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THE INTERACTION EFFECTS OF SUBJECTIVE AND STRUCTURAL FACTORS
ON CRIME AMONG FORMERLY INCARCERATED MALES

A Dissertation

Presented To

the Faculty of the Graduate School of Social Work

University of Denver

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

by

Christopher A. Veeh

June 2015

Advisor: Jeffrey M. Jenson

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Abstract

The high rate of recidivism in the over 600,000 individuals who return from incarceration each year is an important social problem facing U.S. society and the criminal justice system. Efforts undertaken so far early in the 21st century to address the problem of recidivism in the formerly incarcerated, particularly prison reentry programs, have produced disappointing results at reducing the rate of recidivism. Therefore, there is a need to identify new ways for prison reentry programs to reduce recidivism among individuals recently returned from prison, and social work with its person-in-environment perspective can make an important contribution through conducting research to understand the behavior change process that facilitates termination from crime. Explanations for how individuals terminate from crime are dominated by either a structural perspective or a subjective perspective, but new research has identified a third school of thought, the structural-subjective perspective, that attempts to create an integrated theory from both structural and subjective theories of crime termination. The purpose of the current study was to contribute to the literature on crime termination and the structural-subjective perspective by exploring the nature of the relationship between structural factors, subjective factors, and crime termination in a sample of adolescents with serious criminal backgrounds. Secondary data from the *Pathways to Desistance* study, a longitudinal study that followed youth convicted of serious crimes in

Philadelphia, Pennsylvania and Phoenix, Arizona for seven years, was analyzed using confirmatory factor analysis and structural equation modeling to answer the research questions. The method of multisample analysis within structural equation modeling was also used to examine significant relationships for invariance across race and socioeconomic status. Results found support for an inverse relationship between the latent measure *Pro-Social Orientation* and *Self-Reported Offending*. In addition, greater levels of *Social Capital* were found to increase *Pro-Social Orientation*, which in turn decreased criminal behavior three-years later. Implications and recommendations for how social workers and prison reentry programs can help to intervene at the structural level and develop social capital in order to increase the likelihood of success among the formerly incarcerated is discussed.

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Chapter One: Introduction

The rate of re-incarceration among individuals recently released from prison is high and has remained largely unchanged over the past 20 years (Langan & Levin, 2001; Pew Center on the States, 2011). Reducing the high rate of recidivism among ex-prisoners is one of the most pressing issues facing the criminal justice system as well as society-at-large (Wright & Cesar, 2013). Efforts at explaining how individuals terminate criminal behavior following incarceration have largely followed either a structural perspective or a subjective perspective (Giordano, Cernkovich, & Rudolph, 2002; Laub & Sampson, 2003; Maruna, 2001; Sampson & Laub, 1993). Informed by the person-in-environment perspective, the current study aims to bridge these two theories of crime termination by exploring the interaction of structural and subjective factors on future criminal behavior in a sample of adolescents adjudicated for serious crimes.

The division between structural and subjective factors will follow the definitions used previously by LeBel, Burnett, Maruna, and Bushway (2008). Structural factors will be defined as social institutions, development events, and products of interrelationships between two or more individuals (i.e., social capital, neighborhood, employment, marriage) that exist external to the individual (LeBel et al., 2008). Subjective factors will refer to measures of “the way individuals experience, understand, interpret, and make sense of the world around them” (LeBel et al., 2008, p.133). Subjective factors capture

within individual changes in constructs such as agency, identity, motivation, and attitudes.

Overview of the Literature

Mass incarceration. Incarceration has reached epidemic proportions in the United States (Dumont, Brockmann, Dichman, Alexander, & Rich, 2012). The experience of incarceration has become so prevalent in America that it is now a normal part of life for many disadvantaged individuals who are disproportionately nonwhite and of low socioeconomic status, a phenomenon known as mass incarceration (Sampson & Loeffler, 2010). Incarceration is a powerful engine of social inequality that creates an underclass of individuals perpetually stigmatized, shamed, and sanctioned for their past convictions (Wakefield & Uggen, 2010).

The rate of incarceration in the United States reached its highest point in 2008 at a rate of 506 per 100,000 (Carson & Sabol, 2012), and since then there has been a gradual decline in incarceration to a rate of 478 per 100,000 in 2013 (Carson, 2014). These are the first years of declining incarceration in the United States in almost thirty years (Carson & Golinelli, 2014). Despite this recent promising trend, there still remain over 1.5 million individuals incarcerated in prison (Carson, 2014).

The social work profession has the capacity to be a leader in ameliorating the effects of mass incarceration via two important ways. First, social workers are often the frontline providers of services to the incarcerated (Yamatani & Spjeldnes, 2011), thus the profession can assist in transferring the theory-driven findings in the criminological literature into an actual program with a dual focus on both the person and the

environment. Second, social work could develop a standard delivery model to provide services in an effective manner that spans the multiple service systems needed in an individual's transition from incarceration back into the community (Pettus & Severson, 2006; Wilson, 2010). Social work is an applied profession at its roots and it could greatly benefit the criminal justice system by providing a comprehensive approach to intervention research focused on exploring the relationship among structural factors, subjective factors, and crime termination (see Fraser, Richmond, Galinsky, & Day, 2009).

Criminal recidivism and prison reentry programs. Travis (2005)

demonstrated that almost every one of the over 1.5 million who are incarcerated will eventually be released back into the community. Individuals released from incarceration have been shown to have a high rate of return to prison (i.e., recidivism). Within three years of release from prison, approximately one-half of the formerly incarcerated are back in prison again (Langan & Levin, 2001; Pew Center on the States, 2011). The pull of incarceration is strong, evidenced in the research that shows that among individuals with at least two consecutive admissions to prison, four out of five will go on to continue to recidivate repeatedly (Hughes, Wilson, & Beck, 2001). These high rates of recidivism have remained largely unchanged over the past 20 years (Pew Center on States, 2011).

In response to the high rate of recidivism among the formerly incarcerated, the federal government developed funding mechanisms for states, such as the Serious and Violent Offender Reentry Initiative (SVORI) and the Second Chance Act of 2007 (P.L. 110-199), to establish or enhance prison reentry programs across the U.S. These

programs were tasked with finding ways to keep the formerly incarcerated from returning to prison, but outcome evaluations of prison reentry programs report disappointing results at reducing recidivism (Wright & Cesar, 2013). Therefore, there is a need for research aimed at understanding how prison reentry programs can further reduce recidivism.

Theories of crime termination. Research into the change mechanisms associated with the termination of criminal behavior was set into motion by the groundbreaking work of Robert Sampson and John Laub and their age-graded theory of informal social control (Sampson & Laub, 1993). Sampson and Laub (1993) identified a basic paradox in the criminological literature. While studies consistently show that the single best predictor of adult criminal behavior is past delinquency in childhood and adolescence; most delinquent children and adolescents do not become criminal adults. Sampson and Laub found informal control from adult social bonds – particularly through a high quality job, marriage, or social capital – to explain criminal behavior in adults independent of an individual’s prior likelihood to commit a crime (Laub & Sampson, 2003; Sampson & Laub, 1993).

Other scholars have critiqued the age-graded theory of informal social control for over-relying on an individual’s bonding to structural factors (i.e., employment, marriage, and the military) to explain how individuals terminate their criminal behavior. Laub and Sampson (2003) detail that individuals terminate “by default” in a random fashion that often largely occurs without the individual even realizing it (p.278). In contrast, Giordano, Cernkovich, and Rudolph (2002) emphasize the individual’s own role in self-selecting positive opportunities available in the surrounding environment. Before an

individual can take advantage of a job or marital opportunity, there must be a fundamental shift in “the actor’s basic openness to change” (Giordano et al., 2002, p.1000). Without this fundamental shift in one’s openness to change, opportunities or “hooks for change” that promote positive development will fail to lead to change in criminal behavior (Giordano et al., 2002, p.992). Similar to the work of Giordano and colleagues (2002), Maruna (2001) found that individual’s must first make a conscious choice to “make good” in order to develop the type of narrative identity promotive of long-term termination of criminal behavior (p.10). A coherent self-narrative that explains both an individual’s criminal past and the subsequent turnaround is necessary for the continued maintenance of a crime-free lifestyle (Maurna, 2001).

Academic scholarship on the change mechanisms that lead to termination of criminal behavior was dominated by these two competing schools for most of the early 21st century. However, a third school of thought has emerged that attempts to weave the two existing strands into an integrated theory (Bottoms, Shapland, Costello, Homes, & Muir, 2004; Farrall & Bowling, 1999). McNeill (2003) asserts that reentry programs need to be focused both on individual change and on the larger social context required to support change. Social work can be a leader in the development of rehabilitation interventions that integrate strategies for change at both the individual and structural level through the application of the profession’s guiding principle, the person-in-environment perspective (Kondrat, 2008).

The person-in-environment perspective provides an organizing framework for researchers and practitioners to understand the equal importance of both the individual

and the larger environment in explaining human behavior (Kondrat, 2008); an idea rooted in the profession of social work but one that is relatively new to the study of criminal behavior. Current work supporting the integration of the subjective and the structural factors has largely been based on qualitative interviews with the formerly incarcerated (Davis et al., 2013; F-Dufour et al., 2013; Panuccio et al., 2012). Two quantitative studies were found in the literature that examine the relationships between subjective factors and structural factors and criminal behavior. Both studies found support for the interaction between individual-level constructs (i.e., internal motivation and pro-social identity) and structural opportunities in reducing future crime (LeBel et al., 2008; Rocque, Posick, & Paternoster, 2014).

Mass incarceration of the nonwhite and impoverished. Furthermore, despite the disproportionate impact of incarceration on nonwhite and undereducated individuals (Raphael, 2011), there is a general lack of inquiry into whether the relationships found to be associated with termination from crime are consistent across either race or socioeconomic status. In fact, two of the landmark studies on termination from criminal behavior, Sampson and Laub (1993) and Maruna (2001), included practically all white individuals in their samples. Giordano et al (2002) used a more diverse sample but failed to examine if significant relationships were consistent across groups of diversity in the sample.

The core social work value, dignity and worth of the person, calls on all social workers to “treat each person in a caring and respectful fashion, mindful of individual differences and cultural and ethnic diversity” (Dolgoff, Harrington, & Loewenberg, 2012,

p.24). In an effort to integrate this value into quantitative research on criminal justice populations, a test of measurement invariance will be conducted to determine if the findings drawn from the full sample are also invariant across the important diversity groups of race and socioeconomic status. This study also aims to break from the traditional black-white dichotomy found in the majority of criminological studies that have looked for differences by race (Martinez, 2004). Instead, the three racial groups of African American, Hispanic, and White will all be examined in the test of measurement invariance.

Statement of the Problem

The United States currently incarcerates over 1.5 million individuals and the vast majority will be returning to the community where they face a host of challenges to staying out of the criminal justice system. The difficulty of successful reintegration following imprisonment is captured by the high rate of re-incarceration consistently found among the formerly incarcerated over the past 20 years. Current programmatic efforts at reducing the high rate of re-incarceration have produced disappointing outcomes, resulting in the need for new ideas and research that explores how recidivism rates might be reduced.

Existing work that has examined the change mechanisms related to the termination of crime have largely fallen into either a structural or subjective perspective. Very little research, particularly utilizing quantitative methods, has thus far been undertaken to look at the interaction of factors at both the structural level and the subjective level and their effect on future criminal behavior, which is identified as the

structural-subjective perspective (LeBel et al., 2008). McNeill (2009) identifies a need for further research into how reentry programs and other rehabilitation interventions can intervene effectively with both the surrounding structure and the individual to facilitate the process of crime termination among persons recently released from incarceration.

The social problems of mass incarceration and the high rate of recidivism among the formerly incarcerated are important to the profession of social work because of the broad social justice implications. As Pettus-Davis (2012) details, despite the profession largely ignoring the criminal justice system for the past four decades, “almost every facet of social work intersects with criminal justice” (p.3). Mass incarceration has made the experience of confinement “a normal life event for many disadvantaged young men” (Sampson & Loeffler, 2010, p.20), particularly those who are nonwhite and from low socioeconomic backgrounds (Raphael, 2011). African Americans are incarcerated at rates 1.4 times higher than Hispanics and over six times higher than Whites (Carson & Sabol, 2012). Furthermore, while often ignored in criminal justice research (Martinez, 2004; Schuck, Lersch, & Verrill, 2004), Hispanics are incarcerated at a rate two-and-a-half times that of Whites (Carson & Sabol, 2012). The incarcerated are almost exclusively the undereducated, with almost 70% of all prisoners reporting no high school diploma (Western & Pettit, 2010). Further social justice consequences of mass incarceration include: negative health outcomes (Dumont et al., 2012), separation of families (Western & Wildeman, 2009), poor to non-existent employment opportunities (Pager, Western & Sugie, 2009), voter disenfranchisement (Uggen, Manza, & Thompson, 2006), economic inequality (Western & Pettit, 2010), and a vast system of collateral sanctions that keep

the formerly incarcerated in a “felon class” and denied full membership in society (Ewald, 2012; Uggen et al., 2006, p.288; Western & Pettit, 2010).

Informed by the person-in-environment perspective (Kondrat, 2008), the social work profession can be a leader in the development of prison reentry programs and other rehabilitation interventions that address both structural factors and subjective factors. In order to provide that leadership, social work researchers need to be contributors to the academic discussion attempting to understand the change process that leads an individual to terminate criminal behavior (McNeill, 2009). The current study endeavored to make a contribution to that larger discussion by examining the interaction of pro-social attitudes and measures of social capital and neighborhood disorganization on crime in a sample of adolescents convicted of serious crimes.

Research Questions

Secondary data from the *Pathways to Desistance* study was used in the current investigation (see Mulvey et al., 2004). The sample included 681 adolescent males who were adjudicated for serious crimes in the metropolitan areas of Phoenix, Arizona and Philadelphia, Pennsylvania. Data were collected on these individuals at six-month intervals for the first three years of the study and then for the remaining four years the interval was lengthened to yearly, for a total of seven years. The *Pathways to Desistance* study is the largest study of serious adolescent offenders ever completed and data were collected on a wide variety of measures.

Data used for this investigation included demographics, parental Index of Social Position, the level of connectedness to the community (i.e., social capital), neighborhood

disorganization, and a self-report of criminal offending. Data to measure the latent construct *Pro-Social Orientation* included the *Future Outlook Inventory*, two subscales from the *Weinberger Adjustment Inventory*, and Aspirations for Work, Family, and Law Abiding Behavior. Using these data, the following research questions were addressed:

- (1) What is the nature of the relationship between structural and subjective factors and termination from crime following release from the criminal justice system?
- (2) Is the relationship between the structural-subjective interaction and termination from crime similar across the racial groups of African American, Hispanic, and White?
- (3) Is the relationship between the structural-subjective interaction and termination from crime similar across socioeconomic status?

Summary

Overall, mass incarceration represents a substantial social problem for U.S. society and the criminal justice system. Particularly troubling about mass incarceration are the high rates of recidivism that have been consistently found among the formerly incarcerated over the past 20 years. In response to this problem, prison reentry programs proliferated across the U.S. but the rate of recidivism among the formerly incarcerated continues to remain largely unchanged. Social work and its person-in-environment perspective can help to chart a new way forward for prison reentry programs by contributing research which explores the interaction of structural and subjective factors on future criminal behavior and translating those findings into the development of new programs with a dual focus on both the individual and the surrounding social

environment. Detailed in Chapter Two is a review of the literature with a focus on factors associated with crime termination and the dominant theoretical perspectives that explain how the termination of criminal behavior occurs.

Chapter Two: Review of the Literature

The *termination* of crime is defined as the point-in-time at which criminal activity stops, while *desistance* from crime refers to the process that helps an individual maintain a crime-free lifestyle (Laub & Sampson, 2001). Historically, the primary focus of criminological theory has been placed on desistance. However, in recent years, investigators like Laub and Sampson (2001), have emphasized that both termination and desistance should be considered in discussions aimed at understanding how individuals with criminal backgrounds eventually mature beyond antisocial behavior. The current study focuses on the outcome of crime *termination* among individuals with a serious criminal history.

Empirical evidence of the factors associated with crime termination and the dominant theoretical perspectives that explain how the termination of criminal behavior occurs are reviewed in this chapter. First, a description of the age-crime curve is provided; this is followed by a discussion of factors associated with termination from crime. Finally, a description is provided detailing structural, subjective, and structural-subjective theories of crime termination (see LeBel et al., 2008).

Age-Crime Curve

Moffitt (1993) identified the relationship between age and crime “as the most robust and least understood empirical observation in the field of criminology” (p.675). This relationship has been noted consistently in studies for over 180 years and can be

traced to the work of Adolphe Quetelet, who analyzed crimes committed in France between 1826 and 1829 (Laws & Ward, 2011). The age-crime curve is at the foundation of all theory seeking to explain how individuals terminate their criminal behavior.

Laub and Sampson (2003) illustrated the age-crime curve using data from Sheldon and Eleanor Glueck's (1950) landmark study that followed 500 juvenile delinquents from ages 7 to 70. In the aggregate, during the ages from 7 to 17 there is a dramatic increase in criminal behavior, and then a gradual trailing off until approximately age 45 (Sampson & Laub, 2003). A similar relationship between age and crime was reported in numerous influential studies (Elliott, Huizinga, & Ageton, 1985; Farrington, Piquero, & Jennings, 2013; Gottfredson & Hirschi, 1990; Wolfgang, Figlio, & Sellin, 1972).

The age-crime curve described by Laub and Sampson (2003) has been replicated in samples that vary by ethnicity, national origin, historical era, and crime-type (Hirschi & Gottfredson, 1983; Sweeten, Piquero, & Steinberg, 2013). The robustness of the relationship between age and crime led Gottfredson and Hirschi (1990) to hypothesize that the relationship between age and crime is invariant and cannot be explained by available structural and individual-level variables. Gottfredson and Hirschi (1990) indicated that age has a direct effect on crime and the eventual decline of criminal behavior in later age is only attributable to the "inexorable aging of the organism" (p.141). Sweeten and colleagues (2013) identify this as "the inexplicability hypothesis" (p.922), which suggests that the most effective method of crime control is the

confinement of those who commit criminal behavior until the effects of aging render the individual safe for the community (Sweeten et al., 2013).

Recent findings from investigations that examine the age-crime curve using data from the *Pathways to Desistance* suggest that age does not have a direct and inexplicable effect on crime (Sweeten et al., 2013); rather, age and its relationship to crime is merely “a proxy for some unmeasured variable with which it is correlated” (Sweeten et al., 2013, p.924-925). In a rebuke to the inexplicability hypothesis, Sweeten and colleagues (2013) were able to explain approximately two-thirds of the variance in crime between 15 to 25 years old with structural and individual-level variables.

In sum, the age-crime curve represents a fundamental relationship that informs all theories concerned about both how crime begins and how crime is terminated. The invariance of the relationship between age and crime led many criminal justice researchers to support the hypothesis that the relationship is unexplainable by available social science measures. However, current research suggests that factors at both the individual level and the structural level do explain the relationship between age and crime. Important factors related to the termination of criminal behavior are reviewed below.

Factors Associated with Crime Termination

Age. The age to crime relationship found within the delinquent samples examined by Laub and Sampson (2003) and Sweeten et al. (2013) parallels the age-crime curve in the general population (Hirschi & Gottfredson, 1983; Laws & Ward, 2011). An expansive meta-analysis completed by Gendreau et al. (1996) examined 131 different

studies of adult recidivism and found that a one year decrease in age significantly increased the rate of recidivism by a mean effect of .15. Bonta, Hanson, and Law (1998) completed a separate meta-analysis of 58 studies focused on recidivism of adults with mental illness and also found that a one year decrease in age increased recidivism by a mean effect of .15. Cross-sectional studies that analyzed a cohort of prisoners returning to the community by Huebner and Berg (2011) and Stahler et al. (2013) both found that as individuals' increase in age, the odds of recidivism decrease significantly.

Cognitive transformation. Individuals at high risk to commit crime commonly hold a set of attitudes, values, and beliefs that increases the risk for antisocial or criminal behavior (Andrews & Bonta, 2010). Specifically, anger, resentment, identification with criminal others, unfavorable views of law enforcement, and rationalizations for criminal behavior predispose an individual towards crime (Andrews & Bonta, 2010). Andrews and Bonta (2010) identify such an individual as having antisocial cognition, and they found antisocial cognition to have a mean effect of .26 on recidivism. Gendreau et al. (1996) obtained a mean effect of .18 if an individual held attitudes both supportive of an antisocial lifestyle and negative towards advancement within education or employment. In the well-known *Pittsburgh Youth Study*, young people with a positive view of crime between 17 to 19 years old were two-and-a-half times more likely to commit criminal behavior at ages 20 to 25 (Stouthamer-Loeber, Wei, Loeber, & Masten, 2004).

In contrast, a cognitive transformation that facilitates the development of a pro-social self-narrative is associated with the termination of crime (Maruna & Roy, 2007).

