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Sonya Worthington
University at Albany, State University of New York, sworthin89@gmail.com

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Adolescent Maltreatment, Substance Use, and Self-Efficacy: A Test of General Strain Theory
among a Sample of Clinical Youth

By

Sonya Y. Worthington

A Dissertation
Submitted to the University at Albany, State University of New York
In Partial Fulfillment of
the Requirements for the Degree of
Doctor of Philosophy

College of Arts & Sciences
Department of Sociology
Spring 2022
DEDICATION

Without the strength, sacrifices, and values of my mother, Tara Y. Jones, I would not be the woman, daughter, and Dr. that I am today. Thank you for stressing the importance of education, perseverance, and self-belief. Thank you for communicating my value and worth, for being a role model in my world, for carrying yourself with dignity and pride in the face of challenges, and for always supporting me. Thank you for never giving up on me and always pushing me to be great; thank you for rooting for me and always having my back. I will never accept any wooden nickels. I am honored to have you as the matriarch of my family. You are perfect, incredible. I am honored to share this accomplishment with you. I love you more than words can say, and my actions could ever express.

This is for US. For you, for me, and those that have come before us. This is for our bloodline and all the beautiful brown children in our family who desire to thrive. May this serve as symbol of hope. May we always break barriers.

Special thanks to Dr. Hideki Morooka and Dr. Charlesene McNeil-Blue for piquing my research interests and exposing me to “the work” beyond the classroom (HBCU & Bronco Pride!!). I would also like to thank my committee members Dr. Steven Messner, Dr. Joanne Kaufman, and Dr. Jiang Yu for riding with me on this journey, down to the end! I appreciate your guidance, encouragement, and the learning I’ve achieved during this process.

Praise to the Most High and my ancestors who supported me along the way: Jasmine S. Jones, Rowena M. Jones, Ulanda M. Jones, Mary Lou Norman-Lazare, Mary Louise Sanders-Norman, and Julia Cole. I called upon you in my times of need, and you never left me alone. Thank you, thank you, thank you. As above, so below.

Cheers to Black Girl Magic! Remember, to always keep your head high and your crown fixed.
ABSTRACT

The relationship between adolescent maltreatment and delinquency has been of growing interest to social control, social learning, strain, and family-oriented theorist since the 1980’s. While ‘social control’, ‘social learning’, and ‘traditional strain’ theories dominated early delinquency research literature surrounding the association, the past few decades have experienced a shift from these sociological theories to those more social-psychological in nature, lending much support, credibility, and acceptance of Agnew’s General Strain Theory (GST).

GST offers a theoretical framework for understanding micro-level and macro level factors that influence the likelihood of delinquency. In short, GST contends some individuals engage in criminal and deviant behavior to cope with their negative emotions caused by the experience of strain (events, conditions, or negative or adverse relations with others). Agnew (2001, 2013) argues victimization, especially child abuse and neglect, are one of the most consequential types of strain. While it is argued the strain-delinquency relationship can be conditioned by any number of factors that either enhances or diminishes delinquency as a response to strain, findings remain inconsistent and inconclusive.

The link between maltreatment and delinquency (i.e., substance use and criminal involvement) has been well-established, however, there still exists a considerable gap in the literature across fields. Limitations of prior research range from lack of theoretical underpinnings in health research, composite measures of strain and/or the lack of focus on maltreatment solely as strain in the criminological literature to underexplored clinical sub-samples of youth and mixed findings related to the conditioning effects of certain coping resources.
This dissertation research presents an empirical examination of the underexplored link between maltreatment, self-efficacy, and substance use, using two measures of strain and assesses the utility of GST on a sample of clinical youth. Specifically, this research tests the direct effects of the two indicators of strain on two measures of substance use, along with the direct effect of self-efficacy on substance use, and additionally tests the extent to which baseline levels of self-efficacy attenuate the effect of maltreatment on subsequent adolescent substance use.

This dissertation tests the utilization of GST using a unique longitudinal dataset: The Global Appraisal of Individual Needs (GAIN) National Dataset. The GAIN is a standardized biopsychosocial clinical client data assessment tool utilized at treatment intake (GAIN-Initial) to characterize baseline and pretreatment characteristics and at the three-month follow-up.

This study found having a history of adolescent maltreatment and cumulative experiences of adolescent maltreatment are risk factors of the indicator of delinquency and self-efficacy had significant negative effects on both indicators of delinquency for both measures of strain. Self-efficacy did not moderate the effect between any of the indicators of strain and the indicators of delinquency in this study. Findings from focusing on this subset of youth may help minimize the influence of maltreatment on substance use and provide a missing theoretical link in the public health, psychology, and child-maltreatment domains. Moreover, findings may inform interventions and policies aimed at reducing delinquent behaviors.
Chapter 1: Introduction

Adolescent substance use continues to elicit widespread concern and consequences among communities, peers, and individuals and contributes to increasing public health and criminal justice systems costs. Compared to non-users, adolescent substance users are more likely to exhibit dependency symptoms, be arrested, be involved in vehicular accidents, and have legal problems (Dennis, Dawud-Noursi, Muck, and McDermeit, 2003). Adolescent substance use is a risk-taking behavior that only some adolescents engage in and includes consuming psychoactive substances, including both illicit and licit. The World Health Organization (WHO, 2019, para. 1) defines psychoactive substances as “substances that, when taken in or administered into one's system, affect mental processes, e.g., cognition or affect.” *Licit* substances refer to substances/drugs used legally, including alcohol, tobacco, caffeine, and medicine used for illness taken as directed and prescribed for the intended use. *Illicit* substances refer to the production, sale, or use of a prohibited substance under particular circumstances (WHO, 2019). For adolescents that engage in substance use, standard progression includes opportunistic experimentation with the primary indulgence of alcohol, followed by regular use of marijuana and other co-occurring substances (e.g., tobacco and alcohol).

Alcohol is one of the most commonly used psychoactive substances among youths, with marijuana becoming the leading substance. Illicit drug use and underage drinking are associated with many consequential outcomes for youth, including increased contact with the criminal justice system, increased delinquent behavior (Maney, Higham-Gardill, Mahoney, 2002; Kubiak, Arfken, Swartz Koch, 2000), poorer educational and vocational outcomes (Goldstein, 1985; Milich, Lynam, Logan, Martin, Leukefeld, Portis, Miller, and Clayton, 2000; Maney et al.
higher risk of sexually transmitted diseases and HIV infection, and family disruption (Goldstein, 1985; Maney, et al., 2002).

Adolescent substance use tends to peak at the onset of adolescence and emerging-adulthood and declines with age. While adolescents are thought to out-grow these ‘rite of passage’ behaviors, some do not stop voluntarily, resulting in continued and often increased use (Dennis et al., 2003). Research regarding the onset, maintenance, and progression of adolescent substance abuse has produced an immense body of literature demonstrating the complexity of the phenomenon along with a vast number of risk factors associated with adolescent substance use. Among the prominent risk factors for adolescent substance use and substance abuse-related problems are maltreatment. Utilizing a comprehensive definition consistent with theoretical and other empirical research, adolescent maltreatment includes “acts intended to inflict physical or psychological harm, and that reflect a lack of concern for the adolescent’s well-being, sense of self and social competence” (Brezina, 1998:73).

Adolescent maltreatment is associated with higher levels of criminal involvement (Watts and McNulty, 2013; Smith and Thornberry, 2005) psychiatric problems (Sachs-Ericsson, Gayman, Tackett, Lloyd, Medley, Collins, Corsentino, and Sawyer, 2010; Sacks, McKendrick, and Banks, 2008) and poor academic performance (Wordes and Nunez, 2002) during this developmental period. Moreover, research demonstrates maltreated youth, compared to their non-maltreated counterparts, are at greater risk of using illicit substances and developing substance-use disorders and substance-use related problems (Huang, Trapido, Fleming, Arheart, Crandall, French, Malcolm, and Prado, 2011; Lo and Cheng, 2007; Sacks, McKendrick, and Banks, 2008; Ireland and Widom, 1994; Dembo, Dertke, Borders, Washburn and Schmeidler, 1988).
Despite the connection between maltreatment and delinquency being well established (Garner, Hunter, Smith, Smith, and Godley, 2014; Crooks, Scott, Wolfe, Chiodo, Killip; 2007; Salzinger, Rosario; Feldman, 2007; Robertson and Walker; 2018; Watts and McNulty, 2013; Hollist et al., 2009; Manasse and Ganem, 2009; Butler, 2010; Aseltine, Gore, and Gordon, 2000; Johnson and Morris; 2008; Lo and Cheng, 2007; Huang, Trapido, Fleming, Arheart, Crandall, French, Malcolm, and Prado, 2011), there still exists a considerable gap in knowledge across disciplines. Specifically, much of the public health and psychology literature dedicated to investigating the maltreatment-delinquency relationship often does not provide a theoretical framework. For studies that do, the focus on theory that is outside of the scope of General Strain Theory (GST) (Garner, Hunter, Smith, Smith, and Godley, 2014; Crooks, Scott, Wolfe, Chiodo, Killip; 2007; Salzinger, Rosario; Feldman, 2007; Robertson and Walker; 2018). In the criminology literature, General Strain Theory tests that explore the strain-delinquency relationship are limited in the following ways: a lack of studies that explore adolescent maltreatment exclusively as the source of strain or at all (Kaufman, 2009; Butler, 2010; Miller, Fagan, and Wright; 2014; Cullen, Unnever, Hartman, Turner, and Agnew, 2008; Hay, Meldrum, and Mann, 2010; Broidy and Agnew, 1997; Bunch, Iratzoqui, Watts, 2018); a lack of studies that utilize a comprehensive measure of maltreatment (Bunch, Iratzoqui, Watts; 2018; Watts and McNulty, 2013; Hollist, Hughes, Schaible, 2009); very few studies that use substance use as a delinquency outcome, if at all (Watts and McNulty, 2013; Robertson and Walker, 2018; Mersky, Topitzes, Reynold, 2011; Bunch, Iratzoqui, Watts, 2018); a substantial lack of focus on the conditioning variable, self-efficacy in general (Bunch et.al, 2018; Johnson and Morris, 2008; Capowich et.al, 2001) or where maltreatment is the strain of focus (Sealock and Manasse, 2012; Bao, Hass and Pi, 2007; Jennings, Piquero, Gover, and Perez, 2009; Gallupe and Baron, 2009);
and saturated samples of offenders or youth in the general population (Hollist et. al, 2009; Bunch, Iratzoqui, Watts, 2018; Watts and McNulty, 2013; Sealock and Manasse, 2012; Sharp, Peck, Hartsfield, 2012) with no GST test on a sample of clinical youth, a subset of the population that is inundated with histories of maltreatment.

The dissertation research empirically examines the underexplored connection between adolescent maltreatment, substance use, and self-efficacy, guided by tenets of Robert Agnew’s General Strain Theory. Specifically, I explore the direct effects of a history of any adolescent maltreatment and the cumulative experience of adolescent maltreatment on two indicators of juvenile delinquency or delinquent coping (substance use), as well as assess the role of self-efficacy as a predictor of delinquency and a moderator of the effect of maltreatment on substance use. To achieve this, I perform a secondary data analysis using the Global Appraisal of Individual Needs (GAIN), a family of standardized comprehensive biopsychosocial clinical client data assessment tools. All descriptive statistics are analyzed using the IBM Statistical Package for Social Sciences Statistics Version 21.0 (SPSS 21.0) and advanced statistical analyses are conducted using STATA Version 17. Preliminary descriptive analyses are conducted first, and then followed by regression modeling which will entail negative binomial modeling, a variant of Poisson modeling, and is commonly used in the criminological literature when dependent variables are measured as counts.

The Research Context and Current Study

The relationship between adolescent maltreatment and delinquency has been of interest to social control, social learning, strain, and family-oriented theorists since the 1980s. While ‘social control,’ ‘social learning,’ and ‘traditional strain’ theories dominated early delinquency research literature, the past few decades have experienced a shift from these criminological and
sociological theories to those more social-psychological. This shift has lent much support, credibility, and acceptance of Agnew’s General Strain Theory (GST). Despite multiple, ever-changing, and at times, competing theoretical explanations for the maltreatment-delinquency association, tests of GST and several empirical studies maintain that child maltreatment increases the likelihood of delinquent behavior (Bunch, Iratzoqui, and Watts, 2018; Hollist, Hughes, Schaible; 2009; Agnew, 1992; Agnew; 2002; Smith and Thornberry, 1995; Wordes and Nunez, 2002; Williams, Smith, and Hall, 2008). For example, Hollist et al. (2009) found a significant association between a comprehensive measure of maltreatment and three forms of delinquent behavior: substance use, general delinquency, and serious delinquency. Maltreatment continued to exert a significant direct effect on the delinquency measures even when the control variables, prior delinquency, monitoring and supervision, and parental attachment were introduced to the model.

Of significant theoretical contribution to criminology and the maltreatment-delinquency connection is Robert Agnew’s General Strain Theory (GST). GST was introduced in 1992 and is an extension of the classic and traditional strain theories of Robert K. Merton (1938; 1968), Albert K. Cohen (1955), and Cloward and Ohlin (1960). At the core of some classic strain theories are the emphasis on one’s social relationships. Some approaches focus on positive relationships with delinquent peers while others concentrate on neutral relationships in which individuals lack close ties to the conventional forms of social control (Agnew, 1985). GST broadens the scope of classic strain theories by emphasizing the association between delinquency and negative relationships. GST posits strain is inclusive of events, conditions, or “negative or adverse relations with others” (Agnew, 1992: 61).
Agnew (1992, 2001) identifies three sources of strain that refer to different types of negative relationships with others as the following: (1) the failure to achieve positively valued goals, (2) the removal or threat of removal of positively valued stimuli (e.g., loss of a romantic partner, death of a friend), and (3) the presence or threat of presence of noxious or negatively valued stimuli (e.g., physical punishment, stressful life events). Through the lens of Agnew’s GST, delinquency is influenced by an individual’s aversive environment and the strain experienced due to their inability to legally escape the environment, or the source of aversion and other factors including, but not limited to, underserved treatment, presence of delinquent peers, and conditioning and mediating factors (Agnew, 1985; Agnew 1992; Agnew, 2001). Furthermore, an individual may develop 'negative affects' or emotions such as disappointment, fear, depression, frustration, anger, anxiety, etc., that may lead to a number of deviant responses.

Agnew (1992) asserts anger is a key emotional response that encourages delinquency as a means of adapting to noxious or negative stimuli. Anger increases the degree of injury an individual feels, creates a longing for revenge, increases the odds that an individual will take action, and lowers an individual's inhibitions. Furthermore, anger “disrupts cognitive processes in ways that impede noncriminal coping” and “reduces the actual and perceived costs of crime” (Agnew, 2001: 327); it is through this emotional state that the individual believes his or her feelings and behaviors are justified (Agnew, 1992). While the importance of anger is highlighted in GST, offering that some strained youth may turn to violent crime as a coping response, GST also emphasizes the significance of other emotional effects. GST asserts depression and anxiety may result in non-violent delinquent coping mechanisms (i.e., illicit substance use or running away (Agnew, 1992). Several studies confirm the connection between negative emotions and strain (Jang, 2007; Jang and Johnson, 2003; Yang, Nelson-Gardell, and Guo, 2018).
Since the inception of GST, a number of studies, diverse in sample size, methodology, and population, have provided support for a plethora of strain significantly related to delinquency (Brezina, 1998; Agnew and White, 1992; Broidy, 2001; Eitle, 2002). Along with solid empirical backing came criticisms of GST. For one, support was found for much of the categories of strain in their association with delinquency making the broadness of theory ‘difficult to falsify,’ and second, when investigating crime among adolescents, only some types of strain were found to be related to crime (Agnew, 2001). The weakness of the 1992 version led to further revision and expansion of GST in several aspects, including specifying the difference between objective and subjective strain, clarification of the characteristics and types of strains most likely to lead to crime and delinquency, and a stronger emphasis on coping strategies and conditioning effects (Agnew, 2001).

GST remains consistent with the classic strain theories in acknowledging that only some strained individuals resort to crime. In contrast, others adapt with non-delinquent and conventional methods (i.e., deep-breathing techniques and legal routes). Agnew distinguishes between two potential explanations that either encourage or discourage criminality: coping strategies and conditioning factors. One set of factors that influence whether individuals respond to strain in a delinquent or non-delinquent manner are the kinds of coping mechanisms they choose to employ: cognitive, emotional, or behavioral.

For introduction purposes only, I highlight the coping mechanism most relevant to this dissertation: emotional. Individuals who employ emotional coping strategies seek to alleviate the negative emotions produced by strain either conventionally or through delinquency (i.e., the use of illicit drugs, meditation). Compas, Connor-Smith, Saltzman, Thomsen, and Wadsworth (2001:88) summarize Agnew’s argument perfectly, in which they state:
“Coping is a goal-directed process in which the individual orients thoughts and behaviors toward the goals of resolving the source of stress and managing emotional reactions to stress.”

While Agnew’s typology proposed many ways by which an individual may cope with strain, not all individuals have access to positive coping adaptations, making deviant coping more likely. Agnew (2001) persists, individuals are more likely to resort to deviant coping when (1) their goals, values, and identities are threatened or alternatives are low, (2) they lack the individual skills and resources necessary to cope in non-delinquent ways (i.e., low self-esteem, low self-efficacy, poor problem-solving skills), and/or (3) when conventional social supports are scarce or absent. As formerly stated, Agnew extends GST by delineating characteristics of strain most likely to lead to criminal coping; these include strains that:

- Are seen as unjust.
- Are seen as high in magnitude.
- Are associated with low self-control.
- Create some pressure or incentive to engage in crime.

Agnew (2001, 2013) argues victimization - especially child abuse and neglect - is one of the most consequential types of strain. For this research, the term adolescent maltreatment will be used as a synonym for child abuse and neglect and is used to differentiate it from other aspects of victimization. Maltreatment is viewed as a criminogenic source of strain as it “may seriously threaten many of the child’s goals, values, needs, and/or identities,” “is likely to be seen as unjust given cultural expectations and the experience of the other,” and “violates one or more justice norms” (Agnew, 2001:343-344). This type of strain is an aversive event that produces noxious stimuli which may lead to deviance (Capowich, Mazerolle, and Piquero, 2001).
To reiterate, strain may induce deviant responses from individuals with poor coping resources, and negative or noxious stimuli may result in a number of criminal coping strategies. In particular, adolescents who are still forming emotional, cognitive, and behavioral coping skills may not always choose conventional, non-delinquent methods and may be highly susceptible to turning to poorer coping mechanisms (i.e., running away, using illicit substances). Substance abuse as a means of coping with maltreatment has been found across disciplines (Carson, Sullivan, Cochran, and Lersch, 2009; Sacks et al., 2008; Lo and Cheng, 2007; Dembo, 1988; Ireland, 1994); however, there remain ample avenues to explore. GST acknowledges the strain-delinquency relationship can be conditioned by any number of factors (i.e., self-esteem, social support, religiosity, deviant peers, low self-control, low parental bonds) that either enhances or reduces delinquency as a response to strain. Although support for the conditioning hypothesis remains mixed (Agnew and White, 1992; Piquero and Sealock, 2000; Agnew, Brezina, Wright, and Cullen, 2002; Paternoster and Mazerolle, 1994; Hoffman and Miller, 1998; Broidy, 2001; Aseltine, Gore, and Gordon, 2000; Jang, 2007; Jang and Johnson, 2005; Johnson and Morrison, 2008), findings do suggest there are some coping skills and resources that reduce the effect of strain on deviant coping (Jang, 2007; Sealock and Manasse, 2012; Bao, Hass, and Pi, 2007; Jennings, Piquero, Gover, and Perez, 2009).

Self-efficacy is believed to be one coping resource that is likely to moderate the connection between maltreatment and delinquency and is defined as an individual’s belief in their ability to attain a desired outcome (Bandura, 1982). Agnew (1992:71) writes, “individuals high in self-efficacy are more likely to feel that their strain can be alleviated by behavioral coping of a non-delinquent nature, and so they too should be less likely to respond to strain with
delinquency.” Given the theoretical ideas proposed by GST, this dissertation seeks to illuminate the link between substance use, maltreatment, and self-efficacy.

The research in this dissertation seeks to contribute to the GST literature in three ways: 1) by assessing the utility of GST on a subsample of clinical youth, 2) by exploring the direct effects of both a history of any adolescent maltreatment and the cumulative adolescent maltreatment experience on juvenile delinquency and 3) by assessing the role of self-efficacy as a predictor of delinquency and a moderator of the effect of maltreatment. The analysis is based on one of the largest national longitudinal datasets of adolescent substance use treatment available: The Global Appraisal of Individual Needs (GAIN) National Dataset, a family of standardized comprehensive biopsychosocial clinical client data assessment tools designed to integrate research and clinical assessment into one semi-structured interview.

For this research, data were extracted and analyzed from assessments utilized at substance abuse treatment intake, the GAIN-Initial (GAIN-I), and a 3-month follow-up using the GAIN M-90. Substance abuse treatment as an intervention has shown promising deterrence of adolescent delinquency and substance abuse which may, in part, be understood by the goal of substance abuse treatment. Substance abuse treatment aims to reduce substance use disorders and other co-occurring disorders of individuals and target the cognitive problems that sustain and encourage substance abuse and other life-disruptive items. Substance abuse treatment specifically aims to provide youth with the skill acquisition and confidence necessary to “strengthen cognitive control over behavior and [improve their ability] to regulate emotion in response to stressors” (Compas et al., 2001:88). Given that maltreatment may influence delinquent behavior and moderating effects may mitigate negative consequences of maltreatment (i.e., substance use), findings from this specialized subset of youth could inform interventions...
and policies aimed at reducing delinquent behaviors. This research can also contribute to the missing theoretical link in the public health, psychology, and child-maltreatment domains. As explained below, in testing underlying tenets of Agnew’s GST, I examine 10 hypotheses that evaluate the predicted relationships among maltreatment (strain), self-efficacy (moderating factor), and substance abuse (delinquency).

Overview of the Dissertation

Above, I have described my research objectives, briefly introduced the broad relationship between substance use and maltreatment, outlined the gaps in the literature, provided an overview of the theoretical underpinnings that imply a delinquency-maltreatment relationship, specified ways in which this dissertation research seeks to contribute to the current body of literature, and presented a short description of the dataset. The rest of the dissertation proceeds as follows. Chapter 2 presents a more thorough background of the theoretical framework introduced above. It begins with a review of the classical anomie-strain theories that are significant contributors to Agnew’s General Strain Theory's foundation and evolution, then segues into revisions and relevant extensions of the theory followed by an overview of empirical research that has applied GST. This chapter will clarify the role of strain on delinquency, the role of conditioning variables, and conclude with a statement regarding the underexplored strain and positive coping resources.

Chapter 3 further develops the substantive topic under investigation in detail. Next, Agnew’s General Strain Theory's utility to study the phenomenon is described, followed by a literature review of GST studies that examine the relationship between substance use, adolescent maltreatment, and self-efficacy. It will identify limitations of the existing body of literature and discuss how the current dissertation will fill such gaps and contribute to the current body of
knowledge. Chapter 4 will describe the research methodology in detail, including data and variables descriptions, hypotheses derived from the literature, model specifications, and analytic strategy employed for this dissertation research. Chapter 5 will describe the sample at baseline and three-month follow up for the controls, predictors, and dependent variables; present the graphs and statistics used to assess the best fitting count model and conclude with the results of the Zero-Inflated Negative Binomial regression models for all the relationships described above. Chapter 6 will be the conclusion chapter and provide a summary of the contribution to study to the literature; discuss the findings as they relate to the Agnew’s GST, along with, implications of the study and avenues for future research.
Chapter 2: Theoretical Development and Framework

Chapter 2 presents a more thorough background of the theoretical framework introduced above. It begins with a review of the classical anomie-strain theories that are significant contributors to Agnew's General Strain Theory's foundation and evolution, then segues into revisions and relevant extensions of the theory followed by an overview of empirical research that has applied GST. This chapter clarifies the role of strain on delinquency, the role of conditioning variables and concludes with a statement regarding the underexplored strain and positive coping resources.

