

**WESTERN  
CRIMINOLOGY  
REVIEW**  
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Journal of the Western Society of Criminology

**Volume 11, Issue 3 È December 2010**

## Western Criminology Review

Official Journal of the Western Society of Criminology

<http://wcr.sonoma.edu>

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The Western Society of Criminology and the staff of the *Western Criminology Review* are grateful to Sonoma State University Library Faculty for their willingness to house and support the WCR. The WCR is also grateful for the support of Dean Vince Webb and the College of Criminal Justice, Sam Houston State University.

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ISSN 1096-4886

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**Online citation:** Hoffmann, John P. and Karen R. Spence. 2010. "Who's to Blame? Elaborating the Role of Attributions in General Strain Theory." *Western Criminology Review* 11(3):1-12. (<http://wcr.sonoma.edu/v11n3/Hoffmann.pdf>).

## Who's to Blame? Elaborating the Role of Attributions in General Strain Theory\*

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**Abstract:** *Agnew's general strain theory (GST) has motivated dozens of criminological studies over the past two decades. Borrowing in part from Cloward and Ohlin's model of delinquency, Agnew claimed that anger, a key component of GST, occurs when adolescents externalize blame for their adversity. This implies that adolescents who blame strain on an external causal agent (e.g., a parent, a teacher, economic disadvantages) are more likely to get angry and thus lash out through delinquent acts. However, this essential characteristic has been largely neglected in studies of GST. The purpose of this article is to show that external attributions of blame remain a fundamental moderator of GST and to elaborate how it affects the association between strain and delinquency. In particular, we draw from research on attribution theory and hostile attribution biases (HAB) to argue that understanding how adolescents interpret adversity is essential to GST.*

**Keywords:** general strain theory, delinquency, attribution of blame, hostile attribution bias

\*An earlier version of this paper was presented at the annual meeting of the American Society of Criminology, Philadelphia, PA, November 4-7, 2009. The paper has been improved significantly due to discussions with and reviews by Scott Baldwin, Tim Ireland, Tim Brezina, and several anonymous reviewers.

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### INTRODUCTION

General strain theory (GST) has motivated dozens of criminological studies over the past two decades. The developer of GST, Robert Agnew, considered versions of Merton's, Cloward and Ohlin's, and Cohen's strain theories, melded them with innovative concepts from contemporary criminological and social-psychological research, and crafted a new theoretical model of delinquent and criminal behavior. In particular, he re-envisioned this model to emphasize three types of strain and their influence on negative emotionality and delinquency. The three forms of strain addressed by GST are (1) the failure to achieve positively valued goals, (2) the removal of positively valued stimuli, and (3) the presentation of negative stimuli (Agnew 1992). Delinquency results when these strains are interpreted as unjust, high in magnitude, associated with low social control, and have created some pressure to engage in criminal coping (Agnew 2001). Moreover, a key emotion that links strain with delinquency is anger. Anger "increases the individual's feelings of injury, creates a desire for retaliation/vengeance, energizes the individual for action, and lowers inhibitions," resulting in a sense that maladaptive behaviors, particularly

delinquency, aggression, or violence, are justified (Agnew 1992:60). Feelings of anger motivate adolescents to attempt to defend or recover valued stimuli through delinquent actions (Brezina 1996) and may also be aroused through a threat to autonomy, which youths then attempt to reestablish through illicit means (Brezina 2000).

An important issue mentioned briefly in Agnew's seminal GST article involves under what circumstances strain leads to anger and delinquency. Although various coping mechanisms – such as high self-esteem, self-efficacy, self-control, or social support – may alleviate the likelihood of anger, a key factor that increases this negative emotion is when youths blame other people for stressful situations: "Anger results when individuals blame their adversity on others" (Agnew 1992:59). Presumably, this implies that adolescents who blame strain on an external cause (e.g., a parent, a teacher, economic disadvantages) are more likely to get angry and thus lash out through delinquent acts. Yet it also suggests that when the cause of strain is not attributed to others, adolescents do not tend to become angry and thus do not engage in delinquent behavior. Other negative emotions might occur, such as despair or dysphoria, but these will most likely result in depressive symptoms, anxiety, or feelings of

sadness. In general, then, externalizing blame is the key moderating variable in GST.

It is peculiar to note, however, that many studies of GST have addressed the three types of strain, as well as anger and coping resources such as self-esteem, self-efficacy, self-control, and social support (e.g., Agnew 1997, 2001, 2006a; Agnew et al. 2002; Agnew and White 1992; Broidy 2001; Froggio, Zamaro, and Lori 2009; Hoffmann 2009; Hoffmann and Miller 1998; Hoffmann and Su 1997; Mazerolle et al. 2000; Piquero, Gomez-Smith, and Langton 2004; Rebellon et al. 2009; Tittle, Broidy, and Gertz 2008), but there have been few, if any, attempts to study causal attributions even though this mechanism is fundamental to GST and earlier forms of strain theory. Whereas the notion of attributions appears briefly in Agnew's writings, it also has a central role in Cloward and Ohlin's (1960) strain model (see Hoffmann and Ireland 1995). Yet it is perhaps best known to criminologists due to the work of Sykes and Matza (1957), who argued that delinquent behavior is often "neutralized" by attributing the causal factors to others or to uncontrollable events in youths' lives.

We argue that this is a serious, perhaps fatal, omission on the part of general strain theorists and researchers. Ignoring a fundamental mechanism of GST has likely led not only to underfit empirical models that have yielded biased coefficients, but also to a stagnant understanding of how strain might affect delinquency. In particular, it may explain why research has produced such inconsistent empirical results when it comes to whether anger affects the association between strain and delinquency (cf. Agnew et al. 2002; Aseltine, Gore, and Gordon 2000; Mazerolle et al. 2000; Tittle et al. 2008). As we discuss later, understanding who one blames for strain-related experiences is essential to identifying whether anger and, consequently, delinquency ensue. Yet, as we also show in the subsequent discussion, the concept of externalization of blame and the more general category of attributions are sorely underdeveloped in criminological theory in general and in GST in particular.

In this paper, we attempt to overcome the lack of attention to these issues in research on GST by elaborating how causal attributions are a key moderating mechanism for understanding the links between strain, anger, and delinquency. Following a review of some of the early influences on GST, we discuss recent research on attribution theory – in particular, models of how people interpret the situations they experience – to elaborate how strain may require specific forms of external attributions in order to result in anger and, ultimately, aggressive and delinquent behavior. We contend that it is not so much whether some experience that is, perhaps, objectively labeled strain occurs, but how it is interpreted by the adolescent. The interpretation of experiences is acutely influenced by whether the adolescent exhibits an attributional style that identifies other people as causing

the experience as opposed to causal factors such as fate, luck, or personal characteristics. We also propose that hostile attribution bias – which is the tendency to interpret hostile intent on the part of others during what seem to observers as ambiguous social interactions (e.g., Dodge 2006) – is a promising concept for clarifying these linkages.

## THE SOCIAL-PSYCHOLOGICAL UNDERPINNINGS OF GENERAL STRAIN THEORY

As mentioned earlier, Agnew's strain model is a systematic amalgamation of sociological and social-psychological notions about the effects of negative experiences on humans. Although the sociological sources include work by Merton and Cohen, for our purposes an important model in the development of GST is due to Cloward and Ohlin (1960). This is because they emphasized most clearly the role of attributions of blame.<sup>1</sup> In their study of delinquency and opportunity, they proposed that one type of strain leads to delinquency primarily when youths blame their adverse experiences on others. Known generally as *externalization of blame*, this condition was assumed to be a crucial element to their early form of strain theory (Hoffmann and Ireland 1995). In particular, Cloward and Ohlin (1960) argued that those who externalize blame by interpreting their adverse situations with reference to external social factors – such as others, but also on their proximate social environment – are likely to become alienated, withdraw legitimacy from conventional social norms, and find alternative means to gain valued resources. These alternative means typically involve delinquent behavior.

The social-psychological sources of strain theory are found primarily in two related models. First, the frustration-aggression hypothesis was based on studies of the reactions of animals to stressful situations that were assumed to cause frustration. Typically, these involved the blockage of immediate and valuable goals (such as obtaining food or escaping physical pain). In myriad situations, animals (including humans) reacted to these frustrations with aggression, such as trying to gain a particular goal through force (Berkowitz 1989; Miller 1941). Frustration-aggression studies have influenced not only strain theory, but also more general research on aggression and violence (e.g., Bernard 1990; Dill and Anderson 1995; Felson 1992; Moeller 2001).

Second, learned helplessness theory focused on what happens to animals when there is persistent, uncontrollable stress in their lives. In these situations, most animals, after some initial escape attempts, become helpless and avoidant and appear to accept the situation rather than trying to escape it. Although the learned helplessness process seems to work more clearly among animals other than humans, it

has generated a large body of empirical literature and has influenced recent studies of whether stressful life events affect attitudes and behaviors (Hermann 2007; Overmeier 2002; Peterson, Maier, and Seligman 1995). Yet it has also suffered from a general lack of empirical support.

The paucity of empirical support for the ability of the learned helplessness model to explain human behavior led to the development of a revised model. It addressed two limitations of the original model. First, it considered attributional style (also known as *explanatory style*): how people explain the events that they experience. To what broader forces do they causally attribute the events of their lives? This is clearly related to externalization of blame. The second addition to the model involved motivation: What did an aversive event drive the person towards (Peterson et al. 1995; Vázquez et al. 2001)? Much of the research using this revised model has focused on depression or dysphoria, although there are clearly other potential outcomes, including aggression, violence, and various forms of illicit behavior.

Although externalization of blame – or the more general category of attributional style – has a conceptual role in GST (Agnew 1992) and revised learned helplessness models (Peterson et al. 1995), it has generally been neglected in delinquency research (for important exceptions, however, see Sykes and Matza [1957] and Bernard [1990]), even in research on GST. To elaborate this concept more fully, consider that externalization of blame involves attributions of whom or what caused the stressful or anxiety-provoking event. For instance, when an adolescent's parents are going through a divorce, does he blame his father, his mother, or both of them? Does he blame himself? Or does blame fall on conditions outside the family's control? When a student receives a low score on an exam, does she blame the teacher for making the questions too difficult, or is blame attributed to poor study skills, a general lack of intelligence, or not being a skilled test taker?

Although some researchers have viewed externalization of blame as a mediator in the path from strain to delinquency, it is best envisioned as a moderator. In other words, according to both GST and social-psychological depictions of this process, strain tends to lead to maladaptive behaviors such as delinquency among those adolescents who blame others for their adversity. But why should this be so? As discussed later, blaming others increases the risk of anger and frustration in the face of strain. Then, as explained by Agnew, these negative emotions increase the likelihood of delinquency, aggression, and violent behavior.<sup>2</sup> Although this brief description of the strain process has the value of parsimony, focusing on attribution of blame necessitates a much more complex evaluation. We contend that attribution of blame is actually a much richer concept than has heretofore been considered in traditional or general strain theory. Research on attributional styles is

particularly valuable for understanding attributions of blame and how they affect strain, negative emotions, and delinquent behavior. Therefore the next section reviews some of this research to provide a context for our elaboration of GST.

## ATTRIBUTION STYLES

Social-psychological research has identified several attributional styles. Scholars tend to organize these styles along three dimensions: internal vs. external, stable vs. unstable, and local vs. global (Peterson and Seligman 1987; Vázquez et al. 2001; Wise and Rosqvist 2006). Internal vs. external refers to whether people attribute the events they experience to factors external to themselves (other people, random phenomena, fate) or to internal factors that they have inherited genetically or developed in their lives (e.g., their native intelligence, skill levels to perform particular tasks).<sup>3</sup> Stable vs. unstable involves causes that are expected to continue (stable) or those that are seen as temporary or fleeting (unstable). For example, a stable causal factor occurs if youths attribute their poor test taking abilities to a lack of intelligence, whereas an unstable factor is that they didn't get enough sleep the night before the test. Local vs. global concerns whether the cause is assumed to affect only a single aspect of one's life (local), such as taking math tests (e.g., "I'm not good at math"), or affect aspects of one's entire life (global), such as the ability to perform on any test (e.g., "I'm not smart enough to succeed at written tests").

According to research on attributions, negative explanatory styles occur when a person interprets negative events (e.g., the loss of a job, school failure) as caused by internal, stable, and global conditions, whereas positive events are seen as triggered by external, unstable, and local conditions. A positive explanatory style is the opposite. In general usage, those who use negative explanatory styles are labeled pessimists whereas those who use positive explanatory styles are labeled optimists (Jackson, Sellers, and Peterson 2002; Wise and Rosqvist 2006). Among pessimists, bad events are usually understood as being caused by internal limitations (low intelligence, poor judgment), are seen as part of broader, stable conditions, and are thought of as encompassing all aspects of one's life. Good events, on the other hand, are attributed to external conditions (in particular, luck), local (e.g., it will only happen this one time), and unstable conditions.

A substantial body of research suggests that these dimensions of causal attribution are consequential for understanding outcomes such as depression, anxiety, and school failure. Those who utilize internal, global, and stable attribution styles to interpret negative events are likely to experience more negative outcomes, such as school failure and poor interpersonal relations (Boman, Smith, and Curtis 2003; Jackson et al. 2002; Peterson and Seligman 1987; Skinner, Zimmer-Gembeck, and Connell



1998; Vázquez et al. 2001; Wise and Rosqvist 2006). In addition, people tend to attribute causes most often when experiencing negative events (Mikula 2003); positive or neutral events do not as consistently require a causal explanation when they occur. Thus, we should expect that these types of events are particularly germane for research on strain and delinquency.

Nevertheless, it is important to recognize that external attributions actually involve distinct phenomena. Much of the research that has examined this particular dimension focuses on luck or fate as external causes of negative or positive events. For example, in an exceptional instance where attributional styles and criminal behavior have been examined, Maruna (2004) finds that active offenders tend to interpret negative events in their lives as the result of internal, global, and stable conditions. In other words, they tend to rely on a negative explanatory style. They are also more likely to believe that the good events in their lives are the product of external (primarily luck or fate), unstable, and local causes (see also Rowe, Maughan, and Eley 2006). Nevertheless, studies of offender populations indicate that the most serious offenders tend to blame their victims or society for their criminal conduct (e.g., Gudjonsson and Sigurdsson 2004, 2007). Thus, it is important to distinguish whether external attributions involve luck or fate or whether attributions can be linked to particular others with whom youths come in contact.<sup>4</sup>

Unfortunately, most theoretical models and studies of attributions and criminal conduct have involved asking offenders about past behaviors. Sykes and Matza's (1957) description of the "techniques of neutralization" that youths use to rationalize their untoward behaviors – and the research that it motivated – is illustrative of this inclination: they outlined a series of methods that youths use to justify their behaviors, especially by denying responsibility and attributing blame to forces beyond their control. Yet it is not surprising that many offenders use post-hoc excuses or neutralization techniques to explain their illicit behaviors (Maruna 2004; Maruna and Copes 2005; Maruna and Mann 2006). However, these studies do little to help us understand whether attributions condition the association between strain and delinquency. It is clear that we need to address the causal and temporal chain of events better if we are to gain a full picture of the process of strain and attribution of blame.<sup>5</sup>

Moreover, one of the advantages of focusing on attributional styles is that, as shown in the next section, they help explain why some youths react with anger, thus accounting for one of the linchpins of GST. Empirical research has been mixed concerning the necessity of anger as a mediator in the strain process (cf. Agnew et al. 2002; Aseltine et al. 2000; Mazerolle et al. 2000; Tittle et al. 2008), yet this might be because biased attributional styles have not been considered in studies of GST.<sup>6</sup> Without understanding the attributional tendencies of strained youths, it is difficult to determine whether anger ensues

from strain and if anger then affects subsequent delinquent, aggressive, or violent behaviors. In general, then, we are concerned in this article with the attributional process – which is part of the cognitive process youths use to make sense of their lives and situations – that has been mentioned by delinquency and strain theorists but has not been explored sufficiently in conceptual models of strain theory.

## **DOES EXTERNAL ATTRIBUTION OF BLAME MODERATE THE ASSOCIATION BETWEEN STRAIN AND ANGER?**

It is evident from the discussion so far that addressing external attributions only generally without considering their constituent elements is not sufficient. In addition to the distinction between types of external sources (e.g., luck vs. tangible others), an important issue involves the argument that attribution is not the same as blame or how it is focused. Attribution or explanatory style is a general cognitive orientation that affects all or most aspects of the way people try to interpret situations and interactions with others. Blame focuses specifically on culpability; it is especially likely to evoke a hostile or negative response when the event is severe, when the person to whom the event is attributed is present, and when the presumed victim judges that the perpetrator should have known that the act is severe (Hall, French, and Marteau 2003; Tennen and Affleck 1990). This set of conditions has also been found to enhance aggressive reactions in research based on the frustration-aggression hypothesis (Berkowitz 1989; Dill and Anderson 1995). Moreover, when someone causally interprets negative events as the direct product of other people's behaviors – when blame can be attributed directly to another – the probability of subsequent aggressive behaviors increases (Fondacaro and Heller 1990; Powell and Rosén 1999). Much of this research has been based on quasi-experimental designs that provide stimuli to experimental subjects and then examines their reactions. Few studies have used survey research or observational studies in natural settings.

More detailed quasi-experimental studies have shown that anger tends to emerge especially when blame is attributed to others (Berkowitz and Harmon-Jones 2004; Bernard 1990; Miller 2001). These studies indicate that anger is particularly severe when a stressful event is seen as unjustified and under the control of the provocateur (Dill and Anderson 1995; Guerra, Huesmann, and Zelli 1993; Mikula 2003). Moreover, displaced aggression occurs most often when there is more frequent contact between the provocateur and the person but when the intensity of the event is lower (Marcus-Newhall et al., 2000). In general, more intense events – such as those that threaten actual physical harm or are painful – are likely to evoke an immediate response, whereas less intense events

– such as those that seek to make a person feel uncomfortable or that threaten the removal of a valued object – allow a presumed victim to be more cautious, delay the response, and act aggressively against another target. Hence, anger is a common reaction to certain types of negative or stressful events, especially those in which blame may be laid on another person. Interestingly, aggressive responses to anger can actually improve one's subsequent mood (Bushman, Baumeister, and Phillips 2001), thus serving as a coping mechanism (cf. Brezina 1996; Miller 2001).

But why does blaming another rather than blaming, say, fate, bad luck, or internal limitations tend to lead to anger and consequent aggressive reactions? Studies indicate that three specific influences affect this process: (1) blaming others impedes the use of adaptive coping strategies, such as problem solving; (2) it causes the harmed person to dispute positive world views and perceptions of others; and (3) it makes it more difficult to draw upon available social support resources since it negatively affects trust in other people (Hall et al. 2003; Tennen and Affleck 1990). Moreover, we propose that externalization of blame is influenced by particular cognitive biases that are common among aggressive youths.

In general, then, we reaffirm the claims of Cloward and Ohlin (1960) and Agnew (1992, 2006a) that strain becomes channeled toward anger and, consequently, aggression and delinquent behavior when youths directly blame others for the negative situations they find themselves in. Causally attributing blame for negative situations to others, whether the situations involve a failure to achieve positively valued goals, the removal of positively valued stimuli, or the presentation of negative stimuli, is an important, often essential, condition in the pathway from strain to anger. Moreover, anger is particularly likely when the negative event or events are seen as severe, unjustified, and under the control of a provocateur or provocateurs; and when the presumed provocateur or provocateurs are present or in close proximity (Dill and Anderson 1995; Guerra et al. 1993; Hall et al. 2003; Mikula 2003; Miller 2001; Tennen and Affleck 1990). When blame is not causally attributed to another person or group of persons, anger is much less likely to result from negative situations. We propose that under these conditions, other negative or harmful emotions result, such as dysphoria, anxiety, and depression (Aseltine et al. 2000; Hoffmann and Su 1998; Kaufman 2009).<sup>7</sup>

## WHY DO SOME YOUTHS EXTERNALIZE BLAME?

Our elaboration of GST is not complete without considering why some youths blame others whereas other youths do not. What mechanism lies at the heart of

external causal attributions? Rather than being an objective process, we propose that the attributional process involves how youths interpret events, which may or may not be objectively accurate. In order to build this argument, we draw from studies of hostile attribution bias (HAB), which has emerged from research on how people, especially children and adolescents, process sensory information. This is the notion that some children and adolescents are disproportionately likely to interpret hostile intent on the part of others during social interactions. They then tend to generate aggressive responses, which may escalate into violence (Crick and Dodge 1994; Dodge 2003; Dodge, Bates, and Pettit 1990; Fondacaro and Heller 1990; Lösel, Bliesener, and Bender 2007). Although the term attribution is used to define this condition, research on this topic has emerged somewhat independently of other social psychological research on attributional styles. Nevertheless, it holds significant promise for understanding how strain and attributions channel some youths toward anger, aggression, and delinquency.

Studies of HAB find that these youths attribute hostile intent during otherwise ambiguous situations, whereas those without this bias tend to see more benign or inscrutable intentions on the part of others (Dodge 2003, 2006). In general, they are more likely to “jump to conclusions” that others have hostile intentions in these situations and respond with reactive aggression (Hubbard et al. 2002). Kenneth Dodge (2006) argues that the source of these biases stems from neurological functioning, traumatic events in childhood, and a failure to develop secure attachments with parents and other influential adults. In particular, children who manifest HAB are disproportionately likely to have experienced physical and emotional abuse during childhood (Dodge et al. 1990). Thus, the link between experiencing abuse and subsequent delinquent behavior during adolescence is presumed to be mediated by HAB. Those with HAB also tend to have mothers who exhibit the same biases (Bickett, Milich, and Brown 1996) and they demonstrate greater physiological arousal during ambiguous situations (Hubbard et al. 2002).

Moreover, in an argument reminiscent of Gottfredson and Hirschi's (1990) original position on self-control, Dodge (2006) contends that HAB is a natural condition that must be socialized out of the individual. Thus, HAB and self-control are similar concepts, although there are some important differences. For instance, in a recent elaboration of the concept of self-control, Hirschi (2004) argued that it is operationalized best by considering how potential offenders judge a full range of consequences to their behaviors. Reminiscent of social bonding theory, he claimed that those youths who had a higher accumulation of bonding mechanisms in their lives – or what were referred to as *inhibiting factors* – were less likely to engage in analogous acts of misbehavior (see also Piquero and Bouffard 2007). HAB is similar in that it is cognitively oriented and, akin to the judgment aspect of Hirschi's



elaboration, it involves how information is processed. However, HAB is distinct in that its sources are presumed to be affected profoundly by learning experiences in early childhood, as well as by traumatic events and neurological abnormalities that may have a genetic basis.<sup>8</sup> This latter aspect of HAB is especially eschewed by Hirschi (2008).

As far as we have been able to determine, research has not yet linked HAB to GST, but we propose that it serves as a core moderating mechanism for explaining why some youths who experience adverse events or unjust conditions react with anger and aggression, whereas others take a more temperate or internalized route. Thus, we argue that subsequent research on GST should consider whether youths who experience strain and react with anger also disproportionately experience attributional biases. (The next section discusses some ways that HAB might be considered in research on GST.)

Although we do not claim to provide a complete or uniform pathway from strain to delinquency, here is an illustration of how HAB might operate in a GST context. Suppose a negative event occurs in the life of an adolescent; perhaps he is failing a class. Rather than focusing on what he does in this particular situation, we should consider whether he has a general cognitive tendency to externalize the negative experiences of his life. But this will be affected by whether he also manifests HAB. If, say, he blames the event on his teacher's poor treatment of him or lack of skill as an educator (this evaluation of the teacher may or may not be accurate), even when others would observe the situation as ambiguous (his teacher actually treats him fairly but may react to his bad behavior; his teacher is an accomplished educator), he gets angry, feels humiliated, or becomes highly frustrated and takes it out by either disrupting the classroom or through truancy. He may also demonstrate displaced aggressive behaviors such as vandalism, truancy, or fighting with his siblings or with other youths. It is not a matter of poor coping in the traditional sense or even low self-control (although this too could be implicated); rather, the youth's attribution bias conditions the link between strain, anger, and delinquency by affecting how he interprets the adverse events in his life. When ambiguous or uncontrollable strains are perceived as part of a hostile environment by those who display biased attributional styles, their reactions tend to get channeled into anger and frustration and subsequently toward delinquent and aggressive conduct.