For example, in the *Liverpool Desistance Study* Maruna (2001), found that the development of a “redemption script” was associated with termination from crime. In another study, Maruna et al. (2004) used qualitative data from ex-prisoners in New York to provide support for the “looking-glass self-concept” or Pygmalion effect in decreasing the likelihood of future crime (p. 274). This study suggested that individuals who terminate their criminal behavior and have that behavior officially recognized and “reflected back in a ‘delabeling process’” are more likely to sustain a pro-social lifestyle for the long-term (Maruna et al., 2004, p. 274). Giordano and colleagues (2002), based on qualitative data from the *Ohio Lifecourse Study*, also reported that a cognitive shift towards readiness to change increased an individual’s responsiveness to “hooks for change” (e.g., marriage or employment) than can significantly lower the likelihood of crime (p. 1000).

Self-control and perceptions of hope are also important factors in crime termination. Doherty (2006) analyzed data from Laub and Sampson (2003) and found that high levels of self-control at ages 25 to 32 decreased the odds of committing crime by 43.6% between 32 and 45 years old. Additional cognitive changes within the individual measured by hope and pro-social identity have also been shown to decrease crime. Hope, defined as “an individual’s overall perception and confidence that personal goals can be achieved” (LeBel et al., 2008, p.136), was found to decrease crime following release from prison by ameliorating potential social problems that the individual may face in the community. Rocque and colleagues (2014) examined in a community sample the relationship between an individuals’ perception of their identity as

pro-social and crime. Results showed individuals with an increased perception of being pro-social were significantly less likely to commit crime (Rocque et al., 2014).

Social support. Social support networks that contain a high density of criminal peers have been shown to increase an individual's likelihood to commit crime. Andrews and Bonta (2010) found that association with antisocial peers has a mean effect of .28, while Gendreau et al (1996) found antisocial peers to have a mean effect of .18 on recidivism. Similarly, Lipsey and Derzon (1998) observed that having antisocial peers at ages 12 to 14 has a mean effect of .37 on criminal behavior at 15 to 25 years old. Findings from the *Ohio Lifecourse Study* detailed that high levels of criminal peers at 29 years old increased the likelihood of criminal behavior at age 37 by 18 times (Giordano, Longmore, Schroeder, & Seffrin, 2008). Two studies that examined longitudinal data from the *National Youth Survey* also found having antisocial peers to increase adult criminal behavior. Matsueda and Anderson (1998) reported a reciprocal relationship between antisocial peers and crime, with involvement in crime increasing association with antisocial peers which, in turn, leads to further involvement in crime. Agnew (1991) found antisocial peers to influence criminal involvement most when there is strong attachment, long periods of time together, approval of delinquency, and peer pressure to engage in crime.

In contrast to the influence of antisocial peers, pro-social support from family members, friends, and clergy members also has a significant impact on reducing criminal behavior. Doherty (2006), using data from Laub and Sampson's (2003) longitudinal study, found that for every additional event of social integration at ages 25 to 32 (e.g.,

honorable military discharge, marriage, or stable job), the odds of recidivism decreased by 74.4% at 32 to 45 years old. Based on a three-wave longitudinal study, Brown et al. (2009) found that successful parolees had significantly increased levels of social support compared to recidivists over the study period. Berg and Huebner (2011) conducted a cross-sectional study of 401 prisoners in a Midwestern U.S. state and results showed strong support from relatives lowered the odds of recidivism by 32.5%.

Two studies have examined the impact of visitation on recidivism among state prisoners. Both Bales and Mears (2008) and Duwe and Clark (2013) found visitation, especially visitation that occurs closer to a participant's release from prison, to significantly decrease the likelihood of recidivism. Visits from spouses, family, and clergy proved to be particularly beneficial for individuals transitioning from prison back into the community (Bales & Mears, 2008; Duwe & Clark, 2013).

The links between individuals and the social institutions of family, friends, and religion are important because they often create social capital for offenders (Piquero, Jennings, Piquero, & Schubert, 2014). Sampson and Laub (1993) suggested that social capital, construed as the social links that bind an individual to society, is one of the most important factors in the termination of criminal behavior. Nagin and Paternoster (1994) extended the work of Sampson and Laub (1993) and found that individuals who were present-oriented and self-centered lacked adequate social capital, thus increasing their likelihood to commit crime. In a more recent study examining social capital, Piquero and colleagues (2014) found that social capital is most effective when paired with increases in an individual's personal skills and knowledge.

Employment. Employment offers a number of advantages that can facilitate termination from crime among individuals returning from incarceration. Laub and Sampson (2003) found that employment provides informal social control through co-worker relationships and changes in daily routine activities. In a meta-analytic study, Andrews and Bonta (2010) found that poor job performance coupled with low satisfaction had a mean effect of .18 on recidivism. Uggen (2000) analyzed data from the *National Support Work Demonstration Project* that randomly assigned individuals with an arrest history to either supported employment or a control group. Results showed that for adults 27 years old and over in the treatment group, recidivism was a significant 9.7% lower (Uggen, 2000). In a study with *National Youth Survey* data, Wright and Cullen (2004) found that working more hours per week and having bonds to pro-social co-workers was negatively associated with crime.

Stouhamer-Loeber and colleagues (2004) reported that greater job skills at ages 17 to 19 lowered the odds of future recidivism by 2.61 times at 20 to 25 years old. However, Craig and Foster (2013) found no relationship between full-time employment and criminal behavior with the *National Longitudinal Study of Adolescent Health*. In a study of individuals released from Texas prisons, Tripodi, Bender, and Kim (2010) reported that recidivists who were employed remained in the community significantly longer than recidivists without jobs. Finally, Ford and Schroeder (2010) analyzed the *National Youth Survey* and found that high investment in college was negatively associated with adult crime. Mears and colleagues (2008), in their cross-sectional study

of Florida prisoners, uncovered that for every grade level increase in reading, math and language proficiency, the odds of recidivism fell 4%.

Marriage. A high-quality marital relationship operates similar to employment by providing informal social control through spousal expectations and changes in both daily activities as well as peer networks. Laub and Sampson (2003) view marriage as most beneficial for crime termination when it consists of social cohesiveness, mutual investment, and close emotional ties. In longitudinal studies by Laub, Nagin, and Sampson (1998), Sampson, Laub, and Wimer (2006), and Giordano and colleagues (2002), high-quality marriages demonstrate a consistent and significant impact toward decreasing recidivism over time. Meta-analyses provide further support for these findings. Andrews and Bonta (2010) report that poor quality marriages have a mean effect of .17 on recidivism, while Collins' (2010) meta-analysis found that marriage has a negative mean effect of -.22 upon violent criminal recidivism. Moreover, Warr (1998), with data from the *National Youth Survey*, described how marriage lowered the odds for theft 47% and for vandalism 60% by changing social networks as well as decreasing the time available for friends. Beaver, Wright, DeLisi, and Vaughn (2010) used the *National Longitudinal Study of Adolescent Health* and found marriage to increase the likelihood of terminating criminal behavior by 4.85 times at ages 18 to 26 among individuals who reported prior delinquency. Relying on the same dataset as Beaver et al. (2010), Craig and Foster (2013) also found marriage to be negatively associated with crime.

Neighborhood. Sampson, Morenoff, and Gannon-Rowley (2002) describe “geographic hot spots for crime” that commonly exhibit a “concentration of multiple

forms of disadvantages” (p.446). These *hot-spots* are neighborhoods characterized by a large number of residents receiving public assistance, a high rate of poverty, high unemployment, a disproportionate number of female-headed households, and racial segregation (Huebner, Varano, & Bynum, 2007; Kurbin & Stewart, 2006; Mears et al., 2008; Stahler et al., 2013; Wehrman, 2010). In one of the first studies to examine neighborhood effects and recidivism, Kurbin and Stewart (2006) found that parolees residing in neighborhoods with high inequality and concentrated disadvantage were significantly more likely than other offenders to recidivate. Mears and colleagues (2008) found similar results between concentrated disadvantage and recidivism in Florida. Stahler et al. (2013) reported that as the rate of incarceration in the surrounding neighborhood increased by 10%, an individual’s likelihood of recidivism increased 57%. However, it is important to note that other cross-sectional studies have found no relationship between concentrated disadvantage and criminal recidivism (Huebner et al., 2007; Stahler et al., 2013; Wehrman, 2010).

Maruna and Roy (2007) suggest that the removal of “proximate causes and physical environments that led to crime” is critical to the termination of crime (p.105); they refer to this as a process of “knifing off.” In this sense, circumstances most likely to achieve long-lasting personality change are those where “previous responses are actively discouraged while clear information is provided on how to behave adaptively” (Caspi & Moffitt, 1993, p.264). The best example of knifing off is changing the location of one’s residence, with the effect of the knifing off dependent on the degree of change in location. For example, knifing off from one’s previous residence would have a larger

potential effect if the move is to a completely different city as opposed to moving to a different neighborhood within the same city. Kirk (2009) conducted a natural experiment to examine knifing off based on the population displacement following Hurricane Katrina in Louisiana. Formerly incarcerated individuals forced to move to a new parish after the hurricane had a significant 15% drop in recidivism compared to those who moved back to the parish of their conviction (Kirk, 2009).

As described above, some investigators have found that neighborhood disadvantage has a direct effect (Kurbin & Stewart, 2006; Mears et al., 2008), while others have found no direct effect between disadvantage and antisocial behavior (Huebner et al., 2007; Stahler et al., 2013; Wehrman, 2010). Wright and colleagues (2014), in a review of research on neighborhood effects and crime, found “a significant body of work” (p.1783) to support an indirect effect between neighborhoods and crime (Elliott, Wilson, Huizinga, Sampson, Elliot, & Rankin, 1996; Leventhal & Brooks-Gunn, 2002; Sampson et al., 2002). This conclusion parallels findings from Sampson and Laub (1993) indicating that neighborhood factors had only indirect effects on crime through an ecological context that either weakens or strengthens an individual’s bond to surrounding institutions of informal social control.

Substance abuse. Incarcerated individuals have substantially higher rates of substance abuse compared to the general population (Pettus-Davis, Howard, Roberts-Lewis, & Scheyett, 2011). Andrews and Bonta (2010) found substance abuse to be a moderate risk factor for criminal recidivism. Additional meta-analyses have found a similar effect size for the relationship between substance use and crime. For example,

Dowden and Brown (2002) reported that a combined measure of alcohol and drug abuse had a mean effect of 0.22 on recidivism, and a separate meta-analysis found the odds of recidivism to be 2.8 to 3.8 times greater for drug users compared to non-users (Bennett, Holloway, & Farrington, 2008). Moreover, Gendreau et al. (1996) detailed a mean effect of 0.14 and Bonta et al. (1998) reported a mean effect of 0.11 between general substance abuse and adult recidivism. In the *Pittsburgh Youth Study*, frequent alcohol, marijuana, or hard drug use at ages 17 to 19 increased the odds of criminal behavior between 2.5 and 3.3 times at 20 to 25 years old (Stouthamer-Loeber et al., 2004). Furthermore, in a three-wave longitudinal study of prisoners, substance abuse problems decreased significantly over time among individuals who did not recidivate (Brown, St. Amand, & Zamble, 2009).

Military. Involvement in military services has been studied as a factor in termination from crime. Sampson and Laub (1993, 1996) demonstrated that men who served overseas during World War II had significantly lower rates of criminal activity as adults compared to their peers who did not serve in the military. However, studies that examine the impact of the modern, all-volunteer military have not found the same positive effects upon adult crime. Bouffard and Laub (2004) analyzed four birth cohorts born between 1942 and 1964 and found only a marginal decrease in rates of police contact for males who enlisted in the military. Bouffard (2005), using longitudinal data from 1979 to 1994, reported that enlistment in the military did not decrease risk of recidivism among those with a criminal history. Similarly, Craig and Foster (2013) also found no association between military enlistment and criminal behavior.

Spirituality. The adoption of religion or set of spiritual beliefs can help develop pro-social support as well as give a sense of meaning to one's life. Research into the effect of spirituality or religion upon criminal behavior has been limited, but Laws and Ward (2011), in their review of factors related to crime termination, highlight spirituality as a possible mechanism to decrease criminal behavior. Baier and Wright (2001) conducted an extensive meta-analysis on the effect of religion on crime and found a negative mean effect of -0.12. In addition, using data from the *Ohio Lifecourse Study*, Giordano and colleagues (2008) found no relationship between church attendance or spirituality in 1995 and self-reported crime in 2003. Nevertheless, Giordano et al. (2008) still identify spirituality as a promotive factor for crime termination based on qualitative data from participants that described spirituality as a gateway to strong pro-social support.

Summary of factors associated with crime termination. Research into factors associated with criminal termination is an underdeveloped area compared to the substantial amount of research into factors associated with the onset of criminal behavior (see Andrews & Bonta, 2010). While existing studies into crime termination have primarily focused on structural factors, there are also a number of important findings that detail within-individual changes associated with crime termination. The factors found to be associated with the termination of crime move the discussion beyond the age-crime curve and begin to identify possible mechanisms for behavior change that rehabilitation interventions can target to facilitate an individual's transition away from a criminal lifestyle. Nevertheless, in order to develop effective and evidence-based interventions, a

theoretical explanation for how the factors identified above result in the termination from crime is required. Therefore, in the next section, a discussion of the dominant theoretical perspectives that explain crime termination and the factors associated with that outcome is provided.

Structural Perspective of Crime Termination

The structural perspective includes theories that provide explanations for the cessation of criminal behavior based on an individual's social history and the social structures found in a person's environment. Among the strongest proponents of the structural perspective are Robert Sampson and John Laub.

Sampson and Laub's age-graded theory of informal social control. Sampson and Laub (1993) initiated their study of how individuals terminate crime from an apparent paradox in the criminological literature. The authors noted that research suggests that the single best predictor of criminal behavior in an adult is delinquent behavior as a young person. However, a parallel body of longitudinal research following children and adolescents into adulthood found that the vast majority of delinquent children do not commit crime as adults. Based on these conflicted findings, Sampson and Laub (1993) posited that factors beyond an individual's propensity for criminal behavior are necessary to explain why crime occurs throughout the life course.

Sampson and Laub (1993) tested this idea using data from participants between the ages of 7 and 70 from the well-known Glueck and Glueck (1950) study. They found that mechanisms of informal social control from key social institutions explained a significant amount of the variation in criminal behavior over the life course. They also

found that the social institutions that are most relevant to exerting social control over criminal or delinquent behavior are age dependent. While social ties to family and school are most important in childhood, as an individual moves into adolescence and young adulthood, social ties to marriage, employment, peers and the military become more relevant. The basic principle over the entire life course is that the likelihood of criminal behavior increases when an individual's bond to key societal institutions is weakened.

In an extension of their original work on the age-graded theory of informal social control, Laub and Sampson (2003) found further evidence that employment, marriage, and the military are important structural institutions in restructuring the lives of formerly incarcerated individuals. First, the start of a new job or the decision to get married provides a means for the individual to knife off the past (Laub & Sampson, 2003). Social networks are changed dramatically by either employment or marriage and the individual is given the opportunity to start their life anew. Second, turning points transform the individual's daily routine that was previously centered on either friends or unstructured activities to now include new activities focused on the obligations and responsibilities associated with either employment or marriage. The set of activities that promote maintaining employment or a marriage result in little or no opportunity or free time to commit criminal acts. Third, while the bonds that are built through employment and marriage do restructure an individual's daily activities, these relationships further provide the individual with constant supervision as well opportunities for growth (Laub, & Sampson 2003). A spouse or an employer acts as a supervisor of an individual's behavior through mutual expectations on how the individual should behave in order to

continue the relationship. Finally, through these previous three steps, individuals eventually develop the capacity to transform their personal identity into a pro-social member of society (Laub & Sampson, 2003). In sum, the changes to an individual's social environment through participation in important turning points will eventually result in termination from criminal behavior.

As this four-step process plays out, the individual increases investment in social relationships in a gradual fashion that continues to accumulate until the risk to the relationship by a criminal act outweighs the potential benefit. Since investment in social relationships is the determining factor in termination from crime, an individual's development of a crime free lifestyle is also gradual and cumulative over time.

According to Laub and Sampson (2001), the gradual process of crime termination is best described as occurring by default without any type of cognitive transformation or conscious choice to change one's narrative identity (p.278). While the concept of agency is identified as a "missing link" in the understanding of crime termination (Healy, 2013; Laub & Sampson, 2003, p.141), Laub and Sampson (2003) view agency as an "emergent process" that is facilitated by strong relationships to social institutions (p.54). That is, individuals only develop agency through the informal control provided by the social institutions they develop strong bonds with (Laub & Sampson, 2003).

Subjective Perspective of Crime Termination

A substantial critique of the body of work completed by Sampson and Laub concerns the failure of the investigators to consider an individual's own motivation and agency in the context of crime termination. This critique led Laub and Sampson (2003)

to update their age-graded theory of informal social control in a way that acknowledges the importance of human agency in terminating from crime. Despite this acknowledgement, Laub and Sampson (2003) maintained their belief that structural factors are of primary importance in the development of agency. Giordano, Cernkovich, and Rudolph (2002) and Maruna (2001) pushed back against the primacy of structural factors identified by Laub and Sampson (2003). In contrast, these two subjective theories of crime termination place within-changes by the individual as primary in stopping criminal behavior.

Giordano's cognitive transformation theory of crime termination. Giordano and colleagues (2002) built on the work of Sampson and Laub by focusing on an individual's own role in selecting involvement in the turning points associated with crime termination. Giordano et al. (2002) suggest that individuals undergo a cognitive transformation that makes them more open to opportunities presented in their larger environment. They posited that without the initial change in the individual's openness to change their behavior and attitudes, no amount of pro-social structural opportunities available in the larger social environment will lead to termination of crime. Giordano and colleagues (2002) identified individual differences in openness to change to explain the differential impacts that employment and marriage have on an individual's behavior. Overall, the structural factors (i.e., employment or marriage) identified as primary by Sampson and Laub (1993), serve a secondary purpose according to Giordano et al (2002) in order to catalyze and further reinforce the cognitive transformations already made by the individual.

Giordano and associates (2001) suggest that there are three types of cognitive transformation involved in the process of terminating criminal behavior. The first and most fundamental transformation is a basic change in the individual's willingness to seek out available opportunities in the larger social environment, or what Giordano et al (2002) describe as "hooks for change" (p. 992). During this initial transformation the individual simply becomes more amenable to making a change in his or her behavior. Next, a second cognitive transformation relates to the individual's increased receptiveness to a specific hook or a set of hooks for change available in the social environment. As a result of this second type of cognitive transformation, the individual begins to change his or her perception and the personal meaning assigned to a structural opportunity such as a new job. Giordano et al. (2002) consider the individual's basic openness for change achieved during the first transformation as conceptually distinct from an individual's increased interest and positive attitude concerning a specific hook for change such as marriage or a job.

The third and final cognitive transformation consists of the individual identifying a "replacement self" that can take the place of the criminal self (Giordano et al., 2002, p.1001). During this third transformation, the individual begins to understand what a non-criminal identity would look like in the real world. The creation of a replacement self for the individual begins the process where an individual identifies the incongruity between crime and one's new identity. Once crime is perceived as incongruous to the actions of the replacement self, the individual's transition away from a criminal lifestyle is complete.

Each of these three types of cognitive transformations build upon each other until the individual develops a pro-social replacement self. Giordano et al. (2002) suggest that a reciprocal relationship exists between an individual's changes in cognition and the structural environment, but the starting point for the whole process is the cognitive transformation. The catalyst that carries the individual through each of these transformations are hooks for change that help to sustain and further reinforce the modifications made cognitively. At the same time, the cognitive changes drive behavior that results in bonding the individual increasingly more to the hooks for change, which in turn further accelerates the individual's cognitive transformation.

Maruna's narrative theory of crime termination. Some critics have argued that external events, such as Sampson and Laub's (1993) turning points or Giordano and colleagues' (2002) hooks for change, are inherently ambiguous in the sense that the same event can lead one individual to terminate crime, while for another individual it results in further criminal persistence. To illustrate, Maruna (2001) argues that what is most relevant to termination of crime is the meaning and importance the individual ascribes to an external event as opposed to the event itself. Without a transformation in how the individual understands external events, the value of a marriage or a job will have little effect on future criminal behavior. Change in the individual's narrative identity must precede termination from criminal behavior (Maruna, 2001). This is required in order to give the person an explanation for the drastic changes needed to terminate crime

In order to study the role of meaning and narrative identity in termination from crime, Maruna (2001) designed and conducted the *Liverpool Desistance Study* (LDS) to

collect qualitative data about the experiences of persons who terminated and persisted criminal behavior. Fifty individuals were purposively selected in order to identify a sample of habitual offenders who identify as either terminating or persisting in criminal behavior. The LDS participants identified by Maruna were very similar to the sample found in the original Glueck and Glueck study (Laws & Ward, 2011). The sample consisted of males and females from Liverpool, England who were white, middle-aged, impoverished, and with histories of child abuse and drug/alcohol dependence (Maruna, 2001).

Maruna's (2001) analysis of the participants' life histories suggests that individuals trying to terminate from crime need a coherent story to explain their behavior change in order to reinforce their own understanding that what is happening is real change. Terminators developed a narrative identity based on what Maruna (2001) called a "Redemption Script" (p.11). A Redemption Script facilitates termination from crime by connecting the individual's present situation to past experiences in such a way that the current change seems almost inevitable. Despite the popular perception in the United States that individuals with criminal backgrounds need to be realistic and ashamed about their past behavior, Maruna (2001) actually found that the individuals who were most successful at terminating crime had an inflated sense of control over the future and a strong purpose to life. These distortions of reality, similar to those found within the general adult population, allow past criminals with extensive histories of disadvantage to overcome the many barriers similarly faced by their less successful and persisting counterparts. This process of "willful, cognitive distortions" is called "making good." To

make good is to “find reason and purpose in the bleakest of life histories” (Maruna, 2001, p.9-10).