Emile Durkheim: Anomie

The modern-day version of Agnew’s General Strain Theory (GST) is birthed through a family of strain models from the work of Robert K. Merton (1938), Albert Cohen (1955), and Cloward and Ohlin (1960). However, the roots of all strain theories stem from the writings of French sociologist Emile Durkheim. In the nineteenth century, Durkheim alluded to the concept of anomie in several classical works, with the most explicit discussions detailed in *The Division of Labor in Society* (1964, original publication 1893) and *Suicide* (1966b, original publication 1897). While the definition of the concept of anomie has been dynamic, it usually refers to societal conditions/forces (rather than individual-level conditions) that affect individual behavior; specifically, the social structure’s inability to effectively regulate or control goals and prescribe subsequent norms leading to deviance.

In *The Division of Labor*, anomie was discussed in terms of an abnormal form of division of labor, characterized by the rapid shift from a simple pre-modern, traditional society to a complex, modern, industrialized society. As societies morph from the former to the latter, society's structure was believed to change from that of mechanical solidarity to that of organic
solidarity. Societies characterized by mechanical solidarity tend to have little division of labor, and the societal integration of members is moral obligations based on cohesion, commonalities, and sameness. Organic solidarity refers to the societal integration of members that arise out of the need for others; this social system of functional interdependence is born out of specialized roles and responsibilities performed by individuals and is characterized by a high division of labor. Here, moral obligations are born out of respect for unique contributions, reciprocity, and diversity. When the division of labor is functioning normally, Durkheim views societal changes as natural. However, when a society experiences abrupt change, these transformations produce an anomic division of labor, promoting isolated individuality and erosion of collective identity, purpose, and belonging. Moreover, anomie occurs when the normative rules and moral standards that hold society together become outdated and new rules and standards that sanction/regulate behavior are not being established at the same pace as the transforming social structure.

In Durkheim’s work *Suicide*, the concept of anomie relates to one of the three classifications of suicide; each based on a social cause or force and found at higher rates in societies characterized by organic solidarity (for the complete review, see Durkheim, 1966b). In short, anomic suicide results from society’s inability to regulate a member’s desires, aspirations, or ‘human appetite.’ During times of normality, equilibrium is found between an individual’s desire to be happy and their means to obtain such happiness. While the natural development of the division of labor allows one to produce and consume in amounts suitable for one’s enjoyment, an abnormal division of labor disrupts the balance between one’s desire to be happy and the means for achieving such, leaving individuals to feel hopeless, thus potentially leading to suicide. This suggests anomic suicide results from a lack of social regulation of one’s insatiable appetites caused by periods of economic depression or periods of rapid economic prosperity.
As mentioned earlier, Durkheim’s concepts of anomie are the results of social forces, particularly consequences born from the lack of social and moral regulation. Though Durkheim did not explicitly link anomie to forms of crime and deviance in attempting to understand the causes of social order and disorganization, his work *The Rules of Sociological Method* (1966a, original publication 1895) posits that social and cultural forces both constrained and promoted deviance. Several observations in regard to crime in society are made in this literature and follow. First, Durkheim views crime and deviance as normal, necessary, and inevitable. In *Suicide* (1966b:362), Durkheim writes, “We must therefore call crime necessary and declare that it cannot be nonexistent, that the fundamental conditions of social organization, as they are understood logically implies it. Consequently, it is normal.” Durkheim seemingly suggests that levels of deviance (high and low) are related to social order levels and control (high and low). He argues societies characterized by mechanical solidarity have less deviance due to higher conformity levels, while societies characterized by organic solidarity have increased isolation, more individuality, and thus, an increased likelihood of deviance. Second, Durkheim views crime and deviance as an adaptive function necessary for social change and boundary maintenance. He argues, criminality can clarify social norms, increase group solidarity, and renew morality. Whereas Durkheim’s concept of anomie helped shift the thinking around crime and deviance from individual-level forces to social forces, it was the adaptation of the term by Robert K. Merton (1938) that significantly contributed to the field of criminology and spearheaded one of the explanations of crime and deviance.

**Robert K. Merton: Anomie-Strain Theory**

In 1938, the American sociologist Robert K. Merton published his influential article, “Social Structure and Anomie,” presenting a revised theory of Durkheim’s work on anomie and
proposing new ideas regarding the influences of the social structure on individual behavior. Varying from Durkheim’s theory, Merton sought to explain deviant and criminal variations in the United States and developed a response typology theorizing individual conformity and non-conformity in society. Furthermore, Merton’s views on the drivers of crime are a unique contribution to the field and are seen in opposition to Durkheim’s. Whereas Durkheim considers anomie (i.e., social deviance-suicide) as the result of shifting societal culture (i.e., lack of social regulations that govern human instinct and abnormal divisions of labor) constraining individual aspirations, Merton believes “aberrant conduct…may be viewed as a symptom of disassociation between culturally defined aspirations and socially structured means” (Merton, 1938:674). In other words, society pressures individuals to pursue materialistic and monetary success (the American dream) through established middle-class values, which may lead to crime and/or deviance.

Merton’s theory of anomie-strain also rejects the notion that “imperious biological drives” (Merton, 1938:672) can be attributed to societal malfunctioning (anomie) and instead offers that anomie is brought on through the disjuncture of two elements in society’s structure: cultural and social. The cultural structure of society consists of “defined goals, purposes, and interests” (Merton, 1938:672), while the social structure of society “defines, regulates, and controls the acceptable modes of achieving these goals” (Merton, 1938:673). The theory’s basic argument is that anomie/strain arises from the disjunction or discrepancy between culturally valued goals and the legitimate means to attain these goals. Merton’s theory sought to account for variations in crime rates across societies, especially in the United States, a society that emphasizes the achievement of economic success (the American dream) as the dominant goal.
For Merton, high crime rates in the U.S. were explained by two phenomena: the disproportionate culturally valued goals stressed relative to the legitimate and conventional means to attain the success set by middle-class values and the inequity of the distribution of legitimate opportunities (i.e., educational, and occupational pursuits) to achieve economic success. Further, Merton persists, high crime rates in the U.S. arise due to the over-emphasis of “winning the game” (accumulating wealth as a symbol of success) and the under-emphasis of “winning through circumscribed modes of activity” (Merton, 1938:675). In other words, when individuals, particularly those of the lower-class and disadvantaged, lack the acceptable or appropriate resources to reach these goals, they may obtain them through “illegitimate but technically efficient means” (Merton, 1938:675) increasing the likelihood of involvement of acts such as “fraud, corruption, vice, and crime” (Merton, 1938:675). This response is known as innovation in Merton’s response typology (Merton, 1938). Like Durkheim’s argument, it is the social structure that heightens one’s likelihood for deviance and/or crime.

Merton’s strain theory recognizes that not all individuals respond to strain/pressure with a crime when experiencing the stress of their inability to achieve the culturally valued goals through legitimate means. He presents other responses (adaptations) that a person may resort to, noting “that persons may shift from one alternative to another as they engage in different social activities” (Merton, 1938: 676). These other four adaptations are conformity, ritualism, retreatism, and rebellion. The most common response to the social order across all societies is conformity. Merton states that “conventional role behavior oriented toward the group's basic values is the rule rather than the exception” (Merton, 1938:677), asserting that conformity is what maintains “the stability and continuity of the society”. Individuals who fall into the category of adaption accept both culturally valued goals and legitimate means.
Within Merton’s typology of adaptations, three social order responses are deviant: innovation, ritualism, and retreatism. The most common deviant adaptation is innovation (as mentioned previously), in which most crime occurs. Individuals in this category accept culturally valued success but reject (or cannot succeed with) the legitimate and conventional means. Within this classification, Merton places a primary emphasis on the lower-class; however, innovation occurs among other classes and lends itself to white-collar crime. The following adaptation is ritualism, in which an individual pursues legitimate means but rejects the culturally valued goals and opts for self-set goals which they deem more attainable. In the next classification, individuals reject both the valued goals and the means to which to attain them, withdrawing from society; this is known as retreatism, the least common adaptation. Merton defines this group of individuals as ‘true aliens,’ their development arising “from continued failure to attain the goal by legitimate measures and from an inability to adopt the illegitimate route because of internalized prohibitions and institutionalized compulsives…” (Merton, 1938:678). The final adaptation to strain is known as rebellion. Individuals reject the culturally valued goals, replacing them with values that may be political, spiritual, or take on other forms, and reject the means. In this sense, rebels are opting for a new social order in place of the old.

Merton’s Anomie-Strain Theory dominated the social sciences for some time and was deemed appropriate for analysis at the macro and micro level (Agnew, 1985; Bernard, 1987; Messner, 1988), even garnishing some empirical support. His theory was also met with a few criticisms. Specifically, it lacked the establishment of a clear strain-delinquency relationship. It disregarded the presence of subcultural delinquency (Cohen, 1955) and neglected the inequity in the distribution of illegitimate means to reach culturally valued goals (Cloward and Ohlin, 1960). While other criticisms exist and are addressed by various sociologists in the field, for this
dissertation, only four key members within the strain theory lineage are presented: Cohen (1955), Cloward and Ohlin (1960), and Agnew (1992;2001). The two former theorists are outlined briefly, while the latter will include a detailed discussion of the theoretical development and empirical findings.

Albert K. Cohen - *Delinquent Boys: The Culture of the Gang*

Albert K. Cohen, in his 1955 work *Delinquent Boys: The Culture of the Gang*, tackled a few shortcomings of Merton’s Anomie-Strain theory. Merton (1938) explains adult crime and semi-juvenile delinquency by offering that strain is caused by the disjuncture between one’s goals and aspirations and the means to obtain them. Merton’s work was criticized for its application to individual-level crime only, limiting its ability to explain (or account for) group or gang delinquency among working-class males, and its neglect of differing cultural values/goals, such as middle-class status. Additionally, his theory could not account for purposeless crime/delinquency, and it ignored social interactions between individuals which could contribute to deviant acts committed (Clinard, 1964). Cohen (1955), in an effort to address the shortcomings above and explain delinquency, revised and applied Merton’s notion of anomie-strain and incorporated social interaction theory, developing the status-frustration theory. This theory sought to explain delinquency and the emergence of group delinquency and the delinquent subculture, specifically, gang formation among lower-class males.

Cohen begins his work by evaluating prior theoretical attempts to explain delinquency and highlights those limitations. As previously mentioned, one shortcoming of Merton’s anomie-strain theory is the failure to explain “purposeless” crime, as Merton believed crime/delinquency to be utilitarian in response to the social structure. In his analysis of the formation of deviant subcultures, Cohen rallied quite the opposite, noting that some of the acts committed by these
delinquents were intentionally “purposeless.” In contradiction to Merton’s anomie-strain theory whereby stealing would be considered a means to an end, Cohen (1955) instead found that youth that were a part of the delinquent subculture (i.e., gangs) who engaged in stealing did so “for the hell of it,” not for profit. The items stolen were often “discarded, destroyed, or casually given away” (Cohen, 1955:26). Cohen (1955) continues to dissect the delinquent subculture, whose members often engage in “non-utilitarian, malicious, and negativistic” acts of delinquency. He declares such exaggerated behaviors are tools used simply to reject middle-class culture and alleviate feelings of inadequacy due to disadvantaged youths’ inability to meet set criteria (discussed later). So, what then are the drivers of such delinquency?

The core of Cohen’s subcultural delinquency theory emphasizes lower-class males' desire to achieve middle-class status, approval, and/or respect, and their inability to do so, as they are often ill-equipped when judged by middle class “measuring rods”. Whereas Merton believed crime and delinquency are born out of strain from the inability to achieve monetary success, Cohen explored delinquency as strain between the desire to attain middle-class status and disadvantages faced by lower-class boys. While this disadvantage is believed to affect many areas of life, it is chiefly marked in the academic realm and school performance context, according to Cohen. Youth who are actively involved in school will either be supplied, or not, with the tools to succeed in the educational arena; their success, or lack thereof, is influenced by socialization and social class status. According to Cohen (1955), lower-class males face disadvantages in achieving middle-class status due to deficits in their “linguistic, academic, and “social skills” (Cohen, 1955:128) given differences in their socialization. In other words, lower-class males do not measure up to the “middle-class measuring rods” (i.e., good conduct, interest in intellectual achievement, non-aggressiveness) that school administration use to critique
students, thereby decreasing their likelihood to gain “status” as compared to their peers who behave accordingly and perform well in class. Lower-class boys who either value or have internalized middle-class status, will “find himself at the bottom of the status hierarchy” (Cohen, 1955:119) facing problems of adjustments leading to status-frustration.

As youth experience status frustration, a sense of inadequacy or failure, they will attempt to adapt through ‘reaction formation’, ultimately resulting in school truancy and/or the formation of delinquent subcultures (i.e., gangs). Similar to Merton’s anomie-strain theory where youth who cannot achieve culturally defined goals rebel and reject such goal, youth who are faced with status frustration (and ‘problems of adjustment’) reject middle-class standards and values and create their own. In Cohens status-frustration theory, the rejection of the established middle-class values and the construction of a new value system are based on what the group/gang holds sacred, moreover it provides a solution to the problem of adjustment. Cohen (1955:66) explains

“One solution is for individuals who share such problems to gravitate towards one another and jointly establish new norms, new criteria of status which define as meritorious the characteristics they do possess…. New status criteria would represent new subcultural values different from or even antithetical to those of the larger system.”

The delinquent subculture allows lower-class males to compete successfully amongst their peers and is “another way of satisfying the universal desire for status” (Cohen, 1955:27); it also creates a “sectarian solidarity,” further isolating him from mainstream society. So long as a member is offered “status in the eyes of his peers,” he will hold “hostility and contempt for all those who do not share his subculture [and] become more dependent upon his delinquent gang” (Cohen, 1955:136-137), aiding in the maintenance of the subculture. Through the process of
reaction formation, lower-class males can join together, creating a subculture that allows them to find solutions to their “status problems” due to a new frame of reference provided. It is important to note not all youth experiencing “status problems” problem solve by forming a delinquent subculture. Alternately, some youths do not commit fully to the delinquent subculture nor reject the middle-class value; they attempt to adhere to the rules in place even if they commit minor delinquent acts. These youth are referred to as “stable-corner boys”. Furthermore, other youth termed “college-boys " commit to the middle-class standards and adhere to the rule set by this class (see Cohen, 1955 for further discussion).

In sum, Cohen’s theory on the delinquent subculture argues strain or ‘status frustration’ is incited when males of the lower-class status aim to attain status, success, or approval in school but do not possess the resources and skills necessary to be successful. These youth seek out and join other peers (i.e., gangs), experiencing the same dilemma and creating new value systems, setting new status criteria that are achievable, and reducing strain. Marked differences are evident in Cohen’s extension of strain theory, as compared to Merton’s. Specifically, it employs a more comprehensive approach to delinquency that reflects the conditions within the lower-class culture; it accounts for non-utilitarian crime, the creation, and perpetuation of gangs, and illuminates some youths’ engagement in specific behavioral responses to strain.

Richard Cloward and Lloyd Ohlin: Differential Opportunity Systems Theory

In 1960, Cloward and Ohlin published “Delinquency and Opportunity: A Theory of Delinquent Gangs,” building on Cohen’s extension of Robert Merton’s anomie-strain by exploring the formation of delinquent gangs among lower-class male delinquents in urban areas. Cloward and Ohlin (1960) set out to understand the pressures that increased the likelihood of
deviant behavior originating at various social classes and the contributing factors that led to differing delinquent subcultural adaptations. Like their strain predecessors, they agree that delinquency can be attributed to the strain experienced when there is a discrepancy between culturally valued goals/aspirations and the legitimate means necessary to reach such aspirations. Nevertheless, there are marked differences in their theoretical underpinnings as compared to others. Criticizing Merton’s theory, which explored the disjuncture between the culturally valued goal, monetary success, and legitimate means, Cloward and Ohlin argue that the distribution of illegitimate means to achieve success is not available to all members of society. Whereas Cohen assumes delinquency results from lower-class males’ inability to achieve a respectable middle-class status, Cloward and Ohlin only partly agree with the theory. They posit that only some delinquency (typically less serious offenses) is based on the rejection of middle-class values. Cloward and Ohlin (1960:93) believe “many discounted lower-class youths do not wish to adopt a middle-class way of life;” instead, they seek status on their own terms, within the lower class, and tend to emphasize economic success and the ‘conspicuous consumption of wealth,’ rather than status (Cohen, 1960).

Though in alignment with Merton that “pressures” to conform to societal expectations and legitimate means cause strain and frustration which can lead to delinquent adaptations, Cloward and Ohlin emphasize that the formation of delinquent subcultures is only likely when their failure to achieve success is not viewed as a result of personal deficit, but instead, as a result of an unjust social system. To understand the emergence of delinquent subcultures and its various adaptations, as it relates to the social structure, Cloward and Ohlin combine elements from the anomie-strain theoretical paradigms along with those from the “cultural transmission theory” and “differential association” theory, developing the “theory of differential opportunity systems”.

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In sum, lower-class males are often faced with cultural and structural barriers, in regard to (higher) educational attainment and lack of educational opportunities available, which limits their legitimate opportunities for success. While some lower-class boys will seek alternative avenues and legitimate opportunities to reach their success-goals, many will face barriers in the availability of these legitimate opportunities. Finding themselves unable to fulfill their aspirations through legitimate opportunities, they are vulnerable to heightening pressures for the use of illegitimate means to achieve success. Like, legitimate means/opportunities, not all lower-class males will have readily available access to illegitimate opportunity; without illegitimate opportunity and several other factors, the delinquent subculture will not exist.

Within the theory of differential opportunity systems, delinquent gangs do not emerge simply because youth have the chance to commit illegal acts. Such illegitimate opportunity must also include the learning and expression of values that the existing delinquent subculture support, including allegiance to new norms and prohibited conduct and freedom from moral constraints (i.e., guilt and anxiety). The theory of differential opportunity system also emphasizes collective support, effective interaction between members, and the network of criminal actors - each playing a critical role in developing criminal subcultures. In essence, not only must cultural transmission of learning and training occur, but one must also be able to execute his duties and responsibilities which may not be accessible as access is dependent on his position in the social strata, demographic variables, and personality characteristics (Cloward and Ohlin, 1960).

A major contribution of Cloward and Ohlin’s work (1960) is the delineation of delinquent subcultures arising by different processes imposing “distinctive beliefs, values, and prescriptions for action on their members” (Cloward and Ohlin, 1960:2). As previously mentioned, each adaptation from the dominant social order is a response to problems of
adjustment and are conditioned by access or denial to illegitimate opportunities and the social organization of neighborhood. These delinquent subcultures are classified as follows: criminal gangs, conflict gangs, and retreatist gangs. Members in the criminal subculture utilize illegitimate means mostly in their quest of material gain. Those who are organized in the conflict subculture employ manipulation and/or threat or force to acquire respect and a reputation of violence and toughness. Finally, those who belong to the retreatist subculture tend to isolate themselves from conventional roles and place heavy emphasis on the consumption of drugs which is supported by the subculture.

Though each delinquent subculture requires a specialized environment to thrive, each response adaptation varies based on two concepts: integrating age-level offenders and integrating carriers of conventional and deviant values. The criminal subculture is found in integrated neighborhoods where deviant and conventional values are closely bonded (Cloward and Ohlin, 1960). Both individuals in the criminal and conventional role must form relationships with one another and contribute to each for criminal activity amongst this group to be successful. As integration strengthens, the “apprentice criminal” gains status in the illegitimate opportunity system from the knowledge, skills, and opportunity gleaned from interaction with those in the conventional role, creating access to additional illegitimate means and the ability to attain the valued goals. Within this classification of subcultures, adult criminals integrate with youthful offenders, often catering to, encouraging, and providing orientation for delinquent activities. Aforementioned are the characteristics of violence and toughness within the criminal gang; though not a primary component, Cloward and Ohlin, like Merton, agree the use of such does serve a utilitarian function. Specifically, through the use of these tactics, delinquents are able to gain acceptance and membership amongst those in the aspired group. If they are granted
membership, their reputation and/or ability to ‘get things done’ will prompt further socialization. This creates access to illegitimate means, rectifying the problem of adjustment.

The emergence of the conflict subculture is found in urban areas that are highly disorganized and unable to provide legitimate means to access success-goals; typically, the community's nature is built on survival rather than social advancement. The lack of organization amongst adults means a lack of resources and opportunities, both legitimately and illegitimately, preventing learning and offering no access to an opportunity structure for the youth. Moreover, youth have few or no mentors filling deviant or conventional roles, further lessening the chances to attain the desired goal. With no age-level integration or integration amongst carriers of conventional and deviant values, youth often feel powerless and mounting pressures that are followed by violence. In this delinquent subculture, violence is used as a route to status and a way of accessing means to achieve success goals, the risk of injury or death being the prerequisite to success.

The retreatist subculture that occurs in poorly organized neighborhoods is one in which the individual experiences “double failures.” Double failures refer to adolescents who fail to succeed in the criminal world and conflict world, being denied access to the illegitimate opportunity structure and legitimate opportunities. Once faced with the reality that prestige and upward mobility will not be obtained for youth “on the periphery,” they will resort to drug use, which serves as a solution to status deprivation and the strain he experiences, but use may also further alienate them. The more they disassociate from others, the more restricted access to any means becomes, pushing them to detach from the social structure entirely and relinquish any culturally valued goals or the means by which to achieve them (Cloward and Ohlin, 1960).
Outlined above is the evolution of classical strain theories, posed by the key players Merton (1938), Cohen (1955), Cloward, and Ohlin (1960). While each theorist differs in their theoretical premise, they all share the concept that delinquency, or the formation of its subculture, is influenced by an individual’s failure to achieve culturally valued and conventional goals through legitimate means. After much theoretical dominance and popularity of the traditional strain theories in the 1960s, the sociological perspectives of crime and delinquency faced a shift in the 1970s and 1980s becoming highly dominated by theories of social control, social learning, and differential association given the theoretical and empirical criticisms of previous classic strain (Agnew, 1992). Criticisms of classical strain theories included their inability to explain middle-class delinquency, delinquent variability, delinquent desistance in late adolescence, and most notably, the disjunction between aspirations and expectations (Agnew, 1992). Though several revisions to strain theory were attempted by other scholars, those proved to be just as discouraging as the classic strain theories (Agnew, 1985). Through many articles written by Agnew (1985; 1992; 2001), GST was born.

**Robert Agnew: General Strain Theory**

The foundation of Robert Agnew’s General Strain Theory (GST) sought to address such criticisms and substantially revise and expand on existing strain theories presented by Merton (1938), Cohen (1955), and Cloward and Ohlin (1960). This new expansion introduced a social-psychological explanation of crime and delinquency, incorporating research on stress, equity/justice, and aggression from medical sociology, social psychology, and psychology (Agnew, 1992).