For those adolescents who do not have biased attributions that favor hostile interpretations, anger is less likely and strain tends to be directed towards other outcomes such as depression, dysphoria, anxiety, and withdrawal. This may lead to some forms of delinquent acts, such as drug use, but they do not tend to be aggressive forms (cf. Bernard 1990). Of course, some youths may also appear resilient in the face of strain. If youths have strong relations with parents, conventional

peers, solid social support networks, or other positive coping resources, then conventional behaviors likely ensue. But these are still conditioned by a general attributional style, with those who fall on the internal side of the attribution dimension better able to take advantage of coping mechanisms.

Thus, it is not so much whether some event that is, perhaps, objectively labeled strain occurs, but how it is interpreted by the adolescent. The interpretation of events is acutely influenced by whether the adolescent favors an external attributional style that identifies other people rather than fate or luck, manifests hostile attribution bias, and views the events as unjustified and under the control of a presumed provocateur.

We also suggest that the link between a need for autonomy and delinquent behavior may be fruitfully explained by focusing on attributions of blame and HAB. Studies have shown that many youths at high risk for delinquency, including those who experience stressful life situations, seek to manage situations and engage in misbehavior to gain a sense of control over their lives (Agnew 1984; Allen et al. 2002; Brezina 2008; Van Gundy 2002). In terms of GST, we propose that adverse experiences are particularly germane to those with HAB because they are generally interpreted negatively and threaten their sense of control or efficacy. Adolescents with HAB are especially likely to interpret these experiences as unjust and arbitrary. When their sense of autonomy and efficacy is threatened, they may seek control through hostility and aggression. These types of reactions help them feel as if they can gain control and regain their sense of self-efficacy.

Furthermore, attribution biases tend to be self-fulfilling. As an adolescent relies on anger and aggression in the face of strain, this will elicit more presumed mistreatment by others, which perpetuate and may even intensify the tendency to externalize blame and attribute hostile intentions during ambiguous situations. Thus, we propose that there is a reciprocal mechanism at play here that should be explored in research on GST.

## **ASSESSING A MODEL OF HAB, ANGER, AND STRAIN**

Examining the model empirically requires measures of hostile attribution bias, anger, strain, delinquency, and other outcomes such as depression and dysphoria. Such specific data do not generally exist, as far as we have been able to ascertain.<sup>9</sup> One method for examining HAB has been to provide vignettes to respondents to assess how they perceive intentions on the part of others (Hubbard et al. 2002; Lösel et al. 2007; Mikami et al. 2008; Walters 2007). For example, Walters (2007) provided inmates with vignettes that involved being bumped into or jostled on the basketball court. Responses fell along a scale that

included, on one end, that the action was accidental or, on the other, that it was “definitely deliberate.” Mikami et al. (2008), following Dodge (1993), similarly provided vignettes to adolescent girls. They were shown five hypothetical situations involving various peer experiences and asked to tell the interviewer why the other girls behaved as they did. Their responses were then coded as demonstrating negative/hostile attributions or ambiguous attributions. Since vignettes have been used successfully in studies of delinquency and young adult criminal behavior (e.g., Piquero and Bouffard 2007; Piquero et al. 2004), they could be adapted for use in a study of HAB, strain, and delinquency.

As an example that more specifically addresses GST, Agnew and colleagues (2002) used secondary survey data (the 1976 National Survey of Children) to analyze responses to questions about strain, delinquency, and personality traits. They found that negative emotionality/low constraint – which was comprised of measures of impulsivity, hyperactivity, unhappiness, and other negative emotions akin to low self-control – conditioned the association between strain and delinquency. Similarly, in a study of HAB, anger, strain, and delinquency, we anticipate that youths who manifest hostile attributions when presented with vignettes involving interactions with peers and adults will be more likely to report a general trait of anger, and this anger will be channeled into delinquency. Thus, when high levels of strain are reported, those exhibiting a tendency toward HAB are especially likely to become angry and report greater involvement in delinquency. In sum, then, HAB conditions the association between strain and anger, consequently affecting the likelihood of delinquent behaviors.

Experimental research could also be used to measure HAB, strain, anger, and delinquency among adolescents (cf. Hubbard et al. 2002). Vignettes are simple to program into a computer. Youth would be presented with vignettes and their reactions recorded. They could then be placed in provocative situations that are designed to test stress and anger arousal. We anticipate – and this is supported empirically by laboratory research with children – that those exhibiting HAB are more likely to react to stressful situations with anger.

Qualitative studies are also needed to elaborate the potential role of HAB in strain theory. As discussed by Agnew (2006b), qualitative studies suggest that adolescents utilize “storylines” to make sense of their involvement in delinquent behavior. For instance, one of these storylines that has direct relevance for GST is when a youth’s core identity or status is threatened and she blames another for this perceived negative treatment. Peers often provide encouragement for an aggressive or violent response, although exploring the potential role of HAB through in-depth interviews would provide an additional context for this type of research. For example, HAB may

increase the likelihood that a youth’s storylines lean toward a need for vengeance or aggressive reactions to perceived slights. A carefully approached open-ended interview by a skilled researcher could provide important information about whether signs of HAB are present and how they affect a youth’s perceptions of situations both real and imagined. Thus, HAB need not simply be another factor in the positivist tradition of delinquency research; especially since it has implications for self-identity, personalized narratives, and symbolic interactionist notions of how youths perceive reality and their place in the social order (cf. Matsueda 2006).

However, it is also important that these research efforts consider the variety of strains that Agnew proposed are important in GST. Many studies of GST have focused only on stressful or negative life events rather than a full course of strains (e.g., Hoffmann and Miller 1998). Studies should address other strains such as those that elicit feelings of unjustness (cf. Miller 2001), as well as strains that gauge the failure to achieve positively valued goals (cf. Rebellon et al. 2009).

## CONCLUSIONS

GST is a promising model of the etiology of delinquency and crime that has generated dozens of studies over the last two decades. Agnew and others have elaborated GST to take into account additional coping mechanisms, emotions, personality traits, macrosociological conditions, and adult criminal behavior (see, generally, Agnew 2006a). However, one core concept that has been neglected, yet arguably plays a central role in GST as well as in earlier versions of strain theory, involves attributions of blame. Known generally as externalization of blame, several observers have viewed it as the key moderator in the association between strain and delinquency. In this paper, we have revisited this concept and considered it in light of more recent research on attribution theory.

Our main argument is that the key to understanding why some youths react to strain with anger whereas others take an alternate route involves attributional styles. In particular, youths who react with anger tend to have an external attributional style that focuses on blaming other people for their adversity. However, we also contend that those youths who manifest hostile attribution bias are particularly likely to assign hostile intentions to others who they see as the cause of their adversity. When blame can be channeled directly toward another person or group of persons by those with these biases, anger is the likely result. Consequently, for reasons well explicated by Agnew and others, aggression, delinquency, and violence tend to ensue. Moreover, such biases and reactions tend to elicit more presumed negative treatment, which then exacerbates a tendency to externalize blame and react with

anger. Thus, there is likely a long-term reciprocal pathway involved in these associations.

Of course, much more research that explicitly links attributional styles and biases with GST mechanisms is needed. As far as we have been able to ascertain, GST studies have not included measures of attributional style, HAB, or even tendencies to externalize blame in general. It is also uncertain whether attributional styles that place youths at risk of aggression and delinquency may be overcome by conventional coping resources such as positive social support or living in an advantaged neighborhood. Thus, more work is required to determine whether, as we have argued, attributions are the key moderating mechanism in GST, in what specific ways attributions lead to anger in the presence of adverse conditions, or whether other moderators are as consequential for explaining the associations among strain, anger, and delinquency.

## Endnotes

<sup>1</sup> It is curious to note that attributions of blame in Agnew's seminal article were discussed in the context of Cloward and Ohlin's (1960) research. Yet these scholars were influenced by Sykes and Matza's (1957) work on techniques of neutralization that appeared a few years earlier. Although Cloward and Ohlin (1960, pp.134-139) were critical of this neutralization model, they were clearly taken with the notion that attributions of blame can play a central role in the process that leads to delinquent adaptations.

<sup>2</sup> Agnew also discussed other pathways that lead from strain to delinquency, such as when other consequent emotions (e.g., depression) motivate escapist forms of behaviors (e.g., drug use). In this paper, however, we focus on the pathway to delinquency through anger because it has played such a central role in theoretical and empirical examinations of GST.

<sup>3</sup> The internal vs. external dimension is closest to the concept of externalization of blame, though there are subtle differences. For example, externalization of blame is based on dated research that failed to consider broader aspects of attributional styles. The internal vs. external dimension is part of a larger context of how people interpret events, such as how they attribute causality, the factors that affect these attributions, and the likely outcomes that are determined, in part, by these processes.

<sup>4</sup> A related area of research that we do not explore, but likely has implications for research on attributions and delinquency, involves locus of control. This concept refers to the tendency of individuals to attribute events to forces in their control or outside of their control. People who think that they control the forces that affect their lives have an internal locus of control, whereas those who see mostly

the effects of luck or the influence of powerful others on their life course have an external locus of control (Twenge 2007; Twenge, Zhange, and Im 2004). Studies have consistently found that people who manifest external locus of control tend to have problems with depression, anxiety, school failure, self-control, and other negative life course outcomes (Chorpita and Barlow 1998; Kliever and Sandler 1992). Moreover, some research suggests that external locus of control is associated with conduct disorder, aggressiveness, and delinquent behavior (Hindelang 1973; Liu et al. 2000; Peiser and Heaven 1996; Powell and Rosén 1999). Research on locus of control has rarely been linked explicitly to attribution theory or any form of strain theory, though; thus it falls outside the domain of this paper.

<sup>5</sup> Another oversight that is as problematic as failing to consider this causal and temporal chain of events is the emphasis on a positivistic research agenda to conduct these studies. As described later, there is promise in symbolic interactionist based research approaches for understanding attributions and behaviors (cf. Agnew 2006b). For example, linking identity theory, attributional inclinations, strain, and delinquency requires a research agenda that is open to narrative analysis based on in-depth, open-ended interviews and observational protocols. This obviously challenges the use of terms such as "causal attributions" since these approaches tend to subvert attention to "causality," yet they may also be more appropriate to examining the subtleties of understanding delinquent behavior.

<sup>6</sup> A reviewer of an early draft of this paper commented that Agnew et al. (2002) did not focus on anger, but rather addressed the conditioning effect of negative emotionality on the association between strain and delinquency. They found that strain is associated most strongly with delinquency among youths who exhibit negative emotionality/low constraint. However, negative emotionality/low constraint is measured by traits such as impulsivity, hyperactivity, bad temper, argumentative, and unhappiness. Some of these traits have been used to measure low self-control and anger, thus obfuscating the particular personality dimension of concern in studies of GST (cf. Hirschi 2004). Our goal is to show that another type of trait – which involves whether youths externalize blame and among whom this tends to occur – is particularly important for elaborations of strain theory.

<sup>7</sup> Research has also found that depression and delinquency are not independent phenomena; there is substantial co-occurrence of these two conditions among adolescents (e.g., Hagan and Foster 2003; Kaufman 2009). Thus, we do not argue that the pathway from strain to delinquency is uniform or independent of negative conditions such as depressive symptoms; rather, we propose that the association between strain, anger, and

delinquency is conditioned by external attributions of blame that involve tangible others.

<sup>8</sup> Research with primates suggests that getting angry when situations are interpreted as unfair is a typical reaction. Evolutionary psychologists have used this and other evidence to argue that animals, including humans, are “hard-wired” to react to unfair or harmful behavior on the part of others with negative emotions such as anger and anxiety (see Horne [2009] for a concise review of this idea). Thus, it is likely that overcoming – or at least reigning in – such neurological tendencies requires some conventional socializing mechanism; without adequate socialization, perhaps HAB is the natural outcome (Dodge 2006). In a related line of research, children with HAB tend to have greater physiological arousal during stressful interactions, with the stereotypical “hot-headed” reactive aggression ensuing (Hubbard et al. 2002).

<sup>9</sup> Although it would be our preference to test the model we have outlined, the lack of data available that are appropriate for such a test make it impossible to provide an empirical examination in this paper. Moreover, as we suggest later, there are actually several distinct research approaches that are available to test the model. We offer these as an early roadmap to other researchers who may wish to examine HAB’s role in GST.

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**Online citation:** Collins, Peter A., Jonathon A. Cooper, Brady Horn, Mary K. Stohr, Anthony Walsh, Lisa Bostaph, and Edward T. Baker. 2010. "The Cost of Substance Abuse: The Use of Administrative Data to Investigate Treatment Benefits in a Rural Mountain State." *Western Criminology Review* 11(3):13-28. (<http://wcr.sonoma.edu/v11n3/Collins.pdf>).

## The Cost of Substance Abuse: The Use of Administrative Data to Investigate Treatment Benefits in a Rural Mountain State

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**Abstract:** *Findings from cost-benefit evaluations have suggested that the cost of substance abuse treatment is covered by the economic benefits to society. In this research we measure the economic impact of substance abuse treatment in a rural mountain state. Using a novel approach, cost data were gathered from four disparate state administrative databases, which were selected and matched to form one complete data set. A cost-benefit analysis was used to examine the aggregate economic impact of substance abuse treatment. The conservative post treatment outcome of the combined costs revealed a range or \$4.12 to \$3.98 million dollar overall offset, a difference that resulted in 20 to 16 percent savings above the fixed treatment cost. Policy implications are discussed.*

**Keywords:** cost-benefit analysis, treatment, substance abuse, administrative data

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### INTRODUCTION

There are many issues state policy makers must take into consideration when deciding how to allocate scarce economic resources to social service institutions and programs. In order to allocate resources most effectively, state policy makers and practitioners at all levels rely on several sources of information, including empirical

research. The need for empirical research is at a premium in regard to substance abuse treatment specifically, where yearly expenditures for such treatment cost states in the hundreds of thousands, if not millions, of dollars annually (SAMHSA 2008b). Citizens and policy makers alike want to know that money is being spent effectively. Subsequently, an important branch within this body of

substance abuse treatment research centers on economic analyses (Aos, Miller, and Drake 2006; Belenko, Patapis, and French 2005; Dismuke et al. 2008; French, Roebuck, and McLellan 2004; Koenig et al. 2005; Swaray, Bowles, and Pradiptyo 2005; Welsh, Farrington, and Sherman 2001).

Some research on drug and alcohol treatment has focused on efficiency, as measured primarily by recidivism (Welsh et al. 2001). In the current study, we take a different, but related, approach that centers on whether substance abuse treatment renders cost savings as measured by decreases in correctional and medical spending and increased client earnings. We investigate the economic impact of substance abuse treatment on these relatively unexplored social support realms in a rural mountain state (hereafter referred to as Rural State). Analyses are made possible through the combined examination of four administrative databases, which originate from state Health and Welfare, Medicaid, Department of Corrections, and Department of Labor and Commerce agencies. Specifically, we begin to address the question of whether treatment has meaningful and positive effects on social phenomena, such as post-treatment earnings of participants, and whether treatment renders any cost offsets, which may indicate monetary savings at the state level. In regard to the above statement, readers should note that the research design utilized within this study is not strong enough to claim absolute certainty when speaking about causality. This issue is further discussed in the methods and discussion sections below.

This research is guided by Cullen's (1994) contention that social support, in the form of private or public programs, buffers an individual from otherwise criminogenic correlates. Cullen suggested that the more support a person receives the more likely they are to resist and overcome a criminogenic environment. Importantly, Cullen argued that whereas a social support paradigm can retard crime, coercion, another paradigm popular in policy, increases crime (Colvin, Cullen, and Vander Ven 2002). There is empirical support for this contention (Chamlin and Cochran 1997; DeFronzo 1983, 1996; Hannon and DeFronzo 1998; Pratt and Godsey 2003) and implications for the current study, because substance abuse treatment can be seen as a form of social support, and the cost-benefit a positive collateral consequence. Likewise, several researchers have discovered the positive impact (in terms of cost-benefits) and importance of institutional, after-care, and reentry programs for correctional clients and length of and completion of treatment (Belenko et al. 2005; Griffith et al. 1999; McCollister et al. 2003a, 2003b). The current study is unique in that there has been little previous research of this kind conducted in a rural state, and it can therefore set a baseline for future cost-benefit analyses within analogous states. Further, our methodology is novel insofar as we use an amalgam of secondary state-run data sources.

## RURAL DRUG USE

Correctly considered, drug use as a general phenomenon is neither a rural nor an urban issue. Rather, different patterns exist according to the type of drug and the ruralness/urbanicity of the area (Warner and Leukefeld 2001). For example, methamphetamine has historically been a rural phenomenon (Haight et al. 2005; Hunt, Kuck, and Truitt 2006), with use and production generally higher in rural areas than urban (Herz 2000). Although methamphetamine use and production appears to be increasing in urban and suburban areas (Hansell 2006), it still remains mostly a rural concern, concentrated especially in the West and Southwest (Pennell et al. 1999; Kyle and Hansell 2005; Hansell 2006).

Nevertheless, most drug use research has focused on urban areas (Schoeneberger et al. 2006). However, in 2007, although both large metropolitan and small metropolitan residents ages 12 and older reported using illicit drugs twice as much as nonmetropolitan completely rural residents of the same age group, the difference was one of only about four percent (8.3 percent and 8.2 percent versus 4.1 percent, respectively; SAMHSA 2008a). Further, the dynamics associated with drug use in rural areas are often different than those associated with urban areas. For example, given the low populations of rural areas, concomitant with relatively high levels of poverty, rural areas often have low tax bases. This results in less funding and training for police agencies and public drug treatment programs. Also, cultural barriers, illiteracy, and other socio-demographic characteristics of rural residents may preclude them from seeking out treatment (Leukefeld et al. 2002).

Rural and urban drug users are at once similar and different in their use patterns. For example, although substance using arrestees from a rural area were less likely to have used cocaine than their urban counterparts, most other differences in drug use patterns were marginal (Leukefeld et al. 2002). Similarly, although there were some racial differences in drug use patterns among this sample, "statistical control may not reflect reality or characterize possible differences between rural areas, which for this study are generally more White and different culturally than are urban areas" (Leukefeld et al. 2002:723). Other research, however, has found that there are significant and meaningful differences between rural and urban drug users (Warren and Leukefeld 2001). Specifically, rural drug users had both higher rates of lifetime drug use and drug use in the last 30 days. Importantly, these same rural drug users were *less* likely than their urban counterparts to have received treatment. Further, research suggests that between rural and very rural areas there are differences in patterns of drug use, with earlier levels of first drug use and more life-time drug use among rural residents than among very rural residents (Schoeneberger et al. 2006).

It is important, therefore, to consider drug use and treatment in a rural context. Although good research into the differences and similarities of urban versus rural drug use have been done, it is a literature that remains to be expanded on. The research suggests that rural residents do not take advantage of treatment for a host of reasons; this has direct implications for the cost-saving potential of rural treatment programs. The costs of substance use are considered in the next section.

## MEASURING THE COST OF SUBSTANCE ABUSE

In 2002, illicit drug users incurred more than \$180 billion of cost in the United States. Of that amount, 71.2 percent was due to loss of employment productivity, and 8.7 percent was due to healthcare costs (Necochea 2006). Such costs are not unique to the United States: Rehm and colleagues (2006) report that the totality of substance abuse in Canada in 2002 was almost CA\$40 billion. Similar to the United States, the bulk of this amount was loss of employment productivity (61%) (see ONDCP 2004). Healthcare costs comprised 22 percent of the amount, and law enforcement expenses comprised 14 percent. Per capita, alcohol abuse cost Canadian citizens CA\$463 while illegal drug abuse cost CA\$262. It is no wonder, given these costs, that policy makers and program administrators are particularly interested in how economically effective substance abuse treatment programs are (Dismuke et al. 2004).

Generally, cost-benefit evaluations have suggested that the cost of substance abuse treatment is covered by the economic benefits to society (see Aos et al. 2006; Zavala et al. 2005; Holder 1998). Importantly, studies that have utilized lengthy follow-ups have found little to no diminution of savings or increase of costs over time (Koenig et al. 2005; Necochea 2006; Holder 1998; Franey and Ashton 2002; Dismuke et al. 2004). Although cost-benefit analyses are generally employed on unspecified populations of substance abusers, several studies have investigated specific substance abuse populations (along with issues surrounding cost estimation), with results similar to the general conclusion that society saves money by investing in substance abuse treatment. For example, Daley and colleagues (2000) explored the cost-benefit of substance abuse treatment for pregnant women and found that regardless of the type of treatment employed (e.g. detoxification, methadone, residential, out-patient, or a combination of residential and outpatient), the benefits outweighed the costs.

Similarly, Holder (1998) examined numerous cost-benefit studies and differentiated between groups treated by the substance being abused (alcohol or illicit drugs) and found that drug abusers and alcoholics who did not receive treatment utilized the healthcare system twice as much as

those who had received treatment. His research also suggested that the costs of healthcare post-treatment remained below the costs of healthcare pre-treatment for drug and alcohol abusers, well into four-year evaluations. Finally, in regard to alcohol abuse specifically, Holder (1998) suggests that treatment for younger abusers netted greater benefits than for adult abusers, implying the importance of early intervention (see also Koenig et al. 2005). Franey and Ashton (2002) also found similar results in a cost-benefit evaluation of cocaine treatment. As they point out, longer treatment is better, not only clinically, but also economically (Franey and Ashton 2002; see also Taxman and Bouffard 2000). This suggestion is corroborated by Koenig and colleagues (2005), who found that, although the largest general cost-benefit ratio was found within the first six months post-treatment, productivity earnings continued to increase well into the 30-month follow-up period. Similar results have been found for cocaine treatment in terms of the cost of crime to society (Flynn et al. 1999; Hubbard, Craddock, and Anderson 2003).

Other examples of economic analyses have focused on the difficulty surrounding the estimation of costs and targeting multiple outcomes associated with substance abuse treatment, such as reductions in recidivism, arrests, and increases in employment or earnings (French 2000; Sindelar et al. 2004; Zavala et al. 2005). Additional studies have provided comparisons of evaluative cost studies in the community and in the prison setting (Warren et al. 2006), as well as programs aimed at increasing production levels of employees (Jordan et al. 2008), while other studies differentiate between treatment populations such as pregnant women, the mentally ill, and sex offenders (Daley et al. 2000; French et al. 2000; Shanahan and Donato 2001). Generally, what most of these studies have in common is the finding that treatment is more cost effective than no treatment or incarceration.

There are numerous economic studies of treatment related programs at various levels, from individual program evaluations to groups and aggregate level analyses. Some economic studies focus on cost-effectiveness or cost-benefit and cost-offset analyses and are an extension of a general evaluation done at the program level (Swaray et al. 2005). Well-designed (experimental or quasi-experimental) studies at the program level build in a counterfactual, or evaluate programs and/or program components in order to discover what particular treatments or interventions produce the best results (e.g. Patton 1997). As Swaray, Bowles, and Pradiptyo (2005:159) dutifully note in their literature review on economic analysis, there is a "dearth of experimentally rigorous evaluation of criminal justice policies." Given all of the ethical considerations surrounding the denial of treatment to people in need, this is of no surprise to those researchers attempting to unearth and clarify best practices in substance abuse treatment.



However, there are answers to many of the economic questions surrounding treatment, and there are many examples of studies that direct our attention to what really works (see Welsh et al. 2001). One approach, taken here, focuses on the state-level treatment system as a whole in order to clarify or enumerate aggregate level impacts, in the form of economic savings, associated with substance abuse treatment (Alterman, Langenbucher, and Morrison 2001; Cartwright 2000; Godfrey and Parrott 2000).

## RESEARCH DESIGN

The general design of this research is framed by four main databases. Rural State's Department of Health and Welfare (DHW) manages the database that identified the population of substance abuse clients to be analyzed here. This database is called the Substance Abuse (SA) database.<sup>1</sup> The SA data include many different elements consisting of demographic information, treatment unit frequency and cost (which were deflated/ converted into real terms (2009 dollars) by using monthly urban (or medical) CPI (the Consumer Price Index is "an index of prices used to measure the change in the cost of basic goods and services in comparison with a fixed base period" American Heritage Dictionary 1992:188) figures from U.S. Department of Labor, funding source, primary substance of abuse, referral source, employment, treatment setting, and county of residence. The three branching databases are managed by the Rural State's Department of Labor and Commerce (DLC), Medicaid, and the Department of Correction (DOC), and were linked together using the identified SA study group population. Of the 2,996 substance abuse clients, 1,315 were, at some point within the total and approximate five-year study period, incarcerated or supervised by the DOC; all 2,996 clients had DLC records; and 250<sup>2</sup> matched within the Medicaid database.

