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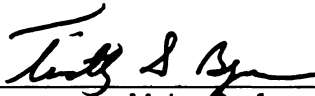
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AN EXAMINATION INTO YOUTHFUL FIREARM
OFFENDING PATTERNS IN MICHIGAN

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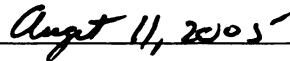
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**THE EFFECT OF SOCIALIZATION AND ONSET BEHAVIOR: AN
EXAMINATION INTO YOUTHFUL FIREARM OFFENDING PATTERNS IN
MICHIGAN**

By

Eric L. Grommon

A THESIS

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ABSTRACT

THE EFFECT OF SOCIALIZATION AND ONSET BEHAVIOR: AN EXAMINATION INTO YOUTHFUL FIREARM OFFENDING PATTERNS IN MICHIGAN

By

Eric L. Grommon

The purpose of this research is to model theoretical propositions of social learning theory with developmental or life course theory to examine socialization pathways into a subculture that utilizes firearms for criminal purposes. Inherent within the research is the assumption that cultural and environmental socialization mechanisms or onset behaviors place an individual at greater risk for involvement in firearm offending, which may lead to specialization in offense patterns. Secondary analyses were conducted on a 1996 study examining the prevalence and incidence of youthful firearm ownership, possession, and use for a random sample of incarcerated male offenders between the ages of 17 to 25 within the state of Michigan. The results indicate that socialization or social learning variables measuring cultural and environmental context served as the best predictors of involvement in serious firearm offending. Onset behavior variables provided marginal support for the prediction of firearm offending seriousness. In efforts to reduce the frequency and proportion of crime involving firearms, criminal justice policy and practices should continue to examine the nexus between gang membership, peer associations, drug sales, and neighborhood exposure to violence which lead to initiation, persistence, or increased levels of involvement in firearm offending.

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CHAPTER I: INTRODUCTION

The prevalence and use of firearms is ingrained into the fabric of American history, societal organization, and political structure to such an extent that a firearm subculture has been and continues to be observed (Hofstadter, 1970; Jacobs, 2002; Kennett & Anderson, 1975; Kohn, 2004). Contemporary statistics reinforce the perception of an American firearm subculture. Although the exact number of firearms may never be known (Wright, Rossi, & Daly, 1983), recent estimates have placed the number of firearms owned by U.S. citizens between 230 to 250 million (Jacobs, 2002; Kleck, 1991; Kleck, 1997). As a point of reference, Wright, Rossi, and Daly (1983) estimated that there were approximately 100 to 140 million firearms owned in the U.S. 27 years ago. National survey data since the early 1960s have consistently estimated that 40 to 50% of U.S. households own at least one firearm (Cook & Ludwig, 2000; Kleck, 1991; Kleck, 1997; Wright & Rossi, 1994; Wright, Rossi, & Daly, 1983). Extrapolating household survey percentages, there were approximately 42 to 53 million households in 2000 and 37 to 46 million households in 1990 in possession of firearms (U.S. Census Bureau, 2000, Table DP-1; U.S. Census Bureau, 1990, Table DP-1). While there appears to be a saturation of firearms in American society, there is also reason to believe that the number of firearms in private possession will continue to increase due to market demand. Four and a half million new firearms are sold each year in addition to approximately two million firearms sold by secondhand means (Bureau of Alcohol, Tobacco, and Firearms, 2000).

Coupled with the growing number of firearms available in recent years, the U.S. continues to have serious violent crime problem although the relative frequency and rate

of violent crime has incrementally subsided since the early 1990s (Jacobs, 2002). Often, firearms are involved in a substantial portion of violent crime, resulting in thousands of injuries or deaths each year (Cook & Ludwig, 2000). The Federal Bureau of Investigation's Uniform Crime Report (UCR) indicates that there were approximately 16,500 homicides in 2003 (Federal Bureau of Investigation, 2004)¹. Supplemental Homicide Report (SHR) data were provided for 14,400, or 87%, of the UCR reported homicides. The SHR provides comprehensive information on homicide victim and offender demographics, relations, and weapon involvement and is considered to be the only crime measure in which a definitive determination of firearm use can be made (Kleck, 1997). The SHR data reveal that approximately 69% of homicide victims were murdered with firearms (Federal Bureau of Investigation, 2004, Table 2.10). Nearly 80% of the firearms used in the homicides were handguns and approximately 9% were committed with rifles and shotguns (ibid, Table 2.12).