Therefore, termination from criminal behavior is achieved through the reconstruction of an individual’s narrative identity as an included and full member of society (Maruna, 2001). In follow-up studies conducted by Maruna and his colleagues, a number of important strategies for supporting the development of a pro-social narrative identity have been identified. Particularly important is the “looking-glass self-concept” (Maruna, LeBel, Mitchell, & Naples, 2004, p.273), especially in the sense that an individual’s termination from crime can be reinforced when conventional society accepts the individual as rehabilitated and de-labels him or her as criminal, specifically acceptance demonstrated by criminal justice authorities can be beneficial (Maruna, et al., 2004). Also the availability of opportunities to fulfill the role of wounded healer can be beneficial for those trying to move beyond a criminal past (LeBel, Richie, & Maruna, 2015).

Structural-Subjective Perspective of Crime Termination

The interplay between structural factors and subjective factors was posited in both the work of Laub and Sampson (2003) and Giordano and colleagues (2002). However, while both teams of scholars noted the importance of structural and subjective factors, each still emphasized the importance of one over the other. Several investigators have used evidence from structural and subjective viewpoints to form integrated models of crime termination.

Bottoms, Shapland, Costello, Holmes, and Muir (2004) suggested that both structural factors and subjective factors should be given equal weight in explaining termination from criminal behavior. They argue that there is a dynamic, continuous interaction between structural and subjective factors in the sense that each amplifies or dampens the effects of the other (Bottoms et al., 2004). Social structures are fundamentally the outcome of individual agency (Giddens, 1984). Thus, the composition and quality of a structural opportunity requires individual actions.

At the same time, Farrall, Sharpe, Hunter and Calverley (2011) detail that structures delimit the available routes and processes an individual can draw upon as the individual terminates crime. Not all environmental contexts provide the same degree of support to individual identity. As described by Healy (2013), the surrounding environment can be quite prohibitive to human agency. If individuals are presented with few opportunities in the structural environment to develop a meaningful personal identity, the likelihood the individual will revert to previous behaviors (i.e., crime) is substantially increased (King, 2013).

Investigations into the interplay of both structural and subjective factors have benefitted from both qualitative and quantitative findings. Qualitative studies are led by Davis, Bahr, and Ward (2013) who interviewed 16 formerly incarcerated individuals; they found that internal motivation and social support were mutually reinforcing during termination from crime. Case studies of 14 incarcerated juveniles found social support to both provide as well as sustain motivation during the transition to the community (Panuccio, Christian, Martinez, & Sullivan, 2012). Additionally, F-Dufour, Bassard, and

Martel (2013) studied 29 men who terminated from crime and found that supportive structures precede the internal motivation needed to turn away from crime.

Two quantitative studies have also attempted to test the structural-subjective perspective. LeBel and colleagues (2008) examined 130 male offenders in the United Kingdom and found internal motivation to be necessary but not wholly sufficient for termination. Individuals with greater motivation experienced fewer structural problems (i.e., housing, family, employment), which in turn decreased the likelihood of crime (LeBel et al., 2008). Finally, based on a community sample of adults in New Jersey, Rocque et al. (2014) analyzed how changes in pro-social identity impact criminal behavior. Findings support that both an individual's pro-social identity and structural opportunities are important to one's success in terminating crime (Rocque et al., 2014).

Summary of Structural, Subjective, and Structural-Subjective Perspectives

Structural and subjective theories have made substantial contributions to the understanding of how individuals terminate criminal behavior. However, informed by new research, particularly evaluations of existing rehabilitation interventions (McNeill, 2009), there is a growing recognition that any adequate explanation of crime termination needs an integrated perspective that equally considers the role of both structural and subjective theories. The structural-subjective perspective attempts to bridge the divide between structural theories and subjective theories and provide explanations of crime termination that account for effects at the individual level and the structural level. Of the three perspectives on crime termination, the structural-subjective perspective is the least developed (LeBel et al., 2008). Informed by the person-in-environment perspective

(Kondrat, 2008), which serves as a guiding principle of the social work profession, social workers can make a substantial contribution to the study of crime termination by continuing to develop the structural-subjective perspective and translating that research into interventions for incarcerated individuals that target both the individual and the surrounding structural environment. In the next section, how social workers can further contribute to the study of crime termination in the formerly incarcerated is discussed.

Social Work and Crime Termination

A significant challenge facing the criminal justice system is how to translate the theory-driven findings that explain how an individual terminates criminal behavior into an effective rehabilitation program (Wright & Cesar, 2013). Particularly troubling is the fact that the criminal justice field lacks a comprehensive set of strategies to address both the structural and individual-level factors related to crime termination. Prison reentry programs and other types of criminal justice interventions are often narrowly focused on changing individual factors associated with criminal recidivism (see Andrews & Bonta, 2010), with little regard given to the structural factors that research has shown play an important role in termination from crime (Wright & Cesar, 2013). Overall, outcome evaluations of the most rigorously developed prison reentry programs have shown disappointing results at reducing the recidivism of participants relative to comparison individuals that received treatment-as-usual from the prison system (Lattimore & Visser, 2009; Wilson & Davis, 2006). Moreover, a large meta-analysis examining 53 evaluations of prison reentry programs found an average reduction in recidivism of only six percent (Ndrecka, 2014).

In light of the high rate of recidivism among the formerly incarcerated faced by the criminal justice system, social workers have the potential to lead in developing rehabilitation programs for the incarcerated (Wilson, 2010). The National Association of Social Workers (NASW) has been involved in lobbying the federal government to expand available funding for services targeted at the incarcerated under the assumption that social workers will be the frontline provider for many of these services (Yamatani & Spjeldnes, 2011). Social work can make a substantial contribution to rehabilitation programs by providing a dual focus on the person and the environment, which has been at the bedrock of the profession since its creation (Kondrat, 2008). Specifically, McNeill (2003), a social worker scholar from Scotland, has conducted extensive research into the community supervision of individuals that addresses both the individual and the social context to help support behavior change. In fact, the criminal justice system in Scotland has been identified by the NASW as a model for how social workers can help to improve criminal justice in the United States (see Wilson, 2010). Social work is fundamentally an applied profession and that expertise in how to design effective programs that adhere to the person-in-environment perspective could help to move the criminal justice system beyond the current status quo.

Furthermore, social workers are well positioned to provide the valuable skill of establishing a standardized delivery model for rehabilitation interventions in the United States (Wilson, 2010). The development of a standardized delivery model is especially important for incarcerated individuals who commonly present comorbid issues that need to be addressed by multiple delivery systems that often hold conflicting values and

priorities (e.g., mental health treatment, workforce development, substance abuse treatment, public housing, and chronic health problems) (Wilson, 2010). Spanning these system boundaries and delivering needed services to individuals in an effective and efficient manner would greatly benefit future prison reentry program development (see Pettus & Severson, 2006).

The Current Study

Additional studies are needed to better understand the unique and interactive nature of structural and subjective factors on crime termination. Findings from such studies would also be helpful in informing social work and other responses to policy and practice efforts aimed at reducing recidivism among the formerly incarcerated. The current study aimed to contribute to the existing literature by further exploring the relationship between structural and subjective factors in the data from the *Pathways to Desistance* study.

Research Hypotheses

Six hypotheses and analytic models are specified and tested to better understand how structural and subjective factors are related to each other and to the termination of crime. These hypotheses are intended to address the study's first research question:

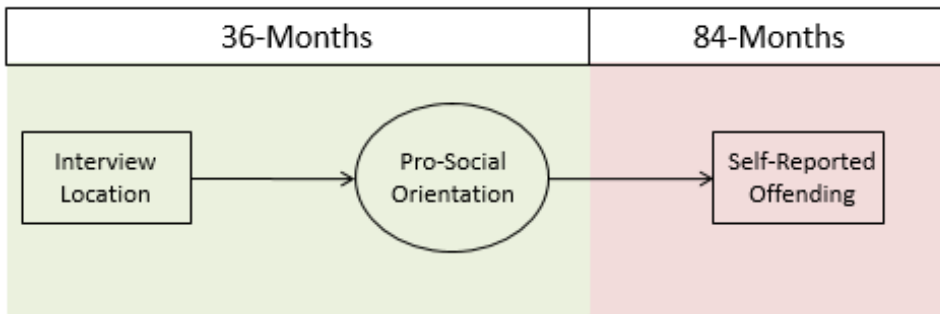
- (1) What is the nature of the relationship between structural and subjective factors and termination from crime following release from the criminal justice system?

To answer Research Question 1, direct effects between each type of factor (e.g., structural or subjective) and criminal behavior are first tested using structural equation modeling approaches. Second, the temporal effects between structural factors and

subjective factors are explored by examining how such factors are related to one another over time. Third, the contemporaneous interaction effects of structural and subjective factors are explored. The study's research hypotheses and the six structural models tested are described below.

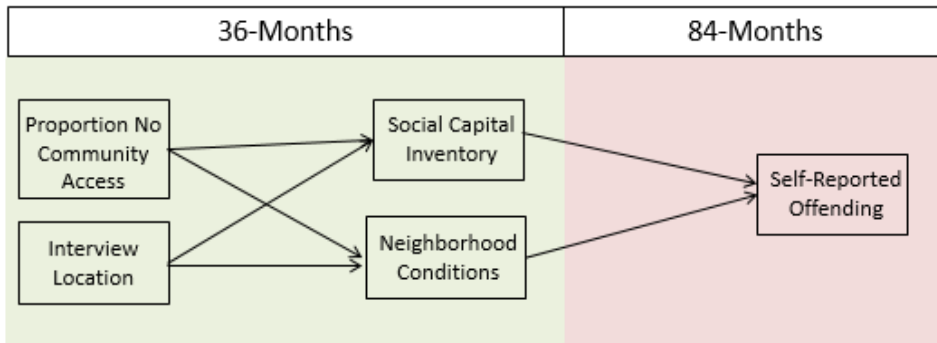
Hypothesis 1: The level of pro-social orientation at 36-month follow-up will be inversely related to offending at 84-month follow-up. Individuals who report high levels of prosocial orientation will be less likely than individuals with low levels of prosocial orientation to commit crimes at 84-month follow-up

Figure 1.1: Structural Model 1



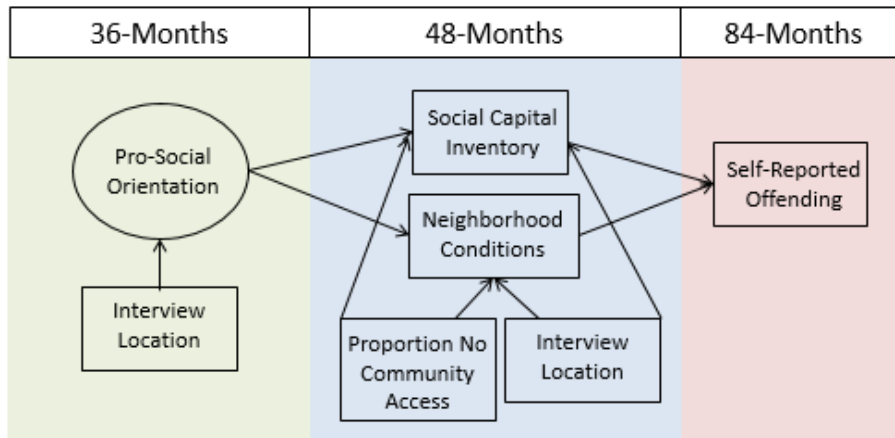
Hypothesis 2: Individuals with high levels of social capital and low levels of neighborhood disorganization at 36-months will be less likely than individuals with low social capital and high neighborhood disorganization to report involvement in criminal behavior at 84-month follow-up.

Figure 1.2: Structural Model 2



Hypothesis 3: Individuals with high levels of prosocial orientation at 36-month follow-up will report higher levels of social capital at 48-month follow-up than individuals with low prosocial orientation. Social capital, in turn, will be related to a decrease in self-reported offending at 84-month follow-up. There will be no relationship between prosocial orientation at 36-month follow-up and levels of neighborhood disorganization at 48-month follow-up.

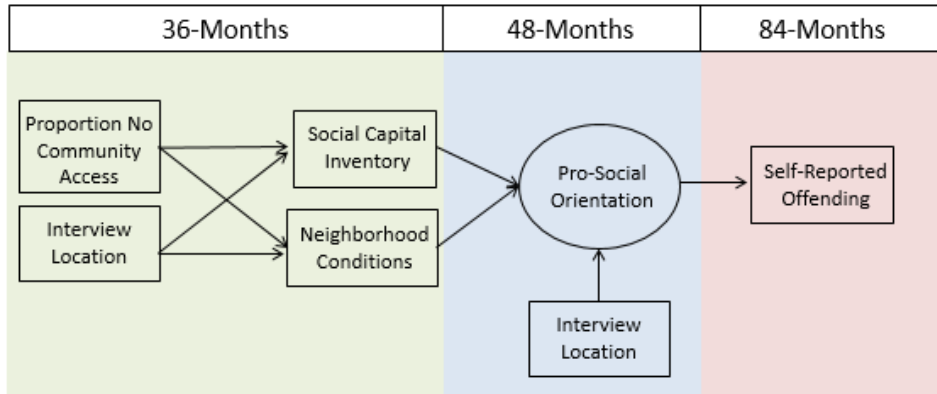
Figure 1.3: Structural Model 3



Hypothesis 4: Individuals with higher levels of social capital and lower levels of neighborhood disorganization at 36-month follow-up will report higher levels of prosocial orientation at 48-month follow-up than individuals with low social capital and

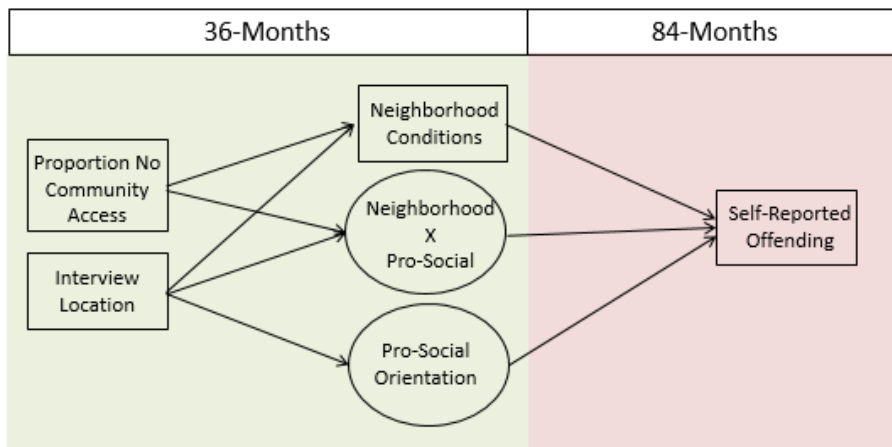
high neighborhood disorganization which in turn will be related to less self-reported offending at 84-month follow-up.

Figure 1.4: Structural Model 4



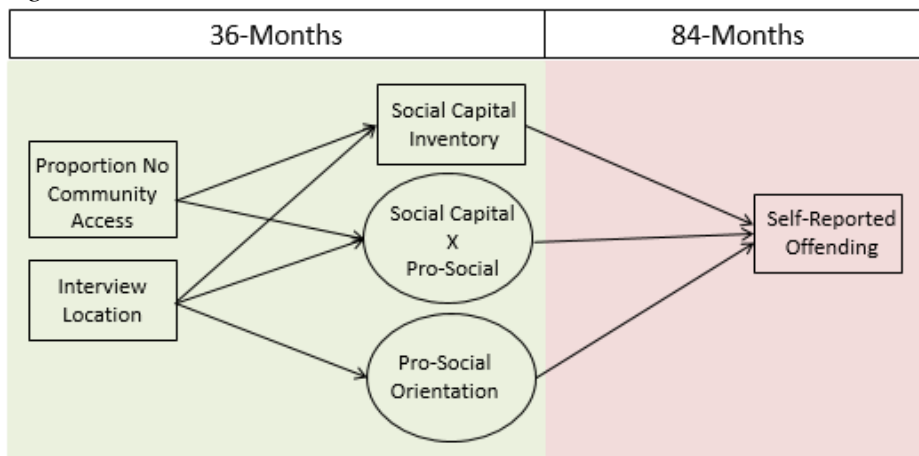
Hypothesis 5: Individuals with lower levels of neighborhood disorganization and higher levels of prosocial orientation at 36-month follow-up will report lower levels of self-reported offending at 84-month follow-up than individuals with high neighborhood disorganization and low prosocial orientation. Low levels of neighborhood disorganization and high levels of prosocial orientation will be related to reductions in self-reported offending at 84-month follow-up.

Figure 1.5: Structural Model 5



Hypothesis 6: Individuals with higher levels of social capital and higher levels of prosocial orientation at 36-month follow-up will report lower levels of self-reported offending at 84-month follow-up than individuals with low social capital and low prosocial orientation. High levels of social capital and high levels of prosocial orientation will be related to reductions in self-reported offending at 84-month follow-up.

Figure 1.6: Structural Model 6



Research Questions 2 and 3 address differences in the relationship between structural and subjective factors by ethnicity, race, and socioeconomic status:

- (2) Is the relationship between the structural-subjective interaction and termination from crime similar across the racial groups of African American, Hispanic, and White?
- (3) Is the relationship between the structural-subjective interaction and termination from crime similar across socioeconomic status?

No specific hypotheses are specified for Questions 2 and 3. These questions will be assessed using the method of multisample analysis within structural equation modeling. Multisample analysis tests for invariance, which is a test of whether relationships within

both the measurement model (i.e., relationship between indicator variables and their respective latent variable) and the structural model (i.e., relationships among latent and observed variables) operate consistently across groups based on either socioeconomic status or race (see Ramos, Guerin, Gottfried, Bathurst, & Oliver, 2005).

Summary

In summary, the age-crime curve is fundamental to understanding why all individuals eventually terminate from criminal behavior. Scholars claimed that the age-crime curve is unexplainable using any structural or subjective factors available to social science researchers, thus supporting a punitive approach to crime control where individuals are kept incarcerated until the effects of aging render them safe for the community. This understanding of the age-crime curve was rejected by a recent study demonstrating that age is simply a proxy for other unmeasured variables with which age is correlated. Therefore, there does exist both structural and subjective factors associated with the act of terminating criminal behavior that can be addressed by prison reentry programs and other rehabilitation interventions.

A range of malleable factors at both the structural level and the subjective level, include: cognitive transformation, social support, employment, marriage, neighborhood, substance abuse, military enlistment, and spirituality have been shown to be associated with the termination of crime. However, in order to fully understand how these factors help to facilitate crime termination, a theoretical explanation of how individuals terminate criminal behavior is necessary. Three perspectives on crime termination were presented. The structural perspective emphasizes the importance of changes in the individual's

bonds to key societal institutions that provide informal social control over behavior. In contrast, the subjective perspective highlights the importance of within-individual changes, particularly an individual's basic openness to change and the meaning the individual ascribes to external events, which provide the individual with the capacity to self-select into available pro-social structural opportunities and ultimately terminate from crime. While both the structural perspective and subjective perspective favor one type of factor above the other, the integrated approach of the structural-subjective perspective considers both the individual and the surrounding structural environment to be of equal importance in the termination of crime.

Results from the few studies that have investigated the structural-subjective perspective provide preliminary support to the idea that prison reentry programs and other rehabilitation interventions need to implement strategies that promote change in both the individual and the structural environment. Social work researchers and practitioners can provide a substantial contribution to the criminal justice field through continued exploration of the relationships among structural factors, subjective factors, and criminal behavior. The current study aims to make such a contribution to the existing literature on the termination of crime. Described in the next chapter is the methodology – including the study's participants, procedures, measures, and data analysis strategies – undertaken to investigate the relationships between structural factors, subjective factors, and criminal behavior.

Chapter Three: Method

This dissertation research used secondary data from the *Pathways to Desistance* study to explore the interaction of structural and subjective factors on future criminal behavior in young adults adjudicated for serious crimes. The study's participants, procedures, measures, and data analysis strategies are described below.

Study Participants

The sample for this study is derived from the *Pathways to Desistance* investigation (Mulvey et al., 2004). A total of 1,354 youth who were adjudicated for serious crimes in Philadelphia, PA (Philadelphia County) or Phoenix, AZ (Maricopa County) were included in the sample. Philadelphia and Phoenix were selected from six possible sites the researchers extensively reviewed (Mulvey, Schubert, & Piquero, 2014). These two site locations were determined to possess characteristics that would increase the generalizability of the study findings. These site characteristics were: (a) high enough rates of serious crimes committed by adolescents to ensure adequate study enrollment; (b) a diverse racial/ethnic mix with substantial numbers of African American and Hispanic youth; (c) a contrast in the operation of the local criminal justice system (i.e., Phoenix had what was described as a sparse treatment system; Philadelphia had a more extensive treatment system); (d) local political support and cooperation from criminal justice practitioners; and (e) the presence of experienced on-site researchers to oversee study implementation and data collection (Mulvey et al., 2014, p.4).