### Sample Selection

Only clients who were eighteen years or older within the treatment range time period were included. In order to fulfill the selection criterion, each client had to first enter treatment (community based, publicly funded) between 7/1/02 and 6/30/03 (2003 State Fiscal Year or SFY). Only those clients who reported an episode for the first time (SFY 03 range only) within the SA database were included. This means that if client A received benefits from the DHW in 2000 and again in our study year 02-03, then client A would be disqualified from this study. First, this was done in order to obtain an unambiguous and arguably sound population of individuals who received services from the DHW for the first time during the treatment period, therefore creating a solid benchmark and resource for future analysis, and creating continuity for the

present study. To clarify, first-time here means the first time each included client received treatment benefits through the DHW system. It does not necessarily mean that each client did not have a single or multiple treatment episodes prior to receiving benefits within the unique treatment episode range studied here. Additionally, at the time this research was conducted, the ability to obtain and measure multiple treatment episodes for each individual client was hampered by data availability and quality, expense, and time. Moreover, the analyses presented here represent a necessary first step for this state system; to get a good idea of the nature of the data and the effects of treatment on clients who receive DHW services for the first time.

Each client's episode range is unique. Therefore, the episode is tracked by a treatment service date, which is defined within the SA system as the date identifying when the service was entered on the system, and a service end date, which is defined as the date the service treatment ended or for ongoing treatment, the last day it was billed for. The follow-up or post interval for this study was set at the point of treatment discharge. Therefore, treatment benefits and costs data associated with corrections, earnings, and medical treatment were not gathered during each unique treatment episode. However, the cost of treatment is included in the final cost-benefit calculation. Treatment costs were calculated by units (hours and days) of treatment that were billed out to the state and were deflated and converted to real values (2009 dollars) using monthly urban CPI figures from U.S. Department of Labor.<sup>3</sup> Unfortunately, the DHW data employed here do not provide information on type of treatment, only real cost per unit/hour of service.

Table 1 (below) provides a brief descriptive overview of the entire SA population. Over half of the SA study population were unemployed, lacked insurance, and were treated in the community. A little under half were under DOC supervision or incarcerated, and one-third did not finish high school. For half of the SA study population, alcohol was the primary substance of abuse, while methamphetamine was proportionately the second, representing the primary drug of use for about one-third of the population. About one-third of the population was female, a small number of whom were pregnant or had a dependent child, which are primary target populations in Rural State. Finally, the majority of clients are classified as White, which is consistent with the general racial composition of Rural State.

Briefly, the matched Medicaid data captured a total of 250 substance abuse client records. We found that generally the Medicaid population, though smaller, at face value closely resembled the larger samples on a number of important indicators. For example, 96.8 percent of the total matched Medicaid clients received their substance abuse treatment from a freestanding or community based

**Table 1. Population Characteristics: Selected Descriptive Highlights (SA N= 2,966)**

| Heading            | Category                      | Mean | Frequency | %    |
|--------------------|-------------------------------|------|-----------|------|
| Age                |                               | 33   |           |      |
| Education          | Graduated High School         |      | 1,913     | 64.5 |
|                    | Did Not Graduate              |      | 1,053     | 35.5 |
| DOC Involvement    | Yes                           |      | 1,315     | 44.3 |
|                    | No                            |      | 1,651     | 55.7 |
| Client Type        | Dual Diagnosis                |      | 277       | 9.3  |
|                    | Pregnant                      |      | 21        | 0.7  |
|                    | Woman and Dependent           |      | 207       | 7.0  |
| Employment         | Unemployed                    |      | 1,628     | 54.9 |
|                    | Full Time                     |      | 737       | 24.8 |
|                    | Part Time                     |      | 389       | 13.1 |
| Living Arrangement | Homeless                      |      | 195       | 6.6  |
|                    | Dependent                     |      | 792       | 26.7 |
|                    | Independent                   |      | 1,979     | 66.7 |
| Insurance          | Yes                           |      | 306       | 10.3 |
|                    | No                            |      | 2,591     | 87.4 |
|                    | Unknown                       |      | 69        | 2.3  |
| Tx Setting         | Free Standing Community Based |      | 2,883     | 97.2 |
| Primary Substance  | Alcohol                       |      | 1,509     | 50.9 |
|                    | Methamphetamine               |      | 798       | 26.9 |
|                    | Marijuana                     |      | 519       | 17.5 |
| Gender             | Female                        |      | 1,007     | 34.0 |
|                    | Male                          |      | 1,950     | 65.7 |
| Race               | White                         |      | 2,651     | 89.4 |
|                    | Non-White                     |      | 315       | 10.6 |
| Marital Status     | Divorced                      |      | 696       | 23.5 |
|                    | Married                       |      | 540       | 18.2 |
|                    | Single                        |      | 1,401     | 47.2 |

\*Some percentages do not add up to 100% due to a small number of missing data and rounding and some variable categories are not included here.

treatment setting/facility. Furthermore, 57.6 percent of the Medicaid clients were categorized as unemployed prior to treatment. Additionally, 59.2 percent reported not having insurance prior to treatment, and the primary substance of abuse was alcohol (43.2%).

### Medicaid Database

For the purposes of this current examination, which partly represents a functional construction of a quality baseline study group or benchmark, the analysis was focused on Medicaid cost of service (COS) groups (which are made up of CPT codes<sup>4</sup>). These COS groups are coded most importantly as inpatient and outpatient and were collected at 18, 15, 12, 9, 6, and 3 month intervals pre and post treatment episode (each client also had continuous eligibility<sup>5</sup> during the study timeline; see Alterman et al.

2001; Reutzell, Becker, and Sanders 1987). Briefly, both inpatient and outpatient COS groups include those costs associated with mental health diagnosis, labs, and surgery services (CPT codes), which are provided by Medicaid. COS data are data that reflect the nominal costs of billed services attached to each individual client and are not estimations. The matching process identified a total of 250 client records within the Medicaid database. Medicaid cost outcomes were deflated and converted to real values (2009 dollars) using monthly medical CPI figures from U.S. Department of Labor.

### Department of Labor and Commerce

The Rural State's Department of Labor and Commerce (DLC) database holds valuable information centering on client earnings. This matched information has

produced an economic observation of post-treatment set against the backdrop of pre-treatment episode/service. The matching procedure resembled that of the Medicaid process except results were reported in quarters (due to the availability of complete data). Earnings data are accessed five quarters pre, and five quarters post, treatment episode/service. DLC data does not capture daily, weekly, or monthly breakdowns of hours or earnings. Additionally, these data only reflect taxable earnings that were reported to the Rural State DLC and do not reflect client earnings that were a result of illicit activities or valid work-related earnings that were not accounted for.

These data, in addition to a dollar amount differential, have proven to be a crucial element in the understanding of substance abuse in Rural State and are addressed within the analysis section of this paper. The matching process identified a total of 2,966 clients within the DLC database; all of the available indicators were positively matched with the SA data. Earnings data were initially reported as nominal (actual) values. However, pre and post treatment episodes were marked by a specific date, which enabled the nominal earnings to be deflated into real terms (2009 dollars) by using monthly urban CPI figures from U.S. Department of Labor.

### Department of Corrections

The matching process identified 1,315 client records within the DOC database. Information was gathered on rates of incarceration and supervision (measured in days). The DOC provided information on the average cost per day, per client for incarceration and supervision. For SFY 03' the *average* cost per day, per client is \$3.50 for supervision and \$50.23 for incarceration or prison. Thus, costs were estimated by multiplying the average costs for supervision and incarceration with the number of days pre and post treatment for each client. These cost estimations were also deflated using the urban CPI figures from the U.S. Department of Labor.

## ANALYSIS

Previous research clearly indicates that some treatment is positively associated with reductions in criminal offending and substance abuse (e.g., Andrews et al. 2001; Henning and Frueh 1996; Knight, Simpson, and Hiller 1999; Lipton 1998; Martin et al. 1999; Pearson and Lipton 1999; Wexler et al. 1999). There are also indications that the longer treatment is continued, the greater the social benefits achieved (Hiller, Knight, and Simpson 1999; Knight et al. 1999; Martin et al. 1999; Wexler et al. 1999). Our focus here is on the cost benefit of treatment on prisons and community corrections and Medicaid spending and client earnings. Therefore, we expect that the overall cost benefit of treatment will be

positive. In this context, we expect that spending (correctional and medical) will decrease and that client earnings will increase after treatment.

In order to measure the economic cost of substance abuse treatment, researchers generally employ one of three evaluation techniques. They may simply calculate the costs of treatment and compare those costs to non-monetary outcomes, such as number of days of substance abuse pre- and post-treatment; this process is generally referred to as a cost-effectiveness analysis. Another method, generally called cost-offset analysis, focuses on the difference post intervention of a cost trajectory compared to an outcome. The third, and possibly the most rigorous, of the three methods researchers attempt to employ is referred to as cost-benefit evaluation or analysis (e.g. see Aos et al. 2006). Cost-benefit evaluations compare the actual monetary cost of treatment to several economic based outcomes pre- and post-treatment (Zavala et al. 2005). Outcomes generally include the cost of healthcare, loss of employment productivity (absence from workforce due to incarceration for example), and the costs associated with criminal activity. This latter category includes costs connected to victimization and those related to the criminal justice system, including law enforcement, legal, and incarceration/correctional costs (Daley et al. 2000; Koenig et al. 2005; Zavala et al. 2005). Costs associated with welfare and Medicaid benefits have also been employed in cost-benefit evaluations (Necochea 2006). As is illustrated by the research, all are valid benefit targets that some authors choose to differentiate, while others combine all the accrued benefits into one aggregate outcome measure (French 2000; see also Koenig et al. 2005 for a discussion on this issue).

Cost is conceptualized in the current study as the net cost (estimated and/or measured as a dollar amount and net benefit as captured by the earnings data) incurred through four social service realms: (1) earnings, (2) medical care costs, (3) corrections, and (4) substance abuse treatment. A cost-benefit ratio is calculated by taking the pre-treatment estimated net costs in the four service areas and comparing those costs to those incurred during the post-treatment period. The pre-treatment costs minus the post-treatment costs reveal the dollar amount offset or net benefit. The information used to estimate these costs include a combination of accounting or claims data, employment history/socioeconomic status, criminal justice system involvement, alcohol and drug use, and medical care (see Walker et al. 2004; Alterman et al. 2001). Some cost measurements are directly applicable to a dollar amount (Reutzel et al. 1987), while non-monetary cost measures, such as social costs, quality of life, or criminal victimization, are more difficult to enumerate (French et al. 2000; Belenko et al. 2005) and often center on effectiveness of service and treatment as an outcome measure of substance abuse treatment (National Evaluation Data Services (NEDS) 2002).

The cost measures employed in this research focus on data from administrative sources regarding client employment (earnings), Medicaid, criminal justice involvement (correctional costs), and treatment costs. These four areas are related insofar as a substance abuse problem may affect each of these areas in tandem. Thus, substance abuse has a compounding effect on costs. However, the main concern while collecting and matching data from each agency was data quality on the *post side* – meaning that after a certain point in time, post-treatment, the data were deteriorating because of agency reporting practices and/or timelines. For example, for a medical claim to move from service for a client to payment then to be recorded may take up to a year. Additionally, there are no solid numbers on the average time it takes employers to report employee earnings to DLC. Given these issues and in consultation with data managers at these agencies, we chose to capture the most reliable data, which resulted in different time coverage by agency within the approximate five year study period.<sup>6</sup> In order to address the concern that the cost benefit ratio, which utilizes all available and time-varying cost data, produces a biased estimate, we present two separate cost benefit outcomes; the first includes all data that were provided by each agency, and in the more conservative second, the DOC data were cut from 24 months to 18 months pre and post in order to provide a cleaner time match with Medicaid (18 months pre and post) and DLC (15 months pre and post). These outcomes are presented and discussed below (see also endnote 6 for a more detailed discussion on “time to return on investment”).

In order to lend a bit more support to the cost benefit outcomes (due to the study design limitations), a simple OLS regression was performed on post treatment client earnings. To begin, both pre and post earnings variables were skewed (Pre = 5.48, Post = 4.42) and therefore were adjusted using a natural log transformation. All other variables were within the limits of normality. The variables included within the model included: age, gender (M, F), race (White = 0, Minority = 1), employment status (pre treatment: part time, full time and unemployed), educational attainment (pre treatment: no high school diploma, high school grad, and some college and above), living status (homeless, dependent, or independent), and primary drug of choice (self reported alcohol, meth, and marijuana). The model notes in Table 4 (at the end of the results section) indicate dummy reference categories as well as some other coding considerations.

## RESULTS

The study hypothesis was supported in that the reported earnings post-treatment increased by approximately 10 percent in the aggregate, and DOC and inpatient and outpatient Medicaid spending decreased post episode. Earnings trends<sup>7</sup> (average, mean earnings per quarter) for pre and post per quarter indicate that regardless of inflation, the reported earnings trend pre-treatment, leading up to the episode, is negative, and the reported trend post-treatment is positive (see Figure 1).

Figure 1. Pre and Post Treatment Episode Earnings Trends (N=2,966)

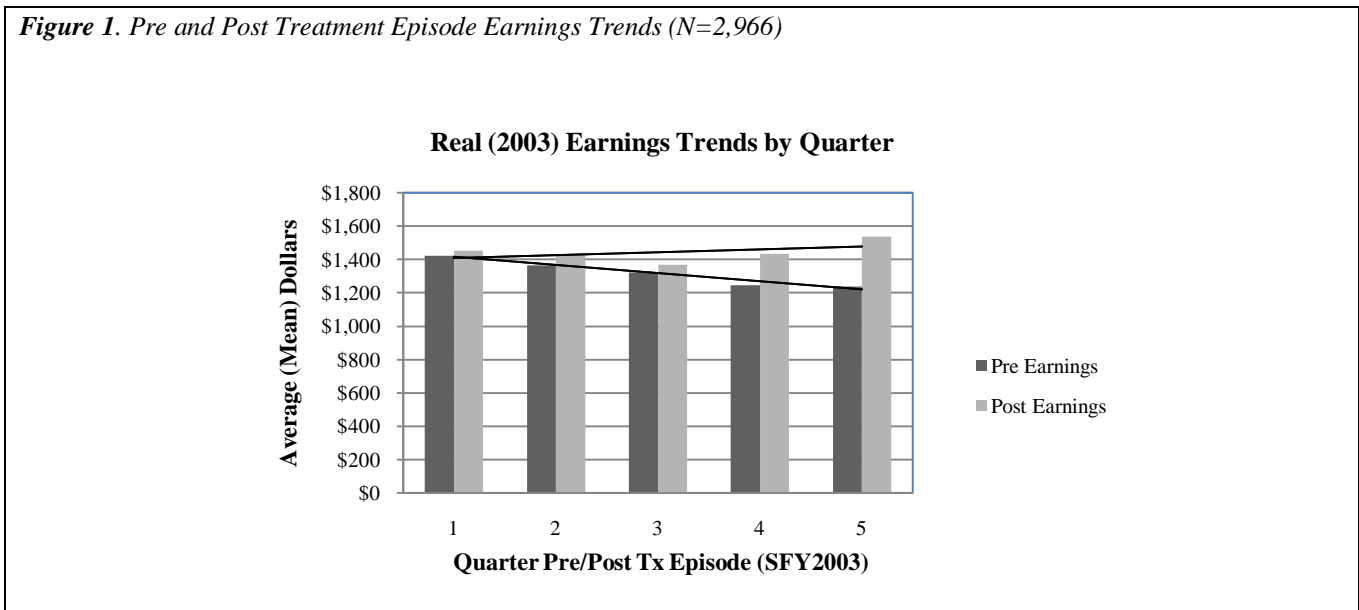


Table 2 highlights the total combined cost offset for the study group population (N= 2,966). The analysis for the combined groups reflected positive outcomes: the result of the combined costs, representing the three major areas of interest (earnings, health and corrections), revealed a \$4.12 million overall offset, and when

combined with the DHW cost of treatment, the difference resulted in 20 percent savings above the fixed treatment cost. This may be interpreted as: for every \$1.00 invested in substance abuse treatment there is a \$1.20 in general savings.

**Table 2. Combined Cost Offset and Benefit Ratio Post Treatment Episode (N=2,966)**

| Time Period (pre/post)             |               | Pre          | Post            | Offset        |
|------------------------------------|---------------|--------------|-----------------|---------------|
| Inpatient <sup>1</sup> (Medicaid)  | 18 months     | \$453,915    | \$293,793       | \$160,122     |
| Outpatient <sup>1</sup> (Medicaid) | 18 months     | \$262,393    | \$183,052       | \$79,342      |
| Recorded Earnings <sup>2</sup>     | 15 months     | \$22,719,884 | \$24,885,559    | \$2,165,675   |
| Days Incarcerated <sup>3</sup>     | 24 months     | \$5,472,748  | \$4,099,599     | \$1,373,149   |
| Days Supervised <sup>3</sup>       | 24 months     | \$794,899    | \$449,195       | \$345,704     |
| Total<br>Offset/Benefit            |               |              |                 | \$4,123,992   |
| Cost of Treatment <sup>2</sup>     | Total Benefit | Outcome      | Percent Savings | Ratio         |
| \$3,448,658                        | \$4,123,992   | \$675,334    | 19.58 (^20%)    | \$1.20/\$1.00 |

1. Deflated using monthly medical CPI figures from U.S. Department of Labor.  
 2. Deflated using monthly urban CPI figures from U.S. Department of Labor.  
 3. Average cost per day of incarceration and supervision used from figures provided by Rural State DOC.  
 These figures were also deflated using monthly urban CPI figures from U.S. Department of Labor.

The analysis for the combined and time-adjusted groups still reflected positive outcomes. The adjusted outcome of the combined costs, revealed a \$3.98 million overall offset, and when combined with the DHW cost of

treatment, the difference resulted in 16 percent savings above the fixed treatment cost. This may be interpreted as: for every \$1.00 invested in substance abuse treatment there is a \$1.16 in general savings.

**Table 3. Time-Frame Adjusted Combined Cost Offset and Benefit Ratio Post Treatment Episode (N=2,966)**

| Time Period (pre/post)             |               | Pre          | Post            | Offset        |
|------------------------------------|---------------|--------------|-----------------|---------------|
| Inpatient <sup>1</sup> (Medicaid)  | 18 months     | \$453,915    | \$293,793       | \$160,122     |
| Outpatient <sup>1</sup> (Medicaid) | 18 months     | \$262,393    | \$183,052       | \$79,342      |
| Recorded Earnings <sup>2</sup>     | 15 months     | \$22,719,884 | \$24,885,559    | \$2,165,675   |
| Days Incarcerated <sup>3</sup>     | 18 months     | \$4,386,619  | \$3,152,120     | \$1,234,499   |
| Days Supervised <sup>3</sup>       | 18 months     | \$703,409    | \$357,512       | \$345,897     |
| Total<br>Offset/Benefit            |               |              |                 | \$3,985,535   |
| Cost of Treatment <sup>2</sup>     | Total Benefit | Outcome      | Percent Savings | Ratio         |
| \$3,448,658                        | \$3,985,535   | \$536,877    | 15.56% (^16%)   | \$1.16/\$1.00 |

1. Deflated using monthly medical CPI figures from U.S. Department of Labor.  
 2. Deflated using monthly urban CPI figures from U.S. Department of Labor.  
 3. Average price per day of incarceration and supervision used from figures provided by Rural State DOC. These figures were also deflated using monthly urban CPI figures from U.S. Department of Labor.



The OLS regression results (see Table 4) lend some further support to the findings presented here and provide additional insight to the nature of these data. Number of days in treatment was significantly ( $p < .05$ ) related to post treatment earnings. This variable is interpreted as for every one unit increase in treatment days there is a 0.2 percent

increase in post treatment earnings. The age variable is significant ( $p < .001$ ) although negatively related to post treatment earnings. This is interpreted as those clients who are younger have an increased chance of making more money post treatment, or for every one year of age post treatment earnings decrease by 4.7 percent.

**Table 4.** OLS Regression for Post-Treatment Client Earnings

| Variables                     | B         | Beta   | Std. Error | t      |
|-------------------------------|-----------|--------|------------|--------|
| Gender                        | 0.182     | 0.020  | 0.155      | 1.176  |
| Tx Days                       | 0.002*    | 0.039  | 0.001      | 2.294  |
| Race <sup>3</sup>             | 0.271     | 0.020  | 0.229      | 1.186  |
| Age                           | -0.047*** | -0.117 | 0.007      | -6.440 |
| Ed High School <sup>1</sup>   | 0.191     | 0.023  | 0.157      | 1.219  |
| Ed College <sup>1</sup>       | 0.292     | 0.025  | 0.225      | 1.299  |
| Employment FT <sup>1</sup>    | 0.694***  | 0.071  | 0.176      | 3.945  |
| Employment PT <sup>1</sup>    | 0.758***  | 0.061  | 0.217      | 3.429  |
| Pre Tx Earnings <sup>2</sup>  | 0.486***  | 0.464  | 0.018      | 26.932 |
| Homeless <sup>1</sup>         | -0.417    | -0.024 | 0.300      | -1.389 |
| Dependent Living <sup>1</sup> | -0.083    | -0.009 | 0.170      | -0.486 |
| Meth <sup>1</sup>             | 0.452*    | 0.045  | 0.184      | 2.450  |
| Marij. <sup>1</sup>           | -0.104    | -0.010 | 0.193      | -0.542 |
| Constant <sup>2</sup>         | 3.768***  | --     | 0.349      | 10.809 |
| N                             | 2633      |        |            |        |
| F                             | 76.528*** |        |            |        |
| R <sup>2</sup>                | .275      |        |            |        |

Note: \* $p < .05$ , \*\*  $p < .01$ , \*\*\* $p < .001$   
 1. Education dummy reference category = did not graduate high school; employment dummy reference category = unemployed; living arrangement dummy reference category = independent living; substance of abuse dummy reference category = alcohol.  
 2. In order to adjust for skewness, both pre and post client earnings were transformed via natural log.  
 3. Race coded White (0), Minority (1).

The interpretation of the pre-treatment (Tx) earnings variable ( $p < .001$ ) in this model is a bit different because it too was adjusted using a natural log transformation. Accordingly, these data indicate that a one percent increase in average client earnings pre-treatment yields a 48.6 percent increase in client earnings post-treatment. Additionally, those significant independent variables ( $p < .001$ ) that are dummy coded (Employment FT/PT & Meth) also must be interpreted differently.<sup>8</sup> Results show that for client full time employment (FT), there was 100 percent relative increase in  $E(Y)$  when dummy is turned on (unemployment is the reference category, see also endnote 8). Likewise, for client part time employment (PT), there was a 113 percent relative increase in  $E(Y)$  when the dummy variable is turned on. The results show that for client substance of abuse (Methamphetamine) there was a 57 percent relative increase in  $E(Y)$  when the dummy variable is turned on (reference category is alcohol).

Regression diagnostics did not indicate any problems with this model.

## DISCUSSION

Those who labor in the public sector are constantly being called upon to make do with less and in the current economic environment (latter part of the 2000 decade), to make cuts. Too often, these cuts are made of programming that is, ironically, central to reducing costs. There is now a body of research that indicates, for instance, that treatment programming that employs best practices can be successful in reducing the recidivism of inmates (Andrews et al. 2001; Henning and Frueh 1996; Knight et al. 1999; Lipton 1998; Martin et al. 1999; Zavala et al. 2005). Moreover, there are studies emanating out of a number of states that indicate related costs such as Medicaid, unemployment insurance, and welfare might be reduced when people with a substance abuse problem receive the appropriate

treatment (Necochea 2006; Swaray et al. 2005). Such cost benefit analyses, such as those presented here, provide researchers and policymakers with an alternate view of the “efficiencies” achieved when treatment for the poor gets cut. Our data indicate that doing so may result in higher costs in terms of other program provision rather than the expected, and hoped for, reductions in overall government expenses.