Of the remaining seven violent crimes measured by the UCR, only two – robbery and aggravated assault – contain supplemental information concerning weapon involvement. Unlike SHR data, which is completed by law enforcement personnel during or after a homicide investigation report, weapon involvement in robberies and aggravated assaults are based upon the communication between the complainant and the law enforcement agent dictating the complainant's report. Since both the complainant and the agent possess variant amounts of discretion affecting the information that is

¹ Currently UCR reporting processes are being transitioned into a National Incident Based Reporting System (NIBRS) that captures comprehensive incident details of 22 offense categories encompassing 46 specific crimes. The Federal Bureau of Investigation (n.d.) reports that the majority of federal, state, and local law enforcement crime data are submitted through the traditional UCR format. NIBRS data will not be reported in UCR yearly crime aggregates until the majority of the reports are received via NIBRS format. Therefore, statistics presented from the 2003 UCR are based upon the traditional format.

reported (Gove, Hughes, & Geerken, 1985; Skogan, 1976), firearm violence researchers have acknowledged that a differentiation between firearm use, display, threaten or attack cannot be made for UCR aggregate reports of these two crimes (Kleck, 1997). Instead, terminology such as “firearm involvement” is preferred in order to capture victim reports of confrontations with an armed perpetrator.

Of the estimated 413,400 robberies reported through the UCR in 2003, approximately 42% involved firearms followed closely by robberies involving personal weapons such as fists and feet (Federal Bureau of Investigation, 2004, Table 2.21). Of the 857,900 aggravated assaults, personal weapons were involved in approximately 27% of aggravated assaults, while firearms were involved in nearly 20% (ibid, Table 2.23). There is also evidence to suggest that the proportion of homicides, robberies, and aggravated assaults involving firearms has been relatively static for the past ten years. Data from the 1993 UCR indicates that approximately 70% of homicides, 42% of robberies, and 25% of aggravated assaults involved the use of firearms (Bureau of Justice Statistics, n.d.).

The rate of violent crime involving firearms, found through the standardization of violent offenses per 100,000 in the population, conflicts with the static proportionality of firearm involvement in specific UCR violent crimes. The rates of aggravated assaults and robberies involving firearms have both reduced by nearly 45% between 1993 and 2003². Additionally, the rate of homicides committed with a firearm has reduced by

² The rate of aggravated assaults involving firearms was 110.5 per 100,000 in 1993 and 56.3 in 2003 (Bureau of Justice Statistics, n.d.). The rate of robberies involving firearms was 108.5 in 1993 and 59.4 in 2003 (Bureau of Justice Statistics, n.d.)

approximately 42% in the 10 year span³. However, the decrease in the rate of violent crimes involving firearms may be confounded by the general reduction in violent crime since the early 1990s. As the frequency of violent crime reduces from years past and the national population remains the same or increases slightly, a reduction in the standardized rate is logically attained. What remains despite the rate decrease is the fact that firearms continue to be involved in a large portion of homicide, robbery, and aggravated assault violent crime categories.

National Crime Victimization Survey (NCVS) data from 2003 have also indicated a general decline in the frequency and rate of violent crime since the early 1990s (Catalano, 2004). Similar to UCR data capturing weapon involvement for the crimes of robbery and aggravated assault, firearms can only be discussed in terms of their involvement in criminal encounters since NCVS data cannot provide any delineation between firearm use, display, threaten, or attack (Kleck, 1997). For the approximate five million violent crime victimizations reported by respondents in 2003, 7% involved a firearm (Catalano, 2004, Table 10). Approximately one million or 11% of violent crime victimizations involved a firearm in 1993. When analyzed by the type of violent crime, nearly 25% of the 553,000 robbery victimizations involved firearms (ibid, Table 10). Additionally, of the four million simple and aggravated assault victimizations, respondents reported that approximately 5% involved the use of a firearm (ibid, Table 10). Perkins (2003) analyses of NCVS trends for the years 1993 through 2001 reinforce statistics from 2003. Approximately 10% of all violent victimizations involved firearms.

³ The rate of homicides committed with firearms was 6.6 per 100,000 in 1993 and 3.8 in 2003 (Bureau of Justice Statistics, n.d.).

Twenty-five percent of robberies, 5% of simple and aggravated assaults, as well as 3% of rape/sexual assaults during the time span involved firearms.