Participants were first identified through a review of court files to determine if they had been convicted of a serious crime. For the *Pathways to Desistance* study, a serious crime was defined as any felony offense with the exception of “a few less serious property crimes, as well as misdemeanor weapons offenses and misdemeanor sexual assaults” (Mulvey et al., 2014, p.4). Further, a cap of 15% of the total sample was placed on males convicted of a drug offense in order to increase the likelihood of a high level of heterogeneity among the sample in terms of both type of conviction and gender (Schubert et al., 2004). In contrast, because of the relatively small number of females in the dataset all young women, regardless of conviction type, were eligible for the study (Mulvey et al., 2014). At baseline, the 1,354 participants ranged in age from 14 to 18 years old ($M = 15.9$, $SD = 1.4$). The majority of participants were male (86%); race was split between African American (44%), Hispanic (29%), and White (25%) (Schubert et al., 2004).

Statistical analysis for this study was conducted on a subsample of the participants who were enrolled in the *Pathways to Desistance* study. Participants in the original sample were included in the current study only if they completed interviews at both 36-months and 84-months ($N = 1,084$). These interview waves were chosen in order to include measurements of structural and subjective factors at the peak of the age-crime curve between 17 and 21 years of age, and measures of criminal behavior four years later when participants were between 21 and 26 years old and descending the age-crime curve (Laub & Sampson, 2003; Moffitt, 1993). Females ($N = 139$) were excluded from the current analysis in order to focus on the substantially larger number of male participants in the *Pathways to Desistance* study. The decision to remove females from the study was

made because of their small number relative to the group of participants who identified as male. Participants were also excluded from analysis if (1) they were below the age of 17 at the 36-month interview ($N = 134$) or (2) they reported “Other” as their race ($N = 44$). Finally, the sample was limited only to those participants who did not spend more than 90% of their time without community access in the 36-month recall period; the proportion of 90% was chosen because at 95% no community access, participants were skipped out of questions for both *Social Capital* and *Neighborhood Conditions* by *Pathways to Desistance* researchers. This left a final sample size of 681 participants. Demographics for the final sample are presented in Table 1.1. These 681 participants were on average 18.97 years old ($SD = 1.16$) at the 36-month interview; race was split among African American (41.0%), Hispanic (34.7%), and White (24.4%).

Table 1.1: Demographics of Study Participants (N = 681)

	<i>Study Participants</i>		<i>Missing</i>	
	<i>M / N</i>	<i>SD / %</i>	<i>N</i>	<i>%</i>
Demographics				
Age (years)	18.97	1.16	0	.00%
Race			0	.00%
<i>African American</i>	279	41.0%		
<i>Hispanic</i>	236	34.7%		
<i>White</i>	166	24.4%		
Parent Index of Social Position	51.32	12.00	5	.73%
Mother Index of Social Position	49.71	13.77	22	3.23%
Father Index of Social Position	54.07	13.36	190	27.90%
Site Location			0	.00%
<i>Philadelphia</i>	342	50.2%		
<i>Phoenix</i>	339	49.8%		

The current study sample is proportionally representative of African Americans but has more Hispanics and fewer Whites than youth in the juvenile justice system nationwide (Sickmund, Sladky, Kang, & Puzzanchera, 2013). Gender and offense history are skewed in the current sample with only males and those adjudicated for serious crimes, in accord with the definition guiding the original *Pathways to Desistance* study, included. Also, this study's sample at baseline was older on average and proportionally more Hispanic than incarcerated youth generally (Sickmund et al., 2013). Overall, the current sample is more nonwhite, male, older, and reflects a more serious offense history than the national population of juvenile delinquents.

Procedures

The *Pathways to Desistance* study collected data in face-to-face interviews. The interview schedule began with an initial baseline interview following completion of an informed consent statement by both the participants and their parents/guardians (Mulvey et al., 2014). Subsequent interviews with the study participants were broken into two types: release interviews and time-point interviews. Additional information was also collected from collateral informants (i.e., parent/guardian or peer) and official records. Neither of these sources will be discussed in further detail because data included in the current investigation come only from interviews completed with the participant.

A release interview was completed with any participant who experienced incarceration during the study period. The goal was to collect data on the participants' experiences within correctional institutions, with particular focus on services provided and feelings of personal safety while incarcerated (Mulvey et al., 2014). The current

study focuses on the termination of criminal behavior in the community, thus no data collected from the release interviews was included.

During the original study, time-point interviews occurred at regular intervals in order to assess “status and change across multiple domains such as individual functioning, psychosocial development and attitudes, family and community context, and relationships” (Mulvey et al., 2014, p.5). Time-point interviews were completed every six months for the first three years and then continued annually up until seven years (84-months) post-enrollment. Each interview lasted approximately two-hours and all interviewees were paid for their participation on a graduated scale that began at \$50 for the baseline interview and maxed out at \$150 by the 84-month interview (Mulvey et al., 2014). Over the course of the 11 time-point interviews, the follow-up rate averaged approximately 90% (Mulvey, Schubert, & Choate, 2013).

Interview responses were recorded with laptop computers and connected to responses recorded at previous time-point interviews; this cross-referencing across interviews increased consistency in data collection across the 11 waves of interviews. The interviewer read aloud all questions to compensate for any reading difficulties, and respondents usually responded aloud except to questions dealing with sensitive material.

Measures

A significant strength of the *Pathways to Desistance* study is the breadth and rigor of measures administered at each time-point interview. Following an initial review of the literature that identified few validated measures for adolescents and young adults with criminal justice involvement, the *Pathways to Desistance* researchers undertook an effort

of “testing, revising, and retesting an array of measures” using youth in detention centers in Pittsburgh and Philadelphia (Schubert et al., 2004, p.243). Further information on all the measures used within the *Pathways to Desistance* is available at <http://www.pathwaysstudy.pitt.edu/codebook/constructs.html>. Detailed below are the measures used to investigate the research questions proposed in the current study.

Pro-Social Orientation. The assessment of one’s self is multifaceted. Previous researchers have examined such constructs as hope, shame and regret, internalizing stigma, and perception of pro-social identity (LeBel et al., 2008; Rocque et al., 2014). The current study proposes a latent variable approach with multiple indicators in order to capture the multifaceted nature of *Pro-Social Orientation*. The proposed latent variable, *Pro-Social Orientation*, includes four indicators: the *Future Outlook Inventory*, Aspirations for Work, Family, and Law Abiding Behavior (Menard & Elliott, 1996), and two subscales from the *Weinberger Adjustment Inventory* (Weinberger & Schwartz, 1990). While limited by the variables available in the *Pathways to Desistance* data, these four indicators were chosen with the goal of creating a subjective measure that could tap into constructs such as hope (LeBel et al., 2008), pro-social identity (Rocque et al, 2014), and future-orientation (Nagin & Paternoster, 1994) that have empirically shown to be associated with decreased criminal behavior.

Future Outlook Inventory. The *Future Outlook Inventory* is a 15-item measure developed by *Pathways to Desistance* researchers to capture an individual’s degree of future consideration and planning ($\alpha = .68$). Items included in the measure were pulled from three existing scales: *Life Orientation Task* (Scheier & Carver, 1985), the *Zimbardo*

Time Perspective Scale (Zimbardo, 1980), and the *Consideration of Future Consequences Scale* (Strathman, Gleicher, Boninger, & Edwards, 1994). Items use a four-point Likert scale ranging from “Never true” to “Always true” and respondents are asked to rank each statement on the scale based on how they are normally.

Perception for Chances for Success. Menard and Elliott (1996) developed the *Perceptions for Chances for Success* measure for the *National Youth Survey* to assess an individual’s investment in and perceived likelihood for adult achievement in several areas. Responses are based on a five-point Likert scale ranging from “Not at all important” to “Very important/Excellent”. Seven of the 14 items on the measure comprise the Aspirations for Work, Family, and Law Abiding Behavior subscale used in the current study. The Aspirations subscale asks participants to rate how important is future achievement in the areas of work, family, and lawful behavior ($\alpha = .67$).

Weinberger Adjustment Inventory. The *Weinberger Adjustment Inventory* (WAI) assesses an individual’s social-emotional adjustment within the context of external constraints (Weinberger & Schwartz, 1990). Respondents are asked to rank, using a five-point Likert scale from “False” to “True”, a series of 23 statements about their behavior in the past six-months. The WAI consists of four subscales: Impulse Control, Suppression of Aggression, Consideration of Others, and Temperance. The subscale of Temperance is a combination of the Impulse Control and Suppression of Aggression subscales. Higher scores on each of these subscales indicate more positive behavior. The two subscales of Consideration of Others ($\alpha = .73$) and Temperance ($\alpha = .84$) will be used in the current study.

Social Capital Inventory. The *Social Capital Inventory* measures the level of connectedness to the community (Nagin & Paternoster, 1994). Three subscales comprise the measure, including: Intergenerational Closure ($\alpha = .73$), Social Integration ($\alpha = .67$), and Perceived Opportunity for Work ($\alpha = .76$). However, *Pathways to Desistance* researchers found Intergenerational Closure did not fit the data well on its own so it was combined into a single scale with Social Integration to create a Closure+Integration subscale ($\alpha = .74$). Higher scores on each subscale indicate greater community connectedness. The *Social Capital* score for each participant was computed by taking the average of the Opportunity for Work subscale and Closure+Integration subscale.

Neighborhood Conditions Measure. The *Neighborhood Conditions Measure* assesses an individual's neighborhood context (Sampson & Raudenbush, 1999). Within the measure, a neighborhood is assessed along the subscales of Physical Disorder ($\alpha = .91$) and Social Disorder ($\alpha = .87$). For each of the 21 items on the scale, respondents used a four-point Likert scale from "Never" to "Often" to indicate the degree of neighborhood disorder. The neighborhood of interest for this measure is the neighborhood where the individual spent the most time during the recall period. However, based on the recommendation of *Pathways to Desistance* researchers, only the total score ($\alpha = .94$) will be used in analysis.

Recidivism. Involvement in antisocial and illegal activities will be measured by the *Self-Reported Offending (SRO)* measure developed for the *National Youth Survey* (Huizinga, Esbensen, & Weiher, 1991). The SRO characterizes self-reported offending in terms of variety and frequency across 22 items. *Pathways to Desistance* researchers'

recommend using a variety score to measure self-reported offending. Variety is calculated as a proportion with the number of items answered affirmatively divided by the total items answered. In addition to the variety score, a frequency count of the number of self-reported offenses as well as a dichotomous measure of whether offending occurred or not during the recall period will be used as an outcome variable. For the purposes of this study, termination from crime is defined by participants' self-reports of no criminal behavior during the past year at the 84-month interview following study enrollment.

Covariates. The covariates included are proportion with no community access, interview location, race, and socioeconomic status. Proportion with no community access is a continuous variable that ranges from 0 to 1. Interview location is a dichotomous variable that indicates whether the interview occurred at a secure placement or in the community. Race is categorized into African American, Hispanic, and White.

Socioeconomic status was measured by the parental Index of Social Position (ISP, see Hollingshead, 1971). The occupation and education for both the biological mother and biological father, if possible, were coded using Hollingshead's index of social position on a scale from 1 (corporate executives, professional degree) to 7 (unskilled workers, no high school education). The ISP was computed using the following formula: $((\text{Occupation score} \times 7) + (\text{Education score} \times 4))$ (Hollingshead, 1971). When both parent's scores were known, a mean was taken for both the occupation and education scores. If only a single parent's scores were known, then only that single score was used to compute the ISP.

Data Analysis

For the purposes of examining the direct and interaction effects between both observed and latent variables, structural equation modeling within the statistical package Mplus version 7.3 was used (Muthen & Muthen, 1998-2012). The process of conducting structural equation modeling followed the classic two-step approach identified by Anderson and Gerbing (1988). First, confirmatory factor analysis was used to estimate an adequate measurement model of the latent variable *Pro-Social Orientation*. Second, each of the six structural models were estimated with structural equation modeling that included both observed and latent variables.

Each model was run multiple times using different combinations of the outcome variable and the estimation method. The sensitivity analysis was conducted in order to examine the robustness of the results from the different models. The measures of self-reported recidivism included a proportion of offense variety, a frequency count of offenses, and a dichotomous (yes/no) measure of whether a participant committed any offense or not. The estimation methods of maximum likelihood (ML), maximum likelihood with robust standard errors (MLR), and weighted least squares with mean and variance adjustment (WLSMV) were used to estimate all six of the models depending on the particular outcome measure of recidivism. Specifically, ML and MLR were used with the offense variety and offense count outcome measures, and WLSMV was used with the dichotomous outcome measure.

The interaction term between *Pro-Social Orientation* and the structural measures of *Social Capital* and *Neighborhood Conditions* was derived following the product

indicant method (i.e., $X3 = X1 * X2$); this was used, in turn, to create a multiplicative interaction effect (Schumacker, 2002). It should be noted that Mplus calculates interactions between latent and observed variables following the latent moderated structural equation (LMS) method developed by Klein and Moosbrugger (2000), which allows for the estimation method to be either ML or MLR. The specific process of how to estimate and interpret a latent variable interaction followed steps outlined by Maslowsky, Jager, and Hemken (2015). Since the latent interaction term included both a latent variable and a manifest variable, the manifest variables of *Neighborhood Conditions* and *Social Capital* were centered prior to estimation of the latent interaction term (Marsh, Wen, & Hau, 2004). In the first step identified by Maslowsky and colleagues (2015), the structural model without the latent interaction term is estimated to ensure it achieves adequate model-to-data fit. Next, the structural model with the interaction term is estimated. The structural model is estimated both with and without the latent interaction term because of the limited output Mplus generates using the LMS method (Maslowsky et al., 2015). Output with a latent interaction term estimated using the LMS method does not compute any fit indices to indicate whether the correlation / covariance matrix is adequately reproduced. Therefore, the model without the latent interaction term and its log-likelihood value are used as a baseline to test if fit deteriorated with the inclusion of the latent interaction term (Maslowsky et al., 2015). The log-likelihood ratio test is used to determine if fit between the two models deteriorated significantly (Maslowsky et al., 2015, p.88).

In a subsequent step, the method of multisample analysis within structural equation modeling was used to compare the measurement and structural similarities across both race and socioeconomic status (Schumacker & Marcoulides, 1998). Multisampling tests for invariance, which is a test of whether relationships within both the measurement model (i.e., relationship between indicator variables and their respective latent variable) and the structural model (i.e., relationships among latent and observed variables) operate consistently across groups. Sass (2011) details that statistical analyses based on the general linear model produces erroneous conclusions when measurement invariance is violated. However, researchers often fail to test for the assumption of measurement invariance (Sass, 2011). Without an explicit test of invariance it is impossible to know whether the relationships found in the overall sample operate similarly across the different racial and socioeconomic groups.

Within the multisampling method, baseline models are tested across groups with no constraints on parameters. Then, in a stepwise fashion, increasingly stringent constraints are placed on the model to be equal across groups. After each additional constraint is placed on the model, a chi-square difference test is performed between the less constrained model and more constrained model to determine if the model and individual parameter estimates are invariant across groups. A significant chi-square test indicates worsening model fit and the hypothesis that parameters are equal across groups must be rejected. A preliminary step prior to conducting the multisampling method is to test for model-to-data fit for each group separately. For example, in order to test for invariance across race, the separate groups of White, Hispanic, and African American

must achieve adequate fit before invariance can be tested across the three groups. Without model fit first achieved in the individual groups (i.e., configural or form invariance), measurement invariance cannot be completed (Dimitrov, 2010). The multisampling method began with a test of the measurement model and then moved to the full structural equation model.

Model-to-data fit was determined using the chi-square test, root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the Tucker Lewis index (TLI). Adequate model fit was defined as a non-significant chi-square test and goodness-of-fit indices that meet cutoff values of $RMSEA < .06$, $CFI > .95$, and $TLI > .95$ (Hu & Bentler, 1999). However, as detailed by Little (2013), there is disagreement over these cutoff points. Little (2013) makes the argument that the cutoff criteria of $RMSEA < .10$, $CFI > .90$, and $TLI > .90$ can be an important indicator that a model has better than poor fit. Therefore, all fit indices were interpreted in relation to each of these cutoff criteria.

Power analysis. In terms of power for the each of the overall models, a useful rule of thumb that has been empirically supported is the N:q rule (Jackson, 2003), where N is the total sample size and q is the number of estimated parameters. However, the values recommended for an adequate N:q ratio differ. In this study, the recommendation by Kline (2011) that the N:q ratio be greater than 20:1 was used. Furthermore, Thompson (2000) recommends there be 10 to 20 participants per observed variable and a minimum sample size of 200 for a full analysis. For Model 4, the most complex of the six, the N:q ratio was 21.93:1 (614/28), and for Models 5 and 6, the N:q ratio slightly improved to 34.05:1 (681/20). The lowest ratio of participants per observed variable

across the six models is 58.8:1 and the smallest proposed sample size far exceeds 200 participants.

A more sophisticated approach to power analysis at the model level was developed by MacCallum, Browne, and Sugawara (1996) based on the “RMSEA and noncentral chi-square distributions for tests of three different null hypotheses” (Kline, 2011, p.223). This approach to power analysis at the model level was translated into a web-based program by Preacher and Coffman (2006) that generates code for the statistical program R to calculate “the minimum sample size required to obtain a target level of power” (Kline, 2011, p.223). Shoemann, Preacher, and Coffman (2010) also provide R code to generate a plot of power for RMSEA against a range of possible sample sizes. In general, as degrees of freedom in a model increase, the sample size required to achieve adequate power of .80 decreases rapidly. The degrees of freedom for the most complex model (Model 4) was 26, while Model 5 and Model 6 each had 13 degrees of freedom. A power curve is displayed below for models with 20 degrees of freedom (see Figure 2.1) and 13 degrees of freedom (see Figure 2.2).

Figure 2.1: Power Curve for Model with 20 Degrees of Freedom
Compute Power for RMSEA

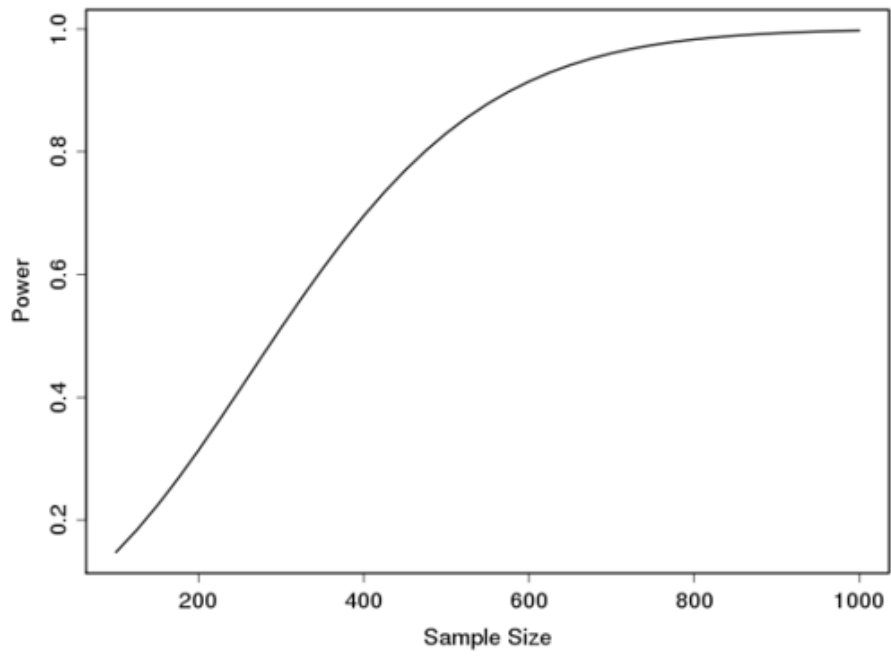
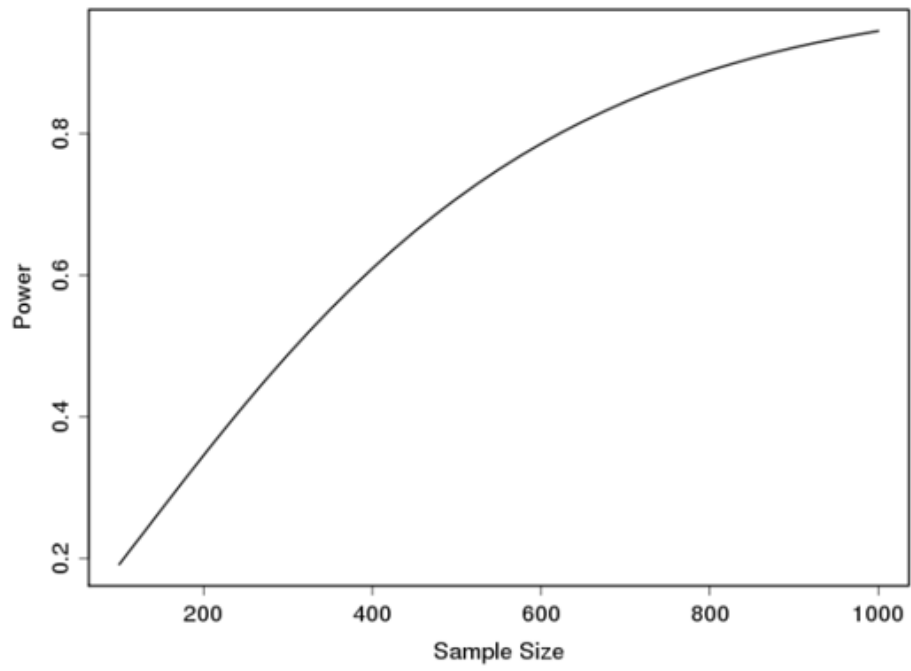


Figure 2.2: Power Curve for Model with 13 Degrees of Freedom
Compute Power for RMSEA



In addition to the power curve, the required sample size to achieve adequate power of .80 was computed using Preacher and Coffman's (2006) web program. Results indicated that a model with 20 degrees of freedom required a sample size of at least 474, and for a model with 13 degrees of freedom the sample size needs to be at least 629 to achieve statistical power of .80.