Like social control and social learning/differential association theory, GST evaluates and emphasizes one’s social relationships with others to explore their influence on delinquency.
While GST (and other strain theories) focuses explicitly on how negative relationships with others prevents an individual from achieving cultural values and goals, social control theory emphasizes a lack of significant ties to conventional supports and/or institutions (i.e., parents, school, and community members), and social learning/differential association theory focuses on positive relationships with deviant peers. Strain theory was not only broadened by Agnew’s explicit focus on negative relationships (Agnew 1985; Agnew 1992), it also emphasizes strain as the consequence of an individual’s inability to legally escape from painful situations.

Defining Strain

Before I discuss the major types of strain presented in GST, it is essential to note the definition of strain was clarified following publications after Agnew’s 1992 article. Agnew (1992:48) originally referred to strain as “relationships in which the individual is not treated as he or she wants to be treated;” however, in Agnew (2001), the concept of strain was further clarified given researchers’ inconsistent use of the term. Agnew (2001) explains strain in three ways. First is objective strain, which “refers to events or conditions that are disliked by most members of a given group,” or by most people in general, such as “physical assault [and] lack of adequate food and shelter” (Agnew 2001: 320-321); how an individual sees objective strain may change over time as he or she learns to cope with strain.

The second is subjective strain which “refers to events or conditions that are disliked by the people who are experiencing (or have experienced) them” (Agnew, 2001:321). In this case, the individual’s view of the objective strain is subjective and may depend on a number of factors including personal traits, personal and social resources (e.g., self-efficacy), their goals, values, and identities, or other life circumstances. Lastly, Agnew (2001) presents emotional response, which is closely related to subjective strain. Two individuals may both dislike an event
or condition to an equal degree; however, the emotional reaction they succumb to may vary. For instance, one may respond to the presented strain with anger, while another may become depressed (Agnew, 2001). These types of events or conditions that can be classified as objective or subjective are delineated in Agnew (1992). They refer to the three major types of strain aforementioned in the previous section and are discussed in detail below.

**Strain as the Failure to Achieve Positively Valued Goals**

**Strain as the Disjunction between Aspirations and Expectations/Actual Achievements**

In sociology, traditional strain theories focused on the achievement of future goals and measured strain as “the disjuncture between aspirations (ideal goals) and expectations (expected levels of goal achievement)” (Agnew, 1992: 51). Recall, Merton (1938) views strain among lower-class youth as their inability to achieve economic gain using legitimate means. Cohen (1955) believes strain is experienced when lower-class males experience status-frustration in the context of school and cannot achieve middle-class status. Cloward and Ohlin (1960) relate strain to lower-class males’ inability to access conventional and illegitimate means to achieve monetary success; each disjuncture between goals and legitimate means explains delinquency or the formation of a delinquent subculture (gangs). Critiques of these theoretical underpinning are summed to their inability to account for middle-class delinquency, neglect of other goals pursued by adolescents and barriers to achievement beyond ones’ status in the socio-economic system and, finally, a limited explanation of delinquency (Agnew, 1992). Agnew (1992) notes revisions in strain theories that focused on immediate rather than future goals in an effort to address these criticisms. This re-conception of strain considered factors beyond social class that attempted to account for a middle-class youths’ failure to achieve positively valued goals; these factors include physical attractiveness, personality, or other traits and skills. Though these revised strain
theories shifted the focus from the disjuncture between aspirations and *expectations* to the disjuncture between aspirations and *actual* achievements, empirical support was still weak (Agnew, 1992).

**Strain as the Disjuncture between Expectations and Actual Achievements**

Agnew (1992) suggests the shortcomings of traditional strain theories are in the type of goal one desires to achieve, which is *aspirations-ideal* goals. This type of goal emphasis is the opposite of social psychology literature that emphasizes the disjuncture between *expectations* and actual achievement, one Agnew suggests is more important. Expected goals are said to be derived from social comparisons or ones that an individual may have previously experienced or have seen others experience. Expectations are rooted in social reality, thus making the desire to achieve them much more possible and the undertaking much more serious (Agnew, 1992). Agnew continues to state if an individual is unable to achieve the expected goal, this may result in emotions such as “anger, resentment, dissatisfaction, disappointment, and unhappiness;” emotions that are also linked to strain, as reported by criminologists (Agnew, 1992:52). To alleviate the strain/stress caused by these emotions, delinquency may be an option (Agnew, 1992).

**Strain as the Disjuncture between Just/Fair Outcomes and Actual Outcomes.**

Agnew (1992) further extends the notion that strain is not just the inability to achieve aspirations and expected goals; he also insists that strain can be viewed as the failure of attaining another positively valued goal: equitable and just relationships. Instead of entering relationships with others with the expectation of achieving specific outcomes (i.e., status, material/monetary gain, good grades), this goal rests in the expectation that an individual’s input/outcome ratio will be equivalent to that exchanged or allocated with the other member in the relationship. Suppose
the input/outcome ratio is unequal. In that case, individuals may feel they are being treated unjustly, which may lead to distress and may prompt deviance - a reaction used to restore equity (see Agnew, 1992). The core development of Agnew’s GST proposes two new sources of strain, unrelated to the inability to realize positively valued goals. These two sources of strain are (1) the actual or anticipated removal (loss) of positively valued stimuli and (2) the actual or anticipated presentation of negative or noxious stimuli (Agnew, 1992).

Strain as the Actual or Anticipated Removal (Loss) of Positively Valued Stimuli

Pulling from the literature on psychology and stress, Agnew (1992) redirects the focus from the pursuit of certain goals to the second type of major strain: The actual or anticipated removal of positively valued stimuli which focuses on stressful life-events that include, but are not limited to, the loss of a romantic relationship partner, the death or illness of someone close, uprooting from one’s social networks (i.e., school or neighborhood), and the change of family dynamics (i.e., parental separation or divorce). To alleviate strain experienced from the loss or anticipated loss of the positive stimuli, youth may resort to delinquency, retrieve, or obtain substitute positive stimuli, seek revenge against the parties they feel are responsible for the loss, or manage their negative emotions produced by the loss (i.e., participate in the consumption of drugs and/or alcohol).

Strain as the Actual or Anticipated Presentation of Negative or Noxious Stimuli

The final type of major strain described by Agnew (1992) is the anticipated or actual presentation of negative stimuli which ranges from child abuse and neglect, physical punishment, negative relationships with others and peers, to environmental pollutants, noise, high density, and the violation of personal space (Agnew, 1992). The presentation (or threat thereof) may lead to aggression, delinquency, or other negative outcomes as individuals attempt to either escape from
or avoid the negative stimuli, terminate, or alleviate it, or seek revenge as the source or related targets of the noxious stimuli. While each source of strain is distinctive, Agnew (1992) notes, they may overlap and be difficult to disentangle.

Negative Affective States

One of the significant components of GST that seeks to explain the link between strain and delinquency is the introduction of negative affective states (interchanged throughout this text with negative affect and/or negative emotions). The experience of any of the proposed strains may result in the increased likelihood of experiencing a range of negative effects (i.e., anger, depression, disappointment, fear, etc.). Agnew (1992) posits that anger is a key emotional response that encourages delinquency. It increases the degree of injury some individual feels, creates a longing for revenge, increases the odds that an individual will take action, and lowers their inhibitions. Furthermore, anger “disrupts cognitive processes in ways that impede noncriminal coping” and “reduces the actual and perceived costs of crime” (Agnew, 2001: 327). Through this emotional state, the individual believes his or her feelings and behaviors are justified (Agnew, 1992). While the importance of anger is highlighted, GST also emphasizes the significance of other emotional affects, such as depression and anxiety. To deal with the experience of negative emotions, adolescents may utilize delinquent or non-delinquent coping adaptations (i.e., violence, illicit substance use, or running away, meditation, etc.).

Characteristics of Strain

Seeking to understand the experience of strain better, Agnew (1992) incorporates research from the stress and equity literature and identifies four characteristics of adverse events (strain) that are likely to have more significant effects. These are the magnitude of the event, recency of the event, duration of the event, and the clustering nature of the event.
(a) Magnitude refers to either the amount of positive stimuli lost, or the amount of pain or discomfort inflicted with respect to the presentation of noxious stimuli. The greater the magnitude the more influential the adverse event.
(b) Recency refers to the timing of when an event occurred, with recent events having greater effect than older events (older than 3 months).
(c) Duration refers to how often the event transpired, with chronic strain, events that occur over a long duration of time, having a greater impact
(d) Clustering refers to timing of when events occur, with closely clustered occurrences having greater negative impacts than those dispersed evenly across time

Though Agnew (1992) saw these four characteristics of strain as being more or less equivalent in regard to their impact on crime, empirical support for the relationship proved only to be weak or moderate (Agnew, 2001). Agnew’s (2001) paper further clarifies conditions for strains and argues the following are more likely to lead to crime: 1) strain that is seen as unjust, it involves the voluntary and intentional violation of a relevant justice norm, 2) strain that is high in magnitude, 3) strain that is caused by or associated with low social control such as parental discipline, homelessness, or erratic parental discipline, and 4) strain that creates some pressure or incentive to engage in criminal coping (see Agnew, 2001 for a detailed discussion). After re-conceptualizing the criteria for strainful events and conditions related to crime, Agnew (2001) lists and describes an unexhaustive list of the top ten types of strain: parental rejection; child abuse and neglect; negative school experiences; the failure to achieve goals that can be easily attained through criminal acts; supervision or discipline that is strict, erratic or harsh; work within the secondary market; homelessness; peer abuse; the experience of prejudice and discrimination based on ascribed characteristics; and being a victim of crime.

Coping Adaptations

Strain theories acknowledge that not all youth who experience strain will resort to crime or delinquency. Furthermore, studies reveal that some highly strained youth that feel intense negative affect do not engage in delinquency (Agnew, 2001). To successfully address the
criticisms of strain theories, GST must answer why “only some strained individuals turn to
delinquency” (Agnew, 1992:66). To do so, GST theorizes that an individual’s risk of
delinquency, as a response to strain and negative emotions, is dependent on whether he or she
employs non-delinquent versus delinquent coping adaptation (coping strategies). Likewise, it is
necessary to identify constraints to non-delinquent coping and dispositions to engage in
delinquent acts. Agnew (1992) first details three coping strategies: cognitive, behavioral, and
emotional. Cognitive coping strategies are used to “cognitively reinterpret objective stressors in
ways that minimize…subjective adversity” (Agnew, 1992:66). Behavioral strategies seek to
diminish or remove the source of strain, and emotional strategies are employed to act directly on
the negative emotion that is produced as the result of the strain (Agnew, 1992).

*Cognitive Coping*

Cognitive coping strategies take on three forms and are said to occur when an individual

1. Ignores or minimizes the importance of the adversity.
2. Maximizes positive outcomes and/or minimizes negative outcomes.
3. Accepts responsibility for the adversity.

*Ignores/Minimizes the Importance of the Adversity*

Individuals dealing with the subjective impact of objective strain may choose to
ignore or minimize the importance of adversity (strain) in a relative or absolute sense. The
subjective impact is dependent on the extent to which the objective strain relates to the
individual’s central goal, values, or identities and the kind of emphasis involved. Suppose an
individual’s goal, value, or identity was centered on money. When strain is experienced, he or
she may claim that money is “not important,” an adaptation similar to Merton’s retreatist or
ritualist adaptation. This is the minimization of the goal, value, or identity in the absolute sense.
In the relative sense, an individual experiencing strain may seek to reduce it by claiming one set of goals, value, or identities (e.g., money) is “less important” relative (or compared to) other sets of goals, values, or identities (e.g., status) (Agnew, 1992).

**Maximizes Positive Outcomes/Minimizes Negative Outcomes**

In this second coping adaptation, individuals attempt to deny the existence of their strain by either maximizing their positive outcomes or minimizing their negative outcomes. To maximize positive outcomes, one may lower the goal standard (e.g., lowering the amount of money desired) which brings their aspirations in line with their reality, or they may choose to raise their threshold for negative stimuli which makes the condition or event experienced seem less negative than it otherwise would be. Individuals may also choose to exaggerate the actual or expected levels of goal achievement or claim their losses are small and their noxious experience is mild, using cognitive distortion to minimize their negative outcomes. These distortions are accomplished via “downward comparisons” or “compensatory benefits” in which he or she claims their situation is no worse than another or derives some positive attribute from the negative situation, respectively (Agnew, 1992).

**Accept Responsibility for Adversity**

Utilizing this third coping strategy, individuals may convince themselves they deserve the strain experienced. This form of coping involves the minimization of positive inputs or the maximization of negative inputs. Suppose the success goal is college acceptance, and an individual cannot achieve it, he or she may minimize their positive inputs by claiming they did not put in enough effort to achieve good grades, or he or she may maximize others positive inputs by claiming they put forth the effort, time, and study to reach their goals.

**Behavioral Coping**
Behavioral coping takes on two forms and is said to occur when an individual 1) maximizes positive outcomes and/or minimizes negative outcomes or 2) seeks vengeful behavior. Maximizing positive outcomes involves using means to achieve positively valued goals (e.g., joining a delinquent subculture to gain status) or protecting positively valued stimuli. Minimizing negative outcomes involve an individual’s attempt to terminate or escape from negative stimuli, and this may include delinquent behaviors such as running away or skipping school. Lastly, individuals may choose to engage in revenge, especially when the adversity/strain is blamed on another. Vengeful behavior may take on non-delinquent or delinquent forms and ultimately seek to increase the inputs of others, increase negative outcomes, or decrease the positive outcomes of others (Agnew, 1992).

*Emotional Coping*

Emotional coping strategies focusing on alleviating negation emotions are especially likely when other coping strategies are unavailable or unsuccessful. Emotional strategy can either be non-delinquent (e.g., physical exercise, meditation, playacting) or delinquent (e.g., use of illicit substances).

*Constraints to Delinquent and Non-Delinquent Coping*

Agnew (1992) notes that only some individuals adapt to strain in delinquent manners and further seek to clarify the factors influencing an individual’s choice in conventional coping strategies or illegitimate/deviant ones. Agnew (1992) notes several coping resources that impact one’s sensitivity to objective strain and their ability to engage in coping adaptations. Specifically, these resources are a range of traits that include self-efficacy, self-esteem, problem-solving skills, and temperament. Coping resources that protect strain–induced individuals from developing delinquent coping adaptations are positive problem-solving and interpersonal skills,
high self-esteem, and higher levels of self-efficacy. Additionally, Agnew (1992) insists conventional social supports that are emotional, social, instrumental, or informational also facilitate conventional coping. Strain-induced individuals who have conventional social supports are said to be more resistant to stress and alleviate strain using non-delinquent coping mechanisms.

On the other hand, while alleviating strain through non-delinquent mechanisms is ideal, not all youth can access such coping strategies and resources. Individuals are more likely to resort to deviant coping when (1) their goals, values, and identities are threatened or alternatives are low, (2) they lack the individual skills and resources necessary to cope in non-delinquent ways (i.e., low self-esteem, low self-efficacy, low problem-solving skills), and/or (3) when conventional social supports are low or absent (Agnew, 1992, 2001). Furthermore, an individual’s disposition to engage in deviant or non-deviant coping is influenced by his or her temperament, social learning, moral beliefs about responding to provocations, and whether he or she blames others. Agnew (1992) describes the following characteristics that increase the likelihood of delinquent coping: poor coping resources or a lack thereof, low levels of conventional social support, low levels of self-control, a predisposition to crime (e.g., association with criminal or delinquent peers blame their strain on others’ beliefs regarding the benefits of crime), and an exposure to circumstances where costs of delinquent coping are low, and rewards are high.

**Empirical Tests of GST**

Since the inception of GST, many empirical tests of GST have generally supported the direct and indirect relationships between strain and delinquency (Agnew and White, 1992; Paternoster and Mazerolle, 1994; Agnew and Brezina, 1997; Hoffmann and Su, 1997; Hoffman
and Cerbone, 1999; Mazerolle, 1998; Hoffmann and Miller, 1998; Mazerolle and Maahs, 2000; Piquero and Sealock, 2000, 2004; Capowich, Mazerolle, and Piquero, 2001; Broidy, 2001; Eitle, 2002; Agnew, Brezina, Wright, and Cullen, 2002; Jang and Johnson, 2003; Rebellon, Manasse, Gundy, Cohn, 2012; Sharp, Peck, & Hartsfield, 2012; Bunch, Iratzoqui, Watts, 2018). Though there is a vast amount of research testing GST, this subsequent section of this chapter addresses only a few key landmark studies that tested the core assumptions of the theory in three areas: positive relationship between strain and delinquency, mediating effects of negative emotions, and moderating/conditioning effects. This section will then conclude with limitations and gaps of the current GST body of knowledge regarding the lack of sufficient empirical research on one of the strains most likely to lead to deviance and how the present dissertation seeks to address this gap. The following chapter will review the literature that applies strain theory more directly to the substantive topic under investigation. The literature reviews are presently separately to separate each content area. This chapter presents the literature that tests assumptions of GST which substantiates the appropriateness of the theory for this research. The following chapter presents the literature review of the strain, adolescent maltreatment, and the moderating factors as they relate to delinquency to demonstrate the lack of sufficient research and thus, the importance of this dissertation research.

**Strain and Delinquency**

General Strain Theory has been empirically tested over the past 25 years, with initial tests of GST finding mixed support for the predictions of the theory. The first empirical test of GST, conducted by Agnew and White (1992), was a partial test of GST that sought to test its central propositions using cross-sectional and longitudinal analysis. Employing data from The Rutgers Health and Human Development Project with a sample of 1,380 youth, Agnew and
White (1992) focused on negative relationships with others. They tested the relationship between eight measures of strain, and delinquency, and drug use. Cross-sectional regression analysis revealed four of the eight strain measures had a significant positive effect on delinquency and/or drug use (e.g., negative life events and life hassles, parental fighting, negative relations with adults, and neighborhood problems), even when theoretical variables from social control and differential association were controlled. Longitudinal panel analysis findings revealed the significant relationship between strain and delinquency held; however, the significant relationship between strain and drug use did not; the failure was attributed to the three-year gap between the two measurement variables.

Introduced in this first empirical study were the moderating effects of delinquent peers and self-efficacy to examine the indirect relationship of strain on delinquency. Agnew and White (1992), in the cross-sectional data, found composite measures of strain had stronger effects on delinquency when delinquent friends were high and self-efficacy was low; in the longitudinal data, strain as an interaction term with self-efficacy and delinquency, separately, did not prove to be significant predictors of delinquency. Overall, the first empirical test was supportive of GST, but the evidence was equivocal.

Two years later, Paternoster and Mazerolle published their 1994 article replicating and extending the prior study, providing a more comprehensive test of GST. Paternoster and Mazerolle (1994), employing a sample of 1,525 youth from Wave 1 and 2 of the National Youth Survey longitudinal data set, constructed several sources of general strain, captured variations in their magnitude and duration, and examined the role of five conditioning variables (e.g., delinquent peers, self-control, self-efficacy, conventional social support, morality) on the strain-delinquency relationship. Longitudinal panel analysis reveals significant positive effects for four
general strain measures with respect to delinquency. Specifically, those who resided in neighborhoods with poor conditions, experienced a past-year stressful event, had difficulty with peers or had poor interpersonal relationships with parents committed more delinquent acts as compared to those who experienced less strain; these relationships held even after controlling for theoretical variables from social control and differential association. In addition, association with delinquent peers contributed to delinquency, while conventional moral beliefs and good academic performance inhibited delinquent involvement. No support was found for the relationships between general strain, strain duration, and strain magnitude and four of the conditioning variables. A significant effect was found for the interaction term between self-efficacy and delinquency, however in the opposite direction whereby higher levels of self-efficacy produced a stronger effect on delinquency. For the relationship between strain and social control/differential association variables, findings reveal strain led to an increase in delinquency through the weakening of social bonds and strong ties to delinquent peers.

The application of GST has been used to examine the relationship between strain, gender, and delinquency by several scholars (Agnew and Brezina, 1997; Hoffmann and Su, 1997; Mazerolle, 1998; Hoffman and Cerbone, 1999). Agnew and Brezina (1997) implement general strain theory to explore the relationship between female delinquency and peer relational problems using the first wave of the National Education Longitudinal Study of 1988 with a sample of 3,595 high-schoolers. Data analysis finds little support that interpersonal strain affected female delinquency or that such strain would affect females more than males. In fact, poor relations with peers and peer problems upon entering high school were more positively associated with delinquency for males than females. Though interpersonal strain was related to higher delinquency for males than their female counterparts, interpersonal strain was an
important predictor of externalizing behaviors, such as fighting, for females. The study also
found both female and male reports of positive interpersonal relations with the opposite sex were
associated with higher delinquency.

Hoffman and Su (1997) implemented a sample of 803 adolescents from the
longitudinal High-Risk Youth Study to investigate the variation of stress effects between males
and females on delinquency. Specifically, they explore the number of stressful life events
reported by adolescents and its impact on delinquency and drug use. Though GST was supported
through their cross-sectional analysis, whereby stressful life events were associated with
delinquency and drug use for both genders, the study found no statistically significant differences
for gender for either outcome variables. Similarly, research conducted by Mazerolle (1998)
found support for the GST model, in that noxious relations with adults predicted delinquency for
females and negative life events predicted delinquency for males. In this study only one of the
predictor variables of delinquency had a gender difference that was statistically significant.
Analyses in his study were conducted on a sample of 1,498 respondents from the first two waves
the National Youth Survey.

Hoffman and Cerbone (1999) utilized hierarchical growth-curve modeling on four
years of data from the Family Health Study (N=651) to examine the effects of stressful life
events on delinquency, and the role of intrapersonal resources on the strain-delinquency
relationship. Their findings also support GST in that stressful life events lead to delinquency;
however contrary to their hypothesis, no significant differences across gender were found.
Moreover, little evidence was found to support GST’s theoretical assumptions that certain
variables (e.g., sex, income, self-efficacy, and self-esteem) moderated the effects of the strain-
delinquency relationship.
Mediating Variables: Negative Emotions/ Negative Emotional Affects

Recall, General Strain Theory (Agnew 1992; 2001) proposes the experience of strains may result in the increased likelihood of experiencing a range of negative effects (e.g., anger, depression, fear, etc.), which may lead to involvement in delinquency and crime. The exploration of the connection between strain and crime, through negative emotions, has received much empirical attention, with conclusions of overall support tending to be mixed (Agnew et al., 2002; Mazerolle and Piquero, 1997; Broidy; 2001; Capowich, Mazerolle, and Piquero, 2001; Aseltine, Gore and Gordon, 2000).

Agnew, Brezina, Wright, and Cullen (2002) explored the reaction to strain with delinquency among a sample of high-school students from the second wave of the National Survey of Children. The study found that for adolescents who measure high in negative emotionality and low in constraint, a composite measure of strain was more likely to lead to delinquency. Mazerolle and Piquero (1997) explored whether sources of strain were predictive of assaultive intentions and whether anger would mediate the relationship. Utilizing data from a sample of 245 undergraduate male students, structural equation modeling reveals that both composite strain exposure and anger have positively, statistically significant effects on assault intentions and that strain has a positive, statistically significant effect on anger. Broidy (2001) tested a full model of GST, using cross-sectional survey finding mixed support. Specifically, two sources of strain (i.e., stress, unfair outcomes) were positively and significantly related to anger and related to crime. In opposition to GST assumptions, one source of strain was negatively related to anger. Though research on the effect of negative affective states on the strain-crime relationships shows favorable support, some research has been found to disconfirm GST’s core propositions (see, Aseltine et. al 2000).
Conditioning Effects/Variables

Initial empirical testing of GST stimulated further research, leading to the examination of the factors that condition the relationship between a variety of strains and delinquency. For example, Agnew, Brezina, Wright, and Cullen (2002) used second-wave data from the National Survey of Children and found, for a sample of 1,483 children, family strain, parental loss of control of feelings, school hatred, and neighborhood strain had a significant positive effect on delinquency even when controlling for variables of negative emotionality, constraint, social control, and social learning. Rebellon, Manasse, Van Gundy, and Cohn (2012) explored the role of perceived injustice on delinquency among a sample 928 of high-school students using three waves of data from the New Hampshire Youth Study. Ordinary least square and negative binomial analyses indicate support for GST in that perceived fairness is a statistically significant predictor of delinquency, net of controls, and the relationship is mediated by situational anger. While there are a number of GST empirical studies that support Agnew’s assumption that certain variables exacerbate the relationship between negative affective states and delinquency, as demonstrated above, findings from empirical research regarding variables that diminish the impact of strain on delinquency are less supportive.