In combination and despite their respective deficits (Gove, Hughes, & Geerken, 1985), UCR and NCVS data both indicate that violent crime is decreasing nationally. The measures also suggest that 69 to 70% of homicides, 42% of robberies, and 25 to 27% of aggravated assaults reported to police involve firearms. Additionally, 25% of robberies and 5% of simple and aggravated assault victimizations involve firearms. While one can expect a sizable proportion of violent crimes to involve firearms, one can also expect the availability of firearms to increase by the millions each year. Kleck's (1991) production based analyses of manufacturer, import, and export data led to the conclusion that "fewer than 1% of handguns and well under 1% of all guns will ever be involved in even a single violent crime" (p. 47-48). Thus, there appears to be a small subset of firearms, and by default a small subset of firearm owners or possessors, involved in crime. In other words, there appears to be a fragmented and smaller subculture within the overall firearm subculture that utilizes firearms for criminal purposes.

In an effort to deter firearm involvement in crime, criminal justice policy and legislation at the federal, state, and local level has focused on the identification of small subsets of dangerous persons who may be persistently involved in criminal activity as well as those who have committed current or previous crimes involving firearms (Bureau of Justice Statistics, 2004; Jacobs, 2002; Cook & Ludwig, 2000; Kennett & Anderson, 1975; Kleck, 1991; Project Safe Neighborhoods, 2004; Wright & Rossi, 1994; Wright, Rossi, & Daly, 1983; Zimring, 1975). As suggested by Jacobs (2002), the justification

for policy and legislation that seeks to identify high-risk individuals is often rationalized under the intuitive auspices that “it is easier to regulate a smaller number of persons or entities than a larger number” (p. 40). However, with nearly 20,000 different firearm laws spanning federal, state, and local levels (Wright, Rossi, & Daly, 1983), there is a question as to the ability of policy and legislation to affect the frequency and rate of violent crime since the regulatory effort used to deter future criminality typically occurs in reaction to observed criminal activity (Kleck & Patterson, 1993). Moreover, the ability to identify and predict individual offending patterns, in terms of frequency and offense, is fraught with imperfections (Gottfredson & Gottfredson, 1994). To attend for current deficits in policy and legislation, an examination of individuals within a subculture that utilizes firearms for criminal purposes will be made in order to expand knowledge concerning the etiology of firearm offending. By doing so, policies and legislation may be enhanced and redeveloped to reduce not only crimes involving firearms but overall crime as well.

Theoretical Background

Social learning theory is commonly used in the discussion of cultural and subcultural phenomenon such as substance abuse or dependence (Akers et al., 1979), gang involvement (Cloward & Ohlin, 1963), and violent behavior in general (Anderson, 1998; Wolfgang & Ferracuti, 1967). More importantly, propositions of social learning theory have been applied to the discussion of legal and illegal firearm subcultures through the examination of individual level socialization experiences (Cao, Cullen, & Link, 1997; Jacobs, 2002; Kleck, 1991; Kleck, 1997; Sheley & Wright, 1995; Wright & Rossi, 1994; Wright, Rossi, & Daly, 1983). The theoretical perspective contends that

both deviant and conformist behaviors are consequences of socially processed learning experiences. In certain social environments, there are ideologies, norms, and behaviors transmitted through interpersonal interactions that may differentially associate individuals or groups into deviant behavior (Sutherland, 1939). The learning of deviant behavior through differential association rests on the assumption that primary or intimate groups expose or socialize an individual to ideologies, norms, and behaviors favorable to law violating behaviors in excess of definitions unfavorable to crime (Akers, 1985). Since not every individual will have a simple dichotomy of non-criminal or criminal associations, but rather variant levels of association between the two, criminal behavior is most likely to occur when individuals are “exposed first, more frequently, for a longer period of time, and with more intensity to law violating definitions than to law abiding definitions” (Akers & Sellers, 2004, p. 83).

The most influential associations are the ones an individual comes into contact with first and most often – family and peers (Akers et al., 1979). Both of these agents of socialization provide sources of reinforcement and imitation that foster the development and maintenance of ideologies and norms and also work to inhibit or increase future instances of behavior. Learning processes are not limited to interpersonal contact but may also occur through social institutions, such as schools or churches, and from the environment as a whole (Vold, Bernard, & Snipes, 2002). Specifically, Sutherland (1939) has presumed that residents of socially disorganized neighborhoods are more at risk for association with other individuals who encourage criminal behavior relative to residents from organized areas who have access to established forms of social control. With an assortment of learning mechanisms available within one’s environment, an

underlying assumption of social learning theory is the dynamic nature of learning.

Deviant behavior may be learned at different ages, at different frequencies for variant periods of time, through an assortment of social and non-social interactions (Thornberry, 1987; Warr, 1993).