Statistical power is also an important issue in tests of measurement invariance for Models 5 and 6. When conducting tests of measurement invariance, it has been found that the larger the sample size the better (Kline, 2011; Meade & Bauer, 2007; Meade & Lautenschlager, 2004). Meade and Bauer (2007), using a Monte Carlo simulation, found power to be consistently low if group size was 100, while groups with 400 or more had consistently high power. However, Meade and Bauer (2007) were unable to determine a "single rule of thumb regarding a ratio of group size to the number of indicators that would ensure adequate power" (Kline, 2011, p.261). Basically, the larger the sample size for each group included in a test of measurement invariance, the more likely adequate statistical power exists (Kline, 2011). The proposed sample size for Model 5 and Model 6 was in the recommended range at 681 participants. For the three-group test of measurement invariance across racial group, no group has fewer than 166 cases (White = 166; African American = 279; Hispanic = 236); within the two-group test of measurement invariance across socioeconomic status, no group has fewer than 300 cases. Therefore, the power to detect measurement invariance is likely inadequate in analysis comparing the three groups of race.

Summary

In order to investigate the relationships between subjective factors, structural factors, and criminal behavior, the current study proposes to use secondary data from the *Pathways to Desistance* study. The *Pathways to Desistance* study systematically collected data on a variety of reliable and validated measures over a period of seven years on a sample of adolescents convicted of serious crimes. Data used for this investigation included demographics, parental Index of Social Position, the level of connectedness to the community (i.e., social capital), neighborhood disorganization, and a self-report of criminal offending. Data to measure the latent construct *Pro-Social Orientation* included the *Future Outlook Inventory*, two subscales from the *Weinberger Adjustment Inventory*, and Aspirations for Work, Family, and Law Abiding Behavior. Statistical analyses of confirmatory factor analysis and structural equation modeling were undertaken to explore the relationships between subjective factors, structural factors, and criminal behavior. Multisampling analysis then examined any significant relationships to test for invariance across race, ethnicity, and socioeconomic status. Presented in the next chapter are the results of these statistical analyses.

Chapter Four: Results

Data analysis was conducted in both preliminary and primary stages. In the preliminary analysis, all data were examined for missing values, normality, outliers, and collinearity using IBM SPSS 22 software. Primary analysis consisted of confirmatory factor analysis and structural equation modeling using the statistical software package Mplus version 7.3 (Muthen & Muthen, 1998-2012). Procedures and study results are detailed below.

Preliminary Analyses

Missing data. The first step in the analysis was to examine each of the variables for missing values. The rate of missing data was low throughout the dataset. The highest rates of missing values were found within the measures of *Social Capital*, *Neighborhood Conditions*, and *Self-Reported Offending*, and all of these variables had rates of missing data that were less than 2%. Kline (2011) notes that a rate of missing values less than 5% for any one variable is of minimal concern, especially in samples of more than 200.

While missing data was not a significant concern, listwise deletion of all missing data was explored as an option. However, analysis of the missing values in *Social Capital* and *Neighborhood Conditions* found the data to be missing at random (MAR) suggesting that the pattern of missing values in either variables was not significantly associated with the outcome variable of *Self-Reported Offending*. Since the MAR assumption was supported, full information maximum likelihood (FIML), the default

option in Mplus for dealing with missing data, was used to impute the missing data and maximize the available sample for statistical analysis (Allison, 2003).

Normality. The assumption of normality is important in structural equation models that contain both latent and manifest variables. At the univariate level, a conservative rule of thumb to assume normality is a variable with an absolute value of skewness less than one and an absolute value of kurtosis less than three. More generous guidelines were proposed by Curran, West, and Finch (1996) who found normality to be supported when the absolute value of skewness is less than two and the absolute value of kurtosis is less than seven. Based on either of these recommendations, significant violations in univariate normality were found for both *Self-Reported Offending* variety (skewness = 2.66, kurtosis = 8.70) and *Self-Reported Offending* frequency (skewness = 6.26, kurtosis = 52.28). In order to address these violations of normality, the *Self-Reported Offending* frequency was transformed by taking the natural log of all values. The transformed measure of *Self-Reported Offending* frequency did meet the assumption of univariate normality (skewness = 1.58, kurtosis = 1.09). Analysis was conducted using the transformed measure of *Self-Reported Offending* but its rather weak performance in the models and the increased difficulty in interpretation resulted in the exclusive use of the untransformed *Self-Reported Offending* measure in all primary analyses. Furthermore, in order to compensate for the violation of normality, the estimation method of maximum likelihood with robust standard errors (MLR) was used (Muthen & Muthen, 1998-2012).

Outliers. Outliers were investigated at both the univariate and multivariate level. Univariate outliers in large sample sizes were defined as values that fell outside four standard deviation units for the mean. Outlier values were only identified in the *Self-Reported Offending* frequency variable. However, the analysis both with and without the outlier values revealed no impact on results; therefore, the outlier values were left in the final analysis.

At the multivariate level, outliers were identified by computing Mahalanobis distance, which measures the distance between observed scores and the centroid of all scores in standard deviation units (Kline 2011). Significant values of Mahalanobis distance are determined by a chi-square test. Based on analysis using Mahalanobis distance, 18 cases (2.64%) were found to be multivariate outliers. Analysis both with and without these 18 cases showed no impact on the results so the multivariate outlier cases were included in the final analysis.

Collinearity. Kline (2011) recommends that screening for extreme collinearity among manifest variables be conducted prior to estimation of a structural equation model. The test of collinearity requires computing the squared multiple correlation (R^2) between each variable and all other variables included in a model. In order to compute the R^2 value, a multiple regression was ran for each variable as the dependent variable with all other variables identified as predictors (Kline, 2011). A R^2 that is greater than .90 suggests extreme collinearity between two variables. As shown in Table 2.1 and Table 2.2, none of the variables to be included in the six models exceed the recommended R^2 value.

Table 2.1: Squared Multiple Correlation (R^2) for Models 1, 2, 5, and 6

Predictor Variable	Model 1 R^2	Model 2 R^2	Model 5/6 R^2
Location – 36 months*	.017	.364	.370
Access – 36 months		.299	.052
Future Outlook – 36 months	.200		.228
Aspirations – 36 months	.114		.166
Consideration – 36 months	.180		.189
Temperance – 36 months	.102		.138
Social Capital – 36 months		.030	.114
Neighborhood – 36 months		.042	.082
Offending Variety – 84 months	.416	.390	.095
Offending Frequency – 84 months	.386	.381	.043

* Nagelkerke R^2 reported with a dichotomous variable

Table 2.2: Squared Multiple Correlation (R^2) for Models 3 and 4

Predictor Variable	Model 3 R^2	Model 4 R^2
Location – 36 months*	.314	.415
Access – 36 months		.286
Future Outlook – 36 months	.214	
Aspirations – 36 months	.146	
Consideration – 36 months	.198	
Temperance – 36 months	.125	
Social Capital – 36 months		.061
Neighborhood – 36 months		.092
Location – 48 months*	.472	.213
Access – 48 months	.469	
Future Outlook – 48 months		.212
Aspirations – 48 months		.167
Consideration – 48 months		.227
Temperance – 48 months		.146
Social Capital – 48 months	.074	
Neighborhood – 48 months	.123	
Offending Variety – 84 months	.434	.442
Offending Frequency – 84 months	.404	.395

* Nagelkerke R^2 reported with a dichotomous variable

Primary Analyses

Confirmatory factor analysis. In order to test the six structural models proposed in the current study, the latent measure of *Pro-Social Orientation* needed to first meet adequate model-to-data fit criteria as a standalone measure (Anderson & Gerbing, 1988). The measurement model for *Pro-Social Orientation* was analyzed using confirmatory factor analysis. The latent variable was investigated for model fit at both the 36-month interview and the 48-month interview. The four indicators – the *Future Outlook Inventory*, Aspirations for Work, Family, and Law Abiding Behavior (Menard & Elliott, 1996), and both the Consideration of Others and Temperance subscales from the *Weinberger Adjustment Inventory* (Weinberger & Schwartz, 1990) – that comprise the latent variable are all continuous, so the estimation methods of ML and MLR were both used. MLR was used because of minor inflation in the skewness value (skewness = -1.375) for the Aspirations for Work, Family and Law Abiding Behavior scores.

Results of the confirmatory factor analysis are detailed in Table 3.1. *Pro-Social Orientation* at the 36-month interview had adequate model-to-data fit using both ML estimation ($\chi^2(2) = .372, p = .8304$; RMSEA = .000 [.000 - .042]; CFI = 1.000; TLI = 1.019) and MLR estimation ($\chi^2(2) = .300, p = .8605$; RMSEA = .000 [.000 - .038]; CFI = 1.000; TLI = 1.026). In contrast, results for the 48-month interview found lack of data fit using ML estimation ($\chi^2(2) = 4.571, p = .1017$; RMSEA = .046 [.000 - .103]; CFI = .989; TLI = .966) because the 90% confidence interval (CI) for the RMSEA exceeded the value of .10. However, when MLR estimation was used to estimate *Pro-Social Orientation* at

the 48-month interview, adequate model-to-data fit was achieved ($\chi^2(2) = 3.811, p = .1487$; RMSEA = .038 [.000 - .097]; CFI = .990; TLI = .971).

Table 3.1: Goodness of Fit Statistics for Confirmatory Factor Analyses

	CFA 1	CFA 2	CFA 3	CFA 4
Chi-Square Test of Model Fit				
Value	.372	.300	4.571	3.811
Degrees of Freedom	2	2	2	2
P-value	.8304	.8605	.1017	.1487
RMSEA				
Estimate	.000	.000	.046	.038
90% Confidence Interval	.000 - .042	.000 - .038	.000 - .103	.000 - .097
CFI/TLI				
CFI	1.000	1.000	.989	.990
TLI	1.019	1.026	.966	.971

Note: CFA 1 used ML estimation and 36-month data; CFA 2 used MLR estimation and 36-month data; CFA 3 used ML estimation and 48-month data; CFA 4 used MLR estimation and 48-month data

MLR performed better at estimating *Pro-Social Orientation* at both the 36-month and 48-month interview. Parameter estimates for the 36-month data are detailed in Table 3.2 and parameter estimates for the 48-month data are detailed in Table 3.3. For both models, all parameter estimates were significant. The *Future Outlook Inventory* contributed the most in both the 36-month data ($\beta = .719$, standard error [SE] = .056, $p < .001$) and the 48-month data ($\beta = .609$, SE = .054, $p < .001$). An individual's Temperance score contributed the least to the 36-month data ($\beta = .320$, SE = .049, $p < .001$) and 48-month data ($\beta = .353$, SE = .056, $p < .001$). Examination of the R^2 values for the indicator variables found each contributed significantly to the variance in *Pro-Social Orientation* at both time points.

Table 3.2: Standardized and Unstandardized Coefficients for CFA 2

Observed Variable	Standardized			Unstandardized		
	β	SE	p	B	SE	p
future36	.719	.056	< .001	1.000	.000	.999
aspirat36	.422	.043	< .001	.573	.081	< .001
consid36	.530	.047	< .001	1.049	.151	< .001
temper36	.320	.049	< .001	.660	.128	< .001

Note: MLR Estimation

Figure 3.1: Measurement Model for CFA 2

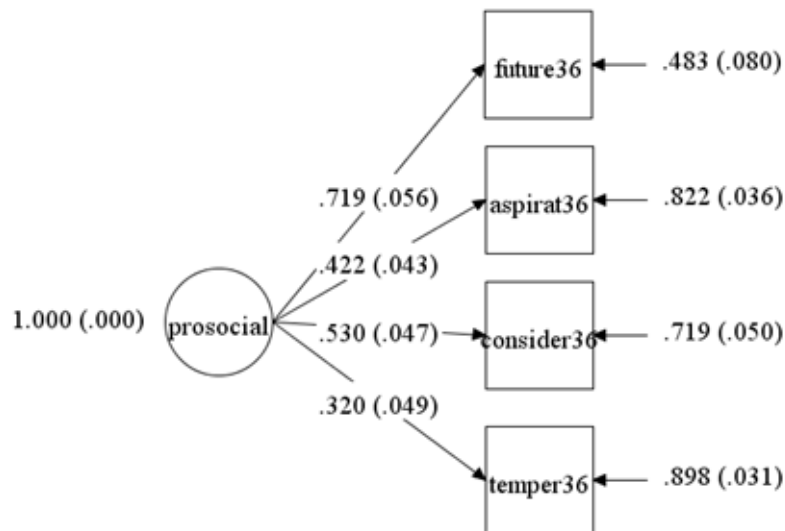
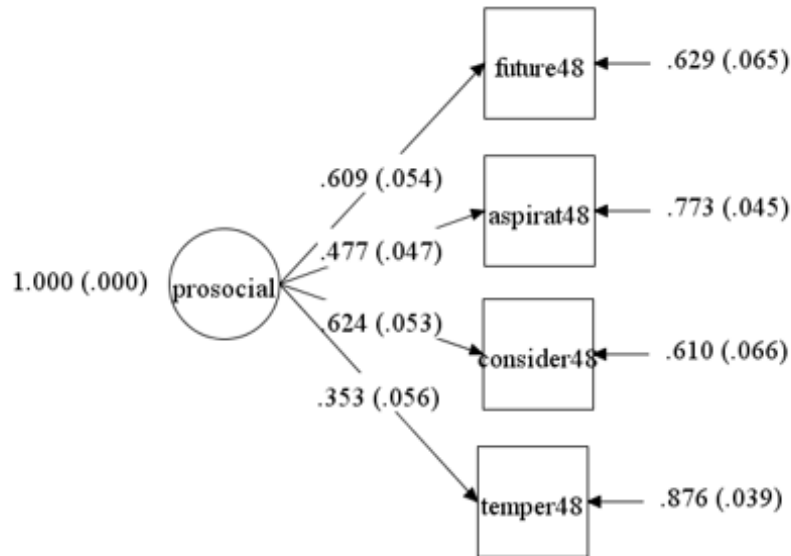


Table 3.3: Standardized and Unstandardized Coefficients for CFA 4

Observed Variable	Standardized			Unstandardized		
	β	SE	p	B	SE	p
future48	.609	.054	< .001	1.000	.000	.999
aspirat48	.477	.047	< .001	.814	.139	< .001
consid48	.624	.053	< .001	1.565	.248	< .001
temper48	.353	.056	< .001	.915	.161	< .001

Note: MLR Estimation

Figure 3.2: Measurement Model for CFA 4



Structural equation modeling.

Model 1. The aim of Model 1 was to investigate the direct effect between the latent individual-level measure of *Pro-Social Orientation* and the outcome of *Self-Reported Offending*. An inverse relationship between *Pro-Social Orientation* and *Self-Reported Offending* was hypothesized. Estimation of Model 1 was conducted multiple times using the three outcome variables of *Self-Reported Offending* variety, *Self-Reported Offending* frequency, and a dichotomous measure of *Self-Reported Offending*. Results for each of the models are detailed in Table 4.1. Model 1a that includes the variety outcome measure failed to achieve adequate model-to-data fit ($\chi^2(9) = 28.962, p = .0007$; RMSEA = .057 [.034 - .081]; CFI = .927; TLI = .878). Model 1a was also run using the MLR estimator but results did not improve so only the results with ML estimation are presented. In addition, Model 1c with the dichotomous outcome measure and WLSMV

estimation also did not fit the data well ($\chi^2(9) = 37.043, p < .001$; RMSEA = .068 [.046 - .091]; CFI = .899; TLI = .831). The only model that achieved adequate model-to-data fit was Model 1b that used the frequency outcome measure and MLR estimation to correct for violations of normality ($\chi^2(9) = 17.978, p = .0354$; RMSEA = .038 [.010 - .064]; CFI = .956; TLI = .926).

Table 4.1: Goodness of Fit Statistics for Structural Model 1

	Model 1a	Model 1b	Model 1c
Chi-Square Test of Model Fit			
Value	28.962	17.978	37.043
Degrees of Freedom	9	9	9
P-value	.0007	.0354	.0000
RMSEA			
Estimate	.057	.038	.068
90% Confidence Interval	.034 - .081	.010 - .064	.046 - .091
CFI/TLI			
CFI	.927	.956	.899
TLI	.878	.926	.831

Note: Model 1a used ML estimation; Model 1b used MLR estimation; Model 1c used WLSMV estimation

Parameter estimates for Model 1b are presented in Table 4.2. The most significant change to the proposed model was the substitution of the variable Proportion with No Community Access for Interview Location. Initial runs of Model 1 found no relationship between Interview Location and *Pro-Social Orientation*. However, as indicated in Table 4.2, the Proportion with No Community Access was negatively associated with *Pro-Social Orientation* ($\beta = -109, SE = .048, p = .023$), thus, as the Proportion with No Community Access increased, the score on *Pro-Social Orientation* decreased. In addition, *Pro-Social Orientation* was also found to have a negative relationship on *Self-Reported Offending* frequency ($\beta = -.191, SE = .059, p < .001$).

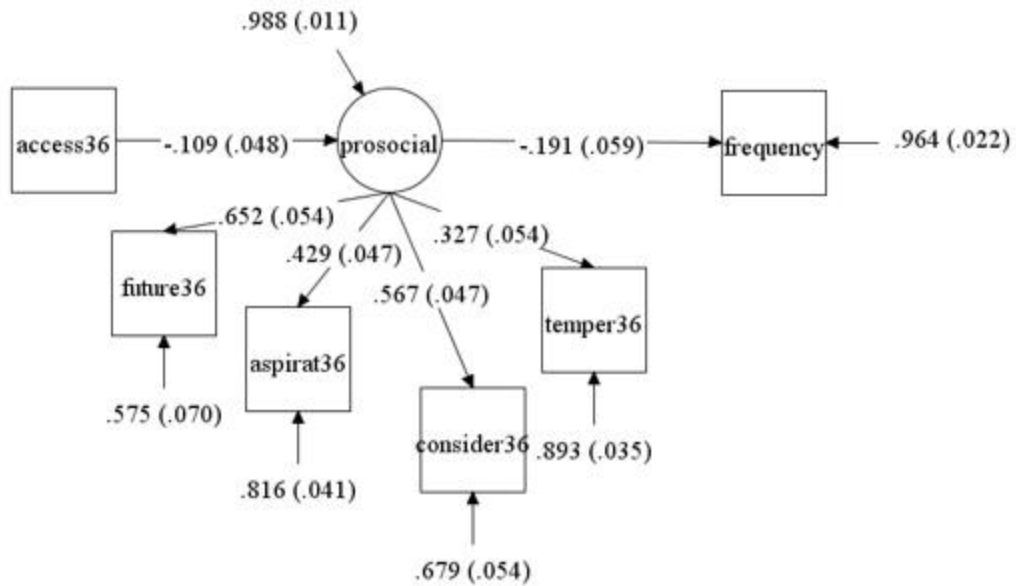
Values of R^2 in Model 1b were all significant except for *Self-Reported Offending* frequency ($R^2 = .036, p = .105$).

Table 4.2: Standardized and Unstandardized Parameter Estimates for Structural Model 1b

Path/Effect	Standardized			Unstandardized		
	β	SE	p	B	SE	p
access36 -> prosocial	-.109	.048	.023	-.176	.075	.020
prosocial -> frequency	-.191	.059	.001	-98.836	36.311	.006

Note: MLR estimation

Figure 4.1: Structural Equation Model for Model 1b



Model 2. For Model 2, the aim was to test the direct effect between both structural measures and *Self-Reported Offending*. *Social Capital* was hypothesized to be inversely related to *Self-Reported Offending*, and *Neighborhood Conditions* was hypothesized to be positively associated with *Self-Reported Offending*. Results for Model 2 are presented in Table 5.1. The same combination of outcome variables and estimation methods used in Model 1 were again performed to examine Model 2. Similar

to Model 1 with *Pro-Social Orientation*, Interview Location showed no relationship with either *Social Capital* or *Neighborhood Conditions* so it was dropped from all future analyses. The initial models demonstrated poor model-to-data fit, particularly with each reporting a negative TLI value (See Table 5.1). By following the tear-down procedure described by Cohen, Cohen, West, and Aiken (2003), where non-significant paths are systematically removed, model-to-data fit was eventually obtained for Model 2d ($\chi^2(1) = .868, p = .3514$; RMSEA = .000 [.000 - .099]; CFI = 1.000; TLI = 1.028).

Table 5.1: Goodness of Fit Statistics for Structural Model 2

	Model 2a	Model 2b	Model 2c	Model 2d
Chi-Square Test of Model Fit				
Value	17.324	15.940	14.306	.868
Degrees of Freedom	3	3	3	1
P-value	.0006	.0012	.025	.3514
RMSEA				
Estimate	.080	.080	.074	.000
90% Confidence Interval	.044 - .120	.044 - .120	.039 - .115	.000 - .099
CFI/TLI				
CFI	.617	.571	.353	1.000
TLI	-.150	-.288	-.941	1.028

Note: Model 2a used ML estimation; Model 2b used MLR estimation; Model 2c used WLSMV estimation; Model 2d used MLR estimation

Figure 5.1: Structural Equation Model for Model 2d



Parameter estimates for Model 2d are detailed in Table 5.2. Proportion with No Community access demonstrated a significant positive relationship with *Neighborhood Conditions* ($\beta = .155$, $SE = .037$, $p < .001$). As an individual's Proportion with No Community Access increased, their score on *Neighborhoods Conditions* also increased indicating higher levels of neighborhood disorganization. No statistically significant relationship was found between *Neighborhood Conditions* and *Self-Reported Offending* frequency ($\beta = .059$, $SE = .045$, $p = .192$). R^2 values showed *Neighborhood Conditions* to be significant ($R^2 = .024$, $p = .038$) but *Self-Reported Offending* frequency was non-significant ($R^2 = .003$, $p = .514$). Within Model 2, a direct effect was not found between *Self-Reported Offending* frequency and either *Neighborhood Conditions* or *Social Capital*. Overall, Model 2 was not a good fit to the data.

Table 5.2: Standardized and Unstandardized Parameter Estimates for Structural Model 2d

Path/Effect	Standardized			Unstandardized		
	β	SE	p	B	SE	p
access36 -> neighbor36	.155	.037	.000	.553	.133	.000
neighbor36 -> frequency	.059	.045	.192	13.179	10.418	.188

Note: MLR estimation

Model 3. The aim of Model 3 was to test a version of the subjective perspective of crime termination (LeBel et al., 2008). The hypothesis for Model 3 was that an increase in *Pro-Social Orientation* at 36-months would lead to an increase in *Social Capital* one-year later at 48-months, and *Social Capital* would in turn be inversely related to later *Self-Reported Offending*. No relationship was hypothesized between level of *Pro-Social Orientation* at 36-months and *Neighborhood Conditions* one-year later. The specification of Model 3 was changed based on the results from Model 1 and Model 2. First, as noted above, Interview Location was dropped from all models. Second,

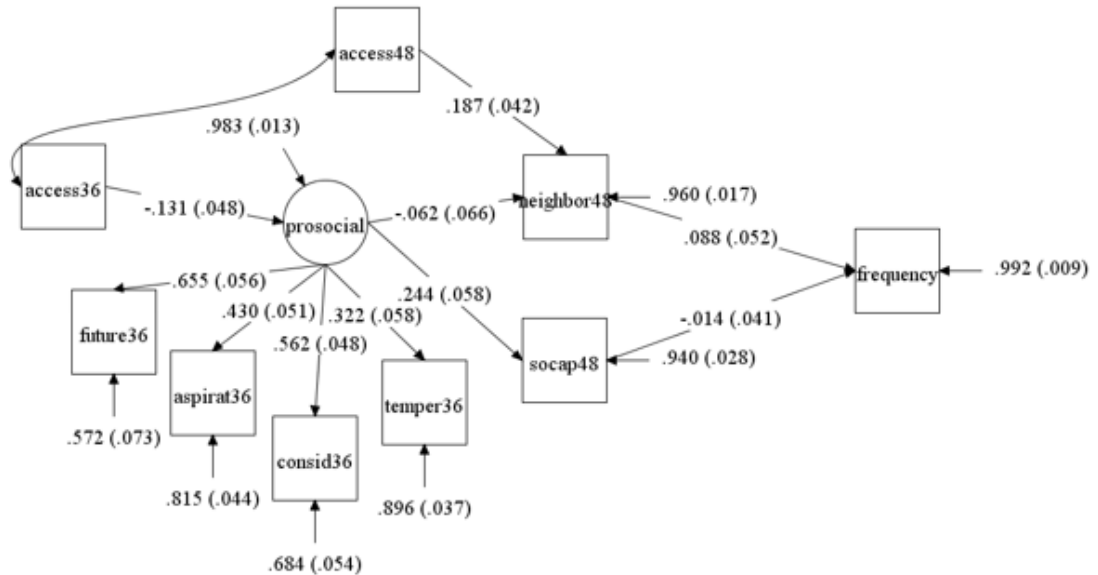
Proportion with No Community Access showed no relationship with *Social Capital* in Model 2 and was thus not included. Third, the dichotomous outcome measure of whether any *Self-Reported Offending* occurred or not was no longer tested because of its poor performance in Model 1 and Model 2. Therefore, Model 3 was ran the first time with the variety outcome measure and ML estimation, and also a second time with the frequency outcome measure and MLR estimation. Both models failed to achieve adequate model-to-data fit (see Table 6.1). Despite the RMSEA values falling in the recommended range, the chi-square value was significant and both the CFI and TLI were considerably lower than the recommended cutoff of .90. Since the model failed to achieve better than poor fit to the data, no parameter estimates or R^2 values are interpreted for Model 3.

Table 6.1: Goodness of Fit Statistics for Structural Model 3

	Model 3a	Model 3b
Chi-Square Test of Model Fit		
Value	119.976	86.481
Degrees of Freedom	24	25
P-value	.0000	.0000
RMSEA		
Estimate	.081	.063
90% Confidence Interval	.067 - .095	.049 - .078
CFI/TLI		
CFI	.715	.778
TLI	.584	.690

Note: Model 3a used ML estimation; Model 3b used MLR estimation

Figure 6.1: Structural Equation Model for Model 3b



Model 4. The aim of Model 4 was to test the structural perspective of crime termination (LeBel et al., 2008). In contrast to Model 3, which hypothesized that changes in the individual factor of *Pro-Social Orientation* was first necessary for later changes in structural factors and eventually criminal behavior, the hypothesis for Model 4 was flipped to suggest changes in structural factors are first necessary for later changes in both individual factors and criminal behavior. For Model 4, it was hypothesized that *Social Capital* at 36-months would be positively associated with *Pro-Social Orientation* at 48-months and *Neighborhood Conditions at 36-months* would be inversely associated with *Pro-Social Orientation* one-year later. The latent measure of *Pro-Social Orientation* would then be inversely associated with *Self-Reported Offending*, which means that as levels of *Pro-Social Orientation* increase the frequency of *Self-Reported Offending* would decrease similar to the relationship hypothesized in Model 1. Model-to-data fit statistics for Model 4 are presented in Table 7.1. The same changes made to the

specification of Model 3 were also followed for Model 4. Initial runs of the model using the variety outcome in Model 4a and the frequency outcome in Model 4b failed to achieve adequate fit. Further examination of the parameter estimates for Model 4b showed that both *Social Capital* and *Neighborhood Conditions* were significantly related to *Pro-Social Orientation*. Therefore, separate models were run that included only *Neighborhood Conditions* (i.e., Model 4c) or only *Social Capital* (i.e., Model 4d) to determine if that would improve model-to-data fit. Model 4c that included *Neighborhood Conditions* continued to fail to achieve adequate model-to-data fit (see Table 7.1). However, Model 4d with *Social Capital* included did meet the requirements for adequate fit ($\chi^2(14) = 26.460, p = .0226$; RMSEA = .038 [.014 - .060]; CFI = .949; TLI = .928).

Table 7.1: Goodness of Fit Statistics for Structural Model 4

	Model 4a	Model 4b	Model 4c	Model 4d
Chi-Square Test of Model Fit				
Value	86.604	66.558	49.114	26.460
Degrees of Freedom	26	26	19	14
P-value	.0000	.0000	.0002	.0226
RMSEA				
Estimate	.061	.050	.051	.038
90% Confidence Interval	.046 - .075	.036 - .066	.034 - .069	.014 - .060
CFI/TLI				
CFI	.835	.862	.887	.949
TLI	.791	.825	.840	.928

Note: Model 4a used ML estimation; Model 4b, Model 4c, and Model 4d used MLR estimation

Parameter estimates for Model 4d are detailed in Table 7.2. Similar to Model 1, Proportion with No Community Access continued to show a negative relationship with *Pro-Social Orientation* ($\beta = -.131, SE = .052, p = .012$). In addition, *Pro-Social Orientation* was found to have a negative relationship with *Self-Reported Offending* ($\beta = -.133, SE = .060, p = .026$). Most importantly, *Social Capital* at 36-months demonstrated

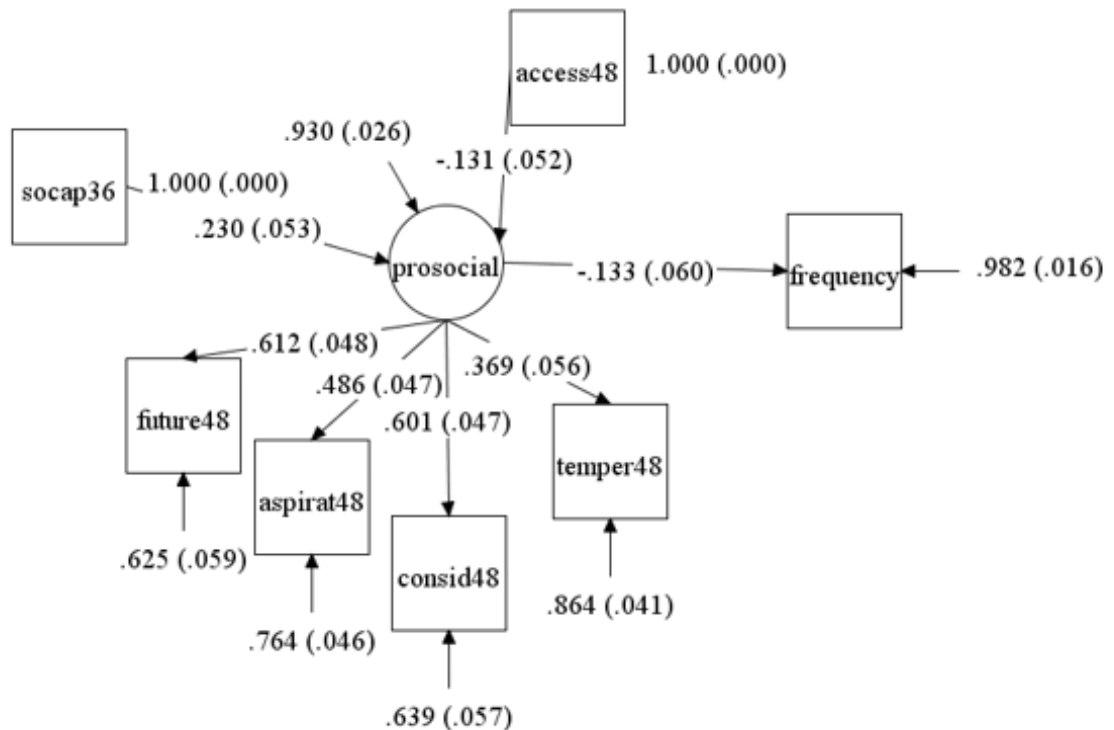
a significant and positive relationship with *Pro-Social Orientation* at 48-months ($\beta = .230$, $SE = .053$, $p < .001$). Thus, as the *Social Capital* score increased so did an individual's *Pro-Social Orientation* score, which in turn decreased future criminal behavior. A review of R^2 values showed all observed variables to be significant except for *Self-Reported Offending* frequency ($R^2 = .018$, $p = .267$).

Table 7.2: Standardized and Unstandardized Parameter Estimates for Structural Model 4d

Path/Effect	Standardized			Unstandardized		
	β	SE	p	B	SE	p
socap36 -> prosocial	.230	.053	.000	.152	.040	.000
access48 -> prosocial	-.131	.052	.012	-.183	.071	.010
prosocial -> frequency	-.133	.060	.026	-80.733	36.944	.029

Note: MLR estimation

Figure 7.1: Structural Equation Model for Model 4d



Model 5. The aim of Model 5 was to test the structural-subjective perspective via the exploration of the contemporaneous interaction effect between the individual-level factor *Pro-Social Orientation* and the structural factor *Neighborhood Conditions*. Rather than suggesting that changes must first occur in either the individual factor (e.g., Model 3) or the structural factors (e.g., Model 4), Model 5 follows Bottoms et al. (2004) and equally considered both the structural factor and the individual factor to have direct as well as interaction effects on future criminal behavior.

Based on the recommendations by Maslowsky and colleagues (2015), the testing of Model 5 with a latent interaction term between *Pro-Social Orientation* and *Neighborhood Conditions* was broken into two stages. First, Model 5a was run without including the latent interaction term, and second, Model 5b was run including the latent interaction term. Since the latent interaction term included both a latent variable and a manifest variable, the manifest variable of *Neighborhood Conditions* was centered prior to estimation of the latent interaction term (Marsh et al., 2004). The LMS method that Mplus uses to compute the latent interaction term relies on MLR as the default to estimate the model. Results of both Model 5a and Model 5b are presented in Table 8.1. No fit indices are reported for Model 5b because the LMS method does not generate fit indices beyond a log-likelihood value. Moreover, the LMS method does not report standardized coefficients in the Mplus output; nevertheless, Maslowsky and colleagues (2015) provide Mplus syntax that computes standardized coefficients for Model 5b. In order to test if model fit deteriorated from Model 5a to Model 5b, an uncorrected log-

likelihood ratio test was conducted based on the following formula: $D = -2[(\log\text{-likelihood for Model 5a}) - (\log\text{-likelihood for Model 5b})]$ (Maslowsky et al., 2015).

Model 5a without the latent interaction term failed to achieve adequate model-to-data fit ($\chi^2(13) = 68.705, p < .001$; RMSEA = .079 [.061 - .098]; CFI = .792; TLI = .665). Therefore, according to Maslowsky et al. (2015), it is not possible to achieve model-to-data fit with Model 5b that includes the latent interaction term and further testing should be terminated. However, the process described by Maslowsky et al. (2015) was followed to its conclusion and Model 5b was also estimated in order to derive the necessary log-likelihood value (see Table 8.1). The result of the log-likelihood ratio test for the value of D comparing Model 5a and Model 5b was 156.31. The value of D is approximately distributed as χ^2 , so to determine the significance of D , a χ^2 distribution table was consulted to compare the computed value of D to a χ^2 distribution with 1 degree of freedom (i.e. number of free parameters in Model 5a – number of free parameters in Model 5b; Maslowsky et al., 2015). The critical χ^2 value for 1 degree of freedom at the .05 alpha level is 3.841. The computed value of D indicates that Model 5a represents a significant loss in model fit relative to Model 5b. Overall, it is necessary for both the log-likelihood ratio test to be significant and for the model without the latent interaction term to fit in order to interpret the parameter estimate of the latent interaction (Maslowsky, et al., 2015). Model 5 only obtained one of these two requirements, thus Model 5 was not a good fit to the data.

Table 8.1: Goodness of Fit Statistics for Structural Model 5

	Model 5a	Model 5b
Chi-Square Test of Model Fit		
Value	68.705	
Degrees of Freedom	13	
P-value	.0000	
RMSEA		
Estimate	.079	
90% Confidence Interval	.061 - .098	
CFI/TLI		
CFI	.792	
TLI	.665	
Log-Likelihood	-7964.797	-7886.642

Note: Model 5b uses the LMS method to estimate the latent interaction term and no fit indices are generated with the LMS method

Figure 8.1: Structural Equation Model for Model 5b



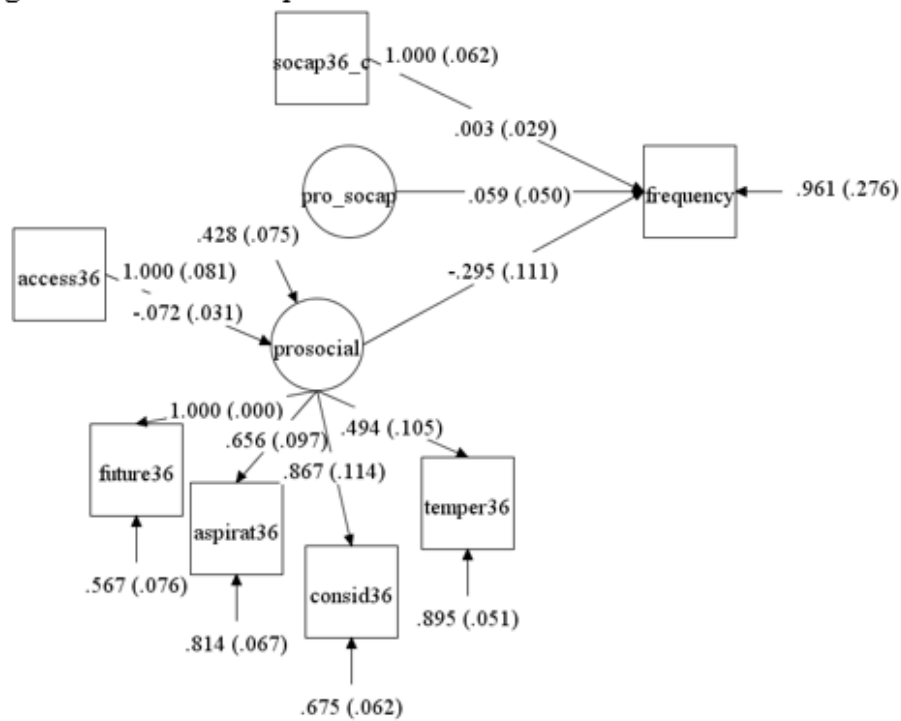
Model 6. Similar to Model 5, Model 6 also followed Bottoms et al. (2004) and equally considered both the structural factor and the individual factor to have direct as well as interaction effects on future criminal behavior. Within Model 6, the individual-level factor remains *Pro-Social Orientation* but the structural factor changes to *Social Capital*. The same two stage process used to test Model 5 was also employed to test Model 6 with a latent interaction term between *Pro-Social Orientation* and *Social Capital* (Maslowsky et al., 2015). The manifest variable *Social Capital* was again centered prior to estimation of the latent interaction term (Marsh et al., 2004). As detailed in Table 9.1, Model 6a without the interaction term between *Pro-Social Orientation* and *Social Capital* failed to achieve adequate model-to-data fit ($\chi^2(14) = 59.751, p = .0000$; RMSEA = .069 [.052 - .088]; CFI = .813; TLI = .732). Model 6b was next estimated in order to compute the necessary log-likelihood value. The computed value of D based on the log-likelihood ratio test was 181.59, which exceeds the critical χ^2 value for 1 degree of freedom at the .05 alpha level. Similar to Model 5, Model 6 also achieved a significant log-likelihood ratio test but Model 6a without the latent interaction term failed to achieve model-to-data fit. On the whole, Model 6 was not a good fit to the data.

Table 9.1: Goodness of Fit Statistics for Structural Model 6

	Model 6a	Model 6b
Chi-Square Test of Model Fit		
Value	59.751	
Degrees of Freedom	14	
P-value	.0000	
RMSEA		
Estimate	.069	
90% Confidence Interval	.052 - .088	
CFI/TLI		
CFI	.813	
TLI	.732	
Log-Likelihood	-7636.692	-7545.899

Note: Model 6b uses the LMS method to estimate the latent interaction term and no fit indices are generated with the LMS method

Figure 9.1: Structural Equation Model for Model 6b



Multisample model analysis. With the aim of integrating the core social work value of dignity and worth of the person into quantitative research, multisample analysis

was conducted to test the invariance of findings across the important diversity groups of race and socioeconomic status. Mutlisample analysis was conducted in a sequential process that began with the measurement model of *Pro-Social Orientation* and then moved to the structural models. Invariance of the measurement model was a necessary requirement before invariance testing of the structural models could move forward. Without support for invariance of the measurement model, the addition of structural parameters to the model for further tests of invariance would lead to the same conclusion.

Moreover, prior to a test of measurement invariance across multiple groups, model-to-data fit must first be achieved in each of the groups included in the multisample analysis; these are referred to as the baseline models (Dimitrov, 2010, p.124). If the baseline models fail to achieve adequate fit, a test of measurement invariance is not recommended (Bowen, 2014; Dimitrov, 2010). Detailed below are the results of the multisample analysis examining groups defined by socioeconomic status and race.

Socioeconomic status. Participants were grouped into either a “High” group or a “Low” group depending on their score on the parental Index of Social Position (ISP). Examination of the ISP variable in SPSS showed the variable to be normally distributed (skewness = -.044; kurtosis = -.278) with a mean of 51.32 ($SD = 12.00$) and a median of 51.00. Therefore, the decision was made to split the sample into either the High or Low group based on the median value of 51.00. Participants with ISP values ranging from 16.50 to 50.99 were considered Low, and participant with ISP values from 51.00 to 77.00 were considered High.

As detailed in Table 10.1, The baseline model of *Pro-Social Orientation* for the Low group demonstrated adequate model-to-data fit ($\chi^2(2) = .878, p = .6446$; RMSEA = .000 [.000 - .086]; CFI = 1.000; TLI = 1.034). Model fit was not achieved for the High group because of an RMSEA 90% CI greater than .10 ($\chi^2(2) = 2.007, p = .3665$; RMSEA = .003 [.000 - .106]; CFI = 1.000; TLI = 1.000). Since the High baseline model did not demonstrate better than poor model fit, the test of measurement invariance should be terminated (Bowen, 2014; Dimitrov, 2010). However, the process of invariance testing the *Pro-Social Orientation* measure across socioeconomic status was carried to its conclusion.

Table 10.1: Goodness of Fit Statistics for SES Groups

	Low SES	High SES
Chi-Square Test of Model Fit		
Value	.878	2.007
Degrees of Freedom	2	2
P-value	.6446	.3665
RMSEA		
Estimate	.000	.003
90% Confidence Interval	.000 - .086	.000 - .106
CFI/TLI		
CFI	1.000	1.000
TLI	1.034	1.000

Table 10.2 presents the results of invariance testing the *Pro-Social Orientation* measure across socioeconomic status. Both the model for configural invariance ($\chi^2(4) = 2.889, p = .5766$; RMSEA = .000 [.000 - .071]; CFI = 1.000; TLI = 1.020) and metric invariance ($\chi^2(7) = 3.306, p = .8553$; RMSEA = .000 [.000 - .037]; CFI = 1.000; TLI = 1.038) demonstrated adequate model-to-data fit. The chi-square difference test comparing the configural model versus the metric model was non-significant ($\chi^2(3) =$

.462, $p = .9628$), which meant no significant loss in model fit occurred when factor loadings were held constant across groups. Overall, measurement invariance for *Pro-Social Orientation* was not supported because the High group baseline model failed to achieve model-to-data fit (Dimitrov, 2010). Because the measurement model of *Pro-Social Orientation* failed to support invariance across socioeconomic status, structural invariance was not explored further.

Table 10.2: Goodness of Fit Statistics for Measurement Invariance by SES: Low versus High

	Configural	Metric
Chi-Square Test of Model Fit		
Value	2.889	3.306
Degrees of Freedom	4	7
P-value	.5766	.8553
RMSEA		
Estimate	.000	.000
90% Confidence Interval	.000 - .071	.000 - .037
CFI/TLI		
CFI	1.000	1.000
TLI	1.020	1.038

Race. Within the *Pathways to Desistance* study, participants were identified as either African American, Hispanic, or White. Invariance testing was conducted for each pairwise combination of these racial groups. The baseline model of *Pro-Social Orientation* for African Americans demonstrated adequate model fit ($\chi^2(2) = .791$, $p = .6735$; RMSEA = .000 [.000 - .090]; CFI = 1.000; TLI = 1.042). Nonetheless, both the baseline model for Hispanics ($\chi^2(2) = 2.194$, $p = .3339$; RMSEA = .020 [.000 - .132]; CFI = .995; TLI = .986) and Whites ($\chi^2(2) = 3.533$, $p = .1709$; RMSEA = .068 [.000 - .182]; CFI = .976; TLI = .928) failed to achieve adequate model-to-data fit (see Table 11.1). Similar to the multigroup analysis with socioeconomic status, the failure of two of

the three baseline race models to demonstrate model fit means measurement invariance across race was not supported. Nevertheless, the process of invariance testing the *Pro-Social Orientation* measure across race was finished as detailed below.

Table 11.1: Goodness of Fit Statistics for Race Groups

	African American	Hispanic	White
Chi-Square Test of Model Fit			
Value	.791	2.194	3.533
Degrees of Freedom	2	2	2
P-value	.6735	.3339	.1709
RMSEA			
Estimate	.000	.020	.068
90% Confidence Interval	.000 - .090	.000 - .132	.000 - .182
CFI/TLI			
CFI	1.000	.995	.976
TLI	1.042	.986	.928

The first pairwise grouping detailed in Table 11.2 compared African Americans to Hispanics. Model fit was found for both the configural invariance model ($\chi^2(4) = 2.925$, $p = .5704$; RMSEA = .000 [.000 - .082]; CFI = 1.000; TLI = 1.025) and the metric invariance model ($\chi^2(7) = 6.365$, $p = .4979$; RMSEA = .000 [.000 - .072]; CFI = 1.000; TLI = 1.008). Chi-square difference test showed no significant loss in fit between the configural model and the metric model ($\chi^2(3) = 3.526$, $p = .3714$).

Table 11.2: Goodness of Fit Statistics for Measurement Invariance by Race: African American versus Hispanic

	Configural	Metric
Chi-Square Test of Model Fit		
Value	2.925	6.365
Degrees of Freedom	4	7
P-value	.5704	.4979
RMSEA		
Estimate	.000	.000
90% Confidence Interval	.000 - .082	.000 - .072
CFI/TLI		
CFI	1.000	1.000
TLI	1.025	1.008

Next, Table 11.3 presents the results of invariance testing comparing African Americans and Whites. Model fit was not achieved for either the configural invariance model ($\chi^2(4) = 2.925, p = .5704$; RMSEA = .000 [.000 - .082]; CFI = 1.000; TLI = 1.025) or the metric invariance model ($\chi^2(7) = 6.365, p = .4979$; RMSEA = .000 [.000 - .072]; CFI = 1.000; TLI = 1.008). The chi-square difference test also reflected a significant loss in fit between the two models ($\chi^2(3) = 21.251, p < .0001$).

Table 11.3: Goodness of Fit Statistics for Measurement Invariance by Race: African American versus White

	Configural	Metric
Chi-Square Test of Model Fit		
Value	4.054	25.529
Degrees of Freedom	4	7
P-value	.3987	.0006
RMSEA		
Estimate	.008	.109
90% Confidence Interval	.000 - .102	.066 - .156
CFI/TLI		
CFI	1.000	.876
TLI	.999	.788

Lastly, the results of invariance testing comparing Hispanics and White is detailed in Table 11.4. Similar to the comparison of African Americans and Whites, model fit was not obtained for either configural invariance model ($\chi^2(4) = 5.651, p = .2267$; RMSEA = .045 [.000 - .123]; CFI = .985; TLI = .954) or the metric invariance model ($\chi^2(7) = 11.489, p = .1187$; RMSEA = .056 [.000 - .113]; CFI = .958; TLI = .928). The chi-square difference test showed no significant loss in fit between the two models ($\chi^2(3) = 5.744, p = .1247$).

Table 11.4: Goodness of Fit Statistics for Measurement Invariance by Race: Hispanic versus White

	Configural	Metric
Chi-Square Test of Model Fit		
Value	5.651	11.489
Degrees of Freedom	4	7
P-value	.2267	.1187
RMSEA		
Estimate	.045	.056
90% Confidence Interval	.000 - .123	.000 - .113
CFI/TLI		
CFI	.985	.958
TLI	.954	.928

Summary

In sum, the most robust association was found between the latent measure *Pro-Social Orientation* and the frequency of *Self-Reported Offending*. In contrast, there was a lack of a direct effect between *Self-Reported Offending* and either structural measure of *Social Capital* or *Neighborhood Conditions*. Analyses that examined the temporal effects between *Pro-Social Orientation* and the structural measures found tentative support for the structural perspective. Increased *Social Capital* at 36-months was found to be associated with increased *Pro-Social Orientation* at 48-months, which in turn decreased

criminal behavior three years later. The subjective perspective model where initial changes in *Pro-Social Orientation* lead to later changes in the structural factors was not supported in the current data. Lack of support was also found for both of the structural-subjective perspective models, but the lack of support for the structural-subjective perspective was likely hampered by the non-significant direct effects between *Self-Reported Offending* and either structural measure. Tests of invariance on *Pro-Social Orientation* found the measure not to be invariant across either socioeconomic status or race, which then inhibited the ability to test further for structural invariance in models that included the *Pro-Social Orientation* measure.

All of the findings from this investigation must be interpreted tentatively since none of the proposed structural models were able to explain a significant proportion of the variance in the *Self-Reported Offending* outcome. Further discussion of these statistical results along with limitations to the data and the study's implications and recommendations for social work research and practice are provided in the final chapter.

Chapter Five: Discussion

The high rate of recidivism found among the over 600,000 individuals returned from imprisonment each year is an important social problem facing U.S. society and the criminal justice system (Carson, 2014; Wright & Cesar, 2013). Efforts undertaken so far in the early 21st century to address the problem of recidivism of the formerly incarcerated, such as prison reentry programs, by government agencies at the federal, state, and local level have produced disappointing results at reducing the rate of recidivism (Ndrecka, 2014; Wright & Cesar, 2013). Therefore, in order to identify new ways for prison reentry programs to reduce recidivism among the formerly incarcerated, research into the behavior change process that facilitates termination from crime needs to be explored further (McNeill, 2009). Explanations for how individuals terminate from crime has been dominated by research that takes either a structural perspective (i.e., Sampson & Laub, 2003) or a subjective perspective (Giordano et al., 2002; Maruna, 2001), but new studies identify a third school of thought, the structural-subjective perspective, that attempts to create an integrated theory from the existing theories of crime termination (Bottoms et al., 2004; Farrall & Bowling, 1999). The purpose of the current study was to contribute to the literature on crime termination and the structural-subjective perspective by exploring the nature of the relationship between structural factors, subjective factors, and crime termination in a sample of adolescents with serious criminal backgrounds.

In this chapter, results of the study are summarized and interpreted in the context of prior research. Next, in light of the study results, the chapter presents a discussion of implications and recommendations for social work practice and the development of prison reentry programs. The chapter concludes with study limitations and a description of future research to be explored.

Summary and Interpretation of Results

This dissertation research was guided by three research questions. The first and most important research question stated:

- 1) What is the nature of the relationship between structural and subjective factors and termination from crime following release from the criminal justice system?**

Addressed in the first research question was a series of six research hypotheses that were examined in order to better understand and predict relationships between structural factors, subjective factors, and crime. The six research hypotheses were each translated into structural models that increased in complexity from the first to the sixth model.

The first research hypothesis examined direct effects and posited that that the level of *Pro-Social Orientation* at 36-months follow-up would be inversely related to offending at 84-months. Results from the statistical analysis revealed a significant, although very small in magnitude, inverse relationship between *Pro-Social Orientation* and *Self-Reported Offending*. This finding is of interest because it completely reverses the traditional focus of criminal justice research, which almost exclusively focuses on attitudes that are risk factors for criminal behavior (Ronel & Elisha, 2011). The current

hypothesis, in contrast, explored an attitude that if developed in individuals with a criminal history can have a small but significant impact at decreasing the likelihood for future criminal behavior. However, the support for the research hypothesis is tempered by the model's inability to explain a significant proportion of the variance in *Self-Reported Offending*. Further research is needed to explore whether the weak relationship between *Pro-Social Orientation* and *Self-Reported Offending* is found for other measures of pro-social attitudes.

Direct effects between the measures of *Social Capital* and *Neighborhood Conditions* and criminal behavior were examined in structural model two. Significant relationships between each of the structural measures and crime were hypothesized. Specifically, individuals with high levels of social capital and low levels of neighborhood disorganization would be less likely to commit crime than individuals with low social capital and high neighborhood disorganization. Statistical analysis of the structural model revealed no support for this second hypothesis. Despite model-to-data fit achieved when only the effect of *Neighborhood Conditions* on crime was included in the model, there was not a statically significant relationship between the structural measure and crime. These findings parallel those found in a number of other studies that have also found no direct effect between neighborhood and crime (Elliott et al., 1996; Leventhal & Brooks-Gunn, 2002; Sampson et al., 2002; Sampson & Laub, 1993; Wright et al., 2014) or between social capital and crime (Piquero et al., 2014).

Model three was the first of two models that explored the temporal effects between subjective factors and structural factors. In this model, it was hypothesized that

Pro-Social Orientation would increase an individual's *Social Capital* one-year later, which in turn would lead to less criminal behavior. No relationship was hypothesized to exist between *Pro-Social Orientation* and the score on *Neighborhood Condition* one-year later. In regards to the second part of research hypothesis three, statistical analysis supported the claim that no relationship existed between *Pro-Social Orientation* and *Neighborhood Conditions*. In addition, there was no support found for *Pro-Social Orientation* increasing *Social Capital* one-year later. Results from structural model three fail to support the subjective perspective of crime termination that identifies changes in individual-level factors to be first necessary in order for changes in structural factors to occur. These findings do not represent an outright rejection of subjective theories of crime termination, particularly considering the limitations present in the latent measure *Pro-Social Orientation* that are discussed in more detail below.

In contrast to a lack of any significant findings for structural model three, the test of the structural perspective of crime termination within model four revealed tentative support in the current data. Prior to analysis, it was hypothesized that a high level of social capital and a low level of neighborhood disorganization were both associated with increases in *Pro-Social Orientation* one-year later, which in turn would lead to lower levels of crime. Despite the findings not supporting a relationship between neighborhood conditions and *Pro-Social Orientation*, there was a significant association between high levels of *Social Capital* and increases in an individual's score on *Pro-Social Orientation* one-year later, which then led to lower levels of future crime. These findings for structural model four parallel the work of Sampson and Laub (1993) who found high

quality social capital to be an important factor in creating the changes in an individual that are likely to lead to the termination of criminal behavior. Overall, the results from model four represent the most substantial findings from the statistical analysis conducted for this dissertation research. The structural perspective of crime termination is supported in the current data but model four again fails to explain a significant proportion of the variance in the outcome of *Self-Reported Offending*. Furthermore, a test of mediation was not undertaken for model four because of a lack of an a priori direct effect between *Social Capital* and *Self-Reported Offending*, which is required within the traditional definition of mediation (Baron & Kenny, 1986). Rather the relationship found between *Social Capital*, *Pro-Social Orientation*, and *Self-Reported Offending* can be understood as a “test of joint significance” (Hayes, 2009, p.410) where *Pro-Social Orientation* serves as a “linking mechanism” between *Social Capital* and future criminal behavior (Mathieu & Taylor, 2006, p.1039).

Models five and six each tested the contemporaneous interaction effects of the latent measure *Pro-Social Orientation* and either the structural measure of *Neighborhood Conditions* or *Social Capital*. Support was not found for either structural model five or six, thus the hypotheses that the interaction between the structural factor and the subjective factor would be related to crime over and above the direct effects of both the structural or subjective factor was rejected. Both of these models were hindered by the lack of a significant direct effect between the structural measures and crime. These results were also likely influenced by the decision to compute the latent interaction term

based on one latent variable and one manifest variable as opposed to two latent variables that capture both the structural and subjective factors.

In sum, the answer to research question one regarding the nature of the relationship between structural and subjective factors and crime is similar to that championed by Sampson and Laub (1993) in their work on the age-graded theory of informal social control. That is, structural factors - particularly measures of social capital - are important in helping to increase levels of *Pro-Social Orientation*, which in turn lowers future criminal behavior in a sample of individuals with serious criminal backgrounds. These findings also suggest a possible sequencing of services that social workers can further test within prison reentry programs. Specifically, frontline providers of reentry services should try to ensure that the development of social capital is given priority on the front end of a reentry program in order to help facilitate the behavior change necessary for termination from crime.

The remaining two research questions dealt with tests of invariance across race and socioeconomic status. The two questions were:

- 2) Is the relationship between the structural-subjective interaction and termination from crime similar across the racial groups of African American, Hispanic, and White?**
- 3) Is the relationship between the structural-subjective interaction and termination from crime similar across socioeconomic status?**

The study was unable to provide an answer to either of these research questions because invariance was not supported for the latent measure *Pro-Social Orientation* across groups

defined by either race or socioeconomic status. These results in regards to *Pro-Social Orientation* preempted any further tests for structural invariance in models that included the latent measure. Future investigations that aim to conduct tests of invariance should make an effort to use measures that have been more extensively investigated for their psychometric properties rather than using an ad hoc, data-driven measure, such the latent measure *Pro-Social Orientation* in this current study. In addition, the sample size for the groups, especially for the three groups defined by race, was likely too small to conduct a rigorous test of invariance at the measurement level and the structural level (Meade & Bauer, 2007).

Implications and Recommendations

The purpose of this study was to contribute to existing research about the way in which individuals terminate from crime by analyzing the relationships between structural factors, subjective factors, and crime termination in a sample of adolescents with serious criminal backgrounds. While all results from the statistical analyses must be interpreted carefully, they do suggest a number of implications and recommendations for social work practice and the criminal justice system.

First, study results revealed strongest support for the structural perspective and the work of Sampson and Laub (1993) who identified changes in structural factors as leading to changes in subjective factor, which in turn result in decreases in criminal behavior. These findings provide social workers with a possible avenue to intervene within prison reentry programs and other rehabilitation interventions to effectively lower the frequency of criminal behavior in individuals. *Support Matters*, a social work intervention targeted

at the formerly incarcerated in order to address the dual focus of treatment for substance misuse and active engagement of naturally occurring social support, is an excellent example of how social work interventions can apply the person-in-environment perspective to intervene and create positive change within both the individual and their immediate structural environment (Pettus-Davis et al., 2011). By strengthening participants' bonds to sources of social support that are already available in the surrounding environment, *Support Matters* is an example of how a program can build the type of social capital that also appear to be important for long-term termination from criminal behavior among subjects in the current study.

Beyond focusing on the immediate social network of the individual, social worker practitioners might also contribute to prison reentry programs through the adoption and adaptation of community-level intervention strategies such as *Communities That Care* (CTC) (Brown, Hawkins, Arthur, Briney, & Fagan, 2011). CTC is a social work intervention that provides a step-by-step approach to transforming a community's prevention service system by identifying "elevated risk factors and depressed protective factors" specific to a particular community or neighborhood (Brown et al., 2011, p.184). Once location specific risk and protective factors are identified, CTC can help social workers provide guidance to a community on how to select and then implement a network of interventions empirically shown to be effective at reducing risk factors and increasing protective factors (Brown et al., 2011). Constructing an effective prevention system such as that described in CTC will likely not have immediate or direct effects on the criminal behavior of adults recently released from incarceration. Nonetheless, the

program may help to foster an environmental context that increases the likelihood of developing high quality social support. A community-level intervention strategy like CTC can begin to strengthen the surrounding social institutions, which then helps to proliferate opportunities for creation of the social support and social capital needed by formerly incarcerated individuals to achieve success outside of the criminal justice system. In addition, the strengthening of social institutions will likely increase the effectiveness of any prison reentry program trying to serve members of an under-resourced community (see Wright, Pratt, Lowenkamp, & Latessa, 2012).

Furthermore, social work practitioners and researchers of prison reentry programs should make attempts to investigate other community-level strategies that have the potential to create an environment that fosters social capital among inhabitants in a community. For example, community nutrition programs could provide a number of indirect benefits. Specifically, a recent randomized, double-blind study found support that public health campaigns that ensure youth and adolescents receive a recommended daily dose of omega-3 can significantly lower aggressive and externalizing behaviors compared to youth without omega-3 supplementation (Raine, Portnoy, Liu, Mahoomed, & Hibbeln, 2014). Therefore, social workers should not only be focused on direct intervention to develop social support as described in the *Support Matters* program, but practitioners also need be creative in identifying possible indirect strategies, such as public health campaigns to eat fish as an important source of omega-3, that can make the development of social support and social capital more likely for everyone in a community.

The value of social justice in the social work profession also calls on practitioners to identify changes at the public policy level that may increase termination from crime among the formerly incarcerated. The justice reinvestment approach is a three-phase strategy that social workers can use to assist public policy makers to systematically identify changes to state laws that could make it easier for individuals recently released from incarceration to be successful in the community (Clement, Schwarzfield, & Thompson, 2011). Specifically, the justice reinvestment approach could help to dismantle the system of collateral sanctions that force individuals with a criminal background into a second-class citizenship (Western & Pettit, 2010). Based on the findings from the current study, changes to public policy that increase the likelihood of an individual developing additional social support could prove very beneficial. State laws that either restrict access to employment or the right to vote may be particularly harmful by pushing an individual with a criminal history to the margins of society, thus greatly restricting an individual's likelihood of developing high quality social support (Blumstein & Nakamura, 2009). Social work could help to advocate for proactive laws that states could adopt, such as New York's practice of issuing certificates of rehabilitation that provides individuals with a criminal history a legally enforceable document that allows the them to move beyond the restrictive system of collateral sanction and be recognized as rehabilitated and a full member of society once again (Radice, 2012). Certificates of rehabilitation not only provide greater opportunities in the structural environment for individuals with a criminal history, but it is also a practice that can help promote individual-level change through the "looking-glass self-concept"

identified by Maruna and colleagues (2004) as effective in increasing the likelihood of termination from crime.

Finally, the social work professionals should follow the recommendation of the NASW, as detailed in Wilson (2010), to develop a standardized delivery model for incarcerated individuals. A standard model of service delivery would be particularly beneficial to those individuals returning from incarceration who have co-morbid issues that require the coordination of services across multiple systems. In order to fulfill this recommendation, social workers can look to Pettus and Severson (2006) who provide details on how social workers can effectively execute the role of boundary spanner within a criminal justice context. Furthermore, the NASW has highlighted the role that social workers has played in improving the Scotland criminal justice system (Wilson, 2010). The model of engagement established between social workers and the criminal justice system in Scotland can serve as a model for how social workers begin to contribute more substantially to criminal justice and corrections policy in the U.S.

Limitations

A number of important limitations need to be considered when interpreting the results from this study. First, the final sample used for statistical analysis excluded females. Females were not included in the current study because of their small proportion (13.6%) of the total sample relative to the larger proportion of individuals who identified as male. Mulvey and colleagues (2014) detail that every female eligible for the study was approached - while males with drug convictions were capped at 15% of the total sample – about participating in order to increase generalizability of findings.