Recall, not all youth who experience strain will resort to crime or delinquency. As a response to strain and negative emotions, an individual's risk of delinquency depends on whether he or she employs non-delinquent versus delinquent coping adaptation (coping strategies). Remember, some non-deviant coping resources guard strain–induced individuals from engaging in delinquency and crime, moderating the strain-crime relationship. Although some GST research supports the role of conditioning factors on the strain-delinquency relationship, overall, conclusions are mixed (Piquero and Sealock, 2000; Agnew, Brezina, Wright, and Cullen, 2002;
Hoffmann and Miller, 1998; Hoffman and Cerbone, 1999; Broidy, 2001; Aseltine, et al., 2000; Mazerolle and Maahs, 2000; Capowich, Mazerolle, and Piquero, 2001; Jang and Johnson, 2003). For example, Hoffman and Cerbone (1999), in a longitudinal study using data from the Family Health Study, examined several GST assumptions, including the relationship between adverse life events, delinquency, and the role of self-esteem and self-efficacy (also termed mastery). Analyses found no evidence that mastery or self-esteem moderated the relationship between life events and delinquency. Aseltine, Gore, and Gordon (2000) conducted a study among a sample of 9th, 10th, and 11th graders using three-wave panel data to explore central tenants of GST, including testing whether the role of levels of personal and social resources impact the relationship between strain and delinquency and marijuana use. Analyses find mastery, self-efficacy, parental support, nor exposure to deviant peers alter the impact of strain on delinquency. In addition to GST research that did not support the conditional effects assumption, other studies find some positive coping resources actually exacerbate the relationship between negative emotions and delinquency/crime (see Baron, 2004; Paternoster and Mazerolle, 1994; and Agnew and White, 1992 for more).

Summary and content definitions

As demonstrated through the literature GST, overall, has proved to be essential in the explanation and understanding of juvenile delinquency. Agnew’s GST advanced and revitalized strain theory in four major ways. First, it emphasizes negative relationship with others, pointing to three major sources of types of strain:

1. The failure to achieve positive value goals.
2. The actual or anticipated loss of positively valued stimuli.
3. The actual or anticipated presentation of noxious or negative stimuli.
Next, it explicitly specifies the connection between strain and delinquency by introducing and highlighting the roles of negative emotions (or affects) and three coping strategies-emotional, behavioral, and cognitive, and factors that constrain delinquent and non-delinquent coping. Finally, it describes the strain most likely to lead to crime.

A broad range of negative events and conditions are linked to delinquency and overwhelmingly support GST. Empirical tests of the validity of GST having shown various strains such as physical punishment (Hay, 2003), physical victimization (Agnew, 2002), negative peer relations (Agnew and Brezina, 1997; Agnew et. al, 2002), poor familiar relationships (Aseltine, Gore, and Gordon, 2000; Paternoster and Mazerolle, 1994), racial discrimination (Jang and Johnson,2003) and community violence (Eitle and Turner, 2002) are positively related to delinquency. Notwithstanding, research regarding the relationship between one specific type of strain victimization, adolescent maltreatment, and one form of deviant coping, adolescent substance abuse, are underexplored and limited. A detailed discussion of the literature and limitations are discussed in the upcoming chapter. Adolescent maltreatment has become a recognized risk factor impairing the development, quality of life, and life-course outcomes of those who experience it. Yet, a lack of substantial GST research exploring the relationship between this risk factor and delinquency still exists. The relationship between maltreatment and substance abuse must be addressed and remedied, especially given that victimization has been identified as one of the strains that is most conducive to crime and delinquency (Agnew, 2001; Agnew and White, 1992; Broidy, 2001).

It is important to note victimization includes a wide range of behaviors, not all of which are related to adolescent maltreatment. Thus, for this research, the term adolescent maltreatment will be used as not to confuse it with other aspects of victimization such as
bullying, violent victimization, or criminal victimization. This research adopts a comprehensive
definition that is consistent with GST and other empirical research and defines maltreatment as
“acts intended to inflict physical or psychological harm, and that reflect a lack of concern for the
adolescent’s well-being, sense of self and social competence” (Brezina, 1998:73). The four most
commonly recognized forms of maltreatment are sexual abuse, physical abuse, emotional and
psychological abuse, and neglect. Definitions of each aspect of maltreatment have been adapted
from Butchart, Harvey, Kahane, Mian, and Furniss (2006:10) and are defined below:

“Physical abuse of a child is defined as the intentional use of physical force against a
child that results in – or has a high likelihood of resulting in – harm for the child’s health,
survival, development or dignity. This includes hitting, beating, kicking, shaking, biting,
strangling, scalding, burning, poisoning, and suffocating. Much physical violence against
children in the home is inflicted with the object of punishing.

Sexual abuse is defined as the involvement of a child in sexual activity that he or she
does not fully comprehend, is unable to give informed consent to, or for which the child is not
developmentally prepared, or else that violates the laws or social taboos of society. Children can
be sexually abused by both adults and other children who are – by virtue of their age or stage of
development – in a position of responsibility, trust, or power over the victim.

Emotional and psychological abuse involves both isolated incidents, as well as a
pattern of failure over time on the part of a parent or caregiver to provide a developmentally
appropriate and supportive environment. Acts in this category may have a high probability of
damaging the child’s physical or mental health, or its physical, mental, spiritual, moral, or social
development. Abuse of this type includes: the restriction of movement; patterns of belittling,
blaming, threatening, frightening, discriminating against or ridiculing; and other non-physical forms of rejection or hostile treatment.

*Neglect* includes both isolated incidents, as well as a pattern of failure over time on the part of a parent or other family member to provide for the development and well-being of the child – where the parent is in a position to do so – in one or more of the following areas: health, education, emotional development, nutrition, shelter and safe living conditions.”

To summarize, Robert Agnew’s General Strain Theory revitalized theories of strains and evolved from the original works of Emile Durkheim (1964;1966a;196b), Robert Merton (1938), Albert Cohen (1955), and Richard Cloward and Lloyd Ohlin (1960). Whereas classic strain theories argue one source of strain, “goal-blockage” or a lower-class youth’s failure to achieve positively valued goals, is the impetus to delinquency involvement and crime, Agnew (1992) argues, this, in addition to actual or anticipated removal/loss of positively valued stimuli and the actual or anticipated presentation of noxious or negative stimuli, may lead a youth to delinquency. In this way, GST broadens the scope of classic strain theories by introducing two additional sources of strain, focusing on the impact of one’s negative relationships with others and the disjuncture between expectations and actual achievements instead of the disjuncture between aspirations and expectations. Furthermore, GST specifies the connection between sources of strain and delinquency through the emergence of negative emotions (or affects) and adaptations of delinquent and non-delinquent coping strategies.

In short, strain as “relationships in which the individual is not treated as he or she wants to be treated” (1992:48) may result in the increased likelihood of experiencing a range of negative affective states, including anger, depression, disappointment, and/or fear. In turn, such emotions activate pressure for corrective action leading to the employment of conventional or
delinquent coping strategies. While not all individuals who experience strain will resort to delinquency, deviant coping strategies are more likely to be resorted to when an individual’s goals, values, and identities are threatened or alternatives are low, when an individual lacks the skills and resources necessary to cope in non-delinquent ways (i.e., high self-esteem, high self-efficacy, high problem-solving skills), and/or when conventional social supports are low or absent (Agnew, 1992, 2001).

Empirical testing of Agnew’s assumptions has led to several revisions of GST (see, Agnew 2001; 2006). The findings of these studies have been limited in important respects that require further inquiry. Research using GST concludes: 1) though several sources of strain are related to delinquency, not all strains lead to delinquent involvement. In fact, strains that are most conducive to delinquency are those that are viewed as high in magnitude, those that are unjust, and those that create incentive to engage in delinquency. Of these strains identified in the literature, adolescent maltreatment has seen the least amount of GST testing and requires further investigation. 2) Findings regarding the role of conditioning variables, specifically those that protect strain-induced individuals from engaging in crime and delinquency are mixed. Exploring the relationship between adolescent maltreatment and delinquency is critical to the field as maltreated youth are at great risk for delinquent involvement (i.e., substance use) that can have adverse effects on their body, mind, and social progression. By extending the study to examine the effect of a conventional coping mechanism, self-efficacy, we can contribute to the body of knowledge surrounding GST, understand what mechanisms have the potential to reduce harm to a class of highly strained youth, and make recommendations for future areas of study.
Chapter 3: Strain, Substance Abuse, and Self-Efficacy

Chapter 3 begins with introducing the substantive topic under investigation, adolescent substance use, and details prevalence data, contextual definitions, consequences of use, patterns, and correlates of the two most commonly used adolescent substances, and risk factors associated with adolescent use. One of the most salient yet underexplored criminological risk factors, adolescent maltreatment, is detailed before the general relationship between maltreatment and substance use is highlighted. Next, Agnew's General Strain Theory's utility to study the phenomenon is described, followed by a literature review of GST studies that examine the relationship, and the limitations of the literature are identified. The chapter concludes with a discussion of how the current dissertation will fill gaps in the literature and contribute to the current body of knowledge. Chapter 4 is presented next, which will describe the data, variables, hypotheses derived from the literature, and analytic strategy employed for this dissertation research.
Statement of the Problem

Adolescent substance use continues to elicit widespread concern and consequences among communities, peers, and individuals and contributes to increasing public health and criminal justice systems costs. Adolescent substance use is more likely to peak during adolescence, a developmentally diverse period for youth 12 through 19 years, leading to diminished well-being and increasing the risk of negative life-functioning of adolescents who engage in use. Compared to non-users, adolescent substance users are more likely to exhibit dependency symptoms, be arrested, be involved in vehicular accidents, and have legal problems (Dennis, Dawud-Noursi, Muck, and McDermeit, 2003). Adolescent substance use has been linked to increased contact with the criminal justice system, increased delinquent behavior (Maney, Gardill, Mahoney, 2002; Kubiak, Arfken, Swartz Koch, 2006), poorer educational and vocational outcomes (Goldstein, 1985; Milich, Lynam, Logan, Martin, Leukefeld, Portis, Miller, and Clayton, 2010; Maney, Gardill, Mahoney, 2002; Miller, Naimi, Brewer, & Jones, 2007), higher risk of sexually transmitted diseases and HIV infection, and family disruption (Goldstein, 1985; Maney, Gardill, Mahoney, 2002).

Adolescent substance use

Adolescence is a developmental period characterized by developmental changes and increased risk-taking behaviors. Risk-taking behaviors are viewed as a normal part of the developmental process on the path toward adulthood; however, certain forms are negative, increasing the risk of harmful outcomes. Adolescent substance use is a risk-taking behavior that only some adolescents engage in and includes consuming psychoactive substances, including both illicit and licit. The World Health Organization (WHO) (2019, retrieved 2019: para. 1, pg.1) defines psychoactive substances as “substances that, when taken in or administered into one's
system, affect mental processes, e.g., cognition or affect”. *Licit* substances refer to substances/drugs used legally, including alcohol, tobacco, caffeine, and medicine used for illness taken as directed and/or prescribed for the intended use. *Illicit* substances refer to the production, sale, or use of a prohibited substance under circumstances (WHO, 2019). Categorization of illicit and licit substances varies across culture and society. In Western societies, some substances that are illicit for adolescents are licit for adults, such as the consumption of cigarettes and alcohol given legal age restrictions.

Adolescent substance use ranges along a spectrum from abstinence and experimental, normative use of certain substances to heavy use resulting in substance abuse and substance-use related disorders that impair day-to-day functioning. Regardless of utilization patterns, adolescent substance use poses harmful risks, including developmental delays, cognitive impairment, sickness and illness, suicide and homicide, and criminal victimization. Notwithstanding, adolescent substance use is still quite common, and specific substances are being used at greater frequencies as compared to the past (e.g., vaping).

According to reports of three national surveys, the Youth Risk Behavior Surveillance System (YRBSS), the National Household Survey on Drug Use and Health (NHSDUH), and Monitoring the Future Survey (MTF), alcohol, cannabis, and cigarettes are the most commonly used substances by adolescents. In contrast, rates of substances such as opiates and cocaine are relatively lower. Despite common usage, substance use and perceptions have seen some shifts since the 1990s. Per the 2018 Monitoring the Future Survey, the use of alcohol and cigarettes has generally seen a downward trend; the use of marijuana and hashish has remained stable; perception of risk of marijuana has declined among high school seniors; and vaping, both marijuana and cigarettes, have increased significantly.
With respect to current prevalence, the MTF Survey (2018) reports 12.4% of high school seniors, 9.6% of sophomores, and 6.1% of 8th graders have used illicit drugs in the past year; approximately 30% of seniors 20% of sophomores, and 8% of 8th graders reported past-month alcohol use; rates of vaping increased by one-third across all three grade levels, and use of tobacco products, including cigarettes and hookah decreased among seniors. Additionally, the use of MDMA, methamphetamines, amphetamines, and sedatives have hit historic lowest levels since the 1990s (Monitoring for Future Survey, 2015). The World Health Organization (2019) note alcohol and marijuana are of major concerns continuing to be problematic to adolescents' present life and future. Data reveal these two substances are the most commonly used among adolescents; given such, alcohol use and marijuana use are the focus of this research and are the psychoactive substances referred to when the term “substance use” is stated.

Adolescent Alcohol Use

Alcohol is one of the most commonly used psychoactive substances among adolescents, peaking at the onset of adolescence and emerging adulthood and declining with age. According to the National Institute on Alcohol Abuse and Alcoholism (NIAAA, 2018), by age 15, thirty-three percent of teens have consumed at least one drink. By age 18, about sixty percent of teens have consumed at least one drink. In comparison to adults, adolescents consume alcohol less often. However, they consume more when they do drink due to binge drinking. In fact, adolescents consume 90% of their alcohol during binge drinking (NIAAA, 2018). Patterns of alcohol use include binge drinking, excessive drinking, heavy drinking, moderate drinking, and problem drinking/alcoholism. Binge drinking, also known as heavy episodic drinking, refers to the consumption of alcohol that leads to intoxication, blood alcohol concentration levels that are above the legal limit of 0.08, and typically measures about five or more drinks in a row for boys
and 4 or more drinks in a row for girls. Binge drinking also refers to a pattern of heavy drinking that occurs over an extended period and interferes with usual obligations and activities. Excessive drinking refers to a drinking pattern that exceeds standards of moderated drinking and acceptability and includes a consumption of alcohol large enough to be detrimental to an individuals’ health and social functioning. Heavy drinking refers to a drinking pattern that exceeds a certain daily volume or quantity per occasion, while moderate drinking refers to the consumption of an undetermined amount of alcohol that does not pose problems. Moderate drinking is typically only used as a contrast to light or heavy drinking. Finally, problem drinking refers to a pattern of drinking that results in collective health and social problems.

The use of alcohol is correlated with several demographic variables, with gender differences, race and ethnicity differences, and sexuality differences being noted in regard to consumption and/or motivation. For example, Cooper (1994) reported males were heavier consumers of alcohol than their female counterparts and usually drank for social support and enhancement motives compared to females who drank for coping and conformity motives. In general, the prevalence of drinking is similar among both girls and boys. Still, boys have higher rates of heavy use and binge drinking than girls (Cooper, 1994; NIAAA, 2018; Taneka, Jamieson, Georgiades, Duku, and Boyle, 2011). In regard to race and ethnicity, and sexuality, Black and Hispanic adolescents use alcohol at lower rates than non-Hispanic Whites while highest rates are found among Native American youth (Ewing, Venner, Mead, and Bryan, 2011; Wallace and Bachman, 1991; Keyes, Vo, Wall, Caetano, Suglia, Martins, Galea, and Hasin; 2015). Lesbian, gay, and bisexual youth are at higher risk of use as compared to their straight-identifying counterparts (Marshal, Friedman, Stall, King, Miles, Gold, Bukstein, and Morse, 2009; Talley, Hughes, Aranda, and Birkett, 2013).
Marijuana Use

Following alcohol, marijuana is the second most common psychoactive substance utilized by adolescents, becoming the leading substance. In 2017, 23.9% of adolescents aged 12-17 reported using marijuana in their lifetime, 16.3% reported past-year use, and 7.9% reported past-month use (National Survey on Drug Use and Health, 2018). To date, rates of marijuana use have remained stable over the past few years in the face of the legalization of medical marijuana in various states in the United States. Though rates of marijuana use remain relatively stable, reports of perceptions of harm have declined among 8th, 10th, and 12th graders, and there has been an increase in vaping marijuana. (MTF, 2018), sparking concerns of further increase with the growing enactment of recreational marijuana use laws. Despite legislative changes around the legalization of marijuana, marijuana use has been noted to have deleterious effects on adolescent brain development and social functioning. It heightens the risk of motor vehicle accidents, academic difficulties, poorer relationship quality, greater economic and occupational difficulties, and other unintentional consequences (Dubowitz, Thompson, Arria, English, Metzger, and Kotch, 2016).

Like alcohol, gender, race, and ethnicity differences have been established for marijuana as well. In two studies evaluating past decade trends in marijuana use, male use is greater than female use, supporting two theoretical assumptions. One that males engage in risk taking behavior more than females, and two, their opportunities to use are greater (Johnson, Fairman, Gilreath, Xuan, Rothman, Parnham, and Holden, 2015; Moss, Santaella-Tenorio, Mauro, Keyes, and Martins, 2018; Keyes et al., 2015). Though prevalence rates of lifetime and past 30-day marijuana use have historically been higher for boys than girls since the 1990s, Johnson et al. (2015) find gender gap differences decreasing, with changes being attributed to
declines in male marijuana use over time. With respect to differences in marijuana use by race and ethnicity, findings are mixed. For example, Johnson et al. (2015) finds the prevalence of current marijuana use is higher for American Indians and Alaska natives (34.6%) and lowest for Asians (10.8%) with other racial groups ranging in use from 22% to 26.4% (no gender differences by race/ethnicity were evaluated), while Keyes et al. (2015) found among females, Whites were more likely to use marijuana than Blacks. The study found no racial or ethnic differences for males. In another study conducted by Johnson, Fleming, Cambron, Dean, Brighthaupt, and Guttmannova (2019), marijuana use was highest among American Indians/Alaskan Natives, Hispanics, and Blacks compared to Whites; the prevalence of use was lowest among Asians. Racial and ethnic variations in marijuana use have been attributed to differences in sample sizes and other methodological differences.

Substance Use Risk Factors

Research regarding the onset, maintenance, and progression of adolescent substance abuse has produced a vast body of literature demonstrating the complexity of the phenomenon along with a vast number of risk factors associated with adolescent substance use. A detailed discussion of all risk factors is beyond the scope of this research. Still, a brief outline of some of the most common and serious risk factors is presented before more detailed discussions of risk factors related to each form of maltreatment are discussed. Risk factors are defined as attributes, characteristics, or exposures of an individual that increase the likelihood of developing disease or injury (WHO, 2018) and range across individual, familial, contextual, and environmental levels.

Hawkins, Catalano, and Miller (1992) produced one of the first seminal articles identifying risk factors for substance use in an effort to “prevent drug abuse by eliminating, reducing, or mitigating its precursors” (Hawkins, Catalano, and Miller 1992:65). Since then, a
host of empirical research identifies and supports many risk factors related to and increasing the likelihood of substance use. To sum, adolescent substance use is positively associated with the

- *social* factors such as the association of deviant peers, peer pressure and perceived popularity, being a victim of or perpetrator of bullying, and gang affiliation;

- *individual external and internal factors* such as attention deficit hyperactivity disorder (ADHD), aggressive and antisocial behavior, post-traumatic stress disorder (PTSD), low-inhibitory control, depression and depressive symptoms, physiological factors, and school difficulties;

- *family background* factors such as parental and family history of substance use, family conflict, maternal substance use during pregnancy, parental practices, family structure, and socioeconomic status and;

- *contextual* factors such as laws and norms of favorable behavior and drug availability (Hawkins, Catalano, and Miller, 1992; Vakalahi NIDA, 2003; Donovan, 2004; SAMHSA, 2016).

**Maltreatment as a risk factor for adolescent substance use**

Among the prominent risk factors for adolescent substance use and substance abuse-related problems is maltreatment. Adolescent maltreatment has received attention due to its common occurrence and growing epidemic, along with the prevalence of substance use found among this specific population. According to the Department of Health and Human Services Child Maltreatment 2017 report by The National Child Abuse and Neglect Data System (NCANDS) (2019), child protective services (CPS) agencies received 4.1 million referrals for maltreatment allegations, involving approximately 7.5 million children. Data reveal 17 percent (or 3.5 million children) were substantiated or indicated victims of maltreatment. The greatest percentages of maltreatment stemmed from neglect (74.9%) and physical abuse (18.3), and data from a national estimate report 1,720 children died from abuse and neglect.
Not only do empirical studies find that adolescents who experience maltreatment, compared to those who have not been maltreated, are at a much greater risk for utilizing illicit substances and developing substance use disorders and substance-use related problems (Huang, et al., 2011; Lo and Cheng, 2007; Sacks, McKendrick, and Banks, 2008), empirical studies have also found that maltreatment is associated with higher levels of criminal involvement (Watts and McNulty, 2013; Smith and Thornberry, 2005); running away (Kaufman and Widom, 1999; Kim, Tajima, Herrenkohl, and Huang, 2009), antisocial behaviors (Smith, Park, Ireland, Elwyn, and Thornberry, 2013), psychiatric problems (Sachs-Ericsson, Gayman, Tackett, Lloyd, Medley, Collins, Corsentino, and Sawyer, 2010; Sacks et al., 2008; Shane, Diamond, Mensinger, Shera, and Wintersteen, 2006), poor academic performance (Wordes and Nunez, 2002), and increased risk for juvenile justice involvement and offending (Mersky, Topitzes, Reynold; 2012; Watts and McNulty, 2013). Experiences of child maltreatment have also been associated with increased risk of earlier initiation of drinking (Dube, Miller, Brown, Giles, Feletti Dong, and Anda, 2006; Champion, Long, Durant, Hensbury, Altman, and Wolfson; 2004), and HIV and other sexual-health related issues (Wilson and Windom, 2008, 2011).

Over the last two decades, empirical studies have not only identified risk factors and consequences of collective adolescent maltreatment, but there have also been explorations of the association between physical, sexual, and emotional abuse and neglect, individually on delinquency and crime. Like studies that find an association between collective maltreatment experiences, individual aspects of maltreatment have also been related to adolescent substance use. Below details a few empirical studies that provide support for those relationships.