To reiterate, the first overall cost benefit analysis uncovered a \$4.12 million overall offset, and when combined with the DHW cost of treatment, the difference resulted in 20 percent savings above the fixed treatment cost. Again, this may be interpreted as: for every \$1.00 invested in substance abuse treatment there was a \$1.20 in general savings. The second and more conservative analysis for the time-adjusted data still revealed a positive outcome. These combined costs, revealed a \$3.98 million overall offset, and when combined with the DHW cost of treatment, resulted in a 16 percent savings above the fixed treatment cost. This may be interpreted as: for every \$1.00 invested in substance abuse treatment there is a \$1.16 in general savings. These conservative findings may indicate that, through the utilization of substance abuse treatment, Rural State saved money (\$4.12 to \$3.98 million, respectively) in the criminal justice and health fields and stimulated increases in client earnings. Furthermore, it is very important to understand that this analysis is limited by the lack of available data enumerating service and social costs derived from arrest records and victimization costs (among others) that may have rendered the identification of even greater savings.

The design of this research is limited by the time period covered, although secondary analysis of administrative data can be a methodologically sound approach which provides clear insight into the research questions (Alterman et al. 2001). Also, there was no comparison group to test whether the cost-offsets reported here are directly related to treatment or not. Therefore, statements regarding a direct relationship between treatment and outcomes cannot be made at this time. We also acknowledge that we only include those individuals who entered treatment for the first time and these findings may not apply to those who enter treatment multiple times. As with any research involving the analysis of secondary data, the original data collection techniques may promote biased conclusions in either direction. Because this research is derived from four disparate databases, the use of which focus on fiscal management, internal/external process evaluations, and client services, findings should be interpreted with caution. Additionally, we did not have access to information on the type of specific treatment that each client received. It is for this reason that we cannot assess whether a particular type of treatment is more cost-efficient with some clients over others. However, the final cost benefit number(s) lack the estimated positive impact of law enforcement data in the form of arrests pre- and

post-treatment, victim associated costs, and societal costs. With the addition of these data, it is possible that the cost offset or complete cost-benefit ratio number could be much greater than the amounts found in this research.

Despite these limitations, the savings we did find are comparable (in terms of trends within the selected cost categories) to those found in a study by researchers at UCLA in a report submitted to the California Department of Alcohol and Drug Programs in 2006 (Longshore et al. 2006). The researchers examined the cost-offset/benefit of the California Substance Abuse and Crime Prevention Act of 2000 (SACPA). SACPA requires that non-violent drug offenders be offered probation and community based drug treatment as a sentence rather than incarceration. In examining the program, the researchers found that there was a general savings of \$2.50 for every \$1.00 invested per offender the first year and a similar savings of \$2.30 for every \$1.00 in the second year. Further, those offenders who completed treatment resulted in a cost-offset of \$4.00 for every \$1.00 invested. Although costs incurred through treatment, probation, and healthcare increased under SACPA, ultimately, savings were offset as a result of cost reductions relating to jail, prison, arrest, and conviction costs, as well as tax savings.

Similar to previous studies (McCollister et al. 2003a, 2003b; Griffith et al. 1999; Belenko et al. 2005), length of treatment was positively related to post treatment earnings. Although increases in earnings per added treatment day (0.2%) are small, they do add up (e.g. +30 days = a 6% increase, respectively). As stated previously, Holder (1998) suggests that treatment for younger abusers netted greater benefits than for adult abusers, implying the importance of early intervention (see also Koenig et al. 2005). The findings related to age here may also reflect this general pattern. The findings in regard to employment status and pre-treatment earnings are not surprising given the argument that those clients who have full and part time employment should naturally earn significantly more than those clients who are unemployed. Finally, the finding that clients who indicated that methamphetamine was their primary substance of abuse had a 57 percent relative increase in post treatment earnings may be explained by highlighting level of risk. Simply, those clients who reported alcohol (a “legal” substance) as their primary substance of abuse may be considered more stable and therefore patterns of relative change in earnings pre to post treatment may be stronger for the more risky meth-addicted clients. To reiterate, clients who received treatment for alcohol had higher levels of pre-treatment earnings than clients receiving services for meth addiction.

There have been few studies that have focused on the possible relationships and outcomes of some aspects of substance abuse and the resulting social, as well as, economic costs incurred (Carey and Finigan 2004; Domino et al. 2005; Godfrey, Stewart, and Gossop 2003). To date, these studies have strengthened quantitative and qualitative

methodological techniques for this kind of research. They have also produced important information on the efficiency, effectiveness, costs, and benefits of substance abuse treatment. Results from these studies have most likely produced policy updates (health, public policy and planning, and law enforcement) and changes within the infrastructure of the study population, whether it is local, state, or on a national level (Anderson et al. 1998).

In Rural State, research studies that address concerns centering on the economic costs of substance abuse treatment are scarce. A strong recommendation is to build a network of researchers and key stakeholders through the replication and integration of similar statewide studies. This group of researchers and practitioners would be responsible for continuing similar research, the development of a more in-depth understanding of the substance abuse treatment and rehabilitation system in Rural State, and as partners, work to break down data sharing walls that currently impede future research, while remaining sensitive to privacy requirements.

Additionally, given the nature of the cost benefit research that utilizes administrative data, such as those employed here, we can make the following methodological recommendations for future research in particular: (1) in regard to the time to return on investment issue and post-data quality, data should cover at least two years out pre and post, if not longer. This is essential to gaining a valid cost benefit estimate, and given the problems associated with institutional reporting processes, one should add between one to two additional years to the targeted or selected years of study (situated pre and post around a treatment episode); (2) future research should seek an answer to both the "horizon" question (when or how much time does it generally take for a return to be seen on the investment) and the question around the flattening of benefits (for example: how long does it take before increases in earnings level out, or decreases in Medicaid spending or DOC spending level out?) in order to assess the stability of treatment outcomes over time within Rural State (see Yates 1999; Hubbard et al. 2003).

At the outset of this research, one driving force that helped in breaking down barriers (data sharing, communication, and shared goals, etc.) between disparate agencies was the notion that client(s) "claimed" by Health and Welfare, for example, were the same client(s) receiving services from the DOC, Medicaid, or both; these agencies are serving a large number of the same individuals. Therefore, inter and intra-agency communication seems to be one area that can be improved in order to better service clients and the community in general. Second, as stated in the introduction, making decisions on how to allocate scarce economic and social resources in regard to service recipients is difficult. Dually problematic for many state agencies is the allocation of internal agency resources. For that reason, state agencies and key community stakeholders should continue to build

networks with university and other researchers, thereby increasing social capital and empirical output, which theoretically should increase agency effectiveness and efficiency.

It is important to note that the areas of focus within this analysis (earnings, health benefits, corrections, and treatment) are uniquely related. Therefore, the effects of substance abuse have a compounding effect on costs, and these costs are interconnected. Concomitantly, the effects of treatment, should they be positive, have the potential to also have compounding prosocial effects. For example, increases in earnings, changes in lifestyle, and decreases in health problems appear to be related to participation in treatment; therefore, movement in a positive direction in one category may well influence progress in another. For that reason, *the effort to improve substance abuse treatment services should be understood as a cooperative effort with collateral effects and should be analyzed as such.*

In his identification of a Social Support Paradigm, Cullen (1994) devised a method for understanding the collateral positive effects of support for distressed and criminogenic individuals in communities. His contention is that social support, in the form of programs, policies and practices that buffer the harsh realities of existence for those in need, are likely to reduce criminal involvement, no matter how that support is delivered (e.g. governmental or private programs). Substance abuse treatment, provided free of charge to those addicted and poor individuals included in this study, might be seen as the kind of social support that would reduce criminal involvement and increase employment and earnings. Of course, aggregate decreases or increases in cost or monetary earnings cannot be attributed to treatment alone. The pre-post changes illustrated here, however, may be correlated to substance abuse treatment.

There has been no similar research in Rural or many other states. It is hoped, therefore, that these findings might be replicated and expanded on (with the inclusion of arrest data, victim costs, and the expansion of health related data to non-Medicaid recipients) in both Rural and other states. If the finding holds true in future studies that treatment costs are more than offset by benefits (such as increased earnings and decreased correctional costs), treatment funding should be expanded in general. However, future research in Rural State should move from the aggregate findings presented here to empirical investigations regarding treatment targets, efficiency (as measured by recidivism), best practices, and specific treatment populations (who benefits most).

## Endnotes

<sup>1</sup> The SA data are gathered at a few stages. When a client first contacts the contracted managing service provider, demographic information is collected along with

materials from a short pre-assessment. The client is then directed into a full assessment. Once this assessment is done, the client then contacts the managing service provider to receive authorization for treatment. The treatment facility then bills the managing service provider for services rendered to the client. Data are gathered at each of these stages for each client who receives benefits. Each client is assigned a unique identification number. This number follows each client continuously through the treatment episode. These numbers, along with client social security numbers, served as key identifiers in matching case to case within the branching databases. We provide an illustration of the matching method in appendix A.

<sup>2</sup> Because the treatment these clients received was publicly funded, one might question why only 250 records were matched from SA to Medicaid. To answer this question, the final number of matched records was influenced by our selection criterion. Previous research has discussed the problems associated with lack of continuous benefit eligibility throughout a study period (Reutzler et al. 1987). Therefore, our first and main matching and selection criterion was that each client had to have continuous eligibility throughout the entire study period (18 months pre and post treatment, including treatment episode length).

<sup>3</sup> Treatment units (hours and days) and actual billed costs data were provided by DHW per client during the 03' SFY. Unfortunately, these data did not contain any information on treatment modality so we are unable at this time to adjust for cost variation by treatment type.

<sup>4</sup> SA client identifiers were dispatched through the Rural State's Medicaid database and matched to services and benefits. The Medicaid database enlists and groups several levels or layers of data within the Medicaid database. The lowest level or most detailed field groups data by diagnostic codes. These codes are called ICD-9 codes. Each state collects and records their data slightly differently depending on the breadth of coverage of these codes and medical coverage. Therefore, comparison between states' Medicaid data by utilizing these ICD-9 codes may not produce reliable results. However, they may act as a guiding tool for reference purposes and as a target group (of codes). For the purposes of this research, instead of matching a substance abusing sub-population by ICD-9 codes (created by a mathematical algorithm), an already identified population (through utilizing DHW SA data) was sent through and matched within the Medicaid database.

The next level above the ICD-9 codes is grouped by procedure. These codes are called CPT codes or procedure codes. The CPT codes give less detail than the ICD-9 codes. A hypothetical example of the difference between the depth of these two codes may look like this:

CPT coded: Pregnant/Physical Exam

ICD-9 coded: Drug Dependence Complicating Pregnancy

The differences between the ways State Medicaid systems report medical information is a direct result of disparate use of CPT codes in concert with the scope of medical coverage and medical definitions. Other data consist of revenue codes and modality or treatment type codes.

<sup>5</sup> In their study, Reutzler et al. (1987) focused on a group of 176 Medicaid enrollees who were admitted to a program for alcohol treatment during the 82-83' state fiscal year. From this group they identified a sub-sample of 46 Medicaid clients, who were "[c]ontinuous enrollees for six months prior to, and six months after, the month in which they entered treatment for the first time" (Reutzler et al. 1987: 503). This issue of "continuous eligibility" comes about because of the movement of clients across benefit levels and systems, where client level data can be influenced by funding sources and changes in income (Alterman et al. 2001).

<sup>6</sup> Note: SFY 03' treatment period defined the time frame within which a client had a total of one treatment episode. Each client's treatment episode is unique (could be 1 day to 365 days, no costs were calculated during this period). Therefore, the main concern while collecting and matching data from each agency was data quality on the *post side*, meaning that after a certain point in time, post treatment, the data were deteriorating. Given these issues (reliability of data) and in consultation with data managers at these agencies, we chose to capture the most reliable data, which resulted in different coverage by agency after all was said and done. Due to the varying length of data provided by each agency, one might conclude that the findings (particularly Table 2): (1) may be an artifact of time, and (2) could be considered a type one error.

First, the fact that the treatment cost is both fixed and funded through a dedicated block grant (meaning Health and Welfare has a certain amount of money they must spend on drug treatment each fiscal year), we argue that: (1) by shortening the pre/post time periods, we run the risk of committing a type two error, not type one (i.e. the more we extend, the clearer the picture), and (2) defaulting to shorter time periods may be flawed because of differing institutional time periods (in terms of reporting processes). This unique issue is empirically supported and commonly referred to as "time to return on investment" (Yates 1999). According to the National Institute on Drug Abuse (<http://www.drugabuse.gov/IMPCOST/IMPCOST10.html>) "Net benefit is the result of subtracting costs from benefits. Present valuing benefits reduces the value of benefits. Using present-value benefits gives an appropriate advantage to programs that achieve their benefits sooner. Present-valuing benefits still, however, gives an advantage (appropriately) to programs that take longer but achieve

better benefits than programs that produce quick but small benefits." Cost benefit outcomes then, can be considered intrinsically related to or an artifact of time. Therefore, our first cost benefit outcome (Table 2) may be just as accurate as the second and more aesthetically pleasing pre/post time-adjusted cost benefit outcome (Table 3), given the many dynamics surrounding agency reporting practices and time to return on investment issues.

<sup>7</sup> The earnings trend R-squared for pre-earnings is 0.958 and for post-earnings is 0.209.

<sup>8</sup> The expression that was used is:

$[E[ Y | \text{dummy} = 1] - E[ Y | \text{dummy} = 0] ] / E[ Y | \text{dummy} = 0]$  or  $\exp(\text{coefficient}) = 2.00, 2-1 = 1$ , turn to percentage = % 100.

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**Online citation:** Chen, Pan and Alexander T. Vazsonyi. 2010. "Hedonic Calculus: Does Self-Restraint Desire Matter?" *Western Criminology Review* 11(3):29-44. (<http://wcr.sonoma.edu/v11n3/Chen.pdf>).

## Hedonic Calculus: Does Self Restraint Desire Matter?

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**Abstract:** *Tittle, Ward, and Grasmick (2004) developed the idea of "self-control desire" as a key in understanding variability in crime and deviance, above and beyond low self-control (ability). The current study investigated the interplay between self-control ability, self-control desire, and deviance. Both self-control ability and self-control desire had independent effects on a variety of deviance measures; in addition, the interactive effects between the two were also significant. Results also indicate that the measure of self-control desire is composed of two different dimensions, namely punishment-avoiding self-control desire, a construct that shares conceptual similarities with perceived sanctions, and reward-seeking self-control desire. The independent and interactive effects of punishment-avoiding self-control desire and self-control ability on deviance were supported in the current study. However, reward-seeking self-control desire was unrelated to deviance once the effects by punishment-avoiding self-control desire and self-control ability were controlled. Follow-up analyses on the interaction effects indicate that the relationships between self-control ability and deviance were weaker for people with higher levels of self-control desire; in addition, the effects by self-control ability were not significant at high levels of self-control desire. Similarly, self-control ability was also found to attenuate the relationships between self-control desire and deviance; self-control desire did not predict deviance at high levels of self-control ability.*

**Keywords:** self-control theory, self-control ability, self-control desire, perceived sanctions

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### INTRODUCTION

Self-Control Theory (Gottfredson and Hirschi 1990) proposes that individuals low in self-control are at greater risk to engage in deviant and criminal behaviors as they lack capability to consider the future consequences of their behaviors and to delay gratification. Specifically, Gottfredson and Hirschi (1990) identified six traits of low self-control including 1) impulsivity, 2) the desire to take risks, 3) a preference for physical activity rather than mental activity, 4) a preference for simple tasks rather than complex ones, 5) selfishness and lack of concern for the well-being of others, and 6) a bad temper. The theory continues to enjoy a tremendous amount of attention through empirical tests and remains one of the most highly cited recent conceptual developments in the criminological literature (e.g., Benda 2005; Burton, Cullen, and Evans 1998; DeLisi 2001; Evans et al. 1997; Gibbs, Giever, and Higgins 2003; Gibson, Schreck, and Miller 2004; Higgins and Tewksbury 2006; LaGrange and Silverman 1999;

Longshore 1998; Morris, Wood, and Dunaway 2006; Pratt and Cullen 2000; Wright et al. 1999). Previous research has documented that low self-control is not only associated with crime (e.g., DeLisi 2001; Longshore 1998), but also with analogous behaviors (e.g., Benda 2005; Gibson et al. 2004). These links have been consistently documented across a variety of samples, including in middle school and high school students (e.g., Benda 2005; Morris et al. 2006), college students (e.g., Gibbs et al. 2003; Gibson et al. 2004), adults (e.g., Evans et al. 1997), juvenile and adult offenders (e.g., DeLisi 2001; Longshore 1998), females and males (e.g., Higgins and Tewksbury 2006; LaGrange and Silverman 1999), as well as in individuals from different cultural and national contexts (e.g., Tittle and Botchkovar 2005; Vazsonyi and Belliston 2007; Vazsonyi et al. 2001; Wright et al. 1999). At the same time, critics have questioned the exclusive focus on the individual, thus neglecting potential external constraint and restraint mechanisms, including sanctions (Akers 1991; Grasmick et al. 1993; Nagin and Paternoster 1993).

The main tenet of Self-Control Theory is based on the concept of *hedonic calculus*, an idea first developed by Bentham (1970). He postulated that crimes and similar behaviors will be committed by individuals if pleasurable consequences of acts exceed painful ones. Thus, social forces, such as formal or informal sanctions, play an important role in this hedonic calculus. The theory also posits that engaging in deviant or criminal behaviors entails some risk of social, legal, and/or natural sanctions or consequences. Therefore, Gottfredson and Hirschi (1990) propose that the self-control-deviance/crime link is affected by calculations of such consequences. In addition, it is also quite likely that the informal and formal sanctioning systems have long-term effects on this hedonic calculus through the development of self-control ability (e.g., family socialization processes). Therefore, the theory acknowledges and highlights both internal and social restraint mechanisms in the understanding of deviance and crime. This includes sanctioning systems that would operate above and beyond a person's levels of self-control ability through the family, through friends, or through society at large. In this way, hedonic calculus is also consistent with the rational choice tradition, which proposes that individuals become involved in deviant behaviors if expected benefits exceed perceived costs. In conclusion, the hedonic calculus underlying Self-Control Theory includes both internal and social restraint mechanisms that are associated with and predictive of subsequent deviant and criminal behaviors, something Vazsonyi (2003) empirically documented in a cross-national comparative test based on samples from four countries.

### **Self-Control Desire versus Self-Control Capacity**

Tittle and colleagues (2004: 147-148) developed the novel idea to differentiate between "self-control desire" and "self-control capacity".

*As noted before, those who can control themselves may not always want to do so; instead, they may sometimes deliberately choose to commit criminal acts. And, people who simultaneously lack the capacity for strong self-control and who possess little desire to control themselves may be especially prone to criminal conduct, while those with strong capacity for self-control and with great interest in exercising that self-control may be especially unlikely to offend. Logically, then, self-control ability and interest in exercising self-control should interact in producing misbehaviors.*

They conceptualized self-control desire as one's interest to exercise self-restraint in the face of temptation. In contrast to self-control capacity, self-control desire is an individual, internal characteristic that is responsive to immediate, external social stimuli. Findings from their work provide

evidence that both self-control desire and self-control capacity were significant predictors of deviant and criminal behaviors; in fact, they exerted independent, cumulative, and interactive effects. Thus, Tittle and colleagues (2004) concluded that self-control desire was fundamentally sensitive to the social context and may reflect the influences of both formal and informal sanctions as perceived by the individual. Tittle and colleagues (2004) identified six indicators of self-control desire, namely 1) self-pride for refraining from offending, 2) perceived levels of praise they will receive (from people whose opinion they value) for refraining from offending, 3) perceived likelihood of losing respect (from people whose opinion they value) for committing deviant behaviors, 4) perceived chance of getting caught for engaging in deviant behaviors, 5) perceived levels of guilt for engaging in deviant behaviors, and 6) moral beliefs about the wrongfulness of deviant behaviors. These indicators were selected as they were proposed by a number of different theories (e.g., social learning and social control theories) to influence an individual's desire to exercise self-restraint in the face of temptation. Despite the fact that Tittle and colleagues (2004) treated the construct of self-control desire as a single factor model, a closer study of how they assessed this construct reveals two underlying dimensions. One of the dimensions assesses self-control interests stimulated by desire to gain rewards for not engaging in deviant behaviors (i.e., receiving praise or feeling proud of oneself), and therefore is reward-seeking self-control desire. The other dimension assesses self-control interests driven by desire to avoid risks or costs of committing deviant behaviors (i.e., losing respect, getting caught, feeling guilty, and feeling morally wrong), namely punishment-avoiding self-control desire.

Cochran, Aleksa, and Chamlin (2006) replicated Tittle et al.'s (2004) work based on a sample of college students and found that self-control ability and self-control desire were separate dimensions of self-control and that these two dimensions had independent as well as interactive effects on deviance (academic dishonesty). One potential limitation of this work is that it exclusively focused on academic dishonesty in college students. It is also important to note that this work did not include items of "pride" and "praise" in the measures of self-control desire. Thus, it only provided additional support for the effects of punishment-avoiding self-control desire on deviance, a dimension that is not distinct from perceived sanctions, a construct that has been widely discussed in deterrence work.

The effects by sanctioning systems on deviance and crime are well established in deterrence work. Sanctions alter an actor's calculations of the potential risks and benefits which in turn may support or prevent the commission of deviant or criminal acts. Some of the original empirical work indicates that legal sanctions have a deterrent effect on deviant or criminal behaviors (e.g.,



Anderson, Chiricos, and Waldo 1977; Cochran, Aleksa, and Sanders 2008; Jensen, Erickson, and Gibbs 1978; Wright et al. 2004). Grasmick and Bursik (1990) extended this by proposing that internalized norms and attachment to significant others may operate as potential punishment to decrease the expected utility of crime. They proposed that a person's conscience (internalized norms such as moral beliefs) may develop a sense of guilt or shame when actors consider something morally wrong; in addition, embarrassment may also result vis-a-vis friends and families whose opinions are valued. Thus, they hypothesized that conscience and embarrassment function as informal sanctions that work together with legal sanctions to decrease the likelihood of norm violations. Based on a random sample of adults, they found that although the effect by embarrassment was not significant, perceived shame and perceived legal sanctions inhibited the likelihood of engaging in illegal behaviors (tax cheating, petty theft, and drunk driving). More recently, Grasmick and Kobayashi (2002) also found additional supporting evidence based on a Japanese sample. Again, perceived shame explained most of the variability in deviance, and embarrassment had no significant effect.

Based on the original work by Grasmick and Bursik (1990), Vazsonyi (2003) tested a similar idea, namely whether both low self-control (ability) and perceived sanctions (perceived guilt, shame, and legal consequences) had independent and additive effects in the prediction of deviance. Based on samples of adolescents from four countries, he found that perceived sanctions impacted the decision to commit deviant behaviors in individuals who were identified as being low in self-control. This finding was consistent for both male and female youth as well as for youth from the four countries (i.e., Hungary, the Netherlands, Switzerland, and the United States). In addition, above and beyond low self-control effects, perceived sanctions predicted a variety of deviant behaviors. These findings supported the original theoretical propositions of Self-Control Theory, namely that mechanisms other than self-control ability also impact whether an individual chooses to engage in norm violating behaviors or not. The interplay between the effects of perceived sanctions and low self-control on deviance or criminal behaviors has also been examined and supported in a number of later studies (e.g., Schoepfer and Piquero, 2006; Svensson, Pauwels, and Weerman 2010; Wright et al. 2004).

In sum, self-control desire is not theoretically novel. Its punishment-avoiding dimension is not distinct from the construct of perceived sanctions, as they both assess the influences of the perceived risks and costs on deviant behaviors. Different from the construct of perceived sanctions, self-control desire as measured by Tittle et al. (2004) also includes a reward-seeking dimension which assesses the influences of perceived rewards on one's deviant or criminal behaviors. Previous theoretical and

empirical work has widely discussed and examined the independent and additive effects of low self-control and perceived sanctions, or punishment-avoiding self-control desire, in the prediction of deviance or criminal behaviors. However, it remains unclear whether two different dimensions underlie the construct of self-control desire. As a matter of fact, findings from the original work by Tittle et al. (2004) imply that the construct of self-control desire may not be unidimensional.<sup>1</sup> We were intrigued by the self-control desire concept proposed by Tittle and colleagues (2004), but also interested in trying to understand whether this construct is composed of a reward-seeking and a punishment-avoiding dimension. Related to that, we would also like to explore whether reward-seeking self-control desire predicts deviance and interacts with self-control ability in the same way as punishment-avoiding self-control desire does. Therefore, the current study had two main goals:

- (1) A replication of the work by Tittle et al. (2004), who identified self-control desire as a key part of the decision to engage in deviant behaviors. More specifically, the study sought to predict deviance with both self-control desire and self-control ability, as well as the interaction between these two constructs, because it was hypothesized that self-control desire and self-control ability would moderate the effects of each other on deviance.
- (2) The study also aimed to address whether the construct of self-control desire, as proposed by Tittle et al. (2004), could be decomposed into reward-seeking self-control desire and punishment-avoiding self-control desire, and if so, whether both components of self-control desire predict measures of deviance along with self-control ability independently and interactively.