Despite the intended goal of enrolling a substantial number of females in *Pathways to Desistance*, the number who actually enrolled in the study was low. The lack of female participation is particularly stark in *Pathways to Desistance* when compared to Giordano and colleagues' (2002) *Ohio Lifecourse Study* that enlisted a sample that was approximately 50 percent female. Future studies of how crime termination occurs need to make a targeted effort at enrolling females, particularly considering the rate of incarceration of females has outpaced their male counterparts over the past decade (The Sentencing Project, 2012).

The study's use of secondary data from the *Pathways to Desistance* creates a number of limitations. The most significant limitation is the choice of variables used in statistical analysis. Every measure that was included in the current study could be improved. A notable example is the four indicator variables used to construct the latent measure *Pro-Social Orientation*. The decision to choose the four indicator variables was largely data-driven given the constraints presented by the *Pathways to Desistance* study. Ideally, the measure of *Pro-Social Orientation* would be developed based on theory and then piloted tested to investigate the measure's psychometric properties before actually using it in any data collection.

Secondary data also created constraints on the manifest variables of *Social Capital*, *Neighborhood Conditions*, and *Self-Reported Offending*. In the preliminary stages of this investigation, the creation of a latent measure was attempted for all three of these constructs. However, because of issues in how the data was collected in the *Pathways to Desistance* study, it proved impossible to create latent measures for any of

the three. The robustness of the statistical analysis for structural equation modeling would be substantially increased by using latent measures for all factors included in the structural models, rather than a mixture of latent and manifest variables.

Beyond the inability to create a latent measure for *Self-Reported Offending*, the outcome variable in each of the six structural models also presented additional limitations. The violation in normality, especially in terms of a high kurtosis value, identified for the *Self-Reported Offending* frequency variable is a concern especially when using the traditional estimation method of Maximum Likelihood (ML), which is the default estimation method in Mplus. ML is very likely to produce biased results when structural models include variables that violate normality, thus the *Self-Reported Offending* frequency variable posed a potentially serious issue for the estimation of the six structural models. However, the use of Maximum Likelihood with robust standard errors (MLR) to correct for violations of normality increases confidence that results from the present investigation are not biased despite the inclusion of a highly non-normally distributed outcome variable.

Moreover, in regards to the *Self-Reported Offending* outcome, the definition of crime termination could be operationalized differently for future studies. For the purposes of this study, termination from crime was defined as a participant self-reporting no criminal activity over the past year at the 84-month interview. A concern with this definition is that it is impossible to know whether a participant who reported no criminal activity at the 84-month interview had actually stopped criminal behavior forever or whether the individual was simply in a temporary pause from crime, a common

occurrence for individuals attempting to stop criminal behavior (Laub & Sampson, 2001), that would then be restarted following the 84-month interview. One possible way to correct for this “false” termination problem would be to expand the definition beyond the self-report of no crime for one year, to include the reporting of no crime over two or even three years (Laub & Sampson, 2001, p.9). However, regardless of the timeframe selected, it is a fact that the only way to be assured that an individual did permanently terminate from crime is to confirm it retroactively after death (Maruna, 2001, p.23).

An additional consequence of relying on secondary data to investigate the relationship between structural factors, subjective factors, and crime termination is the low correlations among the variables included in the structural models. Low correlation values are particularly noticeable for Models 5 and 6 where no squared multiple correlation (R^2) was greater than .370, and values for the outcome variable of *Self-Reported Offending* were less than .100. A likely consequence of these low correlations among the variables was the depressed CFI and TLI values found for many of the models (Muthen, 2009). Also likely related to the low correlations among variables is the unfortunate finding that none of the six structural models was able to explain a significant proportion of the variance in the *Self-Reported Offending* outcome measure.

The final limitation that warrants consideration when interpreting the findings from this study is the statistical power to find significant results within both the structural equation models and the multisample analysis. As detailed in Chapter Three, a model with 13 degrees of freedom requires a sample size of at least 629 to achieve statistical power of .80. The structural models of 3, 4, 5 and 6 each included a sample size that

either exceeded the recommended total or fell a little below it. Model 1 and 2 with only nine and three degrees of freedom, respectively, both fell considerably short of meeting the necessary sample size to achieve statistical power of .80. The lack of adequate power may have had the most substantial impact on Model 2 and the inability to detect a significant direct effect between both structural measures and *Self-Reported Offending*.

Statistical power was also a concern with the multisample analysis that tested for invariance across both race and socioeconomic status in the measurement model for *Pro-Social Orientation*. Monte Carlo simulations, while failing to identify a cutoff for group size in multisample analysis to ensure statistical power of .80, have shown that each group in a multisample analysis should include at least 400 participants (Meade & Bauer, 2007). None of the groups for either race or socioeconomic status included 400 participants, thus it is very likely that the entire multisample analysis conducted within the study was under-powered, which would explain the inability to fit a baseline model for either the race groups or the socioeconomic status groups.

Future Research

There are a number of promising directions for future research that should be pursued in light of the findings from this current study. First, as an advocate of the strengths-perspective, the social work profession can serve as a leader in the nascent development of positive criminology, a new perspective in criminology that focuses on factors of positive development that decrease an individual's likelihood for criminal behavior (Ronel & Elisha, 2011). A particularly important area in need of further research in the study of positive criminology is the development of reliable and valid

measures that capture positive attitudes and behaviors in individuals with criminal backgrounds. Initial work at defining different measures of positive adult behaviors (e.g., volunteerism, group involvement, interpersonal connection, financial responsibility, constructive engagement, and honesty) within a community sample has already been conducted by the Social Development Group based at the University of Washington School of Social Work (Kosterman, Hawkins, Abbott, Hill, Herrenkohl, & Catalano, 2005). Social work researchers should build on this preliminary work and pursue a psychometric agenda that aims to develop and validate measures of positive behaviors within incarcerated samples.

At the same time that measures of positive behaviors are being refined and psychometrically investigated, studies should be pursued that analyze how measures of positive behaviors are associated with criminal behavior and substance abuse. Kosterman and colleagues (2005) have also begun this work by demonstrating significant negative correlations between types of positive adult behaviors (i.e., constructive engagement, financial responsibility, and honesty) and both crime and substance abuse. However, the focus of Kosterman et al. (2005) needs to be broadened to include investigations of positive adult behaviors within individuals with serious criminal backgrounds. Particularly, an important question to explore is whether more rigorously developed measures of positive adult behaviors have the same small effects on criminal behavior as those found for the latent measure *Pro-Social Orientation* in the current study.

The ultimate goal of this proposed research agenda focused on measures of positive adult behaviors in justice-involved samples is to develop a manualized

intervention that integrates findings from research on positive behaviors with the already substantial research that exists on risk factors for crime. The goal would be to develop a range of factors that social workers serving an incarcerated population can intervene with to both promote positive behaviors as well as suppress risk factors for criminal behavior. Social workers should also try to pursue the application of strength-based rehabilitation approaches such as the Good Lives Model that builds case plans for the formerly incarcerated with a balance between avoidance goals (i.e., suppress risk factors) and approach goals (i.e., promote positive behaviors) in order to increase the long-term engagement in a prison reentry program (Laws & Ward, 2011). Following the creation of a manualized intervention, social workers could further benefit the criminal justice system by pursuing a rigorous plan of program evaluation at the pilot, efficacy, and effectiveness stages as described by Fraser and colleagues (2009). The evaluation plan should also attempt to integrate the hybrid model of research in order to evaluate both the efficacy and effectiveness of a manualized intervention with the intent of balancing the competing demands of both maximizing the internal validity as well as external validity of evaluation results (see Carroll & Rounsaville, 2003).

Finally, in regards to future research, social work researchers should make an effort to use sophisticated statistical tools such as latent variable interactions and multisample analysis to explore complex interactions that could prove useful in increasing the effectiveness of social work practice with incarcerated populations. A rich area of potential research throughout social work practice is more in-depth exploration

into interactions between variables, particularly the interaction of variables at both the structural and individual level that could improve social work interventions.

Conclusion

This study provides further evidence of the importance that structural factors – particularly social capital – can have on the effectiveness of prison reentry programs at lowering the rate of criminal behavior among individuals with a serious criminal history. Prison reentry programs targeted at improving an individual’s social capital can have an indirect effect on future criminal behavior by increasing an individual’s pro-social attitudes. The social work profession has great potential to be a leader in the development of interventions for formerly incarcerated individuals that provide a dual focus on changes at both the person and the environment level. However, first, social workers need to reverse their neglect of the criminal justice system and realize the broad social justice implications of mass incarceration within U.S. society (Pettus-Davis, 2012). Social work, with its person-in-environment perspective, can assist the criminal justice system through the translation of research findings on the behavior change process that underlies termination from crime into prison reentry programs that address the high rate of recidivism in the formerly incarcerated. Social workers have the ability to push the criminal justice system beyond the current status quo of how to intervene with formerly incarcerated individuals and instead embrace innovative ways to both protect public safety and better the lives of millions of disadvantaged individuals imprisoned in the age of mass incarceration.

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Appendix A: Mplus Syntax for Structural Models and Multisample Analysis

Syntax for CFA 2

Title:

CFA Model 2

Data:

File is "C:\Users\Chris\OneDrive\PhD Program Documents\Dissertation\MPlus\
CFA\Pro-Social Orientation\CFA_Agency_Final36.csv";

Variable:

Names are future36 aspirat36 consider36 temper36;

Missing is future36 aspirat36 consider36 temper36 (-99);

Usevariables are future36 aspirat36 consider36 temper36;

Analysis:

Estimator = MLR;

Model:

prosocial BY future36 aspirat36 consider36 temper36;

Output:

STDYX Modindices;

Syntax for CFA 4

Title:

CFA Model 4

Data:

File is "C:\Users\Chris\OneDrive\PhD Program
Documents\Dissertation\Analysis\MPlus
\Model 4\Model 4.csv";

Variable:

Names are access36 neighbor36 socap36 access48

future48 aspirat48 consider48 temper48 proportion frequency
dich_frequency;

Usevariables are future48 aspirat48 consider48 temper48;

Missing are all (-99);

Analysis:

Estimator = MLR;

Model:

prosocial BY future48 aspirat48 consider48 temper48;

Output:

SAMPSTAT STDYX;

Syntax for Structural Model 1b

Title:

Dissertation Model 1

Data:

File is "C:\Users\Chris\OneDrive\PhD Program Documents\Dissertation\MPlus
\Model 1\Model 1a.csv";

Variable:

Names are location36 access36 future36 aspirat36 consider36
temper36 proportion frequency dich_frequency ln_frequency;

Usevariables are access36 future36 aspirat36 consider36
temper36 frequency;

Missing are all (-99);

Analysis:

Estimator = MLR;

Model:

prosocial BY future36 aspirat36 consider36 temper36;

prosocial ON access36;

frequency ON prosocial;

Output:

SAMPSTAT STDYX;

Syntax for Structural Model 2d

Title:

Dissertation Model 2

Data:

File is "C:\Users\Chris\OneDrive\PhD Program Documents\Dissertation\Analysis
\MPlus\Model 2\Model 2.csv";

Variable:

Names are location36 access36 neighbor36 socap36
proportion frequency dich_frequency ln_frequency;

Usevariables are access36 neighbor36 frequency;

Missing are all (-99);

Analysis:

Estimator = MLR;

Model:

neighbor36 ON access36;

frequency ON neighbor36;

Output:

SAMPSTAT STDYX;

Syntax for Structural Model 3b

Title:

Dissertation Model 3

Data:

File is "C:\Users\Chris\OneDrive\PhD Program Documents\Dissertation\Analysis
\MPlus\Model 3\Model 3.csv";

Variable:

Names are location36 access36 future36 aspirat36 consid36 temper36
location48 access48 neighbor48 socap48 proportion frequency
dich_frequency ln_frequency;

Usevariables are access36 future36 aspirat36 consid36 temper36
access48 neighbor48 socap48 frequency;

Missing are all (-99);

Analysis:

Estimator = MLR;

Model:

prosocial BY future36 aspirat36 consid36 temper36;
prosocial ON access36;
neighbor48 ON prosocial access48;
socap48 ON prosocial;
frequency ON neighbor48 socap48;

Output:

SAMPSTAT STDYX;

Syntax for Structural Model 4d

Title:

Dissertation Model 4

Data:

File is "C:\Users\Chris\OneDrive\PhD Program Documents\Dissertation
\Analysis\MPlus\Model 4.csv";

Variable:

Names are access36 neighbor36 socap36 access48
future48 aspirat48 consid48 temper48 proportion frequency
dich_frequency ln_frequency;

Usevariables are socap36 access48 future48 aspirat48
consider48 temper48 frequency;

Missing are all (-99);

Analysis:

Estimator = MLR;

Model:

prosocial BY future48 aspirat48 consid48 temper48;
prosocial ON socap36 access48;
frequency ON prosocial;
socap36 WITH access48@0;

Output:
SAMPSTAT STDYX;

Syntax for Structural Model 5b

Title:
Dissertation Model 5
Data:
File is "C:\Users\Chris\OneDrive\PhD Program Documents\Dissertation\Analysis
MPlus\Model 5\Model 5_6.csv";
Variable:
Names are ethn isp dich_isp access36 neighbor36 socap36
future36 aspirat36 consid36 temper36 proportion frequency
dich_frequency ln_frequency neighbor36_c socap36_c;
Usevariables are access36 future36 aspirat36
consider36 temper36 frequency neighbor36_c;
Missing are all (-99);
Analysis:
TYPE = RANDOM;
Define: standardize access36 future36 aspirat36
consider36 temper36 frequency neighbor36_c;
Model:
neighbor36_c ON access36;
prosocial BY future36 aspirat36 consider36 temper36;
prosocial ON access36;
pro_neighbor | prosocial XWITH neighbor36_c;
frequency ON neighbor36_c prosocial pro_neighbor;
Output:
SAMPSTAT TECH1 TECH8;

Syntax for Structural Model 6b

Title:
Dissertation Model 6
Data:
File is "C:\Users\Chris\OneDrive\PhD Program Documents\Dissertation\Analysis
MPlus\Model 6\Model 5_6.csv";
Variable:
Names are ethn isp dich_isp access36 neighbor36 socap36
future36 aspirat36 consid36 temper36 proportion frequency
dich_frequency ln_frequency neighbor36_c socap36_c;
Usevariables are access36 future36 aspirat36
consider36 temper36 frequency socap36_c;
Missing are all (-99);

Analysis:
TYPE = RANDOM;
Define: standardize access36 future36 aspirat36
 consid36 temper36 frequency socap36_c;
Model:
 prosocial BY future36 aspirat36 consid36 temper36;
 prosocial ON access36;
 pro_socap | prosocial XWITH socap36_c;
 frequency ON socap36_c prosocial pro_socap;
 access36 WITH socap36_c@0;
Output:
 SAMPSTAT TECH1 TECH8;

Syntax for Low SES Baseline Model

Title:
Low SES Baseline Model
Data:
File is "C:\Users\Chris\SkyDrive\PhD Program Documents\
Dissertation\MPlus\Model 5\Model 5_6.csv";
Variable:
Names are ethn isp dich_isp access36 neighbor36 socap36
 future36 aspirat36 consid36 temper36 proportion frequency
 dich_frequency ln_frequency neighbor36_c socap36_c;
Usevariables are future36 aspirat36 consid36 temper36;
Missing are all (-99);
Useobservation are (dich_isp EQ 0);
Analysis:
Estimator = MLR;
Model:
 prosocial BY future36 aspirat36 consid36 temper36;
Output:
 SAMPSTAT STDYX;

Syntax for High SES Baseline Model

Title:
High SES Baseline Model
Data:
File is "C:\Users\Chris\SkyDrive\PhD Program Documents\
Dissertation\MPlus\Model 5\Model 5_6.csv";
Variable:
Names are ethn isp dich_isp access36 neighbor36 socap36
 future36 aspirat36 consid36 temper36 proportion frequency

```
    dich_frequency ln_frequency neighbor36_c socap36_c;
Usevariables are future36 aspirat36 consid36 temper36;
Missing are all (-99);
Useobservation are (dich_isp EQ 1);
Analysis:
    Estimator = MLR;
Model:
    prosocial BY future36 aspirat36 consid36 temper36;
Output:
    SAMPSTAT STDYX;
```

Syntax for Measurement Invariance by SES: Low versus High

```
Title:
    Low versus High SES Invariance Testing
Data:
    File is "C:\Users\Chris\SkyDrive\PhD Program Documents\
        Dissertation\MPlus\Model 5\Model 5_6.csv";
Variable:
    Names are ethn isp dich_isp access36 neighbor36 socap36
        future36 aspirat36 consid36 temper36 proportion frequency
        dich_frequency ln_frequency neighbor36_c socap36_c;
    Usevariables are future36 aspirat36 consid36 temper36;
    Missing are all (-99);
    Grouping is dich_isp (0 = Low 1 = High);
Analysis:
    Estimator = MLR;
    Model = Configural Metric Scalar;
Model:
    prosocial BY future36 aspirat36 consid36 temper36;
Output:
    SAMPSTAT STDYX;
```

Syntax for White Race Baseline Model

```
Title:
    White Race Baseline Model
Data:
    File is "C:\Users\Chris\SkyDrive\PhD Program Documents\
        Dissertation\MPlus\Model 5\Model 5_6.csv";
Variable:
    Names are ethn isp dich_isp access36 neighbor36 socap36
        future36 aspirat36 consid36 temper36 proportion frequency
        dich_frequency ln_frequency neighbor36_c socap36_c;
```

Usevariables are future36 aspirat36 consid36 temper36;
Missing are all (-99);
Useobservation are (ethn EQ 1);
Analysis:
Estimator = MLR;
Model:
prosocial BY future36 aspirat36 consid36 temper36;
Output:
SAMPSTAT STDYX;

Syntax for African American Race Baseline Model

Title:
African American Race Baseline Model
Data:
File is "C:\Users\Chris\SkyDrive\PhD Program Documents\
Dissertation\MPlus\Model 5\Model 5_6.csv";
Variable:
Names are ethn isp dich_isp access36 neighbor36 socap36
future36 aspirat36 consid36 temper36 proportion frequency
dich_frequency ln_frequency neighbor36_c socap36_c;
Usevariables are future36 aspirat36 consid36 temper36;
Missing are all (-99);
Useobservation are (ethn EQ 2);
Analysis:
Estimator = MLR;
Model:
prosocial BY future36 aspirat36 consid36 temper36;
Output:
SAMPSTAT STDYX;

Syntax for Hispanic Race Baseline Model

Title:
Hispanic Race Baseline Model
Data:
File is "C:\Users\Chris\SkyDrive\PhD Program Documents\
Dissertation\MPlus\Model 5\Model 5_6.csv";
Variable:
Names are ethn isp dich_isp access36 neighbor36 socap36
future36 aspirat36 consid36 temper36 proportion frequency
dich_frequency ln_frequency neighbor36_c socap36_c;
Usevariables are future36 aspirat36 consid36 temper36;
Missing are all (-99);

Useobservation are (ethn EQ 3);
Analysis:
Estimator = MLR;
Model:
prosocial BY future36 aspirat36 consid36 temper36;
Output:
SAMPSTAT STDYX;

Syntax for Measurement Invariance by Race: African American versus Hispanic

Title:
African American versus Hispanic Race Invariance Testing
Data:
File is "C:\Users\Chris\SkyDrive\PhD Program Documents\
Dissertation\MPlus\Model 5\Model 5_6.csv";
Variable:
Names are ethn isp dich_isp access36 neighbor36 socap36
future36 aspirat36 consid36 temper36 proportion frequency
dich_frequency ln_frequency neighbor36_c socap36_c;
Usevariables are future36 aspirat36 consid36 temper36;
Missing are all (-99);
Grouping is ethn (2 = African American 3 = Hispanic);
Analysis:
Estimator = MLR;
Model = Configural Metric Scalar;
Model:
prosocial BY future36 aspirat36 consid36 temper36;
Output:
SAMPSTAT STDYX;

Syntax for Measurement Invariance by Race: African American versus White

Title:
African American versus White Race Invariance Testing
Data:
File is "C:\Users\Chris\SkyDrive\PhD Program Documents\
Dissertation\MPlus\Model 5\Model 5_6.csv";
Variable:
Names are ethn isp dich_isp access36 neighbor36 socap36
future36 aspirat36 consid36 temper36 proportion frequency
dich_frequency ln_frequency neighbor36_c socap36_c;
Usevariables are future36 aspirat36 consid36 temper36;
Missing are all (-99);
Grouping is ethn (1 = White 2 = African American);

Analysis:
Estimator = MLR;
Model = Configural Metric Scalar;
Model:
prosocial BY future36 aspirat36 consid36 temper36;
Output:
SAMPSTAT STDYX;

Syntax for Measurement Invariance by Race: Hispanic versus White

Title:
Hispanic versus White Race Invariance Testing
Data:
File is "C:\Users\Chris\SkyDrive\PhD Program Documents\
Dissertation\MPlus\Model 5\Model 5_6.csv";
Variable:
Names are ethn isp dich_isp access36 neighbor36 socap36
future36 aspirat36 consid36 temper36 proportion frequency
dich_frequency ln_frequency neighbor36_c socap36_c;
Usevariables are future36 aspirat36 consid36 temper36;
Missing are all (-99);
Grouping is ethn (1 = White 3 = Hispanic);
Analysis:
Estimator = MLR;
Model = Configural Metric Scalar;
Model:
prosocial BY future36 aspirat36 consid36 temper36;
Output:
SAMPSTAT STDYX;