**Physical and Sexual Abuse**
The effects of physical and sexual abuse have been well documented in the literature, with research generally finding a statically significant relationship between these forms of abuse and alcohols and drugs. For example, Smith and Saldana (2013) examined the relationship between childhood maltreatment and delinquency for a group of 166 adolescent girls in substance abuse treatment. They found, of those in treatment, at least 90% experienced physical abuse, sexual abuse, or additional childhood trauma and, at least 75% of those girls experienced high rates of substance use. In their study, sexual abuse was positively associated with alcohol use, marijuana use, and hard drug use (i.e., stimulant use, opiate use, and depressant use), and physical abuse was positively associated with marijuana use and hard drug use.

Kilpatrick, Acierno, Saunders, Resnick, Best, and Schnurr (2000) conducted the National Survey of Adolescents (NSA) among a nationally representative sample of adolescents and found physical and sexual assault was associated with an elevated risk of alcohol, marijuana, and hard drug abuse/dependence. Multivariate analysis confirmed the statistical significance of this relationship and revealed that males were at greater risk of alcohol and marijuana dependence than females. Additionally, maltreated youth began using a given substance at an earlier age compared to non-maltreated youth. Lo and Cheng (2007) conducted a prospective longitudinal study on maltreated adolescents using seven waves of data from the National Youth Survey (NYS). Their study sought to examine the relationship between experiences of maltreatment and subsequent substance abuse. Logistic regression analyses revealed the experience of child abuse was associated with current alcohol abuse, current marijuana abuse, and current drug abuse. Empirical research also finds, physically and sexually abused adolescents are two to four times more likely to use substances (Wall and Kohl, 2007; Kilpatrick et al., 2000) and that males are more likely to be victims of physical abuse, while females are
more likely to be victims of sexual abuse which contribute to substance use preference/choice (Wellman, 1993; Hines, Armstrong, Palm, and Cameron, 2012).

**Emotional and Psychological Abuse**

Literature regarding the effects of emotional and psychological abuse on substance use has been limited. However, two studies did find evidence that emotional abuse is a risk factor for adolescent substance use. Specifically, vicarious traumas such as witnessing domestic violence and emotional neglect were associated with alcohol use. Moran, Vuchinich, and Hall (2004) conducted a study examining the relationship between maltreatment categories and substance use using a subset of high school students. The study found emotional abuse was associated with alcohol and nicotine use; however, the magnitude of those effects was significantly lower than the effects of physical and sexual abuse. Hamburger, Leeb, and Swahn (2008) conducted a cross-sectional study examining the relationship association between maltreatment and age of first alcohol initiation and heavy episodic drinking among a sample of 7th, 9th, 11th, and 12th graders and found the experience of emotional abuse, along with three other forms of maltreatment, was associated with a twofold increased risk of ever drinking alcohol compared to non-maltreated youth. Emotional and psychological abuse was also associated with earlier initiation of alcohol use, but data did not find evidence to support heavy episodic drinking.

**Neglect**

Studies of the effect of neglect are growing in the health and psychology literature, with research finding an association between neglect and increased risk of adolescent substance use. Cheng and Lo (2010) used nationally representative, longitudinal data from the National Survey of Child and Adolescent Well-Being from a sample of children and families participating in child welfare services to examine the relationship between maltreatment, services received,
and adolescent subsequent alcohol use. Discrete-time model analyses found allegations of neglect were related to a significant increase in adolescent alcohol use. deLara, Propp, Chen, and Corvo (2011) used prospective research data from a sample of substantiated cases of child abuse and neglect and found victims of child neglect had elevated risks of alcohol and drug abuse compared to a matched sample. In their study, male victims of neglect were more likely to use alcohol and drugs and commit drug and alcohol-related offenses than their female counterparts.

**Comprehensive maltreatment**

Studies that used composite measures of maltreatment have also found that maltreatment is associated with adolescent substance use. For example, Levenson and Grady (2016), in their exploratory study of adverse childhood experiences on substance abuse and violence outcomes, found that among a sample of 180 offenders in clinical treatment programs, those with higher adverse childhood experience scores were significantly associated with higher substance abuse scores. Ireland, Smith, and Thornberry (2002), in their research of developmental issues in the impact of child maltreatment on later delinquency and drug use, found a consistent, significant relationship between adolescent maltreatment and delinquency. Specifically, they found the odds of chronic offending and occasional offending, the odds of drug use, and the odds of street crime were higher for maltreated youth compared to non-maltreated youth. Moreover, the odds of arrest in late adolescence were 3.7 times greater for maltreated youth than youth who were never mistreated. These findings held for both self-report and official reports of delinquency. Dubowitz et al. (2016) found that child maltreatment was associated with adolescent marijuana use; maltreated youth reported high use of any marijuana (53%) compared to non-maltreated youth (36%). Bivariate analyses revealed physical abuse was significantly associated with heavy marijuana use, sexual abuse was related to moderate marijuana use, and
extensive child maltreatment, which included measures of frequency and chronicity, were associated with heavy marijuana use; no relationship was found between patterns of marijuana use and emotional abuse or neglect.

**Applying GST to Maltreatment**

Research regarding adolescent maltreatment has been extensively established in the health and psychology literature; however, the field of criminology has paid less attention to this factor despite its criminogenic effects and theories that can provide insight (Agnew, 2001; Agnew and White, 1992; Broidy, 2001). Specifically, Agnew’s General Strain Theory highlights victimization as one of the most consequential strains acting as a stressor that may lead to delinquent behavior when attempting to cope (Agnew 2001; Agnew 2002). Many studies informed by GST have explored this tenet, finding support for the relationship between multiple sources of victimization and delinquency/crime (Agnew, 2002; Hay and Evans, 2006; Iratzoqui, 2018; Baron, 2004; Lo, Kim, and Church II, 2008; Kaufman, 2009; Miller, Fagan, and Wright, 2014; Cullen, Unnever, Hartman, Turner, and Agnew, 2008; Hay, Meldrum, and Mann, 2010, Broidy and Agnew, 1997). Falling under the umbrella of victimization, maltreatment is viewed as a criminogenic source of strain as it “may seriously threaten many of the child’s goals, values, needs, and/or identities,” “is likely to be seen as unjust given cultural expectations and the experience of the other,” and “violates one or more justice norms” (Agnew, 2001:343-344). GST indirectly links victimization to delinquent behaviors through negative emotions. According to GST, victimization as the presence, or threatened presence, of negative or noxious stimuli can lead to stress (Agnew, 2001). Stress, in turn, creates intolerable negative affects, including depression, hopelessness, fear, and anger (Agnew, 2001; Agnew, 1992), which creates pressure leading to attempts to escape from, alleviate, or terminate the source of strain.
GST notes youth may deal with strain by utilizing any number of coping strategies, which may be delinquent or non-delinquent; the choice is influenced by access to such strategies, personality, and resources. Adolescent substance use as a form of deviant coping helps youth who experience strain escape from and/or alleviate negative feelings associated with strain when other coping strategies are unavailable or unsuccessful. GST and stress-related empirical studies confirm that substance use may be used as a coping strategy to alleviate negative emotions in the face of strain (Huck, Lee, Bowen, Spraitz, 2012; Smith and Thornberry, 1995; Thornberry, Ireland, and Smith, 2001; Baron, 2004; Huang et al., 2011; Lo and Cheng; 2007; Hollist, Hughes, Schaible, 2009). In addition to deviant coping strategies that condition the relationship between strain and delinquency, Agnew (1992) notes several conventional coping resources may be implored to relieve the pressure of strain in facilitating criminal and deviant acts (i.e. self-esteem, self-efficacy, family attachment, and conventional support); additionally, GST recognizes that not all youth who experience strain will resort to delinquency if access, availability, and skills to use such coping resources are present. As previously mentioned, although some GST research supports the role of conditioning factors on the strain-delinquency relationship, overall, conclusions are mixed (Agnew and White, 1992; Piquero and Sealock, 2000; Agnew, Brezina, Wright, and Cullen, 2002; Paternoster and Mazerolle, 1994; Hoffmann and Miller, 1998; Broidy, 2001; Aseltine et al., 2000; Mazerolle and Maahs, 2000; Capowich, Mazerolle, and Piquero, 2001; Jang and Johnson, 2003). Furthermore, as it pertains to the present study, research between maltreatment, substance use, and conditioning variables is limited.

According to Agnew (1992), one coping resource that is likely to condition the strain-delinquency relationship is self-efficacy. Self-efficacy (also known as mastery) has been conceptualized as the ability to control one’s life to successfully produce desired outcomes based
on executing behaviors (Bandura, 1986). Agnew (1992) posits individuals with higher levels of self-efficacy will be able to relieve strain through non-delinquent behaviors. In the health and psychology literature, higher levels of self-efficacy have been shown to be associated with reductions in the use of alcohol and drugs (Maisto, Connors, and Zywiak, 2000; Dolan, Martin, and Rohsenow, 2008; Stephens, Wertz and Roffman, 1995). According to Bandura (1986), individuals who have the necessary skills and greater self-efficacy levels are more likely to resist high-risk situations and coping mechanisms, such as alcohol and drug use, which is supported by the aforementioned research.

It is evident that the connection between maltreatment and delinquency has been well established (Garner, Hunter, Smith, Smith, and Godley, 2014; Crooks, Scott, Wolfe, Chiodo, Killip, 2007; Salzinger, Rosario; Feldman, 2007; Robertson and Walker, 2018, Watts and McNulty, 2013; Manasse and Ganem, 2009, Aseltine and Gore, 2000; Lo and Cheng, 2007; Huang et al. 2011). However, there still exists considerable gaps in knowledge across disciplines. For example, a large number of studies in the public health and psychology literature dedicated to investigating the maltreatment-delinquency relationship often do not provide a theoretical framework for which the relationship exists; and for studies that do, GST theory is not applied (Garner, Hunter, Smith, Smith, and Godley, 2014; Crooks, Scott, Wolfe, Chiodo, Killip, 2007; Salzinger, Rosario; Feldman, 2007; Robertson and Walker, 2018). Though stress and psychology literature consistently document the relationship between self-efficacy and substance use, GST research evaluating the role of self-efficacy is inconsistent. Furthermore, in the criminological literature, despite having a theoretical framework that supports the exploration of the indirect and direct relationships between maltreatment and delinquency, there is still of a scarcity of GST studies that explore the link between maltreatment and illicit substance use. In fact, the majority
of tests of GST on the victimization-delinquency link is heavily dominated with research on
general and/or violent victimization (Kaufman, 2009; Miller, Fagan, and Wright; 2014) and other
forms of victimization such as bullying (Cullen, Unnever, Hartman, Turner; Hay, Meldrum, and
Mann, 2010, Broidy and Agnew, 1997).

Although a vast number of GST articles were identified regarding the indirect and
direct relationships between strain, delinquency, and conditioning variables; maltreatment and
crime/delinquency; or strain and substance (all of which are included in the limitations section of
this study), only six articles were located that either directly examined the relationship between
maltreatment and substance use or the relationship between maltreatment, substance use, and
self-efficacy. Those empirical studies are detailed in the section below.

**GST Empirical Studies on the Substantive Topic**

*Maltreatment and Substance Use*

Lo, Kim, and Church II (2008) used multi-level hierarchical linear modeling
techniques to examine the impact of age-varying differences in three forms of victimization (i.e.,
sexual, and physical victimization and other victimization) on marijuana use and polysubstance
use. Their study found physical victimization had an effect on polydrug use, with polydrug use
remaining stable until age 16 and more frequent drug use among those 17 and older. Youth aged
16 and 17 who were victims of other victimization (non-sexual and non-physical) had less
frequent polydrug use. Similarly, youth who were victims of sexual victimization (women more
likely to be victims than men) were more likely to report frequent polydrug use. As predicted by
their hypothesis, marijuana use increased among adolescence, peaked at age 21, and declined
after early-adulthood. Hierarchical linear models, which included both substance use measures
and each of the three victimization measures, were statistically significant. This study focused on
adolescents and emerging adults and did not include alcohol use as an outcome measure nor emotional abuse and neglect in their victimization measures.

Carson, Sullivan, Cochran, and Lersch (2009) examined several GST propositions, including whether early victimization increases drug use frequency and reduces the age at first use. Using a national probability sample of 2,359 adolescents aged 12 to 17, Tobit regression analysis found support for their hypothesis that an increase in age at first sexual and physical assault leads to a decrease in the frequency of drug use. Moreover, early victimization was directly related to early drug use. Baron (2004) examined whether street youth that are victims of physical, sexual, or emotional abuse would be related to delinquency measures, including substance use. Findings reveal that emotional and sexual abuse was related to property, violent, and total crime, and physical abuse was related to total crime and property offending. None of the forms of maltreatment were successful at predicting drug use. This study did not evaluate the impact of maltreatment on alcohol use.

Solakoglu, Nicola, and Belshaw (2016) used international data from the “Youth in Europe” survey to explore the relationship between sexual abuse and delinquency outcomes, including smoking, drinking, drug use, and the role of mediating emotions. Logistic regression analyses revealed the experience of sexual abuse was statistically significant and positively related to all three measures of delinquency. The introduction of negative emotions did mediate the relationship between sexual abuse and two of the substance use measures. Specifically, higher levels of depression reduced the effect that sexual abuse has on smoking, anger reduced the effect that sexual abuse had on drinking; however, all relationships remained significant.

Sharp, Peck, and Hartsfield (2012) explored the individual and cumulative effects of strain on two forms of substance use, daily drug use and daily alcohol use, and the role of three
moderating variables, including self-efficacy, on the impact of strain. Using path analyses on data from the Oklahoma Study of Incarcerated Women and Their Children, the study found the experience of sexual abuse was related to drug abuse, physical abuse and physical neglect was directly related only to daily drug, however in the opposite direction predicted, and cumulative strain, which includes 10 measures of strain from adverse childhood experiences, were directly related to alcohol use. With respect to their moderating variables, self-efficacy, self-esteem, and antisocial attitudes, no GST support was found as these variables had no effect on either measure of substance use. This study was limited to only adult incarcerated women.

These studies taken together demonstrate the utility of GST to provide insight on the relationship between maltreatment, substance use, and self-efficacy and demonstrate the need for further GST analysis in this area given the dearth of empirical studies.

Limitations of the literature

After a thorough review of the GST literature regarding the relationship between victimization and delinquency, several limitations have been identified. One, tests of GST on the victimization-delinquency link are heavily dominated with research on general and/or violent victimization (Kaufman, 2009; Butler; 2010; Miller, Fagan, and Wright; 2014) and other forms of victimization such as bullying (Cullen, Unnever, Hartman, Turner, and Agnew, 2008; Hay, Meldrum, and Mann, 2010, Broidy and Agnew, 1997) rather than adolescent maltreatment. Second, GST tests of victimization-delinquency either underexplore substance use as a delinquency outcome, using offending or other forms of criminal involvement as the outcome variable (Watts and McNulty, 2013 Robertson and Walker, 2018; Mersky, Topitzes, Reynold; 2012) or do not include any measures of substance use at all (Bunch, Iratzoqui, Watts, 2018). Three of the studies that did explore the impact of strain on substance use did not include
maltreatment in their strain measures (Hoffman and Su, 1997; Gallupe and Baron, 2009; Eitle, Eitle, and Johnson-Jennings; 2013). Four, there is a scarcity of GST literature that tests the maltreatment-delinquency relationship using maltreatment exclusively as a source of strain. Instead, a number of studies incorporate this variable within a composite measure of strain only (Bao, Haas, and Pi, 2007; Manasse and Ganem, 2009; Moon and Morash; 2017; Sealock and Manasse; 2012; Robertson, Xu, and Stripling 2010). Five of the studies that focus exclusively on maltreatment, these studies fail to incorporate a comprehensive measure of maltreatment (Bunch, Iratzoqui, Watts; 2018; Watts and McNulty, 2013; Hollist, Hughes, Schaible, 2009); studies capture either one or two sources of maltreatment (sexual, emotional, or physical) but not all three (Watts and McNulty; 2013; Bunch, Iratzoqui, Watts; 2018). Sixth, there is a substantial lack of focus on the conditioning variable, self-efficacy (Bunch et.al, 2018; Johnson and Morris, 2008; Capowich et.al, 2001) and of the studies focusing on self-efficacy, maltreatment is not the strain of focus (Sealock and Manasse, 2012; Bao, Hass, and Pi, 2007; Jennings, Piquero, Gover, and Perez, 2009; Gallupe and Baron, 2009).

Finally, one of the greatest limitations is that GST tests of the maltreatment-delinquency relationship are primarily conducted on samples of offenders or youth in the general population (Hollist et.al., 2009; Bunch, Iratzoqui, Watts, 2018; Watts and McNulty; 2013; Sealock and Manasse; 2012; Sharp, Peck, Hartsfield, 2012) with no test of GST on a sample of clinical youth, a subset of the population that is inundated with histories of maltreatment. Studying youth in clinical samples may provide us with a better understanding of the strain-delinquency relationship as clinical youth may have higher reports of histories of maltreatment, and their substance use problems have been noted to exceed that of the general population. Furthermore, reports of maltreatment in the general population and other institutionalized
populations may be underreported due to confidentiality and safety issues. Clinicians of substance abuse treatment programs are trained to address difficult topics effectively, which may reduce underreporting, potentially providing a better sample to ascertain insight. In addition, maltreated youth in clinical settings are taught skills and everyday practical strategies to promote effective problem solving and reduce reliance on substances, making them an ideal population to test the utility of GST.

**Contribution of the Current Study**

Given the limitations of the literature, it is imperative that this phenomenon be further explored. This study seeks to gain more understanding of whether maltreatment contributes to an underexplored area of delinquency, adolescent substance use and whether self-efficacy can condition the maltreatment-substance use connection once maltreatment has occurred. This dissertation contributes to the current body of literature on GST by:

(1) presenting an empirical examination of the underexplored link between maltreatment, self-efficacy, and substance use, using a non-composite measure of strain and (2) assessing the utility of GST on a sample of clinical youth. Substance abuse treatment as an intervention has shown promising deterrence of adolescent delinquency and substance abuse which may, in part, be understood by the goal of substance abuse treatment. The goal of substance abuse treatment is to reduce substance use, substance-use disorders, and other co-occurring disorders of individuals and target the cognitive and interpersonal problems that sustain and encourage substance abuse and other life-disruptive items. Substance abuse treatment specifically aims to provide youth with the skill acquisition and confidence necessary to “strengthen cognitive control over behavior and [improve their ability] to regulate emotion in response to stressors” (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001:88) through a number of interventions.
that have proven to be effective. Suppose maltreatment influences delinquent behavior, and conditioning effects can mitigate negative consequences of maltreatment, altering the desire or need to use drugs and alcohol through enhancing one's coping resources (i.e., self-efficacy), as suggested by Agnew’s General Strain Theory. Findings from focusing on this subset of youth may help minimize maltreatment's influence on substance use and provide a missing theoretical link in the public health, psychology, and child-maltreatment domains. Moreover, findings may inform interventions and policies aimed at reducing delinquent behaviors that potentially present adolescents with an opportunity to live a higher quality of life, learn skills to navigate difficult changes, and break the vicious cycle.
Chapter 4: Research Methodology

Chapter 4 of this dissertation explicates the research methodology for the current exploratory study that addresses the relationship between adolescent maltreatment, self-efficacy, and adolescent substance use. Specifically, this research assesses the direct effects of two indicators of strain on two measures of substance use, along with the direct effect of self-efficacy on substance use, and additionally tests the extent to which baseline levels of self-efficacy attenuate the effect of maltreatment on subsequent adolescent substance use. This chapter begins with an overview of the secondary dataset to be used for the quantitative analysis and segues into the research hypotheses that are guided by Agnew’s General Strain Theory. Next, the chapter describes the measurements for the two dependent variables (i.e., marijuana use and alcohol use); the two independent variables (i.e., any adolescent maltreatment and cumulative adolescent maltreatment); the conditioning variable (i.e., self-efficacy); and the control variables. Details are later provided for the analytical strategy.

Data Source

As previously noted in Chapter 3, the research in this dissertation contribute to the current body of GST literature by exploring the direct effects of a history of any adolescent maltreatment, and the cumulative experience of adolescent maltreatment on juvenile delinquency, as well as assesses the role of self-efficacy as a predictor of delinquency and a moderator of the effect of maltreatment. The analyses are based on one of the largest national longitudinal datasets of adolescent substance use treatment available: The Global Appraisal of Individual Needs (GAIN) National Dataset. The GAIN National Dataset is a collection of pooled data that come from multisite studies funded by the Center for Substance Abuse Treatment, the National Institute on Alcohol Abuse and Alcoholism, the National Institute on Drug Abuse, the
Robert Wood Johnson Foundation, and the Interventions Foundation. The GAIN is a family of standardized comprehensive biopsychosocial clinical client data assessment tools designed to integrate research and clinical assessment into one semi-structured interview. The GAIN is comprised of eight core sections: Background and Treatment Arrangements, Substance Use (Alcohol, Marijuana and Other Drugs), Physical Health, Risk Behaviors and Disease Prevention, Mental and Emotional Health, Environment and Living Situation, Legal (Civil and Criminal), and Vocational (School, Work, Financial). It includes 99 scales and subscales to measure the recency, breadth, and frequency of problems and service utilization related to substance use. Relative to this research, the GAIN also includes scales that screen for trauma and victimization, which is designed to alert clinicians to conduct additional assessment and refer patients to specialized treatment (Dennis, Funk, Godley, Godley, and Waldron, 2004). For the purpose of this research, data will be extracted and analyzed from assessments utilized at substance abuse treatment intake, the GAIN-Initial (GAIN-I), and at 3-month follow-up using the GAIN M-90. The GAIN-I is a full biopsychosocial assessment designed for diagnosis, placement, individualized treatment planning, and program evaluation and characterizes baseline and pretreatment characteristics. The GAIN M-90 contains a subset of questions from the GAIN-I and is a quarterly follow-up used to assess how clients respond to treatment and to monitor post-discharge well-being following treatment. As noted by Chan, Dennis, & Funk (2008: 17), “all data were collected as part of general clinical practice or specific research studies under their respective voluntary consent procedures with identifiers subsequently encrypted for research analysis. All research studies were conducted under the supervision of the institutional review boards for their respective institution.” Secondary analysis of the GAIN data requires the data to be de-identified and kept confidential and for the user to sign data-sharing agreements and
submit a research proposal to the GAIN Coordinating Center team who will then evaluate the feasibility of the study and provide the pooled dataset upon approval and payment submission.

Procedure

Prior to the administration of the GAIN instruments, staff were required to be trained and certified by a GAIN developer or a local GAIN trainer. Licensed trained staff then interviewed and recorded participants’ information with the GAIN instrument as part of their treatment evaluation process using either paper and pencil instruments or the electronic online version using the GAIN ABS portal system. Instruments recorded via paper and pencil were required to be entered into the online GAIN ABS portal system within 7 days. Participation in the clinical research was voluntary and denial to participate did not result in lack of treatment. For adolescents who chose to participate, informed consent was required, and adolescents were notified of confidentiality rights and the ability to decline further participation, though follow-up participation was encouraged.

Hypotheses

In testing underlying tenets of Agnew’s GST, I examine 10 hypotheses that evaluate the predicted relationships among maltreatment (strain), self-efficacy (moderating factor), and substance abuse (delinquency). As noted earlier, GST asserts that the experience of noxious strain is associated with delinquent/deviant outcomes and responses to such strain may be moderated by positive coping resources. Guided by theory, 10 predictions are proposed below.

Relationship(s) between maltreatment and substance use

**Hypothesis 1:** A history of any adolescent maltreatment ($X_1$) will be positively related to the frequency of subsequent 90-day alcohol use ($Y_1$), net of control variables.
Hypothesis 2: A history of any adolescent maltreatment (X₁) will be positively related to the frequency of subsequent 90-day marijuana use (Y₂), net of control variables.