## METHODS

### Sample

The data for the current study were collected from a convenience sample of college students using an anonymous online self-report survey that was approved by a university IRB. A snowball sampling technique was used to recruit participants. Students age 19 or older enrolled in social science undergraduate classes at a major university in the southeastern United States were invited to participate in the study for extra credit; they were also allowed to invite their friends to participate for a modest additional credit. The final study sample included  $N = 324$  late adolescent college students (60% females), with a mean age of 20.7 years.

## Measures

The survey included measures of age, sex, general demographic characteristics, self-control ability, self-control desire, and deviance.<sup>2</sup>

*Age.* Age was measured by an item that recorded a participant's month and year of birth. For age calculations, the 15<sup>th</sup> day of each respective month was used.

*Sex.* A single item asked the sex of the participants: "What is your gender?" Responses were given as 1 = male and 2 = female.

*Socioeconomic Status.* Socioeconomic status (SES) was assessed by both the type of employment performed by the primary wage earner in the family and family income. Six categories modified from Hollingshead's (1975) original nine categories were used to assess the primary wage earner's work type. The condensed descriptions include the following: 1 = owner of a large business, executive; 2 = owner of a small business, professional; 3 = semiprofessional, skilled laborer; 4 = clerical staff; 5 = semiskilled laborer; and 6 = laborer or service worker. Participants also rated their family's approximate total annual income from the following five choices: 1 = \$20,000 or less, 2 = \$20,000 to \$35,000, 3 = \$35,000 to \$60,000, 4 = \$60,000 to \$100,000, 5 = \$100,000 or more. Due to the differences in the metrics of the response, we developed an SES score by averaging the standardized scores of each item. The correlation between the Hollingshead scale and family income was  $r = .31$ .

*Family Structure.* Family structure was measured by a single item: "Which of the following home situations best applies to you?" Participants chose one of the following seven categories: 1 = biological parents, 2 = biological mother only, 3 = biological father only, 4 = biological mother and stepfather, 5 = biological father and stepmother, 6 = biological parent and significant other, and 7 = other. Family structure was recoded as biological parents versus others for data analyses.

*Self-Control Ability.* Grasmick et al.'s (1993) low self-control scale was used to assess self-control ability which included 24 items rated on a 5-point Likert scale: 1 = strongly disagree, 2 = disagree, 3 = neither disagree nor agree, 4 = agree, 5 = strongly agree. In order to better compare with Tittle et al.'s (2004) study, the responses for all items were reverse coded and labeled as self-control. A self-control ability score was computed by averaging the responses to all 24 items, where a high score indicated high self-control ability and a low score indicated low self-control ability ( $\alpha = .86$ ).

*Self-Control Desire.* Self-control desire was measured by a 30-item scale developed by Tittle et al. (2004). Six sets of five items were given with a series of descriptions of deviant behaviors that include gambling, theft, drunk driving, tax cheating and physical assault. Six questions were posed for each of the five deviance indicators: (1) "Generally, in most situation my feelings of pride in

myself would be increased if...", (2) "Would most of the people whose opinions you value lose respect for you if...", (3) "Would most of the people whose opinions you value express praise for you if...", (4) "Do you think you would get caught if...", (5) "Generally, in most situations, I would feel guilty if...", (6) "It is always morally wrong to...". Each item was rated on the following scale: 1 = strongly disagree, 2 = disagree, 3 = neither disagree nor agree, 4 = agree, 5 = strongly agree. The overall self-control desire was computed by averaging the responses to all items ( $\alpha = .94$ ). In addition, the average of responses to all items in question 1 and question 3 was calculated and labeled as reward-seeking self-control desire ( $\alpha = .92$ ). The average of responses to all items in other questions was calculated and labeled as punishment-avoiding self-control desire ( $\alpha = .93$ ).

*Deviance.* A 55-item Normative Deviance Scale (NDS; Vazsonyi et al. 2001) was used to measure deviance. The current investigation examined five subscales on the NDS (vandalism,  $\alpha = .86$ ; drug use,  $\alpha = .88$ ; school misconduct such as cheating on school tests or skipping school,  $\alpha = .79$ ; theft,  $\alpha = .76$ ; assault,  $\alpha = .71$ ), as well as the total deviance scale, which also includes items that assess alcohol use and general deviance (mean of all 55 items,  $\alpha = .95$ ). Participants rated lifetime deviance, "Have you ever ..." Response categories included: 1 = never, 2 = one time, 3 = 2-3 times, 4 = 4-6 times, and 5 = more than 6 times.

## Plan of Analysis

Four analytic steps were used. First, factor analyses were conducted to examine whether self-control ability and self-control desire are two distinct constructs and whether the measure of self-control desire includes two factors (i.e., reward-seeking self-control desire and punishment-avoiding self-control desire). The second step replicated the regression analyses from Tittle et al.'s (2004) study to examine the effects of self-control desire, self-control ability, and the interaction between self-control desire and self-control ability in the prediction of deviance measures. The third step employed regressions to test the independent effects by punishment-avoiding self-control desire and reward-seeking self-control desire. In the final step, the significant interaction effects were further explored using the online computational utility provided by Preacher, Curran, and Bauer (2006).

## RESULTS

### Demographic and Scale Information

Table 1 includes descriptive information on key demographic variables in the current study, while Appendix 1 includes descriptive statistics on the main

**Table 1.** Demographic Variables (Percentages; N=324)

| Demographic Variables    |  | Males | Females | Total |
|--------------------------|--|-------|---------|-------|
| Sex                      |  | 40.1  | 59.9    | 100.0 |
| Age                      | Mean age (years)   | 21.0  | 20.6    | 20.7  |
| Family Structure         | Two biological parents                                     | 80.0  | 77.8    | 78.7  |
|                          | One biological parent (only)                               | 9.2   | 10.3    | 9.9   |
|                          | One stepparents and one biology parent                     | 8.5   | 8.2     | 8.3   |
|                          | Other (e.g., biological parent and significant other etc.) | 2.3   | 3.6     | 3.1   |
| Family Income            | \$20,000 or less   | 1.5   | 0.5     | 0.9   |
|                          | \$20,000 to 35,000   | 3.8   | 2.1     | 2.8   |
|                          | \$35,000 to 60,000   | 13.8  | 12.4    | 13.0  |
|                          | \$60,000 to 100,000  | 39.2  | 35.1    | 36.7  |
|                          | \$100,000 or more  | 41.5  | 50.0    | 46.6  |
| Hollingshead's SES Scale | Laborer or service worker                                  | 0.8   | 1.1     | 1.0   |
|                          | Semiskilled laborer  | 2.5   | 1.1     | 1.7   |
|                          | Clerical staff   | 8.3   | 6.7     | 7.4   |
|                          | Semiprofessional, skilled laborer                          | 17.4  | 11.8    | 14.0  |
|                          | Small business owner, professional                         | 47.1  | 50.6    | 49.2  |
|                          | Big business owner, executive                              | 24.0  | 28.7    | 26.8  |

study scales, including reliability estimates, namely measures of self-control ability, measures of self-control desire developed by Tittle et al. (overall self-control desire, reward-seeking self-control desire, and punishment-avoiding self-control desire), and measures of deviance.

### Factor Analysis of Self-Control Desire and Self-Control Ability

Tittle et al. (2004) conducted an Exploratory Factor Analysis (EFA) and found two factors based on all items part of the self-control desire and self-control ability measures. Results showed that 23 of the 30 self-control desire items loaded (greater than 0.48) on factor 1, but not on factor 2. On the other hand, 21 of the 24 self-control ability items loaded well on factor 2 (greater than 0.30), but poorly on factor 1. We replicated the EFA analyses used by Tittle et al. (2004) and present our findings in Appendix 2; findings show that all 30 self-control desire items loaded well (greater than 0.52) on factor 1, but poorly on factor 2 (less than 0.17). In contrast, all 24 self-control ability items loaded better on factor 2 (greater than 0.28) than on factor 1 (less than 0.14). This suggested that

the two constructs are empirically distinct, and thus findings are consistent with those reported by Tittle and colleagues (2004).

Tittle et al. (2004) used a composite scale of all self-control desire items based on additional analyses. However, a consideration of item content and wording provided some conceptual indication of two potential self-control desire factors. To test this, an EFA on all self-control desire items was conducted, and two factors were specified a priori. As shown in Appendix 3, the pride and praise items loaded (greater than 0.53) on factor 2 but less well on factor 1 (less than 0.39). The remaining items loaded (greater than 0.53) on factor 1 and to a lesser extent on factor 2 (less than 0.40). This provided some empirical support for the idea that perceived rewards, particularly pride and praise, for not engaging in deviant or criminal behavior, may in fact be conceptually distinct from items that seem to tap perceived sanctions or constraint mechanisms. Therefore, in the following analyses, we first tested the potentially additive or redundant effects of self-control desire (total scale) and self-control ability on deviance measures. Next, we further examined self-control desire by separately testing for the effects of each

identified dimension, namely what we term reward-seeking self-control desire (i.e., pride and praise) and punishment-avoiding self-control desire (conceptually related to perceived sanctions). The correlation statistics between measures of self-control ability, self-control

desire (including both total scale and sub-scale scores), and deviance are reported in Table 2. Findings provided evidence of significant negative relationships between measures of self-control ability as well as self-control desire and deviance.

**Table 2. Correlation between Measures of Self-Control Ability, Self-Control Desire, and Deviance (N=324)**

| Measures                | Total Deviance | Vandalism | Drug Use | School Misconduct | Theft   | Assault |
|-------------------------|----------------|-----------|----------|-------------------|---------|---------|
| Self-control ability    | -.36***        | -.31***   | -.27***  | -.41***           | -.25*** | -.22*** |
| Self-control desire     | -.42***        | -.35***   | -.34***  | -.33***           | -.31*** | -.34*** |
| Reward-seeking SCD      | -.20***        | -.18***   | -.16**   | -.16**            | -.18**  | -.15**  |
| Punishment-avoiding SCD | -.47***        | -.39***   | -.38***  | -.37***           | -.34*** | -.40*** |

Note. \*\*  $p < .01$ , \*\*\*  $p < .001$ . SCD = self-control desire.

**Effects by Self-Control Desire**

Consistent with the work by Tittle and colleagues (2004), we tested a model that included both self-control ability and self-control desire in the prediction of a variety of deviance constructs. Table 3 provides the findings from these analyses; all analyses included age, sex, family structure, and SES as covariates.<sup>3</sup> The first two rows include findings from analyses that separately considered the effects by self-control ability and self-control desire, net the effects by control variables. Findings from these analyses are consistent with previous work; both self-

control ability and self-control desire had effects in the prediction of six deviance measures used in this study. The second panel in Table 3 provides the results of regression models that included self-control ability, self-control desire, and the interaction term between the two. Both self-control ability and desire had independent effects in the prediction of deviance; in addition, a significant interaction effect was found for four of the six deviance measures (i.e., total deviance, vandalism, school misconduct, and assault).<sup>4</sup>

**Table 3. Multiple Regressions Predicting Deviance with Self-Control Desire and Self-Control Ability (N=324)**

| Predictor                               | Vandalism  |     | Drug use   |     | School Misconduct |     | Theft      |     | Assault    |     | Total Deviance |     |
|---|------------|-----|------------|-----|-------------------|-----|------------|-----|------------|-----|----------------|-----|
|   | $\beta$    | SE  | $\beta$    | SE  | $\beta$           | SE  | $\beta$    | SE  | $\beta$    | SE  | $\beta$        | SE  |
| <b>Individual Effects<sup>a</sup></b>   |            |     |            |     |                   |     |            |     |            |     |                |     |
| Self-Control Desire                     | -.22***    | .05 | -.29***    | .06 | -.25***           | .06 | -.26***    | .06 | -.20***    | .05 | -.34***        | .05 |
| Self-Control Ability                    | -.25***    | .05 | -.26***    | .05 | -.39***           | .05 | -.22***    | .05 | -.14**     | .05 | -.33***        | .05 |
| <b>Interaction Analyses<sup>b</sup></b> |            |     |            |     |                   |     |            |     |            |     |                |     |
| Self-Control Desire                     | -.20***    | .05 | -.21***    | .05 | -.34***           | .05 | -.18**     | .05 | -.09*      | .05 | -.27***        | .05 |
| Self-Control Ability                    | -.18**     | .05 | -.25***    | .05 | -.19***           | .05 | -.22***    | .06 | -.18**     | .05 | -.29***        | .05 |
| SC Desire X SC Ability                  | .15**      | .05 | .09        | .05 | .14**             | .05 | .10        | .05 | .16**      | .05 | .15**          | .05 |
| R <sup>2</sup>                          | <b>.11</b> |     | <b>.13</b> |     | <b>.19</b>        |     | <b>.10</b> |     | <b>.07</b> |     | <b>.21</b>     |     |

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . SC = self-control. All predictors were centered. Control variables include: SES, family structure, age and sex.  
<sup>a</sup>Regression coefficients are from analyses that only included each independent variable by itself, net the effects by control variables.  
<sup>b</sup>Regression coefficients are from analyses that included both independent variables and their interaction term, net the effects by control variables.

**Effects by Reward-Seeking and Punishment-Avoiding Self-Control Desire**

This set of models examined whether the reward-seeking (pride and praise) and punishment-avoiding self-control desire dimensions had unique and/or redundant effects on deviance measures. The initial model tested the effects by punishment-avoiding self-control desire, self-control ability, and an interaction term. Table 4 includes the findings from these analyses; both punishment-

avoiding self-control desire and self-control ability uniquely predicted deviance measures. In addition, the interaction term was significant in the models predicting vandalism, school misconduct, assault, and total deviance. Net the effects by control variables, punishment-avoiding self-control desire, self-control ability, and the interaction term together explained 9% or more of the variance in deviance in these four models; they also explained 15% of the variance in drug use and 11% in theft.

**Table 4. Multiple Regression Predicting Deviance by “Punishment-Avoiding” Self-Control Desire and Self-Control Ability**

| Predictor                               | Vandalism  |     | Drug use   |     | School Misconduct |     | Theft      |     | Assault    |     | Total Deviance |     |
|---|------------|-----|------------|-----|-------------------|-----|------------|-----|------------|-----|----------------|-----|
|   | β          | SE  | β          | SE  | β                 | SE  | β          | SE  | β          | SE  | β              | SE  |
| Punishment-Avoiding Self-Control Desire | -.20***    | .05 | -.30***    | .06 | -.23***           | .05 | -.25***    | .06 | -.22***    | .05 | -.35***        | .05 |
| Self-Control Ability                    | -.18***    | .05 | -.20***    | .05 | -.33***           | .05 | -.17**     | .05 | -.07       | .05 | -.25***        | .05 |
| Punishment-Avoiding SCD X SCA           | .16**      | .05 | .08        | .05 | .12*              | .05 | .07        | .05 | .17**      | .05 | .14**          | .05 |
| <b>R<sup>2</sup></b>                    | <b>.12</b> |     | <b>.15</b> |     | <b>.20</b>        |     | <b>.11</b> |     | <b>.09</b> |     | <b>.23</b>     |     |

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . SCD = self-control desire. SCA= self-control ability. All predictors are centered. Control variables include: SES, family structure, age and sex.

The next set of models included both reward-seeking self-control desire and self-control ability. Findings are included in Table 5. Controlling for all other variables in the model, reward-seeking self-control desire had a significant effect on five of the six deviance measures,

with the exception of assault. Net the effects by control variables, reward-seeking self-control desire, self-control ability, and the interaction term explained 3% (assault) to 17% (school misconduct) variance across the six deviance measures.

**Table 5. Multiple Regression Predicting Deviance by “Reward-Seeking” Self-Control Desire and Self-Control Ability (N=324)**

| Predictor                          | Vandalism  |     | Drug use   |     | School Misconduct |     | Theft      |     | Assault    |     | Total Deviance |     |
|------------------------------------|------------|-----|------------|-----|-------------------|-----|------------|-----|------------|-----|----------------|-----|
|                                    | β          | SE  | β          | SE  | β                 | SE  | β          | SE  | β          | SE  | β              | SE  |
| Reward-seeking self-control desire | -.10*      | .05 | -.11*      | .05 | -.10*             | .05 | -.14*      | .05 | -.07       | .05 | -.14**         | .05 |
| Self-Control Ability               | -.24***    | .05 | -.25***    | .05 | -.37***           | .05 | -.21***    | .05 | -.13*      | .05 | -.32***        | .05 |
| Reward-seeking SCD X SCA           | .10*       | .05 | .09        | .05 | .13**             | .05 | .13*       | .05 | .09        | .05 | .14**          | .05 |
| <b>R<sup>2</sup></b>               | <b>.08</b> |     | <b>.08</b> |     | <b>.17</b>        |     | <b>.08</b> |     | <b>.03</b> |     | <b>.14</b>     |     |

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . SCD = self-control desire. SCA= self-control ability. Control variables include: SES, family structure, age and sex.



**Independent Effects by Reward-Seeking and Punishment-Avoiding Self-Control Desire**

This set of models tested whether reward-seeking self-control desire and punishment-avoiding self-control desire had independent effects on deviance measures controlling for each other as well as self-control ability. The results are shown in Table 6. It is worth noting that when entered together with punishment-avoiding self-control desire in the models, reward-seeking self-control desire did not have

a significant effect on any of the six deviance measures. However, the effects by the punishment-avoiding self-control desire remained significant for all six deviance measures, net the effects by reward-seeking self-control desire. Findings imply that punishment-avoiding self-control desire had independent effects on all six deviance measures, whereas the effects of reward-seeking self-control desire appeared to be redundant.

**Table 6.** Multiple Regressions Predicting Deviance by “Reward-Seeking” Self-Control Desire, “Punishment-Avoiding” Self-Control Desire, and Self-Control Ability (N=324)

| Predictor                               | Vandalism  |     | Drug use   |     | School Misconduct |     | Theft      |     | Assault    |     | Total Deviance |     |
|---|------------|-----|------------|-----|-------------------|-----|------------|-----|------------|-----|----------------|-----|
|   | β          | SE  | β          | SE  | β                 | SE  | β          | SE  | β          | SE  | β              | SE  |
| Reward-seeking self-control desire      | .01        | .06 | .05        | .06 | .03               | .06 | -.02       | .06 | .07        | .06 | .05            | .05 |
| Punishment-avoiding Self-Control Desire | -.21***    | .06 | -.33***    | .06 | -.24***           | .06 | -.24***    | .07 | -.27***    | .06 | -.37***        | .06 |
| Self-Control Ability                    | -.18***    | .05 | -.20***    | .05 | -.33***           | .05 | -.18***    | .05 | -.07       | .05 | -.25***        | .05 |
| Reward-seeking SCD X SCA                | -.00       | .06 | .01        | .06 | .06               | .06 | .10        | .06 | -.03       | .06 | .04            | .05 |
| Punishment-avoiding SCD X SCA           | .16**      | .06 | .08        | .06 | .09               | .06 | .02        | .06 | .19***     | .06 | .13*           | .05 |
| <b>R<sup>2</sup></b>                    | <b>.12</b> |     | <b>.15</b> |     | <b>.20</b>        |     | <b>.11</b> |     | <b>.09</b> |     | <b>.23</b>     |     |

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ . SCD = self-control desire. SCA = self-control ability. All predictors are centered. Control variables include: SES, family structure, age and sex.

**Interpretation of the Interaction Effects**

To explore the significant interactions between measures of self-control desire and self-control ability, we interpreted the interaction effects using methods outlined by Preacher et al. (2006). Briefly, this method is based on calculation of simple slopes of the focal variable at different levels of the moderator variable and on estimation of the region of the moderator variable within which the focal variable’s effects are significant (i.e., the significant region). We first examined the moderation effects of self-control desire (both the total scale and punishment-avoiding self-control desire) on the relationships between self-control ability and measures of deviance. The regression coefficients of self-control ability (i.e., the simple slopes) were estimated at a low level of self-control desire (i.e., one standard deviation below the

sample mean), at the mean level of self-control desire (the sample mean), and at a high level of self-control desire (i.e., one standard deviation above the sample mean). The estimated simple slopes and significant regions are reported in Table 7. Relationships between self-control ability and measures of deviance were significant at the specified low level of self-control desire. However, effects of self-control ability on measures of deviance became weaker or non-significant for individuals with higher levels of self-control desire (i.e., the mean level or one standard deviation above the mean). Estimations of the significant regions indicate that relationships between self-control ability and measures of deviance were not significant for individuals with very high levels of self-control desire.

**Table 7. Regression Coefficients for the Effects by Self-Control Ability at Different Levels of Self-Control Desire (N=324)**

| Dependent Variables | Self-control ability coefficients at different levels of total self-control desire |             |                            | Significant region |
|---------------------|--|-------------|----------------------------|--------------------|
|                     | -.66<br>(One SD below mean)  | 0<br>(Mean) | .66<br>(One SD above mean) |                    |
| Vandalism           | -.26***  | -.14***     | -.03                       | -2.69 to .22       |
| School Misconduct   | -.73***  | -.53***     | -.33**                     | -2.69 to .90       |
| Assault             | -.23***  | -.09        | .05                        | -2.69 to -.04      |
| Deviance            | -.49***  | -.32***     | -.15                       | -2.69 to .64       |

| Dependent Variables | Self-control ability coefficients at different levels of punishment-avoiding self-control desire |             |                            | Significant region |
|---------------------|--|-------------|----------------------------|--------------------|
|                     | -.69<br>(One SD below mean)  | 0<br>(Mean) | .69<br>(One SD above mean) |                    |
| Vandalism           | -.36***  | -.21***     | -.05                       | -2.90 to .34       |
| Assault             | -.22***  | -.07        | .09                        | -2.90 to -.13      |
| Deviance            | -.43***  | -.30***     | -.18*                      | -2.90 to .71       |

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . Centered self-control desire ranges from -2.69 to 1.11. Centered punishment-avoiding self-control desire ranges from -2.90 to 1.05. Significant regions indicate the ranges of self-control desire and punishment-avoiding self-control desire within which the effects by self-control ability are significant.

In the next step, moderation effects of self-control ability on the relationships between self-control desire (both the total scale and punishment-avoiding self-control desire) and measures of deviance were explored using the same steps mentioned above. Simple slopes and significant regions of self-control desire are exhibited in Table 8. Findings provide evidence of significant negative relationships between self-control desire and measures of

deviance at the low and mean levels of self-control ability, although the relationships at the mean level of self-control ability were weaker than those at the low level of self-control ability. The effects of self-control desire on vandalism and assault (also the effect of total self-control desire on school misconduct) were not significant at the high level of self-control ability. The relationships between self-control desire and total deviance at the high level of

**Table 8. Regression Coefficients for the Effects by Self-Control Desire at Different Levels of Self-Control Ability (N=324)**

| Dependent Variables | Total self-control desire coefficients at different levels of self-control ability |             |                            | Significant region |
|---------------------|--|-------------|----------------------------|--------------------|
|                     | -.48<br>(One SD below mean)  | 0<br>(Mean) | .48<br>(One SD above mean) |                    |
| Vandalism           | -.26***  | -.14***     | -.03                       | -1.36 to .22       |
| School Misconduct   | -.36***  | -.21***     | -.07                       | -1.36 to .27       |
| Assault             | -.23***  | -.12***     | -.02                       | -1.36 to .21       |
| Deviance            | -.37***  | -.25***     | -.13*                      | -1.36 to .51       |

| Dependent Variables | Punishment-avoiding self-control desire coefficients at different levels of self-control ability |             |                            | Significant region |
|---------------------|--|-------------|----------------------------|--------------------|
|                     | -.48<br>(One SD below mean)  | 0<br>(Mean) | .48<br>(One SD above mean) |                    |
| Vandalism           | -.27***  | -.17***     | -.06                       | -1.36 to .27       |
| Assault             | -.29***  | -.18***     | -.07                       | -1.36 to .39       |
| Deviance            | -.40***  | -.31***     | -.22***                    | -1.36 to .82       |

Note. \*  $p < .05$ , \*\*\*  $p < .001$ . Centered self-control ability ranges from -1.36 to 1.48. Significant regions indicate the ranges of self-control ability within which the effects by self-control desire and punishment-avoiding self-control desire are significant.

self-control ability were significant but weaker than those estimated at the low and mean levels of self-control ability. Finally, the significant region estimations indicate that the relationships between self-control desire and total deviance were not significant for individuals with very high levels of self-control ability.