Developmental or life-course theories have attempted to explain individual onset, continuity, and change in behavior and is considered to be an extension of socialization based theories such as social learning (Elder, 1994). Commonly, the theoretical perspective is used to identify individual level specialization or versatility in offending behavior through the use of onset age (Blumstein et al., 1986; Blumstein, Cohen, & Farrington, 1988; Dean, Brame, & Piquero, 1996; Loeber & Le Blanc, 1990; Loeber et al., 1991; Nagin & Farrington, 1992; Piquero et al., 1999). Individuals who have begun to manifest criminal behavior prior to or during adolescence are more likely to be involved in continued criminality later in life relative to those who have started their criminal activities during their early adulthood (Moffitt, 1993). While there may be a difference between early and late onset in future offending, research suggests that individualized offending patterns appear to be more continuous or specialized than variable (Dean, Brame, & Piquero, 1996; Piquero et al, 1999). In an attempt to explain individualized criminal careers, the focus is placed on the variable of age and the extent to which criminal behavior is characteristically static or dynamic with increases in age.

Hirschi and Gottfredson (1983) suggest that the age distribution of criminal offending does not vary longitudinally across the life course. Instead, there are specific categorical groupings of ages, typically mid to late teens, which consistently have high rates of criminal behavior across offense types relative to any other age group. Once

individuals have progressed beyond age specific criminality peaks, an aging-out effect occurs reducing the frequency and rate of offending. Based on this notion, research attempts describing age of first onset, desistance, and criminal careers are futile since the age distribution of crime is relatively stable across sex, race, type of crime, space, and time. What is important under this perspective, however, is the age of the offender since age will enable one to predict whether or not criminal behavior is manifest before, during, or after the peak offending period.

Sampson and Laub (1992) concede that there is a disproportionate amount of criminal behavior within certain age groups that generally declines with age. However, the authors suggest that criminal behavior is transitory and may continue or discontinue dependent upon age progression and significant life events. Expressed in their age-graded theory of informal social control, Laub and Sampson (1993) suggest that informal bonds, such as family and school, may explain a portion of childhood and adolescent onset of delinquency. In turn, long-term delinquent behavioral patterns and continuity of offense type may progress or desist through adulthood depending upon life events and the quality or strength of social ties that an individual has. That is, individual pathways “can change through interaction with key social institutions as they age” (Sampson & Laub, 1992, p. 81). Therefore, Sampson and Laub’s (1992; Laub & Sampson, 1993) perspective contends that the age of first onset, desistance, and criminal careers is necessary since long-term delinquent behavioral patterns are first developed during childhood and may be reinforced or modified during the transition to adulthood. In this regard, age enables one to examine the ability of social mechanisms to modify onset behavioral discourse that may be criminal or conventional in nature.

Purpose of Study

The purpose of this research is to model theoretical propositions of social learning theory with developmental or life course theory in order to examine socialization pathways into a subculture that utilizes firearms for criminal purposes. Specific interest is placed upon the individual and combined influence of peers, family, and the environment on subsequent firearm utilization in offending. Age of onset for delinquent and firearm possession behavior will also be included in order to examine the influence of subcultural socialization variables in combination with developmental variables on firearm offending patterns. Policy recommendations will be developed based on data analyses.

CHAPTER II: REVIEW OF LITERATURE

In order to explore a subset of the larger firearm subculture that utilizes firearms for criminal purposes, it is important to first grasp the meaning of the term subculture. At face value, a subculture could be easily defined as a culture within a culture. As defined, the term appears to be overly broad and ambiguous, which in turn may lead to difficulty in operationalization and empirical study. Despite these difficulties, indirect and direct attempts to study subcultural behavior continue to persist throughout criminological literature (Akers, 1985; Cao, Adams, & Jensen, 1997; Hagan et al., 1998).

Wolfgang and Ferracuti (1967) have provided a detailed conceptualization of subculture through seven propositions in their subculture of violence thesis. First, and closely related to the dictionary definition of the term, the authors suggest that normative ideologies and values are not homogeneously spread throughout society or amongst all subcultures. Instead, “some priority allocation is made, that the subcultural variants may partially accept, sometimes deny, and even construct antitheses of, elements of the central, wider, or dominant values, yet remain within that cultural system” (p. 99).

