’s ability to cope in a legal manner, by influencing the subjective costs and benefits of crime, and by increasing the individual’s disposition towards crime (Agnew 2007).

Agnew et al. (2002) argues that an important, and understudied, set of conditioning factors is personality traits. Personality traits are vital to understanding the variation found between individuals in response to strain because they can influence the subjective evaluation of strains, the emotional reactions to strains, and evaluations of costs and benefits related to criminal coping (Agnew et al. 2002). Among personality traits important to GST, the most critical may be self-control. Individuals with lower levels of self-control are more likely to act on their impulses, take risks, reject conventional social norms, and are less concerned with the feelings or rights of others (Gottfredson and Hirschi 1990). When presented with strain, individuals with low self-control may be at an increased risk for criminal coping. Agnew (2007) argues that individuals with lower levels of self-control are less able to find prosocial coping techniques to ward off the negative effects of strain because they tend to act without thinking and often lack the social skills necessary to employ legal coping. Further, they are less concerned

with the negative consequences of criminal coping and are likely to alleviate the strain any way possible including acting on criminal urges. A lack of self-control may enhance the effect of stressors on offending through reactive person-environment transactions in which individuals exposed to the same strain perceive it differently and react to it differently (Caspi and Bem 1990; Slocum 2010). In a person-environment transaction, individuals with low self-control would be more likely to subjectively evaluate a situation as threatening or as a result of deliberate mistreatment and more likely to blame others for their problems due to the volatile temper and self-centeredness components of self-control (Caspi et al. 1994). Additionally, the lack of impulse control component of self-control suggests that when angered or strained, individuals with low self-control are more likely to turn their negative emotions into action and more likely to act on their aggressive impulses (Caspi et al. 1994). Strained individuals with low self-control are at an increased likelihood of reacting to strains with anger and negative affect and using criminal coping to alleviate the negative effects of strain compared to strained individuals with higher levels of self-control (Botchkovar et al. 2009; Froggio and Agnew 2007; Slocum 2010).

### **Strain, Self-Control, and Within-Individual Change**

Most studies of strain utilize cross-section designs and rely on between-individual analyses. Studies using this approach typically compare individuals who have experienced strain to those who have not experienced strain and examine the difference in delinquent behaviors between the two groups. Cross-sectional studies, however, are limited in their ability to make causal claims because they are unable to address selection and often suffer from omitted variable bias (Firebaugh 2008). Further, cross-section studies are ill equipped to study change, which is a key component of general strain theory. Therefore, cross-sectional studies that have attempted to

detect a conditioning effect of self-control on strain have failed to first rule out selection and provide causal evidence of the strain-crime relationship. Overall in the literature, some cross-sectional studies have been able to detect a conditioning effect of self-control (Agnew et al. 2002; Cheung and Cheung 2010; Mazerolle and Maahs 2000; Hay and Meldrum 2009), while others have failed to find a conditioning effect (Botchkovar et al. 2009; Peter et al. 2003).

Compared to cross-sectional designs, longitudinal designs provide a stronger causal argument for general strain theory's main tenet and provide a design better equipped to assess conditioning effects. Longitudinal analyses allow researchers to better address selection by portioning out the effects of any unmeasured, preexisting differences that might be related to both strain and offending and produce biased estimates (Allison 1990; Slocum et al. 2005). This approach is able to compare within-individual changes in risk factors over time with within-individual changes in delinquency or crime over time (Farrington et al. 2002). In longitudinal designs, each respondent serves as their own "control" or counterfactual, while providing the temporal ordering necessary to make proper causal claims (Farrington 1988). This approach compares the times (i.e., days, months, years) in which individuals experienced strain with times they did not. When examining the impact of an event, such as a stressful life event, it is ideal to eliminate the contribution of prior individual differences and focus instead on the association between within-individual changes on the event variables and within-individual changes in offending (Osgood 2010; see also Horney et al. 1995). Few studies have used a longitudinal design to test the main components of general strain theory, although many that have continue to provide evidence of the strain-crime link (e.g., Aseltine, Gore, and Gordon 2000; Brezina 1998; Hoffman and Cerbone 1999). The shortage of longitudinal studies of strain is surprising given

that general strain theory is really about an individual's reaction to circumstances that change over time, and less about comparing groups that have or have not been strained.

Traditional longitudinal studies, however, typically contain only a few waves of data that often have anywhere from 1- to 5-years between each time of measurement (e.g., Hay and Evans 2006). Others attempt to address selection by controlling for previous behavior by examining the relationship between strain at time 1 and offending at time 2 while controlling for offending at time 1 (e.g., Paternoster and Mazerolle 1994). Unfortunately, these methods have drawbacks when testing general strain theory. Lagged models typically only include a single wave of data. Having more than one wave per respondent is ideal in general strain tests because most people, even offenders, turn to many forms of non-criminal and criminal coping. Furthermore, Agnew and White (1992) have argued that the effect of strain is mostly contemporaneous and criminal coping is mainly a function of current strain levels, not previous levels of strain. Including lengthy intervals between the independent and dependent variables may attenuate the effects of strain on offending (Slocum et al. 2005). Thus, many longitudinal studies of the conditioning effect of self-control are still not ideal. Many of the longitudinal studies testing the conditional effect of self-control on strain have found a moderating effect (Turanovic and Pratt 2013; Mazerolle and Maahs 2000; Wills et al. 2008; Hay and Evans 2006; Dishion and Connell 2006). However, a few studies have failed to detect a moderating effect of self-control (Paternoster and Mazerolle 1994) or found only partial support (Ousey and Wilcox 2003).

Typical longitudinal studies of strain and the conditioning effect of self-control leave room for improvement. In order to adequately study conditioning effects, the design of the study must be able to address selection and control for any unmeasured factors that influence both strain and offending before testing for moderating effects. The within-individual change

approach is able to address selection by portioning out all between-individual variance and instead focus on individual change over time. This approach controls for all time-stable factors, and is better suited to deal with omitted variable bias. Unlike typical longitudinal studies, within-individual change studies generally use measurements that are closer in time (e.g., monthly measurements). In order to provide a clear test of the conditioning effects of self-control on strain, studies must be able to address both selection and the contemporaneous effects of strain on crime (Agnew and White 1992).

To the author's knowledge, only two studies have utilized a within-individual change approach to studying strain that include waves of data that are less than a year apart from each other (Slocum et al. 2005; Felson et al. 2012), and no study has examined the conditioning effect of self-control on strain using this method. Research conducted by Slocum et al. (2005) analyzed retrospective monthly measurements that spanned three years for a sample of incarcerated women. Using a within-individual change approach, the researchers were able to eliminate the effect of selection while controlling for all time-stable characteristics. Findings revealed that the women were more likely to engage in violence during months in which they experienced more negative life events and victimization, while nonviolent crime and drug use were more prevalent during months in which the women were exposed to higher levels of neighborhood strain and negative life events (Slocum et al. 2005). Similarly, Felson et al. (2012) analyzed monthly inmate data and used a within-individual change approach to study the effects of strain on offending while addressing selection (more about this study below). In order to address the shortcomings found in cross-sectional and traditional longitudinal studies that examine the conditioning effect of self-control, the current study uses a within-individual change design that analyzes three years of monthly strain and offending measures in order to determine if

respondents reported engaging in crime more in months when they experienced strain and if that pattern differed by the respondent's level of self-control.

### **Strain And Specific Crimes**

More recent iterations of general strain theory imply specific links between different types of strain and different types of offending (Agnew 2007; Agnew 2013). General strain theory argues that criminal and noncriminal coping are utilized to alleviate negative emotions that are brought about by the strain, but coping processes can also be influenced by the *nature* of the strain (Agnew 2013). Coping can be both an emotional and a rational process undertaken to alleviate the effects of strain. Individuals experiencing strain may rationally decide that criminal coping is the best way to eliminate the strain, use crime to escape the stressful or aversive environment, or use criminal coping as a means to achieve particular goals that have been blocked (De Coster and Kort-Butler 2006).

From this perspective, strain does not cause an impulse towards general offending. Rather, strain produces a need for corrective action towards the source of the strain and is more domain-specific than domain-general. Research conducted by De Coster and Kort-Butler (2006) examined the determinacy (domain-specific coping) or indeterminacy (domain-general coping) of coping after experiencing strain. The researchers utilized cross-sectional data from sixth, seventh, and eighth graders in order to test their determinacy hypothesis. Results of their analyses strongly supported a determinacy model of coping as family-related strains were strongly associated with family-related delinquency and school-related strains were strongly associated with school-related delinquency (De Coster and Kort-Butler 2006). Stressors in the

study exerted the strongest effects on delinquency in the same domain as the stress, although some spillover effects were found.

Recent work by Felson et al. (2012) examined the relationship between specific strains and specific crimes using a within-individual change approach. Felson and colleagues found evidence that criminal coping is not just domain-specific, but is also an instrumental response to strain. From a rational-choice perspective, stress should only result in instrumental crime that addresses the problem created by the stressor (Felson et al. 2012). Individuals who are experiencing aversive stimuli, such as a stressful life experience, should only engage in criminal behavior if the individual anticipates low costs and valuable payoffs associated with the crime (Tedeschi and Felson 1994; Felson et al. 2012). Using the same data used in the current study, the researchers found that dealing drugs and property crimes were related to financial strain, while these offenses were unrelated to strains from work, illness or injury, family, or death of someone close. When experiencing strain from finances, individuals were not motivated to commit just any type of crime, rather, they committed offenses that are generally considered income-generating crimes (e.g., fraud, forgery, dealing drugs, auto theft). Consistent with the previous result, the researchers also found that family strain was associated with assaults, particularly on a family member. Violent reactions to stress are generally directed at the person with whom the individual has a grievance, not displaced onto a third-party (Tedeschi and Felson 1994). Assaults were only weakly related to illness or injury strain and not associated with any other type of strain.



## **The Current Study**

The current study examines retrospective self-reported accounts of criminal behavior by adult male inmates in order to assess the possible conditioning effect of self-control on stressful life events. This study contributes to the strain literature by utilizing a within-individual change approach with monthly measurements of both strain and offending in order to address issues that have been left unresolved by studies that have used both cross-sectional and typical longitudinal data. Further, the analytic strategy employed in the study provides strong causal claims for specific strain-crime relationships while allowing for the examination of between-persons differences in these relationships that may be dependent on the individual's level of self-control. The current study builds on the work by Felson and colleagues by extending their within-individual change approach to include a between-person analysis of self-control. To the author's knowledge, this is the first test of the conditioning effect of self-control that utilizes a within-individual change approach in order to determine whether the influence of self-control on the strain-crime relationship depends on the particular strains and crimes. Many of the previous studies that have found a moderating effect of self-control have used general categories of crime and delinquency without specifically testing whether or not the conditioning effect holds for specific crimes or for specific strains (Mazerolle and Maahs 2000; Cheung and Cheung 2010; Agnew et al. 2002; Hay and Evans 2006; Dishion and Connell 2006). The current study sought to investigate the possibility that the instrumental responses to strain differ depending on the individual's level of self-control.

In addition to contributing to the strain literature by investigating the possible conditioning effect of self-control, the current study will assess the generalizability of general strain theory to adults, and more specifically, to adult inmates that have extensive criminal

histories and reported involvement in a variety of criminal behaviors. Most strain studies have relied on population- or school-based samples (See Froggio 2007 for a review). Recently, researchers have begun the process of investigating the effects of strain on various adult-based samples that have more instability in their lives and participate in more serious forms of crime including: sex offenders (Ackerman and Sacks 2012), incarcerated women (Slocum et al. 2005; Sharp, Peck, and Hartsfield 2012; Foster 2012), police officers (Moon and Johnson 2012), and inmates (Morris et al. 2012). Despite the current shift to apply principles of GST to high risk or adult populations, these populations have been used infrequently when testing the core tenets of GST, and findings remain unclear in concluding whether or not strain influences adults in the same manner that it influences adolescents, and further, if strain influences high-risk adult populations in the same manner as the general adult population. As previous researchers have argued, samples that utilize inmates are well suited to assess the impact of strains or stressful events on criminal behavior as these samples have higher rates of offending and more instability in their lives in terms of stress compared to most samples (Horney et al. 1995; Slocum et al. 2005).

### *Hypotheses*

For the analyses, I use the same inmate sample utilized in Felson et al. (2012). As a starting point to the analyses, I replicate their findings. As such, the first set of analyses should mirror their main findings: family strains and illness/injury strains are associated with assaults, and financial strains are associated with dealing drugs and property crimes. After replicating the main findings, I extend their analyses in order to test the following hypotheses:

Hypothesis 1: Self-control will condition the effect of family-related strain on assaults and illness/injury strains on assaults. More specifically, the likelihood of committing an assault

during months in which the individual experiences a family-related strain or illness/injury strain will be greater for individuals with low self-control compared to individuals with high self-control.

According to general strain theory, two of the principal mechanisms that mediate the relationship between strain and criminal behavior are externalizing blame and experiencing negative affective states, mainly anger (Mazerolle and Piquero 1997). Anger may increase the likelihood of criminal coping because strained individuals blame their own adversity on others and anger may exacerbate their subjective experience of strain and create a desire for retribution or retaliation (Agnew 1992). Anger has the strongest effect on violent responses compared to other forms of deviant behavior (Agnew 1985). Violent acts are often situated in the context of responses to aversive interpersonal conflicts, and are mostly aimed at the target of the conflict (Tedeschi and Felson 1994; Luckenbill 1977). In support of this argument, Agnew (1990) found that a large majority of the sample that engaged in or threatened assault listed revenge or retaliation as their primary motivation.

Self-control has a strong association with violent behavior. Both preadolescent and early adolescent boys with low self-control have an increased risk for the development of aggressive and delinquent behavior (Feldman and Weinberger 1994; Krueger et al. 1996), and adults with low self-control show an increase in psychological aggression and physical violence and criminal behavior (Avakame 1998; Longshore 1998). Deficits in self-control have been strongly linked to aggressive behavior (DeWall et al. 2007). The main component of self-control that has been associated with aggression and violence is a volatile temper (Connor, Stein, and Longshore 2009), and research indicates that most assaults are considered a function of reactive aggression and are likely to involve anger (Berkowitz 1989).

As previously discussed, when individuals with low self-control are presented with strain they are more likely to subjectively evaluate a situation as threatening or as a result of deliberate mistreatment and more likely to blame others for their problems. Additionally, the lack of impulse control component of self-control suggests that when angered or strained, individuals with low self-control are more likely to turn their negative emotions into action and more likely to act on their aggressive impulses (Caspi et al. 1994). The combination of a volatile temper, lack of impulse control, and strain are likely to create a “perfect storm” of factors that induce aggressive and violent behavior.

The relationship between family strain and assaults found in Felson et al. (2012) is primarily driven by interpersonal conflicts between members in a household. Violence is most often directed at whomever the individual has a grievance with and not a third-party (Tedeschi and Felson 1994). Stress in the family often involves conflict among family members as households contain ample opportunity for interpersonal grievances (e.g., Felson 1983). Additionally, family-related strain might influence the individual’s own behavior by influencing him to perform less competently, violate expectations, annoy others, or violate rules of deference (Goffman 1956), which could create grievances that lead to conflict and violence with other family members (Felson 1992). Further, negative emotions in individuals with low self-control are more readily turned into actions and these individuals are more volatile and act more frequently on their aggressive impulses (Caspi et al. 1994). These individuals are more likely to turn to aggression to as an expression of anger and to remove the aversive sources (Agnew 1985). Individuals with high self-control, on the other hand, are less likely to see these grievances as a result of deliberate mistreatment and less likely to be angered by the strain.

Further, they have more control over their impulses and are more likely to find alternative strategies for coping with the strain that do not involve assaultive behavior.

The relationship between illness/injury strain and assaults was much weaker than the relationship between family strain and assaults (Felson et al. 2012). Self-control may provide similar beneficial protective factors mentioned above, but its influence on illness/injury strain is largely unknown. Strain emanating from illness or injury has an ambiguous source. If the respondent was injured through a physical attack, then an individual with high self-control may be less likely to respond with an assault. However, if the strain is from an illness, self-control may have little effect on criminal coping, as assaults would be less likely to occur without a target that inflicted the illness.

Hypothesis 2: Self-control will not condition, or only have a small influence, on the effect of financial strain on dealing drugs or property crimes.

Financial strains should create a corrective pressure to alleviate the source of the strain, and income-generating crimes provide an opportunity to do so. Offenders are frequently under financial strain and commonly perceive themselves as needing money and property crimes as a means to achieve financial gains (Jacobs and Wright 1999). Offenders, low or high in self-control, may perceive income-generating crimes as a viable solution to financial strain.

The influence of self-control on the financial strain and dealing drugs and property crime relationships should be minimal. Financial strains should create a corrective pressure to alleviate the source of the strain, and income-generating crimes provide an opportunity to do so. Offenders are frequently under financial strain and commonly perceive themselves as needing money and property crimes as a means to achieve financial gains (Jacobs and Wright 1999).

Offenders, low or high in self-control, may perceive income-generating crimes as a viable solution to financial strain.

The impulse control component of self-control may only play a small role in deciding to sell drugs or commit a property crime. Many property crimes are not considered crimes of impulse and contain a decent amount of future planning (Swatt and Meier 2008). Research conducted by Petersilia, Greenwood, and Lavin 1978 found that 25% of incarcerated robbers reported that they had planned their offense in detail, while 50% had planned some aspect of their crime, while Walsh (1986) found that over half of armed robbers planned their offense. In a study by Felson and Massoglia (2012), findings indicated that robberies were far more likely to be planned than assaults, homicides and sexual assaults. Temper should also play a much smaller role in the decision to commit a property crime or to sell drugs. Behavioral manifestations of temper are far more likely to occur instantaneously. Individuals with low self-control may perceive their hardships as more deliberate or unjust, and research has provided evidence that grievances can be expressed in a variety of ways, including theft and vandalism (Black 1983; Felson 1992) but this relationship is not as consistent as the relationship between self-control and assaults, and dealing drugs would not fit as a way of dealing with a grievance. Overall, past research suggests that the role of self-control should be greatest in dispute-related violence, not income-generating crimes (Felson and Massoglia 2012; Felson 1993).

## **Methods**

The data used for the study are from the Second Nebraska Inmate Study (Horney 2001). Respondents were randomly sampled from an intake cohort admitted to the diagnostic and evaluation unit of the state correctional system over a 14-month period beginning in November

1997 and ending in December 1998. The response rate for invited respondents was 90.4%, providing a total sample of 717 inmates that completed the original interview. In accordance with Felson et al. (2012), 22 respondents were omitted from analyses due to missing data on vital measures. In the second stage of analyses, an additional 8 respondents were omitted from the sample because they were missing too items in the self-control scale (see below).

Interviewers met with respondents in private visiting rooms where they read survey questions and entered the responses into a laptop computer. The original study gathered information about the respondent's stable background and personality characteristics including their criminal history, personality measures (including self-control), and family relationships. The interviewers used a life event calendar (LEC) to gather data about the respondents' lives for the three-year period prior to commission of the crime that resulted in incarceration. They recorded month-to-month changes in offending and in life circumstances including being under correctional supervision, their living arrangements, employment, social activities, and alcohol and drug use.

### *Measures*

#### *Offending*

In each of the 36 months on the LEC, respondents indicated the months in which they committed specific offenses. For the purpose of this study and to ensure continuity with the measures in Felson et al. (2012), the effect of strain was examined for three outcome variables: assaults, dealing drugs, and property offenses. Assaults were measured using a single item that asked respondents to indicate the months in which they were involved in a physical confrontation (beyond pushing or shoving) in which they attacked another person. Dealing drugs was also measured using a single item and referred to selling, making, smuggling, or moving drugs.

Respondents were similarly asked about their participation in burglary, theft, auto theft, forgery, fraud, personal robbery, or business robbery. Responses regarding these offenses were combined into a single measure of property crime, which was coded “1” if one or more of the individual offenses was committed in a given month. All of the dependent variables were treated as dichotomous measures and coded as “one” if the respondent reported committing the offense in a month and “zero” if he did not.

### *Strain*

The main independent variables of interest were self-reported monthly measures of strain and included the same measures of stressful life events found in Felson et al. (2012) and Slocum et al. (2005). In the survey, respondents were asked about their experiences of severe, unusual, or out of the ordinary stress related to each of the following: finances, family (relationships with their partner, children, or other family members), death of someone close, serious illness or injury (either experienced by the respondent or someone close to them), and work. Each strain measure was coded with a “one” indicating the respondent had experienced a stressful event and “zero” indicating they had not.

### *Self-control*

The independent variable that was used to differentiate respondents was their level of self-control. In the study, self-control was measured using the Grasmick et al. (1993) scale that was administered during the survey. The Grasmick et al. (1993) scale contains 24 attitudinal items, 4 for each of the 6 characteristics that were originally described by Gottfredson and Hirschi (1990), including dimensions of impulsivity, a preference for simple tasks, risk seeking, a preference for physical activities, self-centeredness, and temper.



Each of the original self-control items was scored using a scale that ranged from 1 to 4, with higher scores indicating lower levels self-control. A factor analysis revealed that the 24 items decomposed into 6 distinct components, so all of the items were used in the scale construction. As previously mentioned, 8 additional participants were excluded at this stage of the analyses because they provided responses to fewer than 18 of the 24 items, leaving the sample at 687 participants and 20,946 valid person-months. For each respondent, a self-control score was created by summing the self-control items and dividing by the total number of items each respondent answered. The total sample of respondents had a median self-control score of 2.25 ( $SD = 0.47$ ), with higher scores indicating lower self-control. I used a median split to categorize respondents into low and high self-control groups. The low self-control group ( $n = 337$ ) included all respondents that scored higher than the median self-control score, while the high self-control group ( $n = 350$ ) included all respondents that scored lower than the median self-control scale. Respondents in the low self-control group were coded with a “one” and respondents in the high self-control group were coded with a “zero”.

### *Control variables*

The statistical approach that was used for the analyses controls for all time-stable individual differences. However, in order to control for other explanatory factors that vary over time, additional control variables were added to the model. Control variables that are especially relevant include several aspects of life circumstances that might affect the individual’s levels of stress and criminal behavior. I include those life circumstances used in the models analyzed by Felson et al. Respondents were asked to indicate in which months they were living with their wives, significant others, parents, or children, and months when they were employed, and

months when they were under correctional supervision. All of the life circumstances were coded as “1” if the respondents indicated they confirmed the circumstance and “0” if they did not.

An alcohol use measure was created from two variables: frequency of alcohol consumption and amount of alcohol consumption. For months in which respondents drank more than once a week and consumed more than 7 drinks per day when they consumed alcohol, respondents were classified as “heavy drinkers” and coded with a “two”, while “light drinkers” were defined as respondents that drank alcohol less than once per week regardless of the amount, or had fewer than four drinks per day when they drank (regardless of the frequency) and were coded with a “zero.” All other respondents were coded as “moderate drinkers” and coded with a “one.”

In order to capture drug use and changes in drug use over time, two measures were included into the analyses. The first measure was based on the respondents’ usage of marijuana. Respondents were asked to report on the frequency of marijuana use during each of the months. Responses ranged from “never” (0) to “almost daily” (4). The second measure of drug use was based on drugs other than marijuana including cocaine, crack, heroin, speed/meth or amphetamine, acid or other hallucinogens, or any other drugs not specifically asked about but the respondent may have used. This drug measure combined all of the drugs into a single category and reflected the frequency with which the respondent used whichever drug he used most often in every month. Responses for drug use utilized the same scale as marijuana use.

In order to control for respondents’ unstructured socializing (Osgood et al., 1996), a composite measure was created from three different variables: the number of nights spent out per week during each month (0-7 nights), the frequency of cruising in automobiles, going to bars, and hanging out with friends (each ranged from 0 = never to 3 = almost daily). In order to give

equal weight to each of the measures, the number of nights spent out variable was converted to a range of 0-3 (i.e., 0-1 nights = 0, 2-3 nights = 1, 4-5 nights = 2, and 6-7 nights = 3) Following that conversion, I summed all four variables and divided by four creating a single composite unstructured socialization score.

### *Analytic Strategy*

Since each respondent reported monthly values for the full three years prior to incarceration, there are essentially 36 “waves” of data for each respondent. Months in which the respondent was incarcerated for at least half a month were excluded leaving only “street months” in the analyses. With nested data of this nature, the use of ordinary regression techniques is not appropriate due to a lack of independence between observations. In order to account for the nested data and the lack of independence, hierarchical linear modeling (HLM) was utilized. HLM is also useful because it parcels out the between-group variation and the within-group variation. The strength of this approach lies in its ability to control for unmeasured time-stable explanatory variables as it “controls” for all time-stable characteristics of the person, such as gender, IQ, race/ethnicity, and individual propensity towards crime. One of the major problems with standard “between-persons” analyses is they fail to address any unmeasured variables that could influence both the independent variables as well as the dependent variables, otherwise known as omitted variable bias. By employing person-mean centering in HLM, or expressing each variable as a deviation from its person-specific mean, between person differences are eliminated and the approach allows for the estimation of within-person variation in offending over time while controlling for time-stable characteristics.

Due to the binary nature of the dependent variables, normal distribution of the residuals and prediction estimates using a linear model would provide estimates that are out of the 0-1

range. Further, linear models are additive and imply that the impact of each variable is constant across values of the other variables. In order to account for the nature of the dependent variable, I employed a logistic multilevel regression. The logistic multilevel model is advantageous because it resolves issues that arise when using measures of crime and delinquency that usually have highly skewed and discrete distributions that violate the assumptions of standard statistical models (Osgood 2010). Based on preliminary analyses, the models included a linear, quadratic, and cubic time variables in order to allow for complex patterns of offending across time.

I specify the models using HLM notation (Raudenbush and Bryk 2002). The models consist of two levels. The first level is the within-individual component and was comprised of monthly measures of the independent strain variables, the dependent crime variables, the control variables, and the time variables. All level-1 variables were person-mean centered. The control variables do not include an error term, as there is no a priori reason to believe that the effects of the covariates should vary randomly or systematically across individuals. A simplified model is shown below:

Level-1 Model (Within-Individual)

$$\text{Log}[\text{odds}(Y_{ti} = 1)] = \pi_{0i} + \pi_{1i}(\text{Strain}_{ti} - \overline{\text{Strain}_i}) + \pi_{2i}(\text{Time}_{ti} - \overline{\text{Time}_i}) \quad (1)$$

In equation 2, the intercept included an error term to account for random variation across individuals' average levels of offending and serves as a way to control for persistent unobserved heterogeneity (Horney et al. 1995; Slocum et al. 2005). In equation 4, there is an error term included for the first time variable in order to reduce serial correlation. A simplified version of the level-2 equation is shown below:

Level-2 Model (Between-Individual)

$$\pi_{0i} = \beta_{00} + \beta_{01}(\text{Strain}) + \beta_{02}(\text{Self-Control}) + r_{0i} \quad (2)$$

$$\pi_{1i} = \beta_{10} + \beta_{11} (\textit{Self-Control}) \quad (3)$$

$$\pi_{2i} = \beta_{20} + \epsilon_{3i} \quad (4)$$

The level-2 variable included in the model is self-control, and was grand-mean centered. Any level-2 “main effect” found is interpreted as the difference between the low and high self-control groups from the self-control grand mean. More importantly, the level-2 variable allowed for the creation of cross-level interactions between self-control and the level-1 strain variables, which are the main focus of the analyses. In order to replicate the Felson et al. (2012) findings, the level-2 equation does not include the self-control level-2 variable.

## **Results**

The first set of analyses replicates findings from Felson et al. (2012). In Table 1, descriptive statistics are provided for all of the variables. Combining all months for all of the respondents, assaults were committed in 9% of the months, drug deals in 31% of the months, and property crime in 14% of the months. The most frequently experienced types of strain were financial, family, and work strains. Respondents reported experiencing financial strain in 18% of the months, followed by family strain in 17% of the months, and work strain in 12% of the months. The least common types of strain included illness/injury and death of someone close. Respondents reported experiencing strain from an illness/injury in 5% of the months, followed by strain from a death in 3% of the months. In order to contribute to the within-person analyses, respondents must have reported both months in which they experienced strain and months they did not. For example, respondents that reported never experiencing family strain did not contribute to the analyses of the effects of family strain, nor did respondents that reported experiencing family strain in all of the months. Proportions of respondents reporting change in

the strain measures ranged from 40% for family strain to 25% for strain from a death of someone close. The results of table 1 mirror the descriptive statistics in Felson et al. (2012) indicating that a similar sample was used in both analyses.

In Table 2, I provide the within-person effects of different types of strain and control variables on the three offending measures. The effects of the control variables and strain measures all closely matched the results of Felson et al. (2012). Financial strain is strongly related to dealing drugs (logistic  $b = 1.229$ ,  $SE = 0.403$ ,  $p < .001$ ) and to property crimes ( $b = .737$ ,  $SE = 0.249$ ,  $p < .01$ ), but not significantly related to assaults ( $p > .10$ ). Family strain is strongly related to assaults ( $b = 0.693$ ,  $SE = 0.162$ ,  $p < .001$ ), and strain from illness or injury is also associated with assaults ( $b = 0.446$ ,  $SE = 0.185$ ,  $p < .05$ ), although the effect is weaker than family strain. Neither Strain from work nor strain from death of a close person is significantly related to any of the offending measures. Results of the hierarchical logistic regressions closely replicate the results of Felson et al. (2012) and suggest that strain creates a corrective pressure to offend, but only if the offending behavior is aimed at reducing or eliminating the source of the strain. From this perspective, offending is an instrumental response to strain aimed directly at the source and not the result of a general impulse towards offending created by strain.

In Tables 3-5, I extend the previous within-person analyses to include a level-2 measure of self-control to capture the interaction of self-control and strain for each of the offending measures. The hierarchical logistic regression estimates for assaults are presented in Table 3. In Panel A, I include the level-2 self-control variable. The level 2 intercept estimate indicates that there is no significant difference from the grand mean between the low and high self-control groups in the log odds of committing an assault while controlling for all strain measures and time varying factors ( $b = 0.246$ ,  $SE = 0.130$ ,  $p > .05$ ). Between-individual differences in low self-

control are not associated with assault, controlling for all time-varying factors and the effects of strain. The cross-level interaction between illness/injury strain and self-control is added to the model in Table 3 (Panel B) and failed to reach significance ( $b = 0.305$ ,  $SE = 0.372$ ,  $p > .05$ ). The non-significant interaction indicates that there was no significant difference between the low and high self-control groups in the log odds of committing an assault associated with illness/injury strain. Although it failed to reach significance, I created predicted probabilities for the two self-control groups, for both the absence and presence of strain. Predicted probabilities for all interactions were created by exponentiating the coefficients to create odds, and then dividing the odds by 1 plus the odds. For the purpose of this paper, I only used the coefficients from the level-1 intercept, level-1 strain estimate, level-2 self-control intercept, and the estimate for the cross-level interaction term. The interaction is displayed in Figure 1. For the high self-control group, the presence of strain increased the probability of committing an assault from .044 to .066, while for the low self-control group, the presence of strain increased the probability of an assault from .055 to .109. The presence of an illness/injury strain increased the probability of committing an assault for both groups and had a larger effect for the low-self-control group, although the interaction term failed to reach significance. The lack of a significant interaction term may be due to statistical power. The standard error for the interaction term is large and strain from illness or injury was only reported in 5% of the total months.

The interaction between family strain and self-control is added to the model in Table 3 (Panel C), and reached significance ( $b = 0.827$ ,  $SE = 0.306$ ,  $p < .001$ ). The significant interaction term indicates that there is a significant difference between the low and high self-control groups in the log odds of committing an assault associated with family strain. The significant interaction is displayed in Figure 2. For the high-self-control group, during months when they did not

experience family strain, respondents had a probability of .044 of committing an assault, compared to a probability of .078 during months in which they experienced family strain. The occurrence of family strain only resulted in a .034 increase in the probability of committing an assault. For the low self-control group, there was a .053 probability of committing an assault during months without a family strain and a .192 probability during months they did experience family strain. The occurrence of family strain thus increased the odds of committing an assault by .138 for the high self-control group. The presence of strain more than tripled the probability of committing an assault for the low self-control group, while only slightly increasing the probability for the high-self control group. The estimates in Table 3 show mixed support for hypothesis 1. While self-control clearly moderated the effect of family strains on assaults, there was little evidence that self-control moderated the effect of illness/injury strain on assaults.

In Table 4, I present the hierarchical logistic regression estimates for dealing drugs. The level 2 self-control measure is added to the model in Panel A. The level 2 intercept estimate indicates that there is no significant difference from the grand mean between the low and high self-control groups in the log odds of dealing drugs while controlling for all strain measures and time varying factors ( $b = -0.533$ ,  $SE = 0.403$ ,  $p > .05$ ). Low self-control is not associated with a greater likelihood of dealing drugs. The interaction between financial strain and self-control is added to the model in Table 4 (Panel B) and failed to reach significance ( $b = 0.382$ ,  $SE = 0.787$ ,  $p > .05$ ). The non-significant interaction term indicates that there was no difference between the low and high self-control groups in the log odds of dealing drugs groups associated with financial strain. The non-significant interaction is displayed in Figure 3. The presence of financial strain increased the probability of dealing drugs by .117 for each group. In other words, both the low self-control group and the high self-control group were equally affected by the



presence of strain. Clearly, self-control does not moderate the effect of financial strain on dealing drugs.

In Table 5, I present the hierarchical logistic regression estimates for property crimes. The level 2 self-control measure is added to the model in Panel A. The level 2 intercept estimate indicates that there was a significant difference from the grand mean between the low and high self-control groups in the log odds of committing a property crime while controlling for all strain measures and time varying factors ( $b = 0.727, SE = 0.240, p < .001$ ). Between-individual differences in self-control are associated with a greater likelihood of committing property crimes. The interaction between financial strain and self-control is added to the model in Table 5 (Panel B), and reached significance ( $b = -1.031, SE = 0.459, p < .001$ ). The significant interaction indicates that there was a significant difference in the log odds of committing a property crime between the low and high self-control groups associated with financial strain. The interaction is displayed in Figure 4. For the high self-control group, the probability of committing property crimes increased from .031 to .067 during months when the respondents experienced financial strain. The presence of financial strain resulted in a .035 increase in the probability of committing a property offense for the high-self-control group. For the low-self-control group, the probability of committing a property was relatively unaffected by the presence of strain and actually resulted in a .013 *decrease* in the probability of committing a property crime. In terms of a conditioning effects in general strain theory, the influence of self-control on the financial strain and property crimes relationship is not in the predicted direction. Financial strain decreased the probability of committing property crime for the low self-control group, while increasing the probability of committing property crime for the high self-control group. The results of Table 3, 4, and 5 show support for hypothesis 2 (self-control will have a larger effect on the family strain-

assault relationship compared to financial strain and property crime and dealing drugs relationships). The estimates in Table 4 and Table 5 provide mixed support for hypothesis 2. While self-control clearly does not moderate the effect of financial strain on dealing drugs, self-control did moderate the effect of financial strain on property crime.

## **Conclusion**

Strain theories of criminal behavior saw an increase in popularity after Agnew's (1992) general strain theory was published. Generally, support for its main tenet has been found. A fair amount of research indicates that some strains increase the likelihood of delinquency and crime. The conditioning hypothesis of general strain theory argues that certain factors condition the relationship between strain and delinquency, with factors including both social and individual resources (Agnew 2007). Personality traits, especially self-control, have been argued to serve as important individual resources that either protect the individual from the criminogenic influence of strain, or increase the likelihood of delinquency of strain. Support for the conditioning hypothesis has been decidedly mixed (Agnew 2007), with some studies able to detect a moderating effect of self-control (e.g., Agnew et al. 2002), while others have failed to find a significant effect (e.g., Botchkovar et al. 2009). The current study sought to add to the extant literature in two important ways: 1) to build on the work of Felson et al. (2012) and determine if the influence of self-control depends on the particular crimes and strains involved; and 2) to assess the generalizability of the conditioning hypothesis in a sample of serious offenders.

The results of the study also found that an individual's level of self-control conditions the effects of family strain on assaults. Individuals with high self-control were largely unaffected by the presence of family strain, while individuals with low self-control were more than three times

as likely to commit an assault in months they experienced family strain compared to other months. The individual's self-control shaped their responses to family strain. Agnew et al. (2002) asserts that when confronted with strain, individuals with low self-control should more likely to experience intense emotional reactions; they are generally less concerned with the costs of criminal coping, and less likely to engage in alternative coping strategies. These individuals may be more likely to see family strain as unjust and a result of deliberate mistreatment and are more likely to lose their temper, which increases the likelihood of an assault. Family members frequently have to fight for property, space, other tangible goods, while also participating in division of household labor that can produce competition amongst family members and lead to grievances (Felson 1983). It is not terribly surprising that individuals with low self-control are at an increased risk for assaults when experiencing family strain as the close proximity to the source of the grievance combined with a quick temper and low impulse control creates an easy opportunity to commit an assault. Not all of the assaults were on family members, so further research is needed to determine whom the offender attacked when he experienced strain. Assaults on a third party still may be an attempt to restore equity, or may be an attack on someone who is a member of a group with whom the offender feels aggrieved (Tedeschi and Felson 1994).

Results also failed to find a significant conditioning effect of self-control on illness/injury strain and assaults. Strain from illness/injury has an ambiguous source. If strain is caused by an illness, it is unlikely that the individual would turn to criminal coping in the form of an assault, as there is no target to attack. If strain is caused by an attack that caused injury, there should be a greater association found with assaults. Further research should parse out the sources of illness or injury before analyzing the relationship between illness/injury strain and assaults.

Results of the study also found a conditioning effect of self-control on financial strain in regards to committing property crimes, but failed to find a conditioning effect on financial strain and dealing drugs. Financial strain equally affected the probability of dealing drugs for both the low and high self-control groups. It should also be noted that in non-strained months, individuals with high self-control have a higher probability of dealing drugs than individuals with low self-control. Dealing drugs is generally not considered impulsive and contains a fair amount of planning (Swatt and Meier 2008), and temper has strongest effects on violent behavior, not dealing drugs (Caspi et al. 1994). Offenders view these crimes as income generating, and this view theoretically does not vary between offenders. Financial strain greatly increased the probability of committing property crimes for the high self-control group, but decreased the odds of committing property crime for the low self-control group. The finding that strain decreased the probability of committing property crimes for individuals with low self-control was surprising. It could be that when experiencing financial strain, individuals with low self-control are less able to mobilize their resources in order to commit property crimes, although any explanation must include a reason as to why they are able to deal drugs in order to generate income. Agnew (2013) has argued that individuals possess a variety of coping skills, and in order to further investigate this findings, more research should examine the coping processes of individuals with low self-control and how those strategies differ depending on the type of strain experienced.

Some researchers have argued that studies have failed to find a significant moderating effect of conditioning factors is due to the methodology employed by researchers (Agnew 2007; Mazerolle and Maahs 2000), cultural factors that may play a role in the mixed findings (Cheung and Cheung 2010), or point to the possibility that the assumption may need to be revised

(Mazerolle and Maahs 2000). However, the findings of this study point to a larger issue concerning potential conditioning effects and criminal coping: conditioning effects are largely dependent on the nature of the strain, the instrumental approach to coping, and the nature of the hypothesized conditioning factor. Recent iterations of general strain theory are beginning to highlight the instrumental nature of criminal coping (Agnew 2013; Felson et al. 2012). From this perspective, strain creates internal corrective pressure that is directly related to the source of the strain. Coping is an instrumental response undertaken to alleviate strain, and specific strains and specific crimes should have stronger relationships than others. Conditioning effects should be most evident if the characteristics of the conditioning measure are in line with the nature of the strain-crime relationship, as evident in the conditioning effect found in the family strain and assault relationship.

While this study provides a rigorous test of the conditioning effect of self-control on strain, it is not without its limitations. First, the study sample is drawn from an incarcerated population. These samples are generally not representative of offenders as a whole, as they represent only the subset of offenders who actually are caught and subsequently are sent to jail (Hood and Sparks 1970; Caspi et al. 1994). Further, prosecuted offenders may differ systematically from nonadjudicated offenders; offenders who are white or middle class may be missed in this kind of sample (e.g., Taylor and Watt 1977). Additionally, serious offenders have lower levels of self-control compared to the general population, so conditioning effects may differ when examining the general population. Generalizing beyond this kind of sample must be done with caution.

A second limitation involves the use of the Grasmick et al. (1993) scale of self-control. The Grasmick et al. scale includes 6 dimensions of Gottfredson and Hirschi's original

conceptualization of self-control. While past research has found that self-control consistently predicts criminal behavior, recent research has found that self-control is multidimensional and its components may work differently depending on the situation and the available criminal opportunities. For example, Conner, Stein, and Longshore (2009) used structural equation modeling to examine the Grasmick et al. (1993) scale in order to determine which components of low self-control were most associated with drug use, property crimes, and violent crimes. Results of the models indicated that only the risk-seeking component was associated with property crimes, while volatile temper and risk seeking were associated with violent crimes. Research conducted by Burt, Sweeten, and Simons (2014) found that two key components of self-control (impulsivity and sensation seeking) demonstrated different developmental patterns over time, and these two components did not work in conjunction to comprise a stable self-control construct. Furthermore, the impulsivity and sensation seeking components were independently associated with within-individual changes in offending (Burt et al. 2014). These are not necessarily new findings, as researchers have long argued that proneness to crime, in terms of personality characteristics, is not defined as a single tendency but rather by multiple psychological components, most important of which may be negative emotionality and low constraint (Caspi et al. 1994). Negative emotionality and low constraint are sometimes used by researchers as being synonymous with low self-control (e.g., Agnew 2013), however, the self-control scales used in conditioning tests commonly include components of impulsivity, volatile temper, sensation seeking, having a preference for simple tasks and physical work, and self-centeredness. Many of these components have differential effects on offending (Burt et al. 2014; Conner et al. 2009), and may act differently when the individual is strained. Instead of relying

on a single self-control scale to test for conditioning effects, future research should parse out the multiple components of self-control and test them individually instead of as a single factor.

Finally, a third limitation involves the measurement of strain and the outcomes. In this study, strain was measured using negative life events that involved out of the ordinary stress. Although these strain measures are used in empirical strain tests (e.g., Slocum et al. 2005; Felson et al. 2012), these types of strain only represent a small number of potential strains that individuals face. Agnew (2001) has presented a variety of strains that need further empirical tests in order to identify their causal role in offending. For example, a recent study by Turanovic and Pratt (2013) explored the conditioning effect of self-control on victimization and drug use and found that individuals with high self-control were significantly less likely to turn to substance abuse following a victimization compared to their counterparts. Another study, conducted by Hay and Meldrum (2009) found that self-control conditioned the effect of bullying victimization and self-harm/suicide ideation in a sample of adolescents. Adolescents high in self-control had lower rates of self-harm and lower suicide ideation scores. These studies highlight the importance of examining multiple kinds of strain and outcomes.

Future tests of the conditioning hypothesis are needed that explicitly take into consideration the nature of the strain-crime relationship and the nature of the hypothesized conditioning factor. In the case of the conditioning effect of self-control, future research should examine the multiple components of self-control independently, as the components may have differential effects on offending and may be differentially influenced by strain. The mixed results of conditioning factors should not deter future research; rather, these findings should be a call for a theoretically informed link between strain, criminal coping, and conditioning factors that highlights the instrumental nature of coping.

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## Appendix A

Table 1. Descriptive Statistics

		Proportion of Months	Proportion of respondents who change
<i>Offending measures</i>			
	Assault	0.09	0.65
	Dealing drugs	0.31	0.35
	Property crimes	0.14	0.49
<i>Strain measures</i>			
	Financial	0.18	0.35
	Work	0.12	0.27
	Death	0.03	0.26
	Illness/Injury	0.05	0.25
	Family	0.17	0.40
<i>Life Circumstances</i>			
	Live with parents	0.25	0.31
	Live with wife	0.16	0.13
	Live with children	0.20	0.13
	Live with sig. other	0.26	0.30
	Probation/Parole	0.17	0.37
	Employed	0.69	0.44
<i>Other controls</i>			
	Marijuana use	1.85	1.83
	Drug use	1.08	1.37
	Alcohol use	0.83	0.82
	Unstructured socializing	1.58	0.69
	Months (n) 21,290 =		Respondents (n) = 695



## Appendix B

Table 2. Hierarchical logistic regression estimates and standard errors

	Assaults		Dealing Drugs		Property Crime	
	Coef.	SE	Coef.	SE	Coef.	SE
Intercept	-3.088***	0.064	-2.821***	0.191	-3.448	0.122
<i>Strain Variables</i>						
Financial	0.130	0.146	1.229**	0.403	0.737**	0.249
Work	0.210	0.191	0.168	0.290	-0.228	0.324
Death	0.261	0.254	0.441	0.335	0.027	0.275
Illness/Injury	0.446*	0.185	-0.283	0.519	-0.026	0.292
Family	0.693***	0.162	-0.145	0.289	0.417	0.232
<i>Explanatory Variables</i>						
Live w/ Parents	-0.201	0.185	-0.063	0.352	-0.169	0.232
Live w/ Wife	0.465	0.312	-0.469	0.639	0.259	0.431
Live w/ Child	-0.283	0.295	-0.477	0.629	-0.857	0.444
Live w/ Sig. Other	-0.021	0.186	0.837*	0.375	0.499	0.315
Correctional Supervision	0.198	0.140	0.375	0.326	-0.040	0.195
Employed	-0.034	0.129	-0.871***	0.275	-0.259	0.213
<i>Other Controls</i>						
Marijuana Use	0.105	0.065	0.715***	0.125	0.248**	0.086
Other Drug use	0.157***	0.044	0.896***	0.105	0.386***	0.081
Alcohol Use	0.130	0.083	0.382	0.198	0.377**	0.156
Unstructured Socializing	0.515**	0.161	1.643***	0.333	0.823***	0.218
<i>Variance Components</i>						
Intercept	1.782***		17.204***		7.204***	
Time	0.003***		0.038***		0.011***	
No. of person-months	21,290		21,290		21,290	
No. of persons	695		695		695	

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

## Appendix C

Table 3. Assault hierarchical logistic regression estimates with standard errors in parentheses

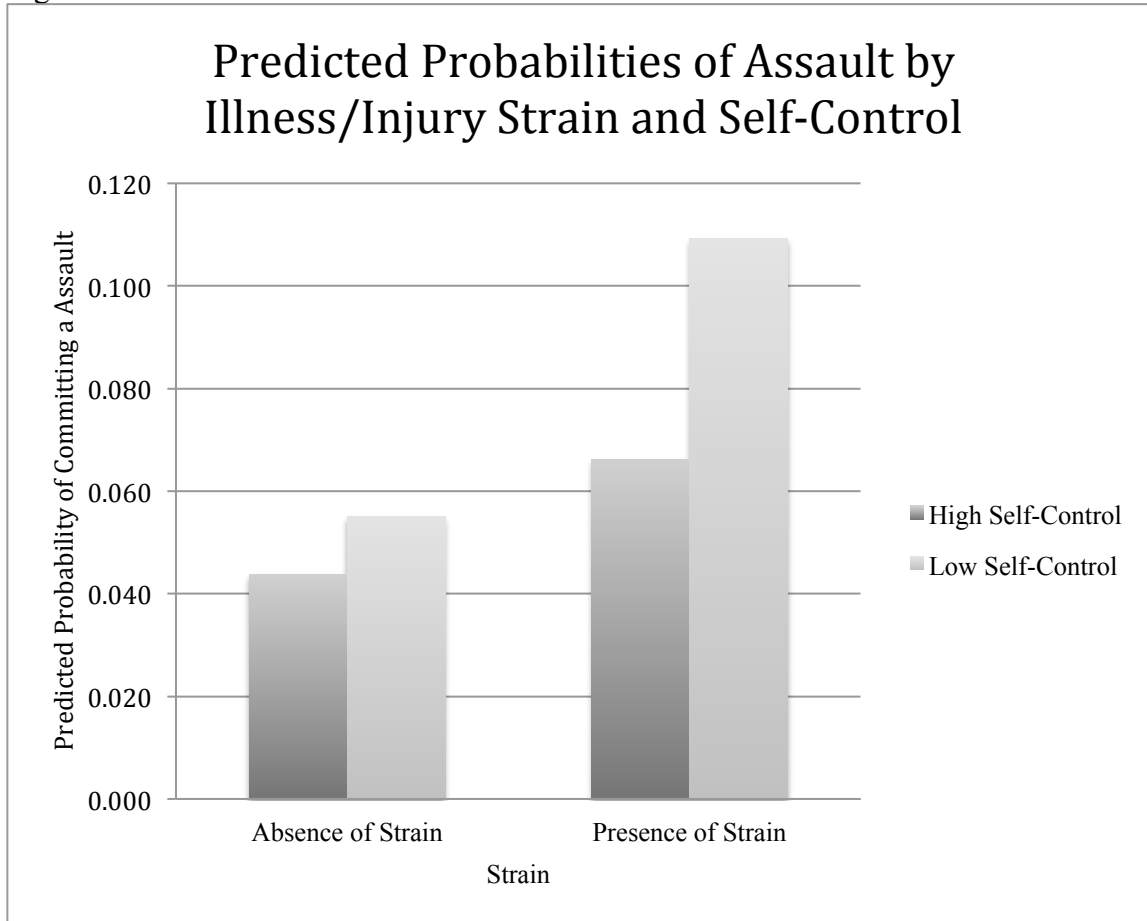
<i>Level 1 Strain</i>	Panel A	Panel B	Panel C
Intercept	-3.085*** (0.065)	-3.085*** (0.065)	-3.086*** (0.065)
Financial	0.130 (0.148)	0.129 (0.148)	0.132 (0.147)
Work	0.211 (0.192)	0.211 (0.192)	0.206 (0.196)
Death	0.215 (0.256)	0.216 (0.257)	0.203 (0.258)
Illness/Injury	0.459* (0.186)	0.439* (0.186)	0.456* (0.187)
Family	0.695*** (0.162)	0.694*** (0.162)	0.610*** (0.155)
<i>Level 2 and Cross-Level Interactions</i>			
Self-Control	0.246 (0.130)	0.242 (0.130)	0.210 (0.131)
Self-control X Illness/Injury	x	0.305 (0.372)	x
Self-control X Family	x	x	0.827*** (0.306)

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

<sup>a</sup>All models include the control variables

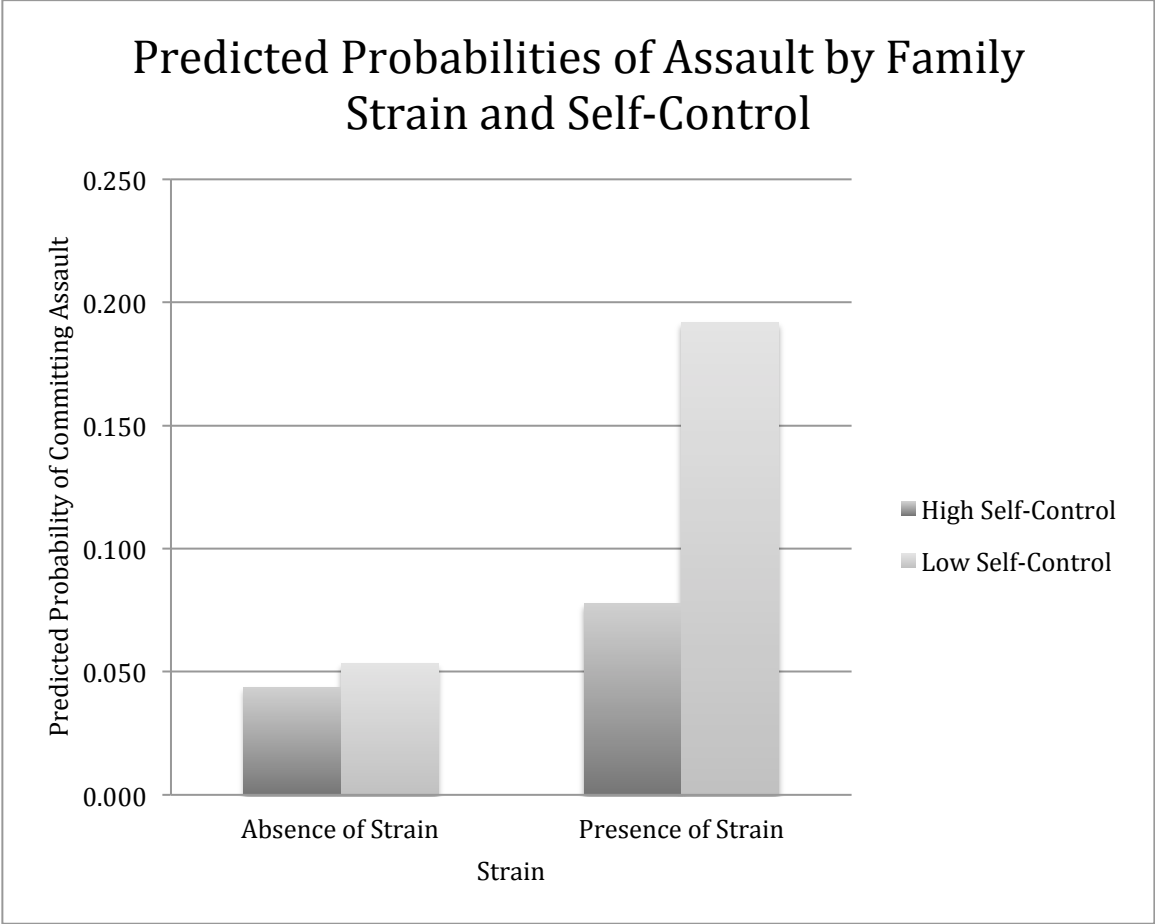
## Appendix D

Figure 1



**Appendix E**

Figure 2



## Appendix F

Table 4. Dealing drugs hierarchical logistic regression estimates with standard errors in parentheses

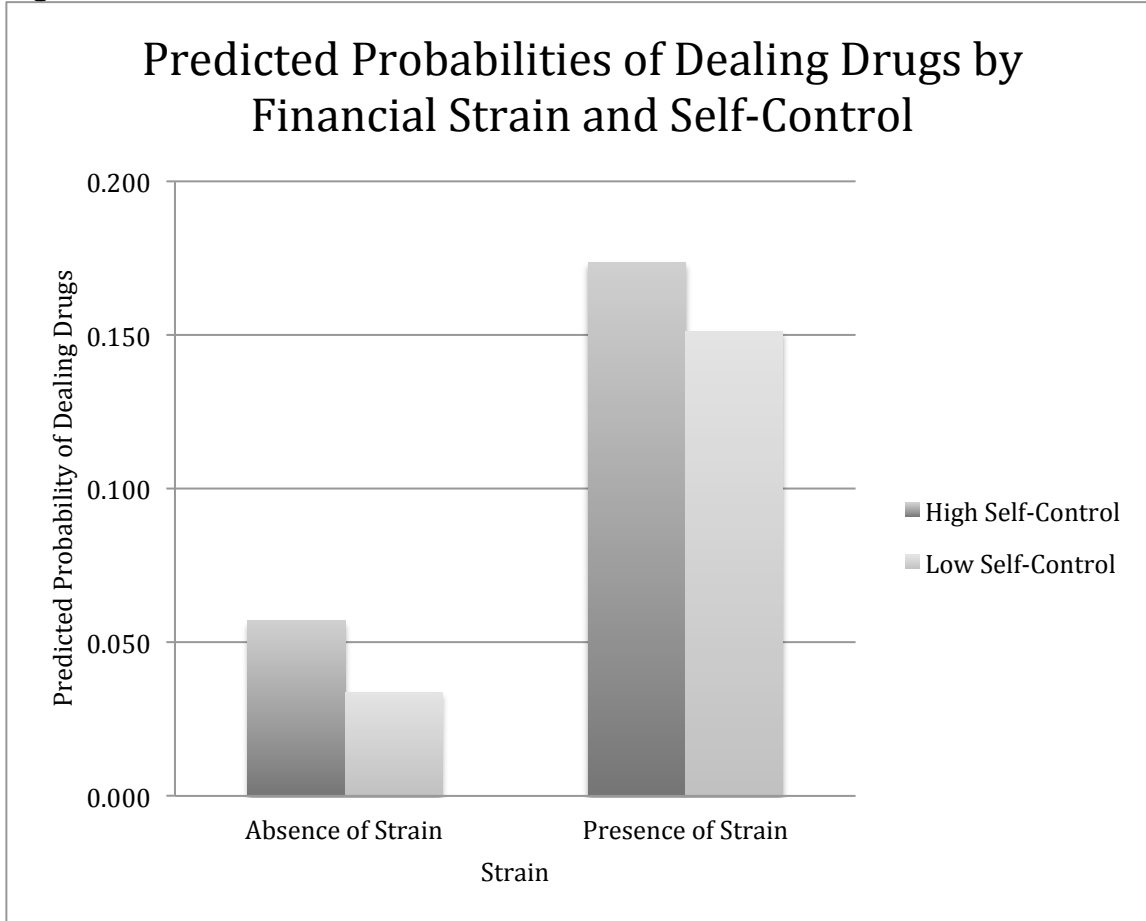
<i>Level 1 Strain</i>	Panel A	Panel B
Intercept	-2.809*** (0.192)	-2.807*** (0.192)
Financial	1.242** (0.404)	1.248** (0.399)
Work	0.167 (0.290)	0.170 (0.290)
Death	0.438 (0.335)	0.440 (0.335)
Illness/Injury	-0.232 (0.537)	-0.242 (0.528)
Family	-0.148 (0.289)	-0.144 (0.290)
<i>Level 2 and Cross-Level Interaction</i>		
Intercept	-0.533 (0.403)	-0.549 (0.403)
Self-control X Financial	x	0.382 (0.787)

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

<sup>a</sup>All models include the control variables

**Appendix G**

Figure 3



## Appendix H

Table 5. Property crime hierarchical logistic regression estimates  
with standard errors in parentheses

<i>Level 1 Strain</i>	Panel A	Panel B
Intercept	-3.420*** (0.122)	-3.434*** (0.123)
Financial	0.747** (0.250)	0.801** (0.235)
Work	-0.230 (0.324)	-0.244 (0.325)
Death	0.019 (0.277)	0.025 (0.265)
Illness/Injury	-0.024 (0.293)	-0.041 (0.292)
Family	0.420 (0.232)	0.403 (0.228)
<i>Level 2 and Cross-Level Interaction</i>		
Intercept	0.727** (0.240)	0.780** (0.241)
Self-control X Financial	x	-1.031*** (0.459)

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

<sup>a</sup>All models include the control variables

**Appendix I**

Figure 4