## DISCUSSION

The current study focused on theoretically salient links between self-control ability, self-control desire, and a variety of deviance measures. In addition to replicating the work by Tittle et al. (2004), the current study also explored whether self-control desire as measured by Tittle and colleagues (2004) is composed of a reward-seeking and a punishment-avoiding dimension, with the latter overlapping conceptually and empirically with perceived sanctions. In support of the work by Tittle and colleagues (2004), the following important findings were made. First, both self-control ability and self-control desire had independent effects on each deviance measure, namely vandalism, drug use, school misconduct, theft, assault, and total deviance. In addition, the interaction between self-control ability and self-control desire significantly predicted vandalism, school misconduct, assault, and total deviance. This finding largely confirms that self-control ability, which can be considered as a relatively stable intra-individual characteristic, and self-control desire, a primarily social constraint mechanism dependent on the context, are both important constructs in the understanding of and prediction of a variety of deviance indicators.

Second, factor analyses provided evidence that self-control desire was composed of two different dimensions or constructs, namely a reward-seeking self-control desire dimension as well as a punishment-avoiding one. While the former seems related to positive feelings about not violating social norms, the latter is conceptually consistent with perceived sanctions that are associated with perceived risks or costs of deviant behaviors by the actor. Thus, both effects by reward-seeking self-control desire and punishment-avoiding self-control desire were tested separately. Analyses which tested both dimensions together provided evidence of some similar findings as made about the effects by self-control desire, namely that punishment-avoiding self-control desire had independent effects on each deviance measure, and that the interaction between punishment-avoiding self-control desire and self-control ability had significant effects on vandalism, assault, and total deviance. However, the reward-seeking self-control desire dimension did not predict deviance when considered together with punishment-avoiding self-control desire.

Candidate explanations for these findings seem to be a function of how these constructs were assessed. The items that measured pride assessed whether an individual

perceived feelings of pride when they refrained from engaging in deviant conduct, while the items that measured praise assessed an individual's perceived likelihood of receiving praise from engaging in deviant behaviors. It is plausible that these items are more salient and account for more variability in individuals who regularly exhibit deviant behaviors. On the other hand, these constructs might be less salient in conforming individuals who would simply not endorse items that assess feeling good about not doing something wrong. Thus, the current study completed on college students, presumably largely conforming individuals, shows that elements consistent with the perceived sanctions part of self-control desire most consistently account for variability in deviant behaviors. Thus, it is also possible that measures tapping the reward-seeking dimension of self-control desire might explain more variability in a sample that can be characterized as less conforming. Therefore, the effect of reward-seeking self-control ability on deviance and its interactive effects with self-control desire need to be explored by future studies using different samples.

Finally, additional analyses on the interaction effects between self-control ability and self-control desire (both the total scale and the punishment-avoiding dimension) indicate that self-control desire and self-control ability attenuate the effects of each other on measures of deviance. Specifically, the relationships between self-control ability and measures of deviance were stronger for individuals with lower levels of self-control desire. More importantly, it was found that the effects of self-control ability on deviance were not significant at very high levels of self-control desire. Similar patterns were also observed for the moderation effects of self-control ability on the relationships between self-control desire and deviance. Tittle and colleagues (2004) found that self-control capability was most effective when the individual's self-control desire was low but its effect was greatly reduced when self-control desire was high. Therefore, findings of the current study replicate the ones from the original work by Tittle et al.'s (2004). The interaction patterns discovered in the current study are also consistent with the findings from the previous work on perceived sanctions. For example, Wright et al. (2004) found that perceived sanctions had greatest impact on criminally prone individuals. Similarly, Cochran et al. (2008) reported that the observed effects of perceived sanctions on academic dishonesty were stronger among those with low self-control than among those of moderate self-control.<sup>5</sup> In addition, a number of studies on moral beliefs (e.g., Schoepfer and Piquero, 2006; Svensson et al., 2010) also provided evidence that low self-control has a stronger effect on criminal behaviors for individuals with low levels of morality than for individuals with high levels of morality. These findings highlight the importance of considering the interplay between self-control ability and

perceived sanctions or self-control desire in future work on deviance or criminal behaviors.

The current study is the first to explore the dimensions underlying the construct of self-control desire and to examine the effects of self-control desire by dimensions. While findings from the current study provide insights into the understanding of the structure and functions of self-control desire, a number of study limitations require mention. First, the sample used was a convenience sample of college students with a comparatively high level of SES. While convenience sampling is economic and efficient, the participants sampled are generally not representative of diverse adolescent populations. Therefore, findings from the current study should not be generalized to non-college and/or low-SES samples of adolescents. In addition, college students may have particularly high levels of self-control ability, and thus, perhaps also low levels of deviant behaviors. Next steps in the work necessarily involve testing some of these ideas on samples of individuals who are highly prone to criminal behaviors, and thus, who have relatively low levels of self-control. In addition, because only cross-sectional data were used in the current effort, causality cannot be inferred; future work needs to endeavor to test some of these ideas related to effects by self-control ability and self-control desire or perceived sanctions in longitudinal data sets. Fourth, the self-control ability measures (the Grasmick et al. scale) used in the current study has been challenged empirically. For example, DeLisi, Hochstetler, and Murphy (2003) examined the dimensionality of the scale and found that it was not unidimensional and failed to meet most goodness-of-fit statistics. In addition, previous scholars did not reach agreement on the use of modification indices to refine the scale (e.g., Longshore, Stein, and Turner 1998; Piquero and Rosay 1998). Therefore, future work should explore the effects by self-control ability and its interactive effects with self-control desire using more refined measures of self-control ability. Finally, it is important to note that the constructs of low self-control and self-control desire have been increasingly linked to related processes in psychology, neuropsychology, or genetics. For instance, it was proposed that self-control ability should be viewed as a part of executive functioning (Beaver, Wright, and Delisi 2007). Beaver et al. (2007) found that measures of neuropsychological deficits were related to variability in self-control ability. Therefore, future research should consider incorporating relevant elements from the psychological or neuropsychological domains into the research on self-control ability and/or self-control desire.

## Endnotes

<sup>1</sup> In their study, the self-control desire items formed more than one factor with an eigenvalue greater than one, but they decided to proceed with a one factor model based on differences in adjacent eigenvalues.

<sup>2</sup> Race/ethnicity was not assessed in the current study as the majority of students enrolled at Auburn University in the year the data were collected was European American (European American: 83%; African American: 8%; American Indian or Alaskan: 1%; Asian or Pacific Island: 2%; Hispanic: 2%; Other: 5%). Therefore, we did not complete analyses by race or control for it, due to the very small number of ethnic and racial minorities. We also did not expect that group membership would have any impact on study findings, consistent with self-control theory.

<sup>3</sup> These variables were used as control variables in all regression analyses.

<sup>4</sup> In order to avoid the problem of multicollinearity, self-control ability and measures of self-control desire were centered using the sample mean in all regression analyses with interaction terms.

<sup>5</sup> The observed differences were found to be non-significant in the follow-up z-test for the equality of regression coefficients. However, Cochran and colleagues tested the interaction effects between low self-control and perceived sanctions by dividing the samples into three groups (i.e., a low self-control group, a moderate self-control group, and a high self-control group) and comparing the effects by perceived sanctions between the three groups. This method is distinct from the more rigid analyses used in the current study (i.e., testing the interaction effects by including self-control ability, self-control desire, and their interaction in the same model). This might explain why Cochran and colleagues found invariance of the perceived sanction effects at different levels of low self-control.

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| <i>Appendix 1. Scale Information</i> |       |          |      |      |      |     |
|--------------------------------------|-------|----------|------|------|------|-----|
| Scales                               | Items | $\alpha$ | Min. | Max. | Mean | SD  |
| Self-Control Ability                 | 24    | .86      | 2.17 | 5.00 | 3.52 | .48 |
| Self-Control Desire                  | 30    | .94      | 1.20 | 5.00 | 3.89 | .66 |
| Reward-seeking SCD                   | 10    | .92      | 1.00 | 5.00 | 3.77 | .88 |
| Punishment-avoiding SCD              | 20    | .93      | 1.05 | 5.00 | 3.95 | .69 |
| Total Deviance                       | 55    | .95      | 1.00 | 4.04 | 1.75 | .58 |
| Vandalism                            | 8     | .86      | 1.00 | 4.63 | 1.34 | .55 |
| Drug Use                             | 9     | .88      | 1.00 | 5.00 | 1.84 | .95 |
| School Misconduct                    | 7     | .79      | 1.00 | 4.71 | 1.82 | .75 |
| Theft                                | 7     | .76      | 1.00 | 3.71 | 1.28 | .47 |
| Assault                              | 6     | .71      | 1.00 | 3.50 | 1.28 | .47 |

Note. SCD = self-control desire

| <i>Appendix 2. Exploratory Factor Analysis for Self-Control Ability Items and Self-Control Desire Items</i> |          |          |
|---|----------|----------|
| Self-Control Desire Items   | Factor 1 | Factor 2 |
| <b>Generally, in most situations my feelings of pride in myself would be increased if:</b>                  |          |          |
| 1. I did not participate in illegal gambling on a sporting event.   | .63      | -.04     |
| 2. If I refrained from physically hurting another person on purpose.  | .64      | -.02     |
| 3. If I refrained from taking something from someplace worth less than \$20 ...                             | .59      | .03      |
| 4. If I did not drive an automobile while under the influence of alcohol.                                   | .60      | .03      |
| 5. If I did not fail to report certain income or claim an undeserved deduction ...                          | .65      | -.01     |
| <b>Would most of the people whose opinions you value lose respect for you if:</b>                           |          |          |
| 6. You gambled illegally on a sporting event or other situation.  | .58      | -.07     |
| 7. You physically hurt another person on purpose.   | .70      | -.16     |
| 8. You took something from someplace worth less than \$20 ...   | .72      | -.14     |
| 9. You drove an automobile while under the influence of a moderate amount of alcohol.                       | .66      | -.09     |
| 10. You failed to report certain income or claimed an undeserved deduction ...                              | .67      | -.08     |
| <b>Would most of the people whose opinions you value express praise for you:</b>                            |          |          |
| 11. For not participating in illegal gambling on a sporting event or other situation.                       | .61      | .17      |
| 12. If you refrained from physically hurting another person on purpose.                                     | .59      | .12      |
| 13. If you refrained from taking something from someplace worth less than \$20 ...                          | .62      | .16      |
| 14. If you did not drive an automobile while under the influence ...  | .57      | .16      |
| 15. If you did not fail to report certain income or claim an undeserved deduction ...                       | .64      | .14      |
| <b>Do you think you would get caught if:</b>  |          |          |
| 16. You gambled illegally on a sporting event or other situation.   | .54      | .06      |
| 17. You took something from someplace worth less than \$20 that did not belong to you.                      | .52      | -.06     |
| 18. You drove an automobile while under the influence of a moderate amount of alcohol.                      | .57      | .01      |
| 19. You failed to report certain income or claimed an undeserved deduction ...                              | .53      | .01      |
| 20. You physically hurt another person on purpose.  | .61      | -.08     |

Appendix 2, continued...

| <b>Self-Control Desire Items</b>   | <i>Factor<br/>1</i> | <i>Factor<br/>2</i> |
|--|---------------------|---------------------|
| <b>Generally, in most situations, I would feel guilty if:</b>  |                     |                     |
| 21. I failed to report certain income or claimed an undeserved deduction ...   | .72                 | -.20                |
| 22. I gambled illegally on a sporting event or other situation.  | .70                 | -.20                |
| 23. I drove an automobile while under the influence...   | .68                 | -.20                |
| 24. I physically hurt another person on purpose.   | .69                 | -.21                |
| 25. I took something from someplace worth less than \$20 that did not belong to me.  | .68                 | -.21                |
| <b>Morality:</b>   |                     |                     |
| 26. It is always morally wrong to gamble illegally.  | .55                 | -.17                |
| 27. It is always morally wrong to physically hurt another person on purpose.   | .54                 | -.08                |
| 28. It is always morally wrong to drive while under the influence of alcohol.  | .54                 | -.15                |
| 29. It is always wrong to steal, no matter what the value of the item is.  | .61                 | -.16                |
| 30. It is always morally wrong to cheat on your income tax.  | .66                 | -.22                |
| <b>Low Self-Control Items</b>  |                     |                     |
| 1. I often act on the spur of the moment without stopping to think.  | .03                 | .52                 |
| 2. If things I do upset people, it's their problem not mine.   | -.18                | .50                 |
| 3. I like to test myself every now and then by doing something a little risky.   | -.03                | .58                 |
| 4. Sometimes I will take a risk just for the fun of it.  | -.02                | .54                 |
| 5. I frequently try to avoid projects that I know will be difficult.   | .06                 | .47                 |
| 6. I sometimes find it exciting to do things for which I might get into trouble  | -.21                | .53                 |
| 7. I dislike really hard tasks that stretch my ability to the limit.   | .04                 | .53                 |
| 8. If I had a choice, I would almost always rather do something physical than something mental.                              | .06                 | .43                 |
| 9. I often do whatever brings me pleasure here and now, even at the cost of some distant goal.                               | -.10                | .56                 |
| 10. I almost always feel better when I am on the move than when I am sitting and thinking.                                   | .08                 | .31                 |
| 11. Excitement and adventure are more important to me than security.   | -.12                | .51                 |
| 12. I try to look out for myself first, even if it means making things difficult for other people.                           | -.15                | .50                 |
| 13. I'm more concerned with what happens to me in the short run than in the long run.  | -.14                | .63                 |
| 14. I will try to get things I want even when I know it's causing problems for other people.                                 | -.23                | .59                 |
| 15. When things get complicated, I tend to quit or withdraw.   | -.01                | .46                 |
| 16. I like to get out and do things more than I like to read or contemplate ideas.   | .14                 | .28                 |
| 17. I'm not very sympathetic to other people when they are having problems.  | -.19                | .46                 |
| 18. I seem to have more energy and a greater need for activity than most other people my age.                                | .00                 | .29                 |
| 19. The things in life that are easiest to do bring me the most pleasure.  | .05                 | .49                 |
| 20. I don't devote much thought and effort to preparing for the future.  | -.09                | .49                 |
| 21. I lose my temper pretty easily.  | -.05                | .44                 |
| 22. Often, when I am angry at people, I feel more like hurting them than talking to them about why I am angry.               | -.16                | .55                 |
| 23. When I'm really angry, other people should stay away from me.  | -.05                | .43                 |
| 24. When I have a serious disagreement with someone, it's usually hard for me to talk calmly about it without getting upset. | .02                 | .37                 |

| <b>Appendix 3. Exploratory Factor Analysis of Tittle's Self Control Desire Items</b>       |                  |                  |     |     |
|--|------------------|------------------|-----|-----|
| Self Control Desire Items  | Tittle et al. F1 | Tittle et al. F2 | F1  | F2  |
| <b>Generally, in most situations my feelings of pride in myself would be increased if:</b> |                  |                  |     |     |
| 1. I did not participate in illegal gambling on a sporting event.                          | .66              | .00              | .39 | .54 |
| 2. If I refrained from physically hurting another person on purpose.                       | .54              | .01              | .34 | .61 |
| 3. If I refrained from taking something from someplace worth less than \$20 ...            | .48              | -.00             | .29 | .59 |
| 4. If I did not drive an automobile while under the influence of alcohol.                  | .53              | -.00             | .35 | .53 |
| 5. If I did not fail to report certain income or claim an undeserved deduction ...         | .66              | .16              | .37 | .59 |
| <b>Would most of the people whose opinions you value lose respect for you if:</b>          |                  |                  |     |     |
| 6. You gambled illegally on a sporting event or other situation.                           | .66              | .00              | .53 | .29 |
| 7. You physically hurt another person on purpose.  | .50              | .12              | .63 | .35 |
| 8. You took something from someplace worth less than \$20 ...                              | .48              | .17              | .62 | .40 |
| 9. You drove an automobile while under the influence of a moderate amount of alcohol.      | .57              | .00              | .61 | .31 |
| 10. You failed to report certain income or claimed an undeserved deduction ...             | .62              | .00              | .58 | .35 |
| <b>Would most of the people whose opinions you value express praise for you:</b>           |                  |                  |     |     |
| 11. For not participating in illegal gambling on a sporting event or other situation.      | .72              | -.19             | .14 | .80 |
| 12. If you refrained from physically hurting another person on purpose.                    | .57              | -.16             | .06 | .89 |
| 13. If you refrained from taking something from someplace worth less than \$20 ...         | .62              | -.20             | .08 | .90 |
| 14. If you did not drive an automobile while under the influence ...                       | .57              | -.26             | .05 | .86 |
| 15. If you did not fail to report certain income or claim an undeserved deduction ...      | .70              | -.13             | .13 | .87 |
| <b>Do you think you would get caught if:</b>   |                  |                  |     |     |
| 16. You gambled illegally on a sporting event or other situation.                          | .57              | -.01             | .53 | .18 |
| 17. You took something from someplace worth less than \$20 that did not belong to you.     | .51              | -.00             | .57 | .11 |
| 18. You drove an automobile while under the influence of a moderate amount of alcohol.     | .57              | -.12             | .63 | .09 |
| 19. You failed to report certain income or claimed an undeserved deduction ...             | .56              | -.00             | .60 | .06 |
| 20. You physically hurt another person on purpose.   | .42              | -.01             | .63 | .18 |



**Online citation:** Gunnison, Elaine and Lisa M. McCartan. 2010. "Persistent versus Late Onset among Female Offenders: A Test of State Dependent and Population Heterogeneity Interpretations." *Western Criminology Review* 11(3):45-62. (<http://wcr.sonoma.edu/v11n3/Gunnison.pdf>).

## Persistent versus Late Onset among Female Offenders: A Test of State Dependent and Population Heterogeneity Interpretations<sup>\*</sup>

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**Abstract:** *Research into female offending has begun to explore the utility of different offending trajectories for females. The current research extends this new line of inquiry by employing both population heterogeneity and state dependent interpretations of offending. Using data on a sample of females collected from a southwestern prison, the results indicate that there are significant differences between persistent and late onset offenders. While many theoretical variables did not distinguish between late onset and persistent offenders, sexual abuse did. This research further suggests that prior sexual abuse may be a key factor in explaining the persistence of female offending. Additionally, substance abuse problems and affiliation with deviant peers were also important factors in explaining female persistence. The results also find support for both population heterogeneity and state dependent approaches to understanding female criminality.*

**Keywords:** persistent offending, late onset offending, female offending, population heterogeneity, state dependent, sexual abuse

<sup>\*</sup>This paper was presented at the annual conference of the Academy of Criminal Justice Sciences in Chicago, IL in March of 2005.

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Over the past several decades, female offenders have been receiving increased attention in the criminological literature (Belknap 2007; Belknap and Holsinger 2006; Chesney-Lind and Pasko 2004; Chesney-Lind and Shelden 2004; Gunnison and McCartan 2005; Naffine 1996; Pollock 2002; Steffensmeier and Haynie 2000). While early researchers viewed female offenders as a product of their sexual promiscuity (see Odem 1995), currently, female offending is viewed within the context of traditional criminological theories. Research on female offending highlights two consistent findings: First, females offend at lower rates than their male counterparts although their rates are increasing (Chesney-Lind & Pasko 2004; FBI 2009); and second, female offenders report 2-3 times higher rates of sexual abuse than the general population (Harlow 1999). In addition, there is an emerging third research area that is consistent with the findings within the literature on male offending: there may be discrete groups of female offenders.

While there is still some debate as to the exact number of discrete offender groups, with estimates ranging from two to five (see Fergusson and Horwood 2002), several researchers agree that there are at least two: chronic or persistent offenders and late onset offenders (Blumstein, Cohen, and Farrington 1988; Moffitt 1993; Patterson and Yoerger 1993).<sup>1</sup> Persistent offenders are offenders who begin offending earlier in the life course and who generally fail to age out of crime with their peers (Blumstein et al. 1988). Late onset offenders, on the other hand, begin offending later in the life course (Blumstein et al. 1988). Research into offending trajectories, largely guided by the work of Moffitt (1993), Sampson and Laub (1993), and Patterson and Yoerger (1993), have substantiated the existence of these discrete groups, with mostly male samples.

Research into female offending has also begun to extend into the identification of discrete groups of offenders (see Aguilar et al. 2000; Fontaine et al. 2009;



Gunnison and McCartan 2005; Landsheer and van Dijkum 2005; Odgers et al. 2008; Silverthorn and Frick 1999). As is the case with male offenders, these discrete groups of offenders are qualitatively different from one another and demonstrate different offending trajectories.<sup>2</sup> Landsheer and van Dijkum (2005:744) have identified persistent female offenders in their examination of male and female adolescent delinquency trajectories. The researchers found that persistent female offenders are a smaller group when compared to persistent male offenders; however, they are “strongly involved in delinquent activities.” Most recently, Haapanen, Britton, and Croisdale (2007:142) noted that the “rate of arrest for females is also very high suggesting that persistence is not simply a male phenomenon.”

The current paper seeks to extend research on the differing female offending groups by employing both state dependence and population heterogeneity interpretations of offending trajectories. These interpretations of offending trajectories posit that either criminal behavior is a result of a stable antisocial trait (population heterogeneity) or that involvement in criminality can increase the chances of future criminality (state dependence). Previous research has argued for either a state dependence or population heterogeneity interpretation of offending, but the current analysis, both qualitative and quantitative in scope, maintains that aspects of both forms of interpretation of continuity will differentiate between persistent and late onset offenders. Specifically, it is hypothesized within the current analysis that persistent offenders will be differentiated from late onset offenders by components of both population heterogeneity and state dependence theories.

## **LITERATURE REVIEW**

Two of the most commonly documented findings within criminology are that 1) females commit fewer criminal offenses than males (Belknap 2007; Chesney-Lind and Pasko 2004; FBI 2009; Moffitt et al. 2001), and 2) past criminal behavior is strongly correlated with future criminal behavior (Farrington et al. 1990; Robins 1978; Tolan and Thomas 1995). The former finding has been well documented with factors such as levels of supervision, lowered criminal propensities, and sexual abuse being identified as critical factors in the difference between offending rates (see Hagan, McCarthy, & Foster 2002; Siegel & Williams 2003). The latter finding may offer insight into an area that is just beginning to be tapped within female offending: persistence in offending.

The literature on the pathway to persistence in offending for females is by no means unequivocal. Recent research has indicated three divergent patterns for female offending: 1) females and males travel the same pathway towards offending; 2) early onset females are similar to early onset males; and 3) girls experience delayed onset instead of early onset (see Rutter, Giller, and Hagell 1998).

More recent research indicates that prior delinquent behavior may be less predictive for female offenders (Landsheer and van Dijkum 2005), suggesting the need to look at additional social and biological influences on female offending. Specifically, Landsheer and van Dijkum (2005), in their longitudinal study of 270 male and female Dutch adolescents, found that for males early involvement in delinquent activity was predictive of late adolescent delinquency. However, the researchers did not find this to be the case for females, and the researchers assert that different models may be needed to explain the development of male and female delinquency. The debate in research on female offending and persistence exemplifies the need for further investigation into the nature of female persistence.

In examining female persistence, the current paper employs two potential interpretations: a state dependence interpretation and a population heterogeneity interpretation. The state dependence interpretation maintains that prior behavior or events alter an individual in such a way as to influence future outcome (Heckman 1981). Conversely, the population heterogeneity interpretation maintains that there is a time stable propensity underlying behavior that is responsible for offending persistence over time. Drawing from traditional, life course, and feminist theories of offending, the current paper attempts to begin answering the question of the nature of female persistence: the result of life experiences or the result of an underlying trait.