Hypothesis 3: Cumulative adolescent maltreatment (X₂) will be positively related to the frequency of subsequent 90-day alcohol use (Y₁), net of control variables.

Hypothesis 4: Cumulative adolescent maltreatment (X₂) will be positively related to the frequency of subsequent 90-day marijuana use (Y₂), net of control variables.

Relationships between self-efficacy and substance use

Hypothesis 5: Baseline self-efficacy (Z) will be negatively related to the frequency of subsequent 90-day alcohol use (Y₁), net of control variables.

Hypothesis 6: Baseline self-efficacy (Z) will be negatively related to the frequency of subsequent 90-day marijuana use (Y₂), net of control variables.

Moderation effects of self-efficacy on the relationship between maltreatment and substance use

Hypothesis 7: The positive effect of a history of any adolescent maltreatment (X₁) on the frequency of subsequent 90-day alcohol use (Y₁) will be attenuated by baseline self-efficacy (Z). As levels of self-efficacy increase, the impact of history of any adolescent maltreatment on past 90-day alcohol use will decrease.

Hypothesis 8: The positive effect of a history of any adolescent maltreatment (X₁) on the frequency of subsequent 90-day marijuana use (Y₂) will be attenuated by baseline self-efficacy (Z). As levels of self-efficacy increase, the impact of history of any adolescent maltreatment on past 90-day marijuana use will decrease.

Hypothesis 9: The positive effect of a history of cumulative adolescent maltreatment (X₂) on the frequency of subsequent 90-day alcohol use (Y₁) will be attenuated by baseline self-
efficacy (Z). As levels of self-efficacy increase, the impact of history of cumulative adolescent maltreatment on subsequent 90-day alcohol use will decrease.

**Hypothesis 10:** The positive effect of a history of cumulative adolescent maltreatment (X₂) on the frequency of subsequent 90-day marijuana use (Y₂) will be attenuated by baseline self-efficacy (Z). As levels of self-efficacy increase, the impact of history of cumulative adolescent maltreatment on subsequent 90-day marijuana use will decrease.

**Measurement of Variables**

The variables used to assess Agnew’s GST fall into four categories: strain, delinquency outcomes, positive coping resources, and control variables. The measures of the variables will be presented below.

**Independent Variables**

**Strain**

Strain, the presence of noxious or negative stimuli, will be conceptualized as two separate maltreatment variables: history of any adolescent maltreatment (X₁) and history of cumulative maltreatment (X₂).

*Any Adolescent maltreatment*

Four items will be used to create a dichotomous composite measure of strain called history of any adolescent maltreatment where 0 = “no” and 1 = “yes”. These items that measure adolescent maltreatment include “(a) has any one ever attacked you with a gun, knife, stick, bottle, or other weapon?”, (b) “ has any one ever hurt you by striking or beating you to the point that you had bruises, cuts, or broken bones or otherwise physically abused you?”, (c) “ has any one ever pressured or forced you to participate in sexual acts against your will, including your regular sex partner, a family member or friend?”, (d) “has any one ever abused you emotionally, that is, did
or said things to make you feel very bad about yourself or your life?”. This will be operationalized as a dummy variable whereby participants who answer “yes” to any of the items will be classified into the history of any adolescent maltreatment group and adolescents that answer no to all items will be classified into no history of any adolescent maltreatment group. This measure is collected at the baseline and will used to explore the effects of strain, specifically history of any adolescent maltreatment, on juvenile delinquency (i.e., 90-day alcohol use and 90-day marijuana use subsequent to the baseline measurement of maltreatment).

**Cumulative adolescent maltreatment**

The three items that measure cumulative adolescent maltreatment are the same as previously mentioned and are stated as follows: “(a) has any one ever attacked you with a gun, knife, stick, bottle, or other weapon?”, (b) “ has any one ever hurt you by striking or beating you to the point that you had bruises, cuts, or broken bones or otherwise physically abused you?”, (c) “ has any one ever pressured or forced you to participate in sexual acts against your will, including your regular sex partner, a family member or friend?”, (d) “has any one ever abused you emotionally, that is, did or said things to make you feel very bad about yourself or your life. Items a or b were combined into one to represent one form of maltreatment (physical) so that any experience of physical maltreatment would produce a single 1.

Adolescents that answer ‘no’ to all three items will be classified into the no maltreatment experiences group. On each of the three maltreatment items, adolescents that indicate they do not have that specific experience of maltreatment will be assigned a score of 0; adolescents that indicate any exposure to that specific experience maltreatment will be assigned a score of 1; thus, each item becomes a dummy variable. These scores will then be summed to create a cumulative adolescent maltreatment score ranging from 0 to 3, indicating the number of
forms of adolescent maltreatment experienced: ‘0’ indicates no experience of maltreatment, ‘1’ indicates an experience of 1 form of maltreatment, ‘2’ indicates an experience of 2 forms of maltreatment, and ‘3’ indicates an experience of 3 forms of maltreatment.

**Dependent Variables**

*Delinquency Measures*

Delinquency will be conceptualized with two dependent variables: subsequent- 90-day alcohol use \((Y_1)\) and subsequent 90-day marijuana use \((Y_2)\). *Alcohol use* will be measured using the item “During the past 90 days, on how many days have you used any kind of alcohol”. *Marijuana use* will be measured using the item “During the past 90 days, on how many days have you used marijuana, hashish, blunts, or THC?” This measure will be collected at the 90-day 3-month follow up period.

**Moderating Variable**

*Self-Efficacy*

The conditioning effect that is believed to attenuate the impact of strain on delinquency will be the moderating variable, Self-Efficacy \((Z)\). Self-efficacy, collected at baseline, is conceptualized as a composite measure, specifically an index, in the GAIN dataset. There are four items in the data that have been selected to measure self-efficacy: “Do you currently think you… (a) “could avoid using alcohol or other drugs at home?”; (b) “could avoid using alcohol or other drugs at work or school”; (c) “could avoid using alcohol or other drugs with your friends”; (d) “could avoid using alcohol or other drugs when people around you were using them?” Higher scores on the index reflect the individual’s level of confidence about resisting substance use in different situations, while lower scores suggest the need for assistance in daily living and/or a controlled environment.
The self-efficacy scale in the GAIN is a summative index that has a Cronbach alpha of .71 resulting in good internal consistency. Research that validates and/or utilizes GAIN’s self-efficacy variable, and conceptualizes it as such, has demonstrated this scale to be both reliable and predictive amongst this population and a range of other populations (Bollen & Lennox, 1991; Nunnally & Berstein, 1994). Thus, I will follow other research guidance and use the established measure. See research design below:

**Control Variables**

Given that empirical evidence has highlighted several variables that are associated with substance use and delinquency, this research will hold such variables constant to allow the relationship between adolescent maltreatment and substance use to be better understood. In alignment with other tests of GST, demographic and social environment control variables will be used in the statistical models. Nominal level variables with multiple categories will be transformed into dummy-coded variables. The following variables were available in the dataset:

*Age.* The respondent’s age is measured in years.
Gender. Gender, collected at baseline, is measured by the item “What is your gender?”. This will be a dummy coded variable labeled “gender” whereby 1 = “female” and 0 if otherwise. In anticipation of small n’s (less than 5) the categories “transgender (male to female)” and “transgender (female to male)” will be excluded from the analysis. For gender, “male” is the reference category.

Race. Race, collected at the baseline, is measured by the item “Which races, ethnicities, nationalities, or tribes best describe you?” This will be measured with a series of dummy variables: 1 if “Black/African American” and 0 if otherwise; 1 if “Hispanic” and 0 if otherwise; 1 = “Other” and 0 if otherwise; 1 if “Caucasian/White” and 0 if otherwise. White will be used as the reference category for the set of racial dummy variables.

Delinquent associations. Delinquent associations, collected at baseline, will be captured using two items: 1) “During the past 90 days, on how many days did other people use alcohol where you were living” and “during the past 90 days, on how many days did other people use drugs where you were living”.

Family history of substance use. Family history of substance use, collected at baseline, is measured by the item “Any family history of substance use”. This will be a dummy variable whereby 1 if “any history” and 0 if otherwise. No history of substance use will be the reference category.

Data Cleaning

Prior to analyses, data were cleaned by identifying and removing incomplete, inaccurate, or irrelevant data. Cases with missing values for all variables of interest were excluded from the final sample using listwise deletion which resulted in an analysis of cases where all observations have complete information.
Statistical Analyses

Data were cleaned and descriptive statistics were analyzed using the IBM Statistical Package for Social Sciences Statistics Version 21.0 (SPSS 21.0); advanced statistical techniques employed Stata Basic Edition (BE) Version 17.0. First, preliminary descriptive analysis was conducted. Frequency distributions, discussed in the next chapter, will report the relative and absolute frequencies for categorical variables, while summary tables for continuous measures will present the mean, standard deviation, minimum, and maximum, along with skewness values. Following the discussion of univariate descriptive statistics, I assess the fit of four models and compare the results of the Poisson Regression Model (PRM), Negative Binomial Regression Model (NBRM), Zero Inflated Poisson (ZIP) and Zero Inflated Negative Binomial (ZINB, and then the analysis turns to regression modeling. First, I conduct a preliminary analysis in which I estimated preliminary inflation models with a full model specification. I identified the variables that consistently exhibited significant effects predicting zero, then I conduct a final analysis and interpret the count models for the specification with only these included for the inflation stage. Hence, the inclusion of alcohol in the inflation stage for both alcohol and marijuana use, and the inclusion on history of family substance use. The dependent variables are measured as counts (reported substance use over a 90-day period). Accordingly, the primary regression analyses will entail zero- inflated negative binomial modeling, which is a variant of Poisson modeling, and is commonly used in the criminological literature when dependent variables are measured as counts.

The probabilities of counts with the Poisson regression model (PRM) are determined by a Poisson distribution, a family of distributions, where the mean of the distribution is a function of the independent variables (Long, 1997). According to Long (1997), an assumption of
this model requires that the conditional mean of the count outcome and the conditional variance be equal which is known as equidispersion. Though the PRM can and has been widely applied to count data analysis, in many cases, especially those that involve clinical data, equidispersion is not the reality as the conditional variance often exceeds the mean, resulting in overdispersion. Wagner et.al (2015:4) note “overdispersion is common and occurs when [case] variability results in data variance which is greater than that assumed by the distribution. Unaccounted for, overdispersion will result in incorrect predictions and will tend to overestimate standard errors increasing the type I error rate”. As stated previously, I analyzed data from the Global Appraisal of Individual Needs (GAIN), a family of standardized comprehensive biopsychosocial clinical client data assessment tools. The clinical treatment data is highly likely to violate the assumption of equidispersion; many respondents may report non-use during the treatment period resulting in a large proportion of zeros. This dissertation thus relies primarily on the negative binomial model to understand the direct effects of history of maltreatment on 90-day marijuana use and 90-day alcohol use and to evaluate the extent to which this relationship is attenuated by self-efficacy.

The negative binomial follows the Poisson distribution where the link function, which connects the mean response to the linear predictors, is a log link function in which the dependent variable is the natural log of the rate at which it occurs given the linear predictors. Generally, this can be represented by the following equation below:

\[ \ln(y_i) = \alpha + \beta_1\ln X_i + \beta_2\ln X_i + \ldots + \beta_k\ln X_i + \epsilon \quad \{i = 1,2,3,\ldots,n\} \]

where, generally, \( \ln \) represents the log, \( y \) represents the dependent variable, \( \beta \) represents the regression coefficients for each covariate, \( X \) represents the covariates in the model (i.e., independent variables, control variables, and interaction effects) and \( \epsilon \) represents the additional dispersion parameter.
Given that this is a non-linear model, for the purpose of this dissertation the model is exponentiated which provides us with an incidence ratio-rate (IRR) for ease of interpreting the regression coefficients (Hilbe, 2007). Exponentiation of the coefficients may be interpreted as the percentage change in the dependent variable for a one-unit change in the independent variables. The negative binomial regression models to represent each dependent variable separately are as follows:

**Any adolescent maltreatment (X₁)**

**Subsequent 90-day alcohol use (Y₁)**

(1) Model 1 presents the equation that represents the exploration between the dependent variable subsequent 90-day alcohol use (Y₁) and history of any adolescent maltreatment (X₁), net of control variables (β₄ – β₈).

\[
P(y₁|x, \epsilon) = \exp(\alpha + \beta₁\text{Any adolescent maltreatment} + \beta₄\text{Gender} + \beta₅\text{Race} + \beta₆\text{Age} + \beta₇\text{Family History of Substance Use} + \beta₈\text{Delinquent Associations} + \epsilon)
\]

(2) Model 2 presents the equation that represents the exploration between the dependent variable subsequent 90-day alcohol use (Y₁) and self-efficacy (Z), net of control variables (β₄ – β₈).

\[
P(y₁|x, \epsilon) = \exp(\alpha + \beta₃\text{Self-efficacy} + \beta₄\text{Gender} + \beta₅\text{Race} + \beta₆\text{Age} + \beta₇\text{Family History of Substance Use} + \beta₈\text{Delinquent Associations} + \epsilon)
\]

(3) Model 3 presents the equation that represents the exploration between the dependent variable subsequent 90-day alcohol use (Y₁), history of any adolescent maltreatment (X₁), and self-efficacy (Z), net of control variables (β₄ – β₈).

\[
P(y₁|x, \epsilon) = \exp(\alpha + \beta₁\text{Any adolescent maltreatment} + \beta₃\text{Self-efficacy} + \beta₄\text{Gender} + \beta₅\text{Race} + \beta₆\text{Age} + \beta₇\text{Family History of Substance Use} + \beta₈\text{Delinquent Associations} + \epsilon)
\]

(4) Model 4 presents the equation that represents the exploration between the dependent variable subsequent 90-day alcohol use (Y₁) and history of any adolescent maltreatment (X₁), and the interaction effect between any maltreatment and self-efficacy (β₉), net of control (β₄ – β₈).

\[
P(y₁|x, \epsilon) = \exp(\alpha + \beta₁\text{Any adolescent maltreatment} + \beta₃\text{Self-efficacy} + \beta₄\text{Gender} + \beta₅\text{Race} + \beta₆\text{Age} + \beta₇\text{Family History of Substance Use} + \beta₈\text{Delinquent Associations} + \beta₉\text{Self-efficacy*any maltreatment} + \epsilon)
\]
**Subsequent 90-day marijuana use (Y2)**

(1) Model 1 presents the equation that represents the exploration between the dependent variable subsequent 90-day marijuana use (Y2) and any adolescent maltreatment (X1), net of control variables (β4 – β8).

\[ P (y_2 | x, \epsilon) = \exp (\alpha + \beta_1 \text{Any adolescent maltreatment} + \beta_4 \text{Gender} + \beta_5 \text{Race} + \beta_6 \text{Age} + \beta_7 \text{Family History of Substance Use} + \beta_8 \text{Delinquent Associations} + \epsilon) \]

(2) Model 2 presents the equation that represents the exploration between the dependent variable subsequent 90-day marijuana use (Y2) and self-efficacy (Z), net of control variables (β4 – β8).

\[ P (y_2 | x, \epsilon) = \exp (\alpha + \beta_3 \text{Self-efficacy} + \beta_4 \text{Gender} + \beta_5 \text{Race} + \beta_6 \text{Age} + \beta_7 \text{Family History of Substance Use} + \beta_8 \text{Delinquent Associations} + \epsilon) \]

(3) Model 3 presents the equation that represents the exploration between the dependent variable subsequent 90-day marijuana use (Y2) and any adolescent maltreatment (X1), and self-efficacy (Z), net of controls (β4 – β8).

\[ P (y_2 | x, \epsilon) = \exp (\alpha + \beta_1 \text{Any adolescent maltreatment} + \beta_3 \text{Self-efficacy} + \beta_4 \text{Gender} + \beta_5 \text{Race} + \beta_6 \text{Age} + \beta_7 \text{Family History of Substance Use} + \beta_8 \text{Delinquent Associations} + \epsilon) \]

(4) Model 4 presents the equation that represents the exploration between the dependent variable subsequent 90-day marijuana use (Y2), history of any adolescent maltreatment (X1), and the interaction effect between any maltreatment and self-efficacy (β9), net of control (β4 – β8).

\[ P (y_2 | x, \epsilon) = \exp (\alpha + \beta_1 \text{Any adolescent maltreatment} + \beta_3 \text{Self-efficacy} + \beta_4 \text{Gender} + \beta_5 \text{Race} + \beta_6 \text{Age} + \beta_7 \text{Family History of Substance Use} + \beta_8 \text{Delinquent Associations} + \beta_9 \text{Self-efficacy} \ast \text{any maltreatment} + \epsilon) \]

**Cumulative maltreatment (X2)**

**Subsequent 90-day alcohol use (Y1)**

(1) Model 1 presents the equation that represents the exploration between the dependent variable subsequent 90-day alcohol use (Y1) and a history of cumulative adolescent maltreatment (X2), net of control variables (β4 – β8).

\[ P (y_1 | x, \epsilon) = \exp (\alpha + \beta_2 \text{History of cumulative adolescent maltreatment} + \beta_4 \text{Gender} + \beta_5 \text{Race} + \beta_6 \text{Age} + \beta_7 \text{Family History of Substance Use} + \beta_8 \text{Delinquent Associations} + \epsilon) \]
(2) Model 2 presents the equation that represents the exploration between the dependent variable subsequent 90-day alcohol use ($Y_1$) and self-efficacy ($Z$), net of control variables ($\beta_4 - \beta_8$).

\[ P(y_1|x, \epsilon) = \exp(\alpha + \beta_3 \text{Self-efficacy} + \beta_4 \text{Gender} + \beta_5 \text{Race} + \beta_6 \text{Age} + \beta_7 \text{Family History of Substance Use} + \beta_8 \text{Delinquent Associations} + \epsilon) \]

(3) Model 3 presents the equation that represents the exploration between the dependent variable subsequent 90-day alcohol use ($Y_1$), history of cumulative adolescent maltreatment ($X_2$), and self-efficacy ($Z$), net of control variables ($\beta_4 - \beta_8$).

\[ P(y_1|x, \epsilon) = \exp(\alpha + \beta_2 \text{History of cumulative adolescent maltreatment} + \beta_3 \text{Self-efficacy} + \beta_4 \text{Gender} + \beta_5 \text{Race} + \beta_6 \text{Age} + \beta_7 \text{Family History of Substance Use} + \beta_8 \text{Delinquent Associations} + \epsilon) \]

(4) Model 4 presents the equation that represents the exploration between the dependent variable subsequent 90-day alcohol use ($Y_1$), history of cumulative adolescent maltreatment ($X_2$) and the interaction effect between a history of cumulative adolescent maltreatment and self-efficacy ($\beta_1 \theta$), net of control variables ($\beta_4 - \beta_8$).

\[ P(y_1|x, \epsilon) = \exp(\alpha + \beta_2 \text{History of cumulative adolescent maltreatment} + \beta_3 \text{Self-efficacy} + \beta_4 \text{Gender} + \beta_5 \text{Race} + \beta_6 \text{Age} + \beta_7 \text{Family History of Substance Use} + \beta_8 \text{Delinquent Associations} + \beta_1 \theta \text{Self-efficacy*cumulative maltreatment} + \epsilon) \]

Subsequent 90-day marijuana use ($Y_2$)

(1) Model 1 presents the equation that represents the exploration between the dependent variable subsequent 90-day marijuana use ($Y_2$) and a history of cumulative adolescent maltreatment ($X_2$), net of control variables ($\beta_4 - \beta_8$).

\[ P(y_2|x, \epsilon) = \exp(\alpha + \beta_2 \text{History of cumulative adolescent maltreatment} + \beta_4 \text{Gender} + \beta_5 \text{Race} + \beta_6 \text{Age} + \beta_7 \text{Family History of Substance Use} + \beta_8 \text{Delinquent Associations} + \epsilon) \]

(2) Model 2 presents the equation that represents the exploration between the dependent variable subsequent 90-day marijuana use ($Y_2$) and self-efficacy ($Z$), net of control variables ($\beta_4 - \beta_8$).

\[ P(y_2|x, \epsilon) = \exp(\alpha + \beta_3 \text{Self-efficacy} + \beta_4 \text{Gender} + \beta_5 \text{Race} + \beta_6 \text{Age} + \beta_7 \text{Family History of Substance Use} + \beta_8 \text{Delinquent Associations} + \epsilon) \]

(3) Model 3 presents the equation that represents the exploration between the dependent variable subsequent 90-day marijuana use ($Y_2$), history of cumulative maltreatment ($X_2$), and self-efficacy ($Z$), net of control variables ($\beta_4 - \beta_8$).

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\[ P(y_2 | x, \epsilon) = \exp(\alpha + \beta_2 \text{History of cumulative adolescent maltreatment} + \beta_3 \text{Self-efficacy} + \beta_4 \text{Gender} + \beta_5 \text{Race} + \beta_6 \text{Age} + \beta_7 \text{Family History of Substance Use} + \beta_8 \text{Delinquent Associations} + \epsilon). \]

(4) Model 4 presents the equation that represents the exploration between the dependent variable subsequent 90-day marijuana use \((Y_2)\), history of cumulative adolescent maltreatment \((X_2)\) and the interaction effect between a history of cumulative adolescent maltreatment and self-efficacy \((\beta_{10})\), net of control variables \((\beta_4 - \beta_8)\).

\[ P(y_2 | x, \epsilon) = \exp(\alpha + \beta_2 \text{Cumulative adolescent maltreatment} + \beta_3 \text{Self-efficacy} + \beta_4 \text{Gender} + \beta_5 \text{Race} + \beta_6 \text{Age} + \beta_7 \text{Family History of Substance Use} + \beta_8 \text{Delinquent Associations} + \beta_{10} \text{Self-efficacy}^* \text{cumulative maltreatment} + \epsilon). \]

Further explorations

As expected, preliminary analyses reveal that relatively large proportions of respondents report no instances of either form of substance use over the 90-day assessment period (alcohol use = 56.3%; marijuana use = 54.4%). Model testing and fit statistics gave overall preference to the Zero-Inflated Negative Binomial.

Summary

In sum, this chapter has presented the methodology employed to investigate the relationship between adolescent maltreatment, self-efficacy, and adolescent substance use. The discussion has included a detailed description of the source of secondary data to be utilized, statement of the testable hypotheses, variable measurement as they relate to Agnew’s General Strain Theory, and a brief overview of the statistical procedures and models to be evaluated. I have proposed negative binomial distribution as the primary statistical technique and provided the rationale for this model. The following chapter (Chapter 5) will report the empirical results of the analytical strategy described above, beginning with an overview of the sample characteristics and descriptive statistics for the independent and dependent variables, followed by the regression modeling.
Chapter 5: Empirical Results

Chapter 5 of this dissertation presents the empirical results for the current study that explores the relationship between adolescent maltreatment, self-efficacy, and adolescent substance use. First, this chapter will discuss the univariate statistics which describes the characteristics of adolescents at baseline as well as the characteristics of adolescents at the 3-month follow-up. Second, it will present and detail the results from the zero-inflated negative binomial regression analyses for each of dependent variable (subsequent 90-day alcohol use and subsequent 90-day marijuana use) and the two independent maltreatment variables and, finally, will conclude with a summary. The final chapter, Chapter 6, will be the conclusion that discusses the theoretical implications, limitations of the current study, and the direction for future research.
UNIVARIATE STATISTICS

Table 1, Table 2, and Table 3 present the descriptive statistics of the variables at baseline (intake/entry to substance-use treatment services) and 3-month follow-up.