Considering the diversity of American society, it is not unreasonable to assume that there are a large number of ideologies, norms, and values that may be interrelated or mutually exclusive and categorized as subcultural. For that manner, individuals may actively or inadvertently participate in a number of different subcultures based upon the context of their normative ideologies, values, and behavior (Fisher, 1995). However, participation within multiple subcultures is assumed to have some degree of continuity. As argued by the authors, subcultural participation “must be complementary or supplementary; otherwise individual personality might become unintegrated or disintegrated” (p. 104).

Second, individuals or groups who share subcultural ideologies, norms, and values may variably manifest subcultural behavior across a number of environmental and interpersonal interactions. Closely aligned with the second proposition, the third proposition contends that the frequency and type of environmental and interpersonal situations in which the subcultural behavior is manifested may be quantitatively measured at the individual level. In turn, the measurement provides an indication of “the extent to which [one] has assimilated the values associated with the subculture” (p. 159). At face value, the measurement of subcultural behavior appears to be rather simple – a measure of situational interactions consisting of ideologies, norms, values, and behavior. However, in order to gauge the extent of differentiation from the dominant culture, the ideologies, norms, values, and behavior of the dominant culture must be measured and compared to the subculture. This implies that subcultures deemed inappropriate by the dominant culture will be easier to identify and empirically study than those subcultures that are tolerated by the dominant culture.

Fourth, the authors propose that subcultural ideologies and values are “most prominent in a limited age group, ranging from late adolescence to middle age” (p. 159). The inclusion of this proposition is aligned with research acknowledging the concentrated age distribution of crime within a categorical subgroup of ages relative to all other ages (Hirschi & Gottfredson, 1983; Laub & Sampson, 1993). Instead of simply extending an age explanation of criminal behavior to an age explanation of involvement in a subculture, the authors suggest that the subset of ages disproportionately involved in a subculture may have deficits in appropriate problem-solving mechanisms and resort to learned subcultural behaviors. Extending onset propositions from developmental theory,

individuals who have been exposed to and manifest behavior derived from subcultural ideologies, norms, and values at an early age are more likely to continue subcultural involvement and behavior as time progresses. Moreover, there is also an increased potential that the subcultural behavior may become specialized and increase in severity with earlier ages of onset (Moffitt, 1993).

Fifth, ideologies and values that run counter to the subculture could lead to individual removal from the group. An underlying assumption of this proposition is based upon the notion that individuals generally participate within subcultures that are characteristically conformist, cohesive, and interactive in ideologies, norms, values, and the behavioral expression of learned ideologies, norms, and values. Subcultures absent or with lesser degrees of these characteristics may not have the ability to remove individuals with contradictory or conflicting ideologies, norms, and values since knowledge of the complete ideologies, norms, and values for each individual within the subculture may not be known. As suggested by the first proposition, the term subculture includes a wide degree of variability in the ideologies, norms, and values that can form or be considered a subculture. Moreover, the fifth proposition suggests that a single subculture can have considerable within group variability in ideologies, norms, and values of its members.

Sixth, the development of subcultural ideologies, norms, values, and behaviors are generally learned and conditioned. The authors utilize social learning theory and suggest that it is the context of an individual's complete social environment that provides the transmission and reinforcement of subcultural ideologies, norms, and values, which in turn produces subsequent subcultural behavior. Parental relationships and imitation during childhood, peer relationships, age, social status, and spatial or residential location

are all considered to be influential actors within the social environment and may be responsible for the socialization and creation of subcultural normative ideologies, values, and behaviors. Moreover, the authors contend that social learning theory explains a portion of the between and within group variability in ideologies, norms, and values found amongst subcultures. As such, socialization through social learning processes is the key to understanding individual involvement in a subculture and the degree to which normative ideologies and values are tightly or loosely held.

Finally, the authors posit that criminal behavior of individuals or groups within one subculture is generally legitimized since the criminal act is directed at an individual or group that shares common subcultural ideologies, norms, and values. The final proposition appears to deviate from prior statements intending to conceptualize subcultures and more specifically a subculture of violence. Rather than integrating earlier propositions into a concluding operationalization of the term, the authors advance homicide analyses upon which the formulation of a subculture of violence thesis was based. Specifically, the authors suggest that those individuals with criminal records are both the victims and perpetrators of homicide. Based on this notion, the authors assert that criminal subculture ideologies, norms, and values become engrained to such a degree that criminal behavioral can become a part of the individual's or group's lifestyle, which in turn leads to interaction with individuals similarly situated within a criminal subculture. As such, commonalities in normative ideologies and values between distinct subcultures can lead to interactions with individuals who are involved in specified behaviors.