### **Population Heterogeneity vs. State Dependence**

The population heterogeneity interpretation of consistency argues that criminal behavior is the result of time stable antisocial propensities developed early in life (Nagin and Paternoster 2000). The population heterogeneity interpretation of offending can be exemplified in trait-based criminological theories such as Gottfredson and Hirschi’s (1990) General Theory of Crime (GTC) and Moffitt’s (1993) theory of life course persistent offending. GTC maintains that the trait underlying criminal behavior is low self-control (Gottfredson and Hirschi 1990). That is, levels of self-control are differentially distributed across the population, and individuals with lower levels of self-control, in the presence of opportunity, are more likely to commit criminal acts. Moffitt’s (1993) theory of life course persistent offenders similarly argues that criminal potential is unequally distributed across the population. Unlike Gottfredson and Hirschi, who argue for more environmental causes (e.g., poor parenting practices),<sup>3</sup> Moffitt argues for a biological origin: neuropsychological injury. This neuropsychological injury results in behavioral, motor, and cognitive deficits. When encapsulated in a poor rearing environment, these deficits can lead to life course persistent offending (Moffitt 1993).

And consistent with offending rates, both theories argue that offenders are more likely to be male.

The alternative explanation of continuity, state dependence, argues that each criminal event increases the chances of future criminal events by eroding constraints on criminal behavior and increasing incentives to committing criminal acts. Contrary to population heterogeneity, the state dependence approach maintains that life experiences can either encourage or discourage future criminal experiences. Sampson and Laub's (1993) Age Graded Theory of Offending is an example of a state dependence based theory. According to Sampson and Laub, with each stage of development, an individual accumulates advantages and disadvantages. That is, the experiences of each stage can either encourage or discourage antisocial behavior. Each stage, therefore, changes or influences the experiences that will occur in the next stage (Sampson and Laub 1993).

Other control based theories, such as Hirschi's (1969) social bond theory, are also state dependence based theories. Hirschi's social bond theory states that when an individual's bonds to society are weak or broken, the individual is more likely to engage in delinquent and criminal behavior. Consistent with the state dependence interpretation, prior criminal behavior may actually weaken bonds to society (Agnew 1985). Involvement in criminal behavior may weaken bonds further by damaging attachments to significant others and by reducing involvement in conventional activities (Massey and Krohn 1986). Similarly, from a differential association and social learning perspective, involvement in criminal activity may increase exposure to and involvement with delinquent peers, thus increasing the chances of future delinquent or criminal acts (Akers 1997; Sutherland 1947).

### Understanding Female Persistence in Offending

To understand female persistence within the state dependence and population heterogeneity interpretations, it is necessary to explore the nature of female development. The influential developmental factors on female offending can be grouped into four categories: biological factors, social control, female development, and prior abuse. Of these four categories, both biological factors and, to a lesser extent, female development approach female offending from a population heterogeneity perspective. Social control and prior abuse, on the other hand, are strongly ingrained in a state dependence approach.

*Biological factors.* Within life course criminology, it is becoming increasingly clear that biological factors may play a role in the continuity of offending (see Farrington 1998; Moffitt 1993; Zahn 1999). According to Moffitt (1993), disruptions in prenatal development or head injury may increase a child's chances for engaging in life course persistent offending. Females, however, appear to be less at risk for biological interference than males (Raine 1993).

Males are more likely to suffer prenatal injury resulting in a range of developmental deficits (Raine 1993). These deficits affect a child's ability to develop appropriate behaviors and to interact well with peers, increasing a child's chance of long-term behavioral problems (Moffitt 1993). Boys are also more likely to engage in risky or dangerous behavior due to lower behavioral controls and, therefore, are at a higher risk for head injury. Across the board, females are less likely to experience both of these biological influences (Raine 1993). If, however, a female does experience either or both influences, her chances of engaging in criminal behavior increase.

*Social control.* From the social control perspective, females are less likely to engage in criminal behavior, because they experience higher levels of social control within society from both friends (McCarthy, Felmlee, and Hagan 2004) and family (McCarthy, Hagan, and Woodward 1999). Research supports this argument of differing levels of social control. For example, Block (1984) argues that females are more closely supervised by family than males, particularly due to the fear of early pregnancy. Females, in turn, are more likely to internalize these social controls at an earlier age, reducing their chances of engaging in delinquent behavior (Heimer 1996). In addition, higher familial responsibilities are also placed on females at an earlier age, further curtailing criminal behavior (Bottcher 2001). Due to both higher levels of supervision and increased responsibilities, girls have less time to engage in delinquent behaviors. Recent research conducted by Booth, Farrell, and Varano (2008) suggests that social controls impact the pathway for female involvement in serious delinquency and risky behaviors.

*Female development.* There are two areas of gender differences in development that may provide an understanding of the relationship between gender and offending rates: maturity and behavioral disorders. Socially, males develop through increased autonomy. That is, as males grow, they increasingly strive for independence and self-reliance. Females, on the other hand, develop through the initiation, maintenance, and deepening of relationships (Gilligan 1982). Females may, therefore, be more influenced by other people's perception of them and by their relationships with others than are their male counterparts (Morris 1987). Accordingly, female relationships may have more influence on female behavior than male relationships (Peters 2001). Theoretically, this line of thought supports the contention of differential association: exposure to delinquent peers will increase an individual's chances of engaging in delinquent behavior. Females exposed to delinquent peers may be at a higher risk for delinquent or criminal behavior. This perspective also speaks to the intensity of definitions favorable or unfavorable to the commission of criminal acts. Moreover, it suggests that relationships damaged by traumatic acts may have more of an impact on females than males (Belknap and Holsinger 1998).

Research into childhood and adolescent disorders may also shed some light on a differential development in offending rates for females. Girls are less likely to develop overt behavioral disorders such as hyperactivity or ADD, both of which have been linked to early onset of offending (Rutter et al. 1998; Zabel and Nigro 1999). Females, on the other hand, are more likely to develop disorders such as anorexia nervosa or depression (Belknap 2007; Jang and Johnson 2005; Motz 2000). In fact, depression appears to be a more common reaction to strain for females than anger (Jang and Johnson 2005). Anger, females have been taught, can damage relationships. Females, therefore, are less likely to demonstrate angry responses and are more likely to become depressed.

*Prior abuse.* All of the previously mentioned criminological risk factors are expected to occur less often in females, thus explaining females' lower participation in criminal behavior. Theoretically, females' non-involvement in criminal behavior and females' actual involvement in criminal behavior have generally been addressed using male focused theories. Females, however, may have some unique factors that contribute to persistent offending (Gunnison and McCartan 2005). One risk factor that appears critical in understanding female involvement and persistence in crime is prior abuse.

Prior abuse can include both sexual and physical forms of abuse. Both forms have demonstrated negative effects on future outcomes. Numerous researchers have found that one unique pathway into onset in criminal offending is prior sexual abuse (Belknap 2007; Belknap and Holsinger 2006; Chesney-Lind and Pasko 2004; Comack 2005; Gilfus 1992). Research indicates that children abused earlier in life are more likely to be arrested later in life (Widom 1995). Prior sexual abuse of females has a pervasive impact on their lives. Mullen and colleagues (1988) found that females who had experienced sexual abuse as a child experienced mental health issues in adulthood (e.g., various psychiatric disorders) and at a greater rate than those women who had not experienced such abuse. Female inmates report higher levels of sexual victimization than the general population (Belknap 2007; Siegel and Williams 2003). When compared to institutionalized juvenile males, institutionalized juvenile females report higher rates of sexual abuse (Belknap and Holsinger 2006). Additionally, it has been suggested that the rate of victimization for female inmates may be double or triple the rate experienced by the general population (Harlow 1999). Sexual abuse can indeed have a detrimental impact on both males and females (McCartan and Gunnison 2010; McGuigan and Middlemiss 2005; Reinemann, Stark, and Swearer 2003; Romano and De Luca 2000). Romano and De Luca (2000), who examined the empirical literature on the impact of sexual abuse for males and compared it to the research literature on females, found that regardless of gender, childhood sexual abuse can negatively impact their lives. The researchers

did note that females who experienced childhood sexual abuse tended to display more internalizing problems (e.g., depression or anxiety) as a result of their victimization. Other responses to childhood sexual abuse that females exhibit include substance abuse (internalized pain) and criminal involvement (externalized pain). Several researchers have linked prior sexual abuse to the use of drugs and/or alcohol for females (Bailey and McCloskey 2005; Belknap 2007; Cheney-Lind and Pasko 2004; Comack 2005; Gilfus 1992; Goodkind, Ng, and Sarri 2006; Kilpatrick et al. 2000; Luster and Small 1997; Miller and Downs 1993; Saunders et al. 1999; Widom 1995). Thus, the trauma of abuse can not only lead to onset into offending, but sexual abuse can also have a long-term cumulative impact on the lives of female offenders, causing them to persist in offending (see Gunnison and McCartan 2005).

Physical abuse has also been associated with arrest for a violent crime later in life (Bunch, Foley, and Urbina 1983; Rivera and Widom 1989; Widom 1995). Physical abuse of females has additionally been linked to the onset of criminal behavior in general (Belknap 2007; Belknap and Holsinger 2006; Chesney-Lind and Shelden 2004), as well as increasing a female's chance of beginning to use drugs or joining a gang (Acoca 1998). The role of abuse, therefore, appears to be a factor that needs to be addressed in explaining female persistence.

From these four areas of research, we find both population heterogeneity and state dependence approaches to understanding female offending. From the population heterogeneity perspective, the argument is put forth that females experiencing in-utero injury or early head injuries are more likely to engage in delinquent or criminal behavior than females who have not experienced in-utero injury or early head injuries. Also from the population heterogeneity perspective is the argument that females' pathway to maturity through relationships places her at greater risk for criminal behavior, as she may be more susceptible to negative influences. While this approach does address environmental factors (i.e., the negative influences), the actual causal factor that sets a female up for a detrimental outcome is her gender, and hence, this approach falls into the population heterogeneity camp. The remaining categories address critical life events that can re-direct a female from a non-criminal pathway into a criminal pathway. Through social control, females can be prevented from engaging in offending behavior. Prior abuse, on the other hand, can have a crippling effect on a female's pathway and can encourage her to engage in future criminal behavior.

Drawing on both state dependence and population heterogeneity based theories, the following analyses examine the role of these theoretical factors in explaining persistence for a group of persistent and non-persistent female offenders. Previous research into offending offers some further guidance into the expected results. Research

by Chung and colleagues (2002) indicates that discrete offender groups and non-offender groups can be distinguished by alcohol use, family factors, and exposure to antisocial peers. Fergusson, Horwood, and Nagin (2000) similarly found family factors played a role in differentiating offender groups. Association with delinquent peers, however, appears to be the critical factor in escalating onset of offending. Unlike the delineation demarcated by the state dependence and population heterogeneity approaches, it is hypothesized within the current analysis that persistent offenders will be differentiated from late onset offenders by components of both population heterogeneity and state dependence theories. Drawing from the extant criminological literature discussed earlier, specifically, it is believed that: 1) persistent offenders are more likely to have biological injury early in life; 2) persistent offenders are more likely to have experienced abuse; 3) persistent offenders are more likely to have lower levels of self control; 4) persistent offenders are more likely to have few social ties and to associate with delinquent or criminal others; 5) persistent offenders are more likely to have a history of drug and alcohol use; and 6) persistent offenders are more likely to commit violent crimes. Thus, unlike previous research which argues for either a state dependence or population heterogeneity interpretation of offending, the current analysis maintains that aspects of both forms of interpretation of continuity will differentiate between persistent and late offenders.<sup>4</sup>

## METHOD

The current analysis seeks to better explain persistent female offending using both a quantitative and qualitative approach. Using both juvenile and adult descriptors from multiple criminological theories (e.g., social control theory, differential association theory, self-control theory, feminist theory), the analyses compare female late onsetters and female persisters. It is necessary to compare both juvenile and adult descriptors for the discrete offender groups as some researchers have asserted that exploration into adult onset of offending has been overlooked in the literature (see Eggleston and Laub 2002). Through such comparisons, the analyses seek to provide both similarities and differences between those females who have late onset into criminal offending patterns to those females who persist in criminal behavior.

### Sample

The data used in the following analyses are gathered from a voluntary retrospective self-report survey of female inmates at a Southwestern prison. This prison represents the only privately run prison in the state and the only prison for women in the state. Within this Southwestern

state, there are eight prison institutions, ten conservation camps, and one restitution center. Virtually all prisons within the state are operating beyond designed inmate capacity. At the time of this research investigation, 400 women were incarcerated in this Southwestern prison that had a designed operating capacity of 291 offenders. Females represented approximately 8 percent of the total prison population in this state, and the majority of incarcerated females had committed property or drug offenses. The ethnic distribution of the incarcerated women is as follows: 66 percent Caucasian, 23 percent African-American, 7 percent Latina-American, 2 percent Asian-American, and 2 percent Native-American. Overwhelmingly, incarcerated females were between the ages of 25 and 44. A total of 131 surveys were administered and completed after approval from the Institutional Review Board at the University of Nevada, Las Vegas (UNLV) and from the Institutional Review Board at the Department of Corrections in the Southwestern state was sought and granted. Similar to the entire prison population, the majority of the sample was Caucasian (57%). There were 15 percent African-American women, 10 percent Latina-American women, 2 percent Asian-American women, and 4 percent Native-American women in our sample. In addition, the majority of our sample was from lower socioeconomic backgrounds (74%), had received a G.E.D. or lower levels of education (51%), and was not currently married (55%). In terms of prior arrest histories, 74 percent of the sample reported a prior arrest, 66 percent reported a prior misdemeanor conviction, and 61 percent reported a prior felony conviction.

The designed survey collected information on the offenders' life history, prior criminal involvement, and demographic information. Overwhelmingly, the designed survey was quantitative in nature. However, several open-ended questions were included in the survey in order to gather qualitative feedback that could aid in understanding both female onset and persistent offending patterns. The researchers were careful in the solicitation of subjects to ensure that every female offender participating in the study was doing so on a voluntary basis. For example, subjects were recruited via fliers hung in all of the inmates' pods explaining that a research study was being conducted by university researchers and that voluntary participants were appreciated. All posted fliers contained information, such as the time and place of the survey administration, and did not indicate the nature of the study. Since the fliers did not state the exact purpose of the study, the researchers were assured that this method did not exclude participation of females from various racial/ethnic and criminal backgrounds.

Since the survey had a Flesch-Kincaid readability of 6.0, the researchers felt that the survey was not written at a level above the reading comprehension level of inmates. Thus, the survey was administered to small groups of 5 to



10 female inmates, and it took the women approximately 30 minutes to complete. On several occasions, the researchers gave assistance to the Spanish-speaking inmates and to inmates with reading difficulties or learning disabilities. In these two types of situations, the survey questions were read aloud to the inmates without anyone else being in the room at the same time. This procedure was utilized to ensure confidentiality of survey responses. Unfortunately, the researchers did not have access to the official records of the female inmates in our study to verify reported information.

### Measures of Theoretical Constructs

In order to better understand which descriptors could distinguish late onsetters from persisters, respondents were asked to reflect on experiences that occurred prior to the age of 18 in their lives as well as experiences over the age of 18. Responses gleaned from items asking the respondent to reflect on experiences prior to age 18 were classified as juvenile descriptors, while responses obtained from items asking the respondent to reflect on experiences after the age of 18 were classified as adult descriptors. The only exception to this was our head injury variable where respondents were asked to report any head injuries prior to age 12. Given the problems with retrospective measures (e.g., telescoping, retrieval error, etc.), the reference period is important to consider. For the juvenile measures, respondents were asked to recall events prior to age 18. For the adult measures, respondents were asked to recall items as an adult (i.e., over age 18) or within one year prior to arrest leading to their incarceration, with the majority of the adult measures falling in the latter category. To help prevent error, the key elements of the survey questions were bolded and italicized to draw greater attention to the specificity of the item (e.g., under the age of 18). While retrospective surveys do have their limitations, Gottfredson and Hirschi (1990) assert that retrospective studies are a valid method of measurement. Additionally, Henry and colleagues (1994), in their study of shoplifters, found that offenders did remember committing an offense earlier in their lives but that they had difficulties identifying the specific age at which they committed it.

### Population heterogeneity variables

*Premature birth.* According to Moffitt (1993), a child who is born premature will develop behaviorally, physically, and cognitively slower than his/her counterparts. In addition, Moffitt (1993) asserts that life course persisters are more likely to be impacted by premature birth than their late onsetter, or adolescent limited, counterparts. Thus, a measure of premature birth was included in the current analysis. The researchers asked respondents whether or not they were born premature.

*Head injury.* Since Moffitt (1993) asserts that neurological deficits are the root cause of life course persistent offending patterns, we wanted to explore whether such a deficit could distinguish our groups. While we did not have access to the medical records of the female inmates, we used a proxy for neurological deficits in this research. Respondents were asked whether or not they had suffered a head injury when they were under the age of 12.

*Low self-control.* We utilized Grasmick et al.'s (1993) 24-item low self-control scale to determine whether persisters were more likely to exhibit this trait than late onsetters. Responses were dummy coded where 0 = low self-control and 1 = high self-control. The Cronbach alpha for this scale is .85.

### State dependence measures

*Employment.* In order to ascertain whether employment distinguished persisters from late onsetters, we asked respondents whether, while under the age of 18, they had a mother or father who was employed. In addition, respondents were asked whether or not they were employed in the year before their current prison sentence.

*Spousal Attachment.* Sampson and Laub (1993) state that a quality marriage can promote desistance from crime. King, Massoglia, and MacMillan (2007) note that marriage can suppress criminal involvement for females. Thus, in order to determine whether marriage could distinguish persisters from late onsetters, respondents were asked whether they were married in the year prior to their current prison sentence. Horney, Osgood, and Marshall (1995) found that men who were not residing with their spouses were more likely to continue committing crimes. Therefore, we asked respondents whether or not they resided with their spouses. Additionally, Sampson and Laub (1993) explain that it is not marriage per se that contributes to one breaking away from criminality, but a quality marriage where each spouse supports the other. Thus, we asked respondents whether or not they received support, warmth, encouragement, and love from their partner and whether they had respect for their spouse or shared similar interests with them. Responses from these questions were then summated to create a spouse attachment scale. The Cronbach alpha for this scale is .77.

*Child attachment.* To ascertain whether attachments are important, as Sampson and Laub (1993) assert, we explored whether persisters were less likely than late onsetters to be attached to their child/ren. Thus, using items adapted from the National Youth Survey, we asked respondents to report their enjoyment and satisfaction with their children prior to their current incarceration sentence. The responses from these two items were summated to create a child attachment scale where responses were recoded as 0 = no enjoyment/satisfaction and 1 = enjoyment/satisfaction.



*Loving household.* Hirschi (1969) proposes that those who are attached to a significant other are less likely to commit criminal acts. In order to explore whether being raised in a non-loving household distinguished late onsetters from persisters, we asked respondents to report whether or not they would describe their household as loving when under the age of 18.

*Religious commitment.* In the qualitative portion of Giordano, Cernkovich, and Rudolph's (2000) analysis of desistance, a large number in their sample reported that a commitment to religion promoted desistance from criminality. Thus, we would expect persisters to be less committed to religion than late onsetters. Respondents were questioned as to the importance of religion in their lives prior to their incarceration sentence.

*Military service.* In 1996, Sampson and Laub, using the Gluecks' (1950) data, found that overseas duty in the WWII era emerged as a crucial life experience for breaking away from past social disadvantages (such as poverty and deviant peers). Thus, we expect that persisters would be less likely to have served in the military than late onsetters. Respondents were questioned as to whether they had ever served in the military.

*Drug and/or alcohol use.* Drug abuse has been associated with onset and persistence of criminality (Johnson, Golub, and Fagan 1995). Respondents were asked separate questions as to whether or not they had used drugs or alcohol as a juvenile and as an adult.

*Delinquent associations.* Sutherland (1947) proposed that those who had friends that were delinquent and/or criminal were also more likely to be delinquent and/or criminal. In this survey, respondents were asked whether or not they had ever been a member of a gang (as a juvenile and adult). Respondents were also asked whether any of their closest friends had been arrested (as a juvenile and adult).

*Physical abuse.* Researchers have found that physical violence during one's childhood is related to onset and persistence in criminal offending patterns (Chesney-Lind and Rodriguez 1983; Widom 1995). Respondents were asked whether they had been physically abused as a juvenile or as an adult, and two separate measures were created capturing abuse before age 18 and after 18.

*Sexual abuse.* Several researchers have pinpointed sexual abuse as a unique pathway into criminal offending patterns for females (Belknap 2007; Belknap and Holsinger 1998; Chesney-Lind and Rodriguez 1983; Silbert and Pines 1981; Widom 1995). Respondents were asked if they had been sexually abused as a juvenile or as an adult, and two separate measures were created capturing abuse before age 18 and after 18.

*Depression.* Some research has suggested that offenders who recidivate suffer from mental illness such as depression (Craft and Craft 1984). Research has also found that women who persist in illicit drug use suffer from depression (Kandel, Simcha-Fagan, and Davies 1986). In

order to investigate whether depression is more likely to be found in persisters, respondents were asked if they had ever been diagnosed with depression as a juvenile or adult.

### Discrete Offender Groups

Research within life course criminology is increasingly using discrete offender groups to understand male offending. Previous research into female offending has also begun to examine and support the use of discrete offender groups (see, for example, Gunnison and McCartan 2005; Landsheer and van Dijkum 2005). The current research dichotomizes its offender sample into late onset and persistent offenders to be consistent with this previous research. Using responses to arrest and incarceration questions in our self-report survey, persister and late onsetter groups were created. It is recognized by researchers that those who persist in criminality have exhibited involvement in crime as an adolescent (Ge, Donnellan, and Wenk 2001; Moffitt 1993; Soothill, Ackerley, and Francis 2003). Thus, a persister was defined as an individual who had self-reported an arrest as a juvenile and then was subsequently incarcerated as an adult. A late onsetter was defined as an individual who did not self-report an arrest or incarceration as a juvenile but was later incarcerated as an adult. Some researchers have defined late onset as criminal onset at ages 13-15. However, Eggleston and Laub (2002:613) state "that applying the definition of late onset to adult only offenders may be more appropriate since adolescent onset seems normative." Since researchers have found that a higher percentage of female late onset offenders are adults in the U.S. and Sweden, there is empirical support for defining late female onsetters in adulthood (Kratzer and Hodgins 1999; Magnusson 1988; Shannon 1998; Tracy and Kempf-Leonard 1996). There were a total of 55 persisters and 76 late onsetters in our sample. While some researchers would argue for the use of group based methodology for identifying these groups (see Odgers et al. 2008), the authors did not utilize latent class analysis (ELCA) since the purpose of the present study was to evaluate state dependent versus population heterogeneity interpretations for persistent vs. late onsetters. There is not a precedent in the literature to use such an analysis for a research investigation such as ours. More recently, Skardhamar (2010:311) reports that utilizing group based methodology "to test for the existence of distinct latent groups...is, at best, unreliable."

## RESULTS

The first step in the research investigation was to examine qualitative feedback from the overall sample of female offenders to better understand why they first became involved in criminality and why they continued to

persist in criminal offending patterns. Then, quantitative comparisons were utilized to further define late onsets and persisters and to understand these discrete groups. Specifically, comparisons between juvenile descriptors, adult descriptors, and the type of crime were performed to ascertain differences between late onsets and persisters by using descriptive statistics and Chi-square analyses.

### Experiences Promoting Involvement

Several open-ended questions were utilized to understand the minute similarities and differences as to why females may first become involved in criminality. When the female offenders were asked, "Can you identify any life experiences, problems, or difficulties that caused you to get into trouble and commit this crime?" 50.4 percent of the sample (n = 66) articulated a response, and the majority of their responses were consistent with previous literature.

Multiple female offenders (19.6% of the sample) reported abuse as a child and abandonment as reasons why they first became involved in crime. Not surprisingly, many female offenders (16.7% of the sample) reported sexual abuse as contributing to their onset into criminality. One woman reported "an out of control life of incest, sexual abuse, and running away from home by age 13" as contributing to her onset. Several researchers have reported that, to escape sexual abuse, many juveniles escape to the streets to evade the abuse (Belknap 2007; Belknap and Holsinger 1998; Chesney-Lind and Pasko 2004).