Table 1. Characteristics of Adolescents at Baseline (n=17541)

<table>
<thead>
<tr>
<th>Baseline Characteristics</th>
<th>n</th>
<th>%</th>
<th>min.</th>
<th>max.</th>
<th>mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>12,978</td>
<td>74</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>4,563</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17,541</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black/African American</td>
<td>2,670</td>
<td>15.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>5,219</td>
<td>29.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>3,204</td>
<td>18.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>6,448</td>
<td>36.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17,541</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family History of SU</td>
<td>12,515</td>
<td>71.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Family History SU</td>
<td>5,026</td>
<td>28.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17,541</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-efficacy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>1,873</td>
<td>10.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>4,819</td>
<td>26.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>11,269</td>
<td>62.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17,541</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (in years)</td>
<td>-</td>
<td>-</td>
<td>12.00</td>
<td>18.00</td>
<td>15.74</td>
<td>1.31</td>
</tr>
<tr>
<td>Alcohol Use (days)</td>
<td>-</td>
<td>-</td>
<td>0.00</td>
<td>90.00</td>
<td>13.38</td>
<td>27.10</td>
</tr>
<tr>
<td>Drug Use (days)</td>
<td>-</td>
<td>-</td>
<td>0.00</td>
<td>90.00</td>
<td>5.74</td>
<td>19.10</td>
</tr>
</tbody>
</table>

Table 1 presents the characteristics of adolescents at baseline/intake. The final sample for this study consists of 17,541 adolescents, ages 12 to 18 years old, receiving some form of substance-use treatment services; the mean age of adolescents is 15.7 years old. Data reveal there are more males than females receiving substance-use treatment services: 74% of the sample self-reported as male (n=12,978) and 26% self-reported as female (n=4,563). This sample of adolescents is racially/ethnically diverse, comprised of 37% White, 30%
Hispanic, 15% Black, and 18% reporting “other” which includes Native Americans/Alaskan Natives, Asian, Mixed Race/ethnicities, and those that reported any other race. Majority of the adolescents receiving substance-use treatment services, less than three-quarters of the sample (72.3%|n=12,515), reported a family of history substance use.

With respect to the last two sociodemographic control variables, delinquent associations, the average number of days an adolescent lived with persons who used alcohol during past 90-days is 13.38 days (sd 27.10 days) with a range of 0 days minimum and 90 days maximum; and the average number of days an adolescent lived with persons who used drugs during the past 90-days was far lower, at 5.74 days (sd 19.10 days). The range was 0 days minimum to 90 days maximum for this variable. For the moderating variable, self-efficacy, about 63 % of adolescents reported high levels of self-efficacy (n=11,269), while about 27% reported moderate levels, and 10% reported low levels.

This dissertation explores the impact of two key independent variables on substance use: history of adolescent maltreatment, and cumulative experiences of adolescent maltreatment.

Table 2. Maltreatment Characteristics of Adolescents at Baseline -Full Sample (n=17541)

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any history of adolescent maltreatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No history</td>
<td>7,651</td>
<td>43.6</td>
</tr>
<tr>
<td>History</td>
<td>9,890</td>
<td>56.4</td>
</tr>
<tr>
<td>Total</td>
<td>17,541</td>
<td>100%</td>
</tr>
<tr>
<td>Cumulative experiences of maltreatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 forms of maltreatment experienced</td>
<td>7,651</td>
<td>43.6</td>
</tr>
<tr>
<td>1 form of maltreatment experienced</td>
<td>6,490</td>
<td>37.0</td>
</tr>
<tr>
<td>2 forms of maltreatment experienced</td>
<td>2,713</td>
<td>15.5</td>
</tr>
<tr>
<td>3 forms of maltreatment experienced</td>
<td>687</td>
<td>3.9</td>
</tr>
<tr>
<td>Total</td>
<td>17,541</td>
<td>100%</td>
</tr>
</tbody>
</table>
Table 2 presents the maltreatment characteristics of adolescents at baseline/intake. 43.6% of adolescents reported no history of maltreatment (n=7,651); 56% percent of adolescents reported a history of adolescent maltreatment; 37% of adolescents experienced at least one form maltreatment, 15.5% of adolescents experienced two forms of maltreatment, and only 3.9% of adolescents experienced all three forms of maltreatment.

Next, I present the descriptive statistics for the two maladaptive coping strategies, which are the two dependent variables in this dissertation: subsequent 90-day alcohol use and subsequent 90-day marijuana use.

Table 3. Substance-Use Characteristics of Adolescents at 3-Month Follow-Up -Full Sample (n=17541)

<table>
<thead>
<tr>
<th></th>
<th>min.</th>
<th>max.</th>
<th>mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subs. 90-day Alcohol Use (# days)</td>
<td>0.00</td>
<td>90.00</td>
<td>3.71</td>
<td>9.36</td>
</tr>
<tr>
<td>Subs. 90-day Marijuana Use (# days)</td>
<td>0.00</td>
<td>90.00</td>
<td>10.50</td>
<td>21.32</td>
</tr>
</tbody>
</table>

Analysis reveals the average number of subsequent 90-day alcohol use is substantially lower than subsequent 90-day marijuana use. The mean number of subsequent 90-day alcohol use is 3.71 days (SD, 9.36 days) with a range of 0 days to 90 days. The mean number of subsequent 90-day marijuana use is 10.50 days for adolescents (SD, 21.32 days). Marijuana use may be perceived as safer than alcohol use with fewer mortality rates, no fatal overdoses, and less risk to the consumer which may be why it the most commonly used illicit substance.

MODEL ASSESSMENT AND FIT

As a useful place to begin, I compare the observed distributions of both dependent variables with a Poisson Distribution that has the same mean. I fit two univariate Poisson
distributions with a mean equal to that of my outcome variables: subsequent 90-day alcohol use and subsequent 90-day marijuana use. The results of the estimation of the parameters of the models are presented below:

**Table 4. Subsequent 90-day Alcohol Use Parameter Estimation**

| Subsequent 90-day alcohol use | Coefficient | Std. err. | z     | P>|z| | [95% conf. interval] |
|-------------------------------|-------------|-----------|-------|------|---------------------|
| cons                          | 1.311       | 0.004     | 334.560 | 0.000 | 1.304               | 1.319               |

$^\hat{\beta}_0 = 1.31$, $^\hat{\mu} = \exp(1.311) = 3.71$, which is the same as the estimated mean of subsequent 90-day alcohol use observed in the univariate statistics presented earlier.

**Table 5. Subsequent 90-day Marijuana Use Parameter Estimation**

| Subsequent 90-day marijuana use | Coefficient | Std. err. | z     | P>|z| | [95% conf. interval] |
|--------------------------------|-------------|-----------|-------|------|---------------------|
| cons                          | 2.352       | 0.002     | 1009.450 | 0.000 | 2.347               | 2.356               |

$^\hat{\beta}_0 = 2.352$, $^\hat{\mu} = \exp(2.253) = 10.51$, which is the same as the estimated mean of subsequent 90-day marijuana use observed in the univariate statistics earlier.

Next, I construct two graphs which compares the observed probabilities for each value of the count dependent variable with the predicted probabilities from fitting the Poisson distribution.
Figure 1. Observed VS. Predicted Probabilities for Subsequent 90-day Alcohol Use

Figure 2. Observed VS. Predicted Probabilities for Subsequent 90-day Marijuana Use

Figure 1 shows that the fitted Poisson distribution (in red) underpredicts 0's, 1's, 2's and 3's and over predicts counts 6-17 for the dependent variable subsequent 90-day alcohol use; the graph converges after this point. This pattern of overprediction and underprediction is a characteristic of fitting a count model that does not consider heterogeneity among sample members in their subsequent 90-day alcohol use; fitting the Poisson distribution assumes that all
youth receiving substance abuse treatment services have the same rate of subsequent 90-day alcohol use, which is unrealistic. The same can be concluded from Figure 2 that compares the observed and predicted probabilities for Subsequent 90-day Marijuana use. Given the results of these two graphs, I go on to assess the fit of four models and compare the results of the Poisson Regression Model (PRM), Negative Binomial Regression Model (NBRM), Zero Inflated Poisson (ZIP) and Zero Inflated Negative Binomial (ZINB). This allows me to visually see the best fitting model for the data. I begin with the assessment for the history of adolescent maltreatment and subsequent 90-day alcohol use.

*History of any Adolescent Maltreatment and Subsequent 90-day Alcohol Use*

**Figure 3. History of any Adolescent Maltreatment and Subsequent 90-day Alcohol Use**

**Model Fit Graph**
As demonstrated in Figure 3, points above 0 on the y-axis indicate more observed counts than predicted; those below 0 indicate more predicted counts than observed. The graph shows that only the PRM and ZIP has a problem predicting the average number of 0's. The ZIP does less well, predicting too many 1s, 2s, and 3s and too few 5s to 10s. The NBRM and ZINB do about equally well. Since both the NBRM and ZINB seem substantively reasonable, but are mathematically different, I employ the countfit function in Stata to help make a final determination for the most appropriate model.

**Figure 4. NBRM and ZINB Residual Plots**

![Residual Plots](image)

Figure 4 plots the residuals from the tested two models for subsequent 90-day alcohol use at 3-month follow-up. Small residuals indicate good-fitting models; based on the graph above, both models perform similarly for counts greater than two, and both differ from the actual values and each other at zero, one, and two counts. Since both the NBRM and ZINB seem substantively reasonable, but are mathematically different, I employ the countfit function in Stata.
to assess the best model for the data. While there are numerous outputs and ways to assess fit based on these outputs, Hilbe (2007) suggests utilizing the AIC and BIC for final model assessment, thus, only those output will be presented.

**Table 6. ZINB and NBRM Countfit Statistic Comparison**

<table>
<thead>
<tr>
<th>Tests and Fit Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBRM</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>vs ZINB</td>
</tr>
<tr>
<td>AIC= 67507.703</td>
</tr>
<tr>
<td>Vuong= .</td>
</tr>
</tbody>
</table>

In Table 6, the tested models are compared to each other head-to-head using the tests appropriate to each comparison. Each line can be boiled down to the last three columns. They suggest which model is preferred by the given comparison and the strength of the evidence supporting this preference. When we compare our two models using the BIC and AIC the zero-inflated negative binomial model is preferred over the negative binomial; these statistics are smaller.

*History of any Adolescent Maltreatment and Subsequent 90-day Marijuana Use*

Next, I conduct the necessary test for the history of adolescent maltreatment and subsequent 90-day marijuana use.
The graph shows that only the PRM and ZIP has a problem predicting the average number of 0's. The ZIP does less well, predicting too many 1s, 2s, 3s, 4s and 5s while the PRM predicts too few 4s to 15s. The NBRM and ZINB do about equally well. Following the aforementioned logic, I employ another test to determine the best fitting model.

**Figure 6. NBRM and ZINB Residual Plots**

Figure 6 plots the residuals from the two tested models for subsequent 90-day marijuana use at 3-month follow-up. Small residuals indicate good-fitting models. Based on the graph above, both
models perform similarly for counts greater than five, and both differ from the actual values and each other at zero, one, two, and three counts.

Table 7. ZINB and NBRM Countfit Statistic Comparison

Tests and Fit Statistics

<table>
<thead>
<tr>
<th>NBRM</th>
<th>BIC= 87367.052</th>
<th>AIC= 87281.556</th>
<th>Prefer Over Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>vs ZINB</td>
<td>BIC= 86642.416</td>
<td>AIC= 86479.198</td>
<td>ZINB     _ NBRM Very strong</td>
</tr>
<tr>
<td></td>
<td>dif= 724.636</td>
<td>_ 802.359</td>
<td>NBRM     _ ZINB</td>
</tr>
<tr>
<td></td>
<td>Vuong= . prob= .</td>
<td>_ ZINB     _ NBRM p= .</td>
<td></td>
</tr>
</tbody>
</table>

When we compare our two models using the BIC and AIC, zero-inflated negative binomial model is preferred over the negative binomial. Thus, these model fit statistics support what we have seen in the model residuals. To analyze the relationship between the first main independent variable, history of any adolescent maltreatment, and the two substance use dependent variables, the zero-inflated negative binomial regression will be utilized and presented. To assess the best model fit between the final two main independent variables, cumulative experience of maltreatment and type of maltreatment experienced, and the two substance use dependent variables, I follow the same series of test. This paper has already constructed the two graphs which compares the observed probabilities for each value of the count dependent variable with the predicted probabilities from fitting the Poisson distribution, thus, it would be redundant to do so. From this point forward, this paper will only produce the necessary graphs and statistics for determining the best regression analysis to employ.
Cumulative Experience of Adolescent Maltreatment and Subsequent 90-day Alcohol Use

Figure 7. Cumulative Experience of Adolescent Maltreatment and Subsequent 90-day Alcohol Use Model Fit Graph

Like the prior figures, Figure 7 shows that only the PRM and ZIP have a problem predicting the average number of 0's. The NBRM and ZINB do about equally well.

Figure 8. NBRM and ZINB Residual Plots

Note: positive deviations show underpredictions.
Figure 8 reveals both models perform similarly for counts greater than two, and both differ from the actual values and each other at zero, one, and two counts.

**Table 8. ZINB and NBRM Countfit Statistic Comparison**

<table>
<thead>
<tr>
<th>NBEM</th>
<th>BIC= 68260.716</th>
<th>AIC= 68175.221</th>
<th>Prefer</th>
<th>Over</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>vs ZINB</td>
<td>BIC= 67676.430</td>
<td>AIC= 67513.211</td>
<td>dif= 584.286</td>
<td>ZINB</td>
<td>NBRM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Vuong= .</td>
<td>prob= .</td>
<td>ZINB</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p=</td>
</tr>
</tbody>
</table>

Comparing our two models using the BIC and AIC the zero-inflated negative binomial model is preferred over the negative binomial.

*Cumulative Experience of Adolescent Maltreatment and Subsequent 90-day Marijuana Use*

**Figure 9. Cumulative Experience of Adolescent Maltreatment and Subsequent 90-day Alcohol Use Model Fit Graph**
Similar to the prior results, Figure 9 shows that only the PRM and ZIP has a problem predicting the average number of 0's. The PRM does less well. The NBRM and ZINB do about equally well.

**Figure 10. NBRM and ZINB Residual Plots**

![Residual Plots](image)

Based on Figure 10, both models perform similarly for counts greater than five, and both differ from the actual values and each other at zero, one, two, and three counts.

**Table 9. ZINB and NBRM Countfit Statistic Comparison**

<table>
<thead>
<tr>
<th></th>
<th>BIC</th>
<th>AIC</th>
<th>Prefer</th>
<th>Over</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBRM</td>
<td>87365.863</td>
<td>87280.368</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vs ZINB</td>
<td>86646.447</td>
<td>86483.228</td>
<td>719.416</td>
<td>ZINB</td>
<td>NBRM Very strong</td>
</tr>
<tr>
<td></td>
<td>dif=</td>
<td>dif=</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>797.139</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When we compare our two models using the BIC and AIC from Table 9, we see the zero-inflated negative binomial model is preferred over the negative binomial. Similar to our other models, we will use ZINB regression to analyze the relationship.
Given the outcome of model fit and testing, all relationships explored will utilize the ZINB regression.

As a brief overview and for the purposes of understanding the results I provide background about ZINB models and the parameter estimation and interpretation. The ZINB regression models two separate processes which produces two sets of coefficients, one for each latent group, or for the type of zeros that exist in the model. The first set of coefficients are for the count part of the model and the second set is for the logistic part of the model. The count model contains all of the theoretical variables that form the basis of the predicted relationships and contain random (false) zeroes. The binary part of the model contains variables that contain information that contributes to excess zeroes which are called structural (true) zeroes (Yang, Harlow, Puggiono, and Redding, 2017; Beaujean and Grant, 2016). As it pertains to this research, respondents in the first latent group are those who do use the specific substance (i.e., subsequent 90-day alcohol use) but did not use in the specified period, these are called “random zeros” and are the counts that we are focused on predicting in this research. Respondents in the second latent group are those who have never used the specific substance and fall into the “structural zeroes”.

For the purposes of this dissertation, I focus solely on the count portion of the model but reports the results of both sets of coefficients. All tables report the unstandardized coefficients and their standard errors, along with the standardized coefficients used for interpretation. Results will be interpreted using the ‘inherent multiplicative nature of the variables relationship to examine the percent change in the expected change in the expected counts’ (Beaujean and Grant, 2016:5). Consistent with other research I utilize this method as it is the preferred and easiest method to relay results to the lay audience (Long and Freese, 2006;
Beaujean and Grant, 2016). For categorical variables, coefficients can be interpreted as “having a specific characteristic on the X variable changes the count dependent variable by 100 x (e^b-1) %, holding other variables constant.” For count variables, coefficients can be interpreted as “a one-unit change in X increases the count dependent variable by 100 x (e^b-1) %, holding other variables constant”. The binary portion of the model predicts the odds of being in the structural zero group for adolescents with specific characteristics which are outside of the scope of this dissertation.

In testing underlying tenets of Agnew’s GST, I examine 10 hypotheses to evaluate the predicted relationships among adolescent maltreatment (strain), self-efficacy (moderating factor), and substance abuse (delinquency). This research examines the direct effects of strain on delinquency utilizing two measures of delinquency, subsequent 90-day alcohol use and subsequent 90-day marijuana use; and two measures of strain: history of any adolescent maltreatment, and cumulative experiences of maltreatment. This dissertation research also assesses the direct relationship between each measure of delinquency and the coping mechanism, self-efficacy and, also seeks to determine whether self-efficacy moderates the relationship between maltreatment and subsequent 90-day substance use. First, I assess the baseline relationship between the each of the dependent delinquency measure and the control variables (Table 10). Next, for each regression analysis, I explore 4 models that are specific to the said variables. Though the substantive areas differ, each table follows the same format.

Model 1 represents the exploration between the dependent delinquency variable and measure of strain, net of control variables. Model 2 represents the exploration between the dependent delinquency variable and the adolescent’s coping mechanism, net of control variables. Model 3 represents the exploration between the dependent delinquency measure, strain measure,
and coping mechanism, net of control variables and is the main effects model; finally, model 4 represents the exploration between the dependent delinquency variable, strain measure, and the interaction effect between the measure of strain and coping, net of controls.

**REGRESSION ANALYSES: ZERO-INFLATED NEGATIVE BINOMIAL**

Prior to assessing any direct or indirect relationships, I establish a baseline relationship between both dependent variables: subsequent 90-day alcohol use (Y₁) and subsequent 90-day marijuana use (Y₂) the control variables (β₄ – β₈). These established baselines are presented in Table 11. The controls are demographic, background characteristics, and learning theory variables which are standard controls in criminology literature. By establishing a baseline relationship with control variables prior to entering the main independent variables and moderating variables, I limit their influence on the outcome and help better establish a causal relationship solely between strain (e.g., adolescent maltreatment) and delinquency (e.g., subsequent 90-day marijuana use) and delinquency and coping (e.g., self-efficacy). Status of control variables significance across models 1-4 will also be discussed within the next section.
Table 10. Theoretical Controls and Subsequent 90-day Substance Use

<table>
<thead>
<tr>
<th>Count Equation</th>
<th>Subsequent 90-day Alcohol Use</th>
<th>Subsequent 90-day Marijuana Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>S.E.</td>
</tr>
<tr>
<td>Female</td>
<td>-0.080 *</td>
<td>(0.040)</td>
</tr>
<tr>
<td>Black/African American</td>
<td>-0.382 ***</td>
<td>(0.056)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.259 ***</td>
<td>(0.043)</td>
</tr>
<tr>
<td>Other</td>
<td>0.056</td>
<td>(0.049)</td>
</tr>
<tr>
<td>Family History of Substance Use</td>
<td>0.237 ***</td>
<td>(0.043)</td>
</tr>
<tr>
<td>Age (in years)</td>
<td>0.187 ***</td>
<td>(0.014)</td>
</tr>
<tr>
<td># of days person lived with persons who used alcohol during past 90-days</td>
<td>0.002 **</td>
<td>(0.001)</td>
</tr>
<tr>
<td># of days person lived with persons who used drugs during past 90-days</td>
<td>0.004 ***</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.78***</td>
<td>(0.228)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Binary Equation</th>
<th>Subsequent 90-day Alcohol Use</th>
<th>Subsequent 90-day Marijuana Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family History of Substance Use</td>
<td>-0.784***</td>
<td>(0.120)</td>
</tr>
<tr>
<td># of days person lived with persons who used alcohol during past 90-days</td>
<td>-1.739</td>
<td>(0.899)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.727***</td>
<td>(0.089)</td>
</tr>
</tbody>
</table>

N (Total) 17541 17541
Theoretical Control and Subsequent 90-day Alcohol Use

Baseline coefficients in Table 10 indicate being female (-7.7%) and being black (-31.8%) decreases the estimated average number of days of subsequent 90-day alcohol use while being Hispanic (29.6%), having a family history of substance use (26.8%) being of older age (20.5%), and having more days living with delinquent associations (living with person who use drugs [0.2%] or living with person who use alcohol during the past 90-days [0.4%]) increases the estimated average number of days of subsequent 90-day alcohol use. Most of the control variables were statistically significant except for the race category ‘other’.

Theoretical Controls and Subsequent 90-day Marijuana Use

Coefficients in Table 10 indicate being female (-22.4%) decreases the estimated average number of days of subsequent 90-day marijuana use, while being Black (15.8%), being Hispanic (33.8%), having a family history of substance use (14.8%), being of older age (4.4%), and living with person who use drugs [0.6%] increase the estimated average number of days of subsequent 90-day marijuana use. For the controls only model (see Table 10) the results demonstrate support for most of the theoretical control variables except for the “Other” race category and living with persons who use alcohol during the past 90-days. However, for this indicator of delinquent coping, the “other” race category becomes statistically significant in Model 2 (see Tables 12).

I next run a series of ZINB regression models to assess: (1) the effects of strain on delinquency without self-efficacy in the model; (2) the effects of self-efficacy on delinquency without strain in the model; (3) the effects of strain and self-efficacy on delinquency with both theorized predictors in the model; and (4) the effects of the (strain*self-efficacy) interaction on delinquency. Findings from these analyses are presented below.
History of Any Adolescent Maltreatment and Substance Use

Compared to non-maltreated youth, having a history of adolescent maltreatment increases the expected average number of days of subsequent 90-day alcohol use by 48.3% (p <.001), holding other variables constant (see Table 11, Model 1). As predicted, this indicator of strain (e.g., history of any adolescent maltreatment) has a significant positive effect on the frequency of subsequent 90-day alcohol use, net of control variables. Thus, hypothesis 1 is supported.

Compared to non-maltreated youth, having a history of adolescent maltreatment increases the expected average number of days of subsequent 90-day marijuana use by 28.5% (p <.001) holding other variables constant (see Table 12, Model 1). As predicted, a history of any adolescent maltreatment has a significant positive effect on the frequency of subsequent 90-day marijuana use, net of control variables. Thus, hypothesis 2 is supported. Results seem to suggest having a history of any maltreatment results in a greater average number of subsequent 90-day alcohol use than marijuana use for this population.

Model 2 (see Tables 11 &13) reveals that the effect of self-efficacy is statistically significant. As predicted, baseline self-efficacy has a significant negative effect on the frequency of subsequent 90-day alcohol use, net of control variables. Thus, hypothesis 5 is supported. For each one “level” increase in self-efficacy, the expected average number of days of subsequent 90-day alcohol use decreases by 29.5% (p.<.001) holding control variables constant.