Wolfgang and Ferracuti (1967) do not attempt to determine the empirical validity of their subculture of violence propositions beyond the notation that there is “a potent theme of violence current in the cluster of values that make up the lifestyle, the socialization process, the interpersonal relationships of individuals living in similar conditions” (p. 140). Other than a small discussion of trends for the crime correlates of sex, age, race, social class, and the ability of the correlates to alter violent subcultures, there is little application and more speculation of the empirical results the thesis may find. Moreover, the authors suggest that empirical evidence for the thesis is missing or tautological and may not include many manifestations of criminal behavior.

What the thesis does provide, however, is an invaluable heuristic that has integrated psychological and sociological concepts for the meaning and empirical examination of a single subculture or groups of subcultures. The overarching theme suggests that any study of subculture will be filled with complexities – subcultures are not that different from the dominant culture, there may be a variety of ideologies, norms, and values within a single subculture, and subcultural behavior may be dependent upon the situation. At the same time, the thesis highlights the importance of applying an integrated theoretical approach to the examination of subcultural ideologies, norms, values, and behaviors with social learning theory as a viable starting point.

Identification of Individuals Within a Firearm Subculture

Research examining the empirical validity of Wolfgang and Ferracuti’s (1967) subculture of violence thesis has generated a common discourse for the study of individual or group involvement in any type of subculture. Commonly, the focal concern is the identification of demographical and structural characteristics that may be

responsible for the socialization of cultural or subcultural normative ideologies and values. Characteristics used to test the subculture of violence thesis have included race (Messner, 1983), socioeconomic status (Heimer, 1997), institutional environment (Felson et al., 1994), rural versus urban categories of residence (Fisher, 1995), and Southern regional residencies (Ellison, 1991; Hawley & Messner, 1989; Loftin & Hill, 1974; Messner, 1983). The focus is not directly placed on the context of the normative ideologies and values held by the subculture, but rather on the social characteristics and structures that are assumed to have provided both social and nonsocial sources of learning, reinforcement, and imitation that foster subcultural behavior (Akers, 1985).

Following the discourse, descriptions of individuals or groups of individuals within a firearm subculture have generally been construed through demographic and structural variables measuring ownership and use (Dixon & Lizotte, 1987; Wright, Rossi, & Daly, 1983). Wright and Marston (1975) found average firearm owners, both of any firearm in general and handguns specifically, to be predominantly white Protestants of middle to upper middle class status from the rural South through the use of National Opinion Research Center's General Social Survey data. The average owner also owned longer firearms, as 60% of the respondents owned a rifle, nearly 60% owned a shotgun, and approximately 42% owned a handgun.

Extrapolating from the demographic and structural correlates, Wright and Marston (1975) inferred that ownership in the South and rural areas should be expected given the land opportunities for firearm recreation and sport. Moreover, the researchers infer that the positive relationship between socioeconomic status and the likelihood of firearm ownership is associated with monies needed to purchase firearms in order to

participate in recreational and sporting activities. Data were also limited to an examination of respondents from urban areas under the “land opportunist” assumption that urban firearm ownership cannot be used for recreation or sport, but rather some other motive such as self-protection. Again however, average urban owners of any type of firearm and handguns specifically were white Protestants of the upper middle class.

The Wright and Marston (1975) study provided the foundation for future examinations of firearm subculture through the identification of specific social and structural characteristics thought to disproportionately produce individual firearm ownership through learned normative ideologies and values that accept firearm possession and use. In replication with multivariate techniques, Kleck (1997) has found similar characteristics of owners, consisting of married middle-aged whites earning a relatively high income and residing in a rural area. Again, the average owner was more likely to own rifles and shotguns rather than handguns. Additionally, Kleck (1997) found firearm ownership levels to be the lowest among single young black and Hispanics of lower income residing in urban areas. Kohn’s (2004) ethnographic research of firearm enthusiasts in the San Francisco Bay area found firearm owners and users to be of middle to upper class status who use their firearms primarily for recreation or sport.

Yet, the characterization of an average firearm owner versus the average non-owner is not as simplified as the data suggests. Wright and Marston (1975) implied through categorical comparisons between individual ownership in rural versus urban areas as well as ownership of any type of firearm versus ownership of only own handguns that individuals within these categories may own firearms and thereby become involved in the firearm subculture for a variety of reasons. Beyond the simple

identification of persons through bivariate and ethnographic techniques, socio-demographical information reveals little concerning how an individual from a specific social and structural characteristic is socialized into a