For 27 percent of our sample, drug and/or alcohol addictions were reported as explanations for their involvement in criminality, which is consistent with previous literature (Sommers and Baskin 1994). Several women reported multiple explanations for their onset into criminality. One woman reported a "dysfunctional childhood, being abused sexually, verbally, and mentally," while another woman identified "my own guilt (wrongful) of being molested and no money in the home" as reasons for onset into crime. Other women stated "poor coping skills," "parents drank, I feel unloved, lonely, and unwanted," "brain cancer, sexual assault (rape), mental trauma," "going around wrong people, getting high again," and "sexual abuse, drugs, and alcohol" as explanations for entering into crime. Thus, for some female inmates, it was a culmination of multiple life experiences. Much of the women's explanations are consistent with the literature (Baskin and Sommers 1998; Belknap 2007; Belknap and Holsinger 1998; Chesney-Lind and Sheldon 2004; Sommers and Baskin 1994).

Based on the qualitative feedback, the women helped to shape our understanding of female offending. For example, onset into offending is linked to drug and/or alcohol use, prior sexual abuse, child abuse, and feelings of abandonment. These multifaceted explanations for entry

into criminal offending suggest that onset cannot typically be attributed to one sole factor. After obtaining a more comprehensive understanding of female onset into offending, the examination into *why* these females continued to persist was explored.

### Experiences promoting persistence

As stated above, relatively little research has examined persistence in criminal offending patterns, and most of what has been published has involved samples of males (Farrington, Lambert, and West 1998; Ge et al. 2001). Thus, our question of "If you had committed crimes under the age of 18, why do you think you continued to commit crime as an adult?" can aid in the understanding of female persistence patterns. A total of 57 percent of our sample (n = 75) answered this question.

Interestingly, none of the women in our sample reported prior sexual abuse as a contributor to their persistent behavior. However, an overwhelming number of women in our sample (20%) stated a drug and/or alcohol addiction as the primary reason for their persistent criminal behavior. For example, the women explained that they continued in crime because of "addiction," "to supply my drug use," to support my drug habit," "becoming addicted to drugs, my criminal behavior overtook my ability to make correct choices," and "because I was hiding from my problems and felt I did not have to deal with them if I was high." It is possible that some of these women had turned to drugs and/or alcohol to cope with prior sexual abuse as previous research has suggested (Acoca 1998). However, we were unable to determine if this was indeed the case for our sample. Research literature has reported that drug addiction is a factor for onset into criminality, but few researchers have examined whether drug use is related to persistence in offending (Dembo et al. 1991; Fainzylber, Lederman, and Loayza 2002).

Several women (5% of our sample) reported that they continued because they were "bored," "for fun," or "for the excitement and gain." The feedback that was given by these women is consistent with the existing literature on reasons why offenders may commit crime. For example, several researchers have suggested that offenders may commit crime for the thrill or excitement (Carlen 1988; De Hann and Vos 2003; Katz 1988; McCarthy and Hagan 2005). Carlen (1998), in her qualitative study of 39 British female offenders, found that excitement was one explanation that female offenders provided for their continued involvement in crime. Other researchers have linked boredom to various forms of criminal involvement, including white-collar crime (Nadler 1987; Samuelson, Hartnagel, and Krahn 1995).

A few women stated their continued involvement in crime "because I got away with it," "because I loved the money I was making," and "because I was forced to do some of the things by my ex." Primarily, researchers have

found that female offenders will commit the crime alone approximately 20-30 percent of the time, and if they have a “crime partner,” it is often another woman (Alarid et al. 1996; Bunch et al. 1983). Similar to these previous findings, we found only one female in our qualitative sample who reported that her involvement was due to an outside male influence.

**Juvenile descriptors**

The qualitative feedback generated descriptors that may distinguish female late onsetters from their persister counterparts. The quantitative comparisons provide further insight into these discrete groups. In Table 1, results from descriptive analyses and Chi-square Tests of Independence for the juvenile descriptors between the discrete offender groups are presented. The percentage of participants with prior head injuries differed significantly between late onsetters and persistors [ $\chi^2(1, N = 124) = 4.84, p < .05$ ], as did several other variables: the percentage of inmates who had been gang members [ $\chi^2(1, N = 123) = 4.93, p < .05$ ]; the percentage of inmates who had friends arrested [ $\chi^2(1, N$

$= 107) = 11.25, p < .05$ ]; the percentage of inmates who had experienced prior sexual abuse [ $\chi^2(1, N = 121) = 6.85, p < .05$ ]; the percentage of inmates who had experienced prior physical abuse [ $\chi^2(1, N = 121) = 14.72, p < .05$ ]; and the percentage of inmates who had been diagnosed with depression as juveniles [ $\chi^2(1, N = 98) = 3.08, p < .10$ ]. As can be seen in the table, late onsetters were less likely to have a head injury (14.5% vs. 30.9%), been a gang member (10.3% vs. 25.5%), and have friends arrested (19.3% vs. 50%) than their persister counterparts. In addition, late onsetters were less likely to have experienced sexual abuse (50.7% vs. 74.1%), physical abuse (42.6% vs. 77.4%), or have been diagnosed with depression (22.4% vs. 38.8%) than persisters. The percentage of inmates who consumed drugs as juveniles also differed significantly between late onsetters and persistors [ $\chi^2(1, N = 121) = 20.97, p < .05$ ], as did the percentage of inmates who drank alcohol [ $\chi^2(1, N = 123) = 15.80, p < .05$ ]. Late onsetters were less likely to have consumed drugs (54.4% vs. 92.5%) or alcohol (64.7% vs. 94.5%) as a juvenile than persisters.

**Table 1. Comparisons of Juvenile Descriptors for Late Onsetters and Persisters: Percentages and Chi-Square Tests of Independence (N = 131)**

| Juvenile Descriptors            | Late Onsetter | Persister    | Chi Square | Phi  |
|---------------------------------|---------------|--------------|------------|------|
| <b>Population Heterogeneity</b> |               |              |            |      |
| Not Premature Birth             | 89.9% (n=62)  | 85.2% (n=46) | 0.62       |      |
| Premature Birth                 | 10.1% (n=7)   | 14.8% (n=8)  |            |      |
| No Head Injury                  | 85.5% (n=59)  | 69.1% (n=38) | 4.84**     | .198 |
| Head Injury                     | 14.5% (n=10)  | 30.9% (n=17) |            |      |
| <b>State Dependence</b>         |               |              |            |      |
| Mother <b>Not</b> Employed      | 33.3% (n=23)  | 22.2%(n=12)  | 1.84       |      |
| Mother Employed                 | 66.7% (n=46)  | 77.8%(n=42)  |            |      |
| Father <b>Not</b> Employed      | 13.2% (n=9)   | 17.0% (n=9)  | 0.33       |      |
| Father Employed                 | 86.8% (n=59)  | 83.0% (n=44) |            |      |
| Not Loving Household            | 25.0% (n=17)  | 38.2% (n=21) | 0.25       |      |
| Loving Household                | 75.0% (n=51)  | 61.8% (n=34) |            |      |
| Not Gang Member                 | 89.7% (n=61)  | 74.5% (n=41) | 4.94**     | .200 |
| Gang Member                     | 10.3% (n=7)   | 25.5% (n=14) |            |      |
| No Friend Arrested              | 80.7% (n=46)  | 50.0% (n=25) | 11.25**    | .324 |
| Friend Arrested                 | 19.3% (n=11)  | 50.0% (n=25) |            |      |
| No Sexual Abuse                 | 49.3% (n=33)  | 25.9% (n=14) | 6.85**     | .238 |
| Sexual Abuse                    | 50.7% (n=34)  | 74.1%(n=40)  |            |      |
| No Physical Abuse               | 57.4% (n=39)  | 22.6% (n=12) | 14.72**    | .349 |
| Physical Abuse                  | 42.6% (n=29)  | 77.4% (n=41) |            |      |
| No Alcohol Use                  | 35.3%(n=24)   | 5.5% (n=3)   | 15.80**    | .358 |
| Alcohol Use                     | 64.7% (n=44)  | 94.5% (n=52) |            |      |
| No Drug Use                     | 45.6% (n=31)  | 7.5% (n=4)   | 20.97**    | .416 |
| Drug Use                        | 54.4% (n=37)  | 92.5% (n=49) |            |      |

\*\* p < .05

**Adult descriptors**

Comparisons, using percentages and Chi-square tests of independence for the adult descriptors between the discrete offender groups are presented in Table 2. The percentage of inmates who were prior gang members differed significantly between late onsetters and persistors [ $\chi^2(1, N = 122) = 6.69, p < .05$ ], as did the percentage of inmates who had friends arrested [ $\chi^2(1, N = 121) = 16.53, p < .05$ ], the percentage who had experienced sexual abuse [ $\chi^2(1, N = 120) = 8.15, p < .05$ ], the percentage who had

consumed drugs [ $\chi^2(1, N = 121) = 13.57, p < .05$ ], and the percentage who drank alcohol [ $\chi^2(1, N = 123) = 4.00, p < .05$ ], as an adult. Similar to the juvenile descriptors, results revealed that late onsetters were less likely to have been a gang member (7.4% vs. 24.1%) and to have had friends arrested (63.6% vs. 94.5%) than their persistor counterparts. In addition, late onsetters were less likely to have experienced sexual abuse (34.8% vs. 61.5%) or consumed drugs (64.2% vs. 92.6%) or alcohol (64.7% vs. 94.5%) as an adult than persisters.

**Table 2.** Comparisons of Adult Descriptors for Late Onsetters and Persisters: Percentages and Chi-Square Tests of Independence (N = 131)

| Adult Descriptors        | Late Onsetter | Persister    | Chi Square | Phi  |
|--------------------------|---------------|--------------|------------|------|
| Population Heterogeneity |               |              |            |      |
| High Self-Control        | 17.5% (n=11)  | 14.3% (n=7)  | 0.21       |      |
| Low Self-Control         | 82.5% (n=52)  | 85.7% (n=42) |            |      |
| State Dependence         |               |              |            |      |
| No Military Service      | 100% (n=69)   | 98.2% (n=54) | 1.27       |      |
| Military Service         | 0% (n=0)      | 1.8% (n=1)   |            |      |
| No Employment            | 25.4% (n=16)  | 39.2% (n=20) | 2.49       |      |
| Employment               | 74.6% (n=47)  | 60.8% (n=31) |            |      |
| No Religious Commitment  | 63.2% (n=43)  | 72.2% (n=39) | 1.10       |      |
| Religious Commitment     | 36.8% (n=25)  | 27.8% (n=15) |            |      |
| No Spousal Attachment    | 61.5% (n=24)  | 63.2% (n=12) | 0.01       |      |
| Spousal Attachment       | 38.5% (n=15)  | 36.8% (n=7)  |            |      |
| No Child Attachment      | 7.8% (n=4)    | 8.9% (n=4)   | 0.03       |      |
| Child Attachment         | 92.2% (n=47)  | 91.1% (n=41) |            |      |
| Not Gang Member          | 92.6% (n=63)  | 75.9% (n=41) | 6.70**     | .234 |
| Gang Member              | 7.4% (n=5)    | 24.1% (n=13) |            |      |
| No Friend Arrested       | 36.4% (n=24)  | 5.5% (n=3)   | 16.53**    | .370 |
| Friend Arrested          | 63.6% (n=42)  | 94.5% (n=52) |            |      |
| No Sexual Abuse          | 64.7% (n=44)  | 38.5% (n=20) | 8.15**     | .261 |
| Sexual Abuse             | 35.3% (n=24)  | 61.5% (n=32) |            |      |
| No Depression            | 39.4% (n=26)  | 30.9% (n=17) | 0.94       |      |
| Depression               | 60.6% (n=40)  | 69.1% (n=38) |            |      |
| No Alcohol Use           | 34.8% (n=24)  | 18.5% (n=10) | 4.00**     | .180 |
| Alcohol Use              | 65.2% (n=45)  | 81.5% (n=44) |            |      |
| No Drug Use              | 35.8% (n=24)  | 7.4% (n=4)   | 13.57**    | .335 |
| Drug Use                 | 64.2% (n=43)  | 92.6% (n=50) |            |      |

\*\* p < .05

**Type of crime**

In addition to developing an understanding of descriptors that may distinguish the discrete offender groups, we also explored whether there were any differences in the type of crime (i.e., violent, property, drug) committed by each group. According to Moffitt (1993), life course persisters commit more serious types of offenses than their adolescent limited counterparts. There was a slightly higher percentage of female late onsetters

(30.3%) than female persisters (27.5%) in our sample, which is inconsistent with Moffitt's assertions, although it should be kept in mind that the discrete groups of the current analysis were not identical to Moffitt's typologies. Consistent with Moffitt's theory, we discovered that a higher percentage of late onsetters in our sample (34.8%) had committed a property offense than persisters (27.5%). Thus, Moffitt's explanation that adolescent limiteds commit less serious types of offenses than life course



persisters was supported in our *descriptive* analyses. However, a Chi-square test for independence failed to reveal any significant relationship between discrete offender groups and type of crime [ $\chi^2(1, N = 121) = 5.11$ ]. Due to the availability of data, the sample could not be delineated into Moffitt's categorizations. Therefore, it is possible that adolescent limited and life course persistent offenders are confounded within the current categorizations of persistent and late onset offenders. Additionally, because of the small sample size for the groups, we were unable to conduct any predictive analyses. Thus, this relationship should be further explored by future researchers. Perhaps, there are distinct differences in the types of crimes that female late onsetters and female persisters commit.

## DISCUSSION

Within the last few years, criminological research has identified discrete offending trajectories for male offenders (Fergusson et al. 2000; Nagin, Farrington, and Moffitt 1995). More recently, discrete offending trajectories have been employed to further our understanding of female offending. The current research examines two potential interpretations of these offending trajectories for female offenders: state dependence and population heterogeneity. To this end, the current research examines whether female offenders can be identified as discrete groups of offenders and whether these discrete groups can be differentiated by underlying traits or life experiences.

The first stage of analysis involved examining the qualitative differences between onset and persistence in female offenders. Results from our open-ended questions revealed that, while females attributed prior sexual abuse as a factor for onset into offending, they did not attribute the experience to their continued involvement in crime. In fact, the females reported that drug and/or alcohol dependence was responsible for their persistence in criminal offending. However, results from our quantitative analyses revealed that prior sexual abuse is a critical factor for persisters. Perhaps females are not cognizant of the full effects of sexual abuse on their behavior or their self-perception. Additionally, it is also very likely that sexual abuse was underreported in both our qualitative and quantitative measures.

The results from the current quantitative analysis revealed that there do appear to be two discrete groups of offenders. Persistent offenders were differentiated from their late onset counterparts with a range of juvenile predictors including early life head injury, association with gangs, association with criminal others, both prior sexual and physical abuse, depression, and the use of both alcohol and drugs. Two findings within the juvenile descriptors may relate to Moffitt's work on persistence. In the analysis, late onset and persistent offenders were not differentiated by premature birth but were differentiated by

head injury. Our finding that late onsetters were less likely to have a head injury is consistent with Moffitt's (1993) assertion that life course persisters, as opposed to adolescent limiteds, are more likely to have suffered from a neurological deficit or injury to the head. Additionally, our finding that sexual or physical abuse as a juvenile distinguished late onsetters from persisters was consistent with feminist research literature which has found that sexual or physical abuse as a child can have an enduring impact on behavior (Belknap 2007; Chesney-Lind 1989; Chesney-Lind and Sheldon 2004; Gunnison and McCartan 2005). This finding was also consistent with research that has found child abuse as a juvenile to be related to persistence (see Dean, Brame, and Piquero 1996). Delinquent associations and alcohol consumption as a juvenile also distinguished late onsetters from persisters. The literature reveals that persisters are more likely to consume alcohol and have delinquent peer associations as a juvenile (see Smith, Visher, and Jarjoura 1991), and we found that persisters did indeed consume more alcohol and possess more delinquent peer associations than late onsetters. Not all of the descriptor variables, however, distinguished late onsetters from persisters. For instance, parental employment and residing in a loving household did not distinguish late onsetters from persisters.

For the adult predictors, only the differential association measures (i.e., association with gang members, association with criminal others), prior sexual abuse, and use of both alcohol and drugs significantly differentiated the two groups. Similar to our juvenile descriptor findings, we once again found that persisters were more likely to have experienced sexual abuse. Consistent with the feminist literature, sexual abuse at any age is one of the main pathways for females to enter criminality (Belknap 2007; Chesney-Lind and Pasko 2004). It is apparent that prior sexual abuse can contribute not only to onset into offending but to persistence as well. It may be that the trauma of the abuse experienced makes it more difficult for the female offender to break from offending patterns. While prior sexual abuse has been linked to the onset of drug abuse (see Kilpatrick et al. 2000), it has not been linked to contributing to female persistent substance abuse problems until recently. According to Denov (2004), prior sexual abuse can contribute to long-term substance abuse problems for females. Thus, our finding that late onsetters were significantly less likely to have experienced sexual abuse or consume drugs or alcohol than persisters provides support for Denov's (2004) assertion. Moreover, our finding is congruent with the drug literature where previous researchers have found that consumption of drugs can have an enduring impact on behavior (see Johnson et al. 1995). Finally, we found that delinquent peer associations were more problematic for persisters than late onsetters. While it is widely known that delinquent peer associations are a risk factor for entry into offending (see Farrington 2003), recently, Kosterman and colleagues



(2001) discovered that adult persistence in violent behavior was influenced by early antisocial associations. Our findings reveal that adult antisocial associations may also be instrumental in contributing to persistence.

The research also found support for both the population heterogeneity and state dependence interpretations of offending trajectories. Of the juvenile predictors, late onset and persistent offenders were not differentiated by premature birth but were differentiated by head injury. This finding hints to a biological underpinning of persistent offending behavior. For the set of adult predictors, however, self-control failed to significantly differentiate between late onset and persistent offenders. Additionally, this finding is contrary to the population heterogeneity argument. The bulk of the findings, however, appear to support a state dependence interpretation of female offending, particularly for persistent female offenders. While head injury before age 12 did significantly differentiate between persistent and late onset offenders, the large majority of factors differentiating the two groups are factors that would alter or interrupt a female's social interactions and behavior. These findings are consistent with the different developmental tracks of females. Recall that research indicates that females develop and mature through relationships (Morris 1987). Therefore, it is possible that these significant factors, particularly sexual abuse, are radically altering a female's perception of herself and her relationship with others. Although additional research will be required to confirm, these findings suggest that female offending trajectories may differ from male offending trajectories with certain factors such as sexual abuse being more influential for females than males. While some researchers have found similarities between males and females in regards to their development of offending trajectories (see Odgers et al. 2008), our finding is more consistent with research reported by Fontaine and colleagues (2009), who state that females can indeed have unique developmental offending trajectories.

One of the key findings of the current research is the role of prior sexual abuse. While most theoretical variables did not distinguish between late onset and persistent offenders, sexual abuse did. Specifically, persistent offenders were significantly more likely to have experienced sexual abuse using both juvenile and adult descriptors. This finding adds to the already substantial evidence indicating prior sexual abuse is a critical factor in the etiology of female offending (see for example, Feerick and Snow 2005). The research further suggests that prior sexual abuse may be a key factor in explaining the persistence of female offending. What seems possible is that sexual abuse may create a state in which persistent offending becomes more likely. While the factors that relate to this state are currently unknown, the research offers some suggestions. Research indicates that females are often initiated into criminal activity through a male

(Alarid et al. 1996). It seems possible that prior sexual abuse, which has been associated with lowered self-esteem, may set a female up to be manipulated by males in her life. As such, the sexual abuse creates a state in which her chances of future criminal behavior are greatly enhanced. Or from Moffitt's perspective, sexual abuse may snare an individual within an offending trajectory from early on. From Sampson and Laub's perspective, early sexual abuse may reduce an individual's social capital or, perhaps more accurately, their perception of social capital.

Of critical importance is also exposure to delinquent peers or gang members. For both juvenile and adult predictors, these two differential association measures distinguished between late onset and persistent offenders. These findings are in line with the findings of Fergusson et al. (2000). They further highlight that these critical factors in male offending are similarly critical in the etiology of female offending.

While this study represents one of the few that have explored the similarities and differences between female late onsetters and female persisters, it is not without its limitations. One limitation of this study was our small sample size. This limitation precluded us from conducting more sophisticated statistical analyses that could have aided in our explanation of female persisters. Additionally, our sample was comprised only of females. Thus, we were unable to directly compare whether there are similarities and differences between male and female late onsetters and persisters. Future research should examine both male and female late onsetters and persisters to determine whether similarities and/or differences exist between the discrete groups. Because the sample design is retrospective, it suffers from the same methodological problems as all retrospective samples. For instance, the prevalence and incidence of critical factors, such as abuse, could be inflated when compared with a representative sample (see Widom 1995). Also, the researchers did not have access to other sources of information (e.g., prison records), thus only one source of information was utilized for this study. Finally, as mentioned previously, there is disagreement in the field whether distinct offending trajectories exist for females and males (see Fergusson and Horwood 2002). Thus, some researchers may view our delineation of discrete groups to be a limitation.

Despite the limitations, findings from this research offer implications for researchers. This is one of the few studies to explore the etiological differences between female late onsetters and female persisters, and more research on both discrete groups is needed (see Aguilar et al. 2000; Odgers et al. 2008; Piquero, Moffitt, and Wright 2007; Piquero and White 2003; Silverthorn, Frick, and Reynolds 2001). While much of the existing research on persistence has been on samples of males, more research is needed to further understand both male and female late onset and persistent offending patterns. For females, the differential findings between individuals with a history of

sexual abuse and those without requires further analysis to see why those with a sexual abuse history were more likely to be persistent offenders. Clearly, there is a need for future researchers to examine the issues of co-morbidity in relation to sexual abuse given that females are at a greater risk for experiencing mental health problems (e.g., depression) as compared to males (National Institute of Mental Health 2010). Additionally, the etiology of how sexual abuse may contribute (i.e., internal or external) to offending needs further exploration. Future researchers examining late onset or persistence should also consider using qualitative research methods in addition to quantitative methods. For instance, conducting in-depth interviews with offenders could provide a greater understanding of late onset and persistence upon which theoretical propositions might be made and subsequently tested with quantitative methods.

Finally, the results from this research investigation also have implications for policymakers. One implication from this research is that correctional programming should address prior sexual abuse, drug abuse, and the role of delinquent peers. For instance, programming which counsels female offenders about their past victimizations and helps to resolve such issues may be useful in reducing persistence. Moreover, the continued implementation of drug abuse programs in the correctional system would be beneficial, especially since many women in the sample indicated that drug abuse was a key factor as to *why* they continued to commit crimes.

## Endnotes

<sup>1</sup> There is a debate in the literature as to whether discrete groups exist (see Laub and Sampson 2003; Nagin and Tremblay 2005). More recently, for example, Laub and Sampson (2003) challenged the existence of Moffitt's life course persistent offending group.

<sup>2</sup> Some researchers have stated that identical offending trajectories exist for males and females (see Fergusson and Horwood 2002) or that distinct offending trajectories proposed by Silverthorn and Frick (1999) may be overstated (see White and Piquero 2004).

<sup>3</sup> It should be noted that some researchers have asserted that differences in power relationships in a household can result in different socialization of male and female children (see Hagan, Gillis, and Simpson 1985; 1990). Thus, several researchers have criticized the general theory of crime for its inattention to gendered power differences and inequalities, particularly as it relates to parenting of children (Miller and Burack 1993). More recently, Blackwell and Piquero (2005) found that parental control predicted the development of low self-control except for females reared in less patriarchal households. Clearly, the results of their research indicate that males and females responded differently to parental control.

<sup>4</sup> This employment of both interpretations is not refusal by the authors to pick a side. It is informed by the nature of the literature currently available on continuity. It is largely recognized that there is not equipotentiality early in life for later life offending (Gottfredson and Hirschi 1990; Moffitt 1993). Instead, individuals have different levels of criminal disposition. Individuals with a higher potentiality have an increased risk of engaging in offending behavior across the life course. At the same time, life events can alter pathways of offenders both with criminal pre-dispositions and those without (Sampson and Laub 1993). As the current analysis is exploratory, it is critical, therefore, to examine both possibilities in the continuity of offending.

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