Model 2 (see Tables 12 & 14) demonstrates support for hypothesis 6. As predicted, baseline self-efficacy has a significant negative effect on the frequency of subsequent 90-day marijuana use, net of control variables. For each one “level” increase in self-efficacy, the expected average number of days of subsequent 90-day marijuana use decreases by 30% (p.<.001) holding all variables constant.
Model 3 (Table 11 & 12) addresses the main effects of both any history of maltreatment and self-efficacy on subsequent 90-day substance use, net of control variables. Results from Table 11 (Model 3) indicate, compared to non-maltreated youth, having a history of adolescent maltreatment increases the expected average number of days of subsequent 90-day alcohol use by 40.6% (p <.001), holding other variables constant; these coefficients are slightly reduced from Model 1 (difference of 7.7 percentage points) and remain statistically significant. Each “1 level” increase in self-efficacy decreases the expected average number of days of subsequent 90-day alcohol use by 27.6% (p <.001), net of control variables; the magnitude of this effect decreased 1.9 percentage points from Model 2. With respect to the controls, the coefficients remain consistent and statistically significant.

Table 12 (Model 3) indicates when we add both predictors to the model, compared to non-maltreated youth, having a history of adolescent maltreatment increases the expected average number of days of subsequent 90-day marijuana use by 22.7% (p <.001), holding other variables constant; these coefficients are slightly reduced from Model 1 (difference of 5.8 percentage points) and remain statistically significant. Each “1 level” increase in self-efficacy decreases the expected average number of days of subsequent 90-day marijuana use by 29.1% (p <.001), net of control variables; the magnitude of this effect is roughly the same as Model 2. With respect to the controls, family history of substance use is no longer significant for Models 1-4 and delinquent associations (alcohol use) is not significant in any of the models.

Cumulative Experiences of Adolescent Maltreatment and Substance Use

---

1 Model 2 is the same specification as that previously presented in analyses with any maltreatment. The statistical results are reproduced in the tables with cumulative maltreatment as the strain indicator for the convenience of the reader.
Results from Table 13, Model 1 reveal a one unit increase in the number of cumulative experiences of maltreatment increases the expected average number of days of subsequent 90-day alcohol use by 20.6% (p < .01), holding other variables constant. Results from Table 14, Model 1 reveal a one unit increase in the number of cumulative experiences of maltreatment increases the expected average number of days of subsequent 90-day marijuana use by 13.9% (p < .001), holding other variables constant. Overall, there is support for proposed hypothesis 3 and 4. As predicted, a history of cumulative adolescent maltreatment has a significant positive effect on the frequency of subsequent 90-day alcohol use, net of control variables and a history of cumulative adolescent maltreatment has a significant positive effect on the frequency of subsequent 90-day marijuana use, net of control variables.

Model 3 (Table 13 & 15) addresses the main effects of cumulative experience of adolescent maltreatment and self-efficacy on subsequent 90-day substance use, net of control variables. Results from Table 13 (Model 3) indicate, after adding both predictors to the model, a one unit increase in the number of cumulative experiences of maltreatment increases the expected average number of days of subsequent 90-day alcohol use by 16% (p < .001), holding other variables constant and a one level increase in self-efficacy decreases the expected average number of days of subsequent 90-day alcohol use by 27.9% (p < .001), holding other variables constant. Controls are similar in magnitude and remain statistically significant.

Table 14 (Model 3) indicate, after adding both predictors to the model, a one unit increase in the number of cumulative experiences of maltreatment increases the expected average number of days of subsequent 90-day marijuana use by 10% (p < .001), holding other variables constant (3 percentage points down from Model 1) and a one level increase in self-efficacy decreases the
expected average number of days of 90-day marijuana use by 29.1% (p < .001), holding other variables constant. Controls are similar in magnitude and remain statistically significant.

*Moderating effects of coping on the relationship between strain and delinquency*

Model 4 in tables 11-14 represents the full model, including theoretical controls, the strain measure for maltreatment, the coping resource, self-efficacy, the delinquency variable (e.g., subsequent 90-day alcohol use) and finally, includes an interaction term that is specific to the indicators of strain. Hypothesis 7-10 explicate the proposed predictions between each measure of strain, self-efficacy, and their respective effect on both measures of delinquency. This dissertation research predicted the positive effect of indicators of strains (e.g., any history of maltreatment, cumulative maltreatment, and maltreatment type) on the frequency of 90-day substance use (e.g., subsequent 90-day alcohol use and subsequent 90-day marijuana use) would be attenuated by baseline self-efficacy. That is, as levels as of self-efficacy increase, the impact of adolescent maltreatment on past 90-day substance use will decrease. Contrary to expectations, the interaction terms are not significant.

While theoretically derived predictions indicate that the interaction term should be in the model, the interaction term is shown to be unimportant. These results make the main effects model (Model 3) discussed above, the best model of this dissertation research.
Table 11. Zero-Inflated Negative Binomial Regression for Frequency of Subsequent 90-day Alcohol Use and History of Any Adolescent Maltreatment

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b (S.E.)</td>
<td>%</td>
<td>b (S.E.)</td>
<td>%</td>
</tr>
<tr>
<td>Female</td>
<td>-0.083</td>
<td>-8.0</td>
<td>-0.156</td>
<td>-14.5</td>
</tr>
<tr>
<td></td>
<td>(0.040)</td>
<td></td>
<td>(0.040)</td>
<td></td>
</tr>
<tr>
<td>Black/African</td>
<td>-0.382</td>
<td>-29.6</td>
<td>-0.358</td>
<td>-30.1</td>
</tr>
<tr>
<td>American</td>
<td>(0.056)</td>
<td></td>
<td>(0.055)</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.223</td>
<td>24.9</td>
<td>0.219</td>
<td>24.5</td>
</tr>
<tr>
<td></td>
<td>(0.043)</td>
<td></td>
<td>(0.043)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>0.024</td>
<td>2.4</td>
<td>0.057</td>
<td>5.8</td>
</tr>
<tr>
<td></td>
<td>(0.049)</td>
<td></td>
<td>(0.049)</td>
<td></td>
</tr>
<tr>
<td>Family History of</td>
<td>0.177</td>
<td>19.3</td>
<td>0.171</td>
<td>18.6</td>
</tr>
<tr>
<td>Substance Use</td>
<td>(0.043)</td>
<td></td>
<td>(0.043)</td>
<td></td>
</tr>
<tr>
<td>Age (in years)</td>
<td>0.183</td>
<td>20.1</td>
<td>0.199</td>
<td>22.0</td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
<td></td>
<td>(0.014)</td>
<td></td>
</tr>
<tr>
<td>Delinquent</td>
<td>0.002</td>
<td>0.2</td>
<td>0.002</td>
<td>0.2</td>
</tr>
<tr>
<td>Associations- AU</td>
<td>(0.001)</td>
<td></td>
<td>(0.001)</td>
<td></td>
</tr>
<tr>
<td>(days)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delinquent</td>
<td>0.004</td>
<td>0.4</td>
<td>0.003</td>
<td>0.3</td>
</tr>
<tr>
<td>Associations- DU</td>
<td>(0.001)</td>
<td></td>
<td>(0.001)</td>
<td></td>
</tr>
<tr>
<td>(days)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of Any</td>
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<td>48.3</td>
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Binary Equations

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**Notes:**
- *p < 0.10
- **p < 0.05
- ***p < 0.01
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<td>(0.092)</td>
<td>-51.2</td>
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***p<.001, ** p<.01, *p<.05
### Table 12. Zero-Inflated Negative Binomial Regression for Frequency of Subsequent 90-day Marijuana Use and History of Any Adolescent Maltreatment

#### Count Equation

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<td>0.0</td>
<td>0.000</td>
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#### Binary Equation: Factor Change in Odds of Always 0

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*** p<.001, ** p<.01, *p<.05
Table 13. Zero-Inflated Negative Binomial Regression for Frequency of Subsequent 90-day Alcohol Use and Cumulative Experience of Adolescent Maltreatment

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<td>-0.349*** (0.026)</td>
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<td>Self-efficacy*Cumulative Experience Adol Malt. (product)</td>
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Binary Equation: Factor Change in Odds of Always 0

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***p<.001, ** p<.01, *p<.05
Table 14. Zero-Inflated Negative Binomial Regression for Frequency of Subsequent 90-day Marijuana Use and Cumulative Experience of Adolescent Maltreatment

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</tr>
<tr>
<td>Female</td>
<td>-0.305*** (0.043)</td>
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<td>-0.329*** (0.042)</td>
<td>-28.0</td>
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<tr>
<td>Black/African American</td>
<td>0.164** (0.056)</td>
<td>17.9</td>
<td>0.197*** (0.056)</td>
<td>21.7</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.292*** (0.045)</td>
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<td>Age (in years)</td>
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<td>Delinquent Assoc.-Alcohol (# of days lived with person using)</td>
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<td>Count of Cumulative Experiences of Adolescent Maltreatment (predictor)</td>
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<td>Self-efficacy*Cumulative Experience Adolescent Maltreatment (product)</td>
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<td>b</td>
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<td></td>
<td>(S.E.)</td>
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<tr>
<td>Family History of Substance Use</td>
<td>-0.387*** (0.043)</td>
<td>-32.1</td>
<td>-0.401*** (0.043)</td>
<td>-33.0</td>
</tr>
<tr>
<td></td>
<td>(0.057)</td>
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<tr>
<td>Delinquent Assoc.-Alcohol</td>
<td>-0.006</td>
<td>-0.007</td>
<td>-0.007</td>
<td>-0.007</td>
</tr>
<tr>
<td>(# of days lived with person using)</td>
<td>*** (0.001)</td>
<td>*** (0.001)</td>
<td>*** (0.001)</td>
<td>*** (0.001)</td>
</tr>
<tr>
<td>Constant</td>
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<td>-0.377</td>
<td>-0.383</td>
<td>-0.381</td>
</tr>
<tr>
<td></td>
<td>*** (0.067)</td>
<td>*** (0.068)</td>
<td>*** (0.069)</td>
<td>*** (0.068)</td>
</tr>
<tr>
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<td>17541</td>
<td>17541</td>
<td>17541</td>
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</table>

***p<.001, **p<.01, *p<.05
Chapter 6: Conclusion

The purpose of this chapter is to explicate the main goal of this study, and the importance of this study by highlighting the contributions to the literature and how this dissertation seeks to fill in the gaps of prior empirical research. Chapter 6 will also provide a brief overview of the findings and their theoretical implications, discussing whether there is support for tenets of Agnew’s General Strain Theory, and additionally, will present ideas for avenues for future research, and the limitations of this study.
This goal of this dissertation research was to present an empirical examination of the underexplored link between maltreatment, self-efficacy, and substance use, using two measures of strain and assess the utility of GST on a sample of clinical youth. Specifically, this research assesses the direct effects of the two indicators of strain on two measures of substance use, along with the direct effect of self-efficacy on substance use, and additionally tests the extent to which baseline levels of self-efficacy attenuate the effect of maltreatment on subsequent adolescent substance use.

**Contributions to the literature**

Despite having a theoretical framework that supports the exploration of the indirect and direct relationships between maltreatment and delinquency, there is still a scarcity of GST studies that explore the link between maltreatment and illicit substance use. The present dissertation research advances the literature on GST and the field of criminology by focusing on an underexplored form of victimization, adolescent maltreatment, that is successful in predicting substance use. Recall, the majority of tests of GST on the victimization-delinquency link are heavily dominated with research on general and/or violent victimization (Kaufman, 2009; Miller, Fagan, and Wright, 2014) and other forms of victimization such as bullying (Cullen, Unnever, Hartman, Turner; Hay, Meldrum, and Mann, 2010, Broidy and Agnew, 1997). Furthermore, this study examines two indicators of strain and two forms of substance use to provide a clearer picture of the types of strain that influence the most common substance-use behaviors, especially given that prior studies have been limited in either the measures of substance use (Baron, 2004) or the types of abuse included in their indicators of strain (Lo, Kim, Church, 2008). Moreover, prior GST research supports the role of conditioning factors on the strain-delinquency relationship, overall, conclusions are mixed and research between maltreatment, substance use,
and conditioning variables is limited. This research seeks to fill those gaps in research by assessing the role of self-efficacy, as a conditioning factor, on the relationship between the phenomena of interest. Finally, prior GST tests of the maltreatment-delinquency relationship are primarily conducted on samples of offenders or youth in the general population (Hollist et al., 2009; Bunch, Iratzoqui, Watts, 2018; Watts and McNulty; 2013; Sealock and Manasse; 2012; Sharp, Peck, Hartsfield, 2012) which limits applicability to other subsamples of youth. A contribution to the literature is this study’s utilization of a unique sample of clinical youth, a subset of the population that is inundated with histories of maltreatment yet have received no attention in the GST literature. 

**Theoretical Implications**

*Strain: The Presence of Noxious/Negative Stimuli (maltreatment)*

GST emphasizes negative relationship with others, pointing to three major sources of types of strain that may lead to crime and delinquency: (1) the failure to achieve positive value goals, (2) the actual or anticipated loss of positively valued stimuli and (3) the actual or anticipated presentation of noxious or negative stimuli. Agnew (1992) also identifies four characteristics of adverse events (strain) that are likely to have more significant effects, of importance to this study is the magnitude of the event, which refers to either the amount of positive stimuli lost, or the amount of pain or discomfort inflicted with respect to the presentation of noxious stimuli. The greater the magnitude the more influential the adverse event.

The form of strain highlighted in this research from Agnew’s GST is the presence of noxious/negative stimuli. The indicators of strain in this study are any history of adolescent maltreatment, and cumulative experiences of maltreatment. Below, is a discussion of how these aspects of the theory relate to the findings.
As a brief summary of the results, ZINB models reveal having a history of any maltreatment results in a greater average number of subsequent 90-day alcohol use, net of controls and reveal having a history of any maltreatment results in a greater average number of subsequent 90-day marijuana use [the effects are greater for alcohol use than marijuana use for this population]; a history of cumulative adolescent maltreatment has a significant positive effect on the frequency of subsequent 90-day alcohol use, net of control variables and a history of cumulative adolescent maltreatment has a significant positive effect on the frequency of subsequent 90-day marijuana use, net of control variable.

Generally speaking, results from this study are consistent with prior empirical studies that find adolescents who experience maltreatment, compared to those who have not been maltreated, are at a much greater risk for utilizing illicit substances and the effects are usually greater for alcohol use than marijuana use (Huang, et al., 2011; Lo and Cheng, 2007; Sacks, McKendrick, and Banks, 2008; Moran, Vuchinich, and Hall, 2004; Hamburger, Leeb, and Swahn , 2008). Taken together, having a history of adolescent maltreatment and cumulative experiences of adolescent maltreatment are risk factors of the indicator of delinquency: substance use (e.g., subsequent 90-day alcohol use and subsequent 90-day marijuana use). Overall, these findings support the tenets of GST that the presence of noxious stimuli, as a form of strain can lead to delinquent coping and the magnitude of strain experienced, produces more deleterious effects.

**Conditioning variable: Self-efficacy**

Agnew (1992) notes several conventional coping resources may be implored to relieve the pressure of strain in facilitating deviant acts. Theoretically, individuals with higher levels of self-efficacy are expected to relieve strain through non-delinquent behaviors (Agnew,1992) resisting high-risk situations or delinquent-coping mechanisms, such as alcohol and drug use
(Bandura, 1986). The results from the ZINB regression models support these theoretical predictions when the direct effects of self-efficacy on alcohol and marijuana use are explored. Specifically, self-efficacy had significant negative effects on both indicators of delinquency for both measures of strain; these results were consistent with other research that found reductions in the use of drugs and alcohol were associated with higher levels of self-efficacy (Maisto, Connors, and Zywiak, 2000; Dolan, Martin, and Rohsenow, 2008; Stephens, Wertz and Roffman, 1995). Given these results, self-efficacy can be seen as a protective and/or conditioning factor that reduces delinquency, supporting a tenet of GST.

As recognized by GST, not all youth who experience strain will resort to delinquency if access, availability, and skills to use such coping resources are present. In exploration of this, the present study also tests the extent to which baseline levels of self-efficacy attenuate the effect of maltreatment on subsequent adolescent substance use. Contrary to the theoretically derived prediction that higher levels of self-efficacy would reduce the effects that maltreatment has on delinquent coping, hypotheses 7-10 were not supported. Empirical research on the role of conditioning factors continue to remain mixed. This unsupported tenet of GST is an interesting finding that provides avenues for future research.

Avenues of Future Research

*Types of maltreatment:*

In considering avenues for future research, this area of interest can be expanded by investigating the three forms of maltreatment (physical abuse, emotional abuse, and sexual abuse). While this was beyond the scope of the present study prior research exists that explores the relationship between sexual maltreatment and smoking and drinking that find significant, positive effects (Solakoglu, Nicola, and Belshaw, 2016; Wall and Kohl, 2007; Kilpatrick et al.,
2000). It may be useful to conduct analyses that tease out the effects of race and gender for each form of maltreatment and explore these effects on subsequent 90-day alcohol use or subsequent 90-day marijuana use. One empirical study found males are more likely to be victims of physical abuse, while females are more likely to be victims of sexual abuse which contributes to substance use preference/choice (Wellman, 1993; Hines, Armstrong, Palm, and Cameron, 2012). Additionally, the GAIN dataset offers several forms of illicit substances so it may prove insightful to incorporate additional measures of illicit drug use beyond alcohol use and marijuana use.

**Conditioning Effects**

As mentioned, self-efficacy did not moderate the effect between any of the indicators of strain and the indicators of delinquency in this study, which is not uncommon in the psychosocial literature. Though some studies have found support for this coping resource on reducing substance use outcomes, others have not (see summary of outcomes, Kadden and Litt, 2007). Mixed results as it pertains to this variable may be the result of aims of treatment interventions that specifically target enhancing self-efficacy, the need to be proficient in other skills mastery which increases confidence in self-efficacy, and better empirical measurements of the concept itself (Kadden and Litt, 2007). Research surrounding conditioning effects suggest exploring alternative statistical techniques beyond statistical significance tests to detect conditioning effects (Mazerolle and Maahs, 2000; Thaxton and Agnew, 2017) as reliance on these tests when performing multiple regression analyses “represents a conservative test of the conditioning hypothesis of GST” (Mazerolle and Maahs 2000:772). In addition to this, rather than solely examining the role of a single conditioning variable, future research should construct a measure
which reflects multiple conditioning factors as “a single conditioning variable does not strongly constrain individuals to engage in a particular type of coping” (Thaxton and Agnew, 2017:888).

Negative Affects

Recall, in addition to coping resources, Agnew’s GST highlights the role that negative emotions (affects) may play in leading to deviant responses and that depression and anxiety may result in non-violent delinquent coping mechanisms (i.e., illicit substance). Though empirical research is vast regarding the indirect and direct relationships between strain, delinquency, and negative effects, research on negative affective states that may mediate the relationship between adolescent maltreatment and substance use is extremely scarce (Solakoglu, Nicola, and Belshaw, 2016). Thus, another avenue for future research entails the introduction of negative emotions to determine which, if any, may mediate the relationship between the strain measures in this study and subsequent 90-alcohol and marijuana use.

Implications of the study

Findings from the utility of GST on sample of clinical youth suggest equipping youth with the skill acquisition, everyday practical strategies, and confidence can promote effective problem solving and reduce one’s reliance on substance use. Moreover, findings suggest that youth of specific races (i.e., Hispanics), youth older in age, and youth who associate with delinquent peers face higher average number of days of substance use than others and therefore, prevention and aftercare strategies should be targeted to strengthen coping resources within those communities, and ensure youth have communities and residences to return to that minimize the risk of negative peer influence. In addition, creating sound, manageable, situational-based treatment strategies may prove to be an effective way for youth to build their self-efficacy, thereby preparing youth to successfully and positively cope in environments where alcohol and
drug use are unavoidable. It is also important to note that this study comes during the time of
cannabis legalization. While some research has found that states adopting cannabis-use laws
have experienced increased use among adults, adolescent marijuana use appear to be
uninfluenced (Smart and Pacula, 2019). This may, in part, be due to the age restrictions of
purchasing cannabis -products that are only available to adults, and/or pricing. However,
additional research into the effects of cannabis legalization and policy impacts on adolescent use
will need to be further explored to come to conclusionary statements.

Limitations of the study

There were several limitations to the present study. First, with respect to the indicators
of strain, the perpetrators of the adolescent maltreatment were not readily available in the GAIN
data, thus limiting the ability to narrow down the effects of specific perpetrators to this form of
victimization. Additionally, only one of the theoretical characteristics of strain as it relates to
delinquent coping were assessed (e.g., magnitude). Future studies should consider (1) recency
which refers to the timing of when an event occurred, as more recent events of maltreatment
could have greater effects than older events (older than 3 months); (2) duration which refers to
how often the event transpired, with chronic maltreatment, events that occur over a long duration
of time may have a greater impact; and finally, clustering which refers to the timing of when
events occur, with closely clustered occurrences possibly having greater negative impacts than
those dispersed evenly across time.

Second, with respect to indicators of delinquent coping, only two variables were
assessed: frequency of past 90-day marijuana use and alcohol use. While the GAIN dataset
specifies a multitude of substance that can be analyzed, these two substances were selected,
primarily, because they were among the most commonly used substances for adolescents, aside
from cigarettes. Additionally, the number of days of past-90 substance use was selected rather than, the greatest number of drinks/joints in one day as this research wanted to consider the continuous nature of the dependent variables rather than focus on one point in time. To better understand the effects of maltreatment on substance use, polysubstance use, cigarette smoking, and other forms of illicit substances should be considered. Polysubstance use refers to the use of two or more drugs taken together or within short period of time. Third, limitations exist with respect to the controls due to insufficient sample sizes. Though this research sought to employ as many criminology control variables supported by the GAIN instrument as possible there were too few cases for such variables (sexual orientation, sexual identity, marital status) to produce meaningful results. The GAIN data did not provide questions related to sexual activity which can be an influential variable for the subject at hand.

Fourth, although this research utilizes a sample of clinical youth in substance abuse treatment programs, the research does not consider differences in outcomes due to substance abuse treatment type. Future studies can create subsamples and the explore relationships based on type of substance abuse treatment program (i.e., inpatient treatment, outpatient treatment, intensive outpatient treatment, detoxification treatment, etc.), type of therapy sessions received during treatment (i.e., individual, group, therapy), therapy modalities (i.e., cognitive behavior therapy, contingency management, motivational enhancement/motivational interviewing, etc.), length of stay, and/or frequency of sessions attended, all which may produce varying substance use outcomes.

Conclusion

There is no shortage in research aimed at reducing delinquency, reducing adolescent substance use, or the role of self-efficacy, nor has the utilization of GST in the criminology
literature been untapped. Yet, the focus of this dissertation has identified areas within the literature that have received little to no attention and begins to lay the foundation for future research to expand the field. Agnew’s GST contends some strained individuals may resort to crime and delinquency, and that coping mechanisms may reduce delinquency outcomes; findings from this dissertation research are consistent with the existing data. To summarize, having a history of adolescent maltreatment and cumulative experiences of adolescent maltreatment are risk factors of the indicator of delinquency and self-efficacy had significant negative effects on both indicators of delinquency for both measures of strain.

Though the use of GST in the criminology literature is not new, the use of applying GST to a clinical sample of youth in substance abuse treatment is a unique contribution. Additionally, this study contributes to the current body of knowledge by expanding the forms of victimization to include adolescent maltreatment, an underexplored measure of strain. Findings remain mixed on the conditioning effects that moderate the strain-delinquency relationship; however, the non-significant finding creates opportunities for further exploration utilizing this unique dataset and subsample of cases.
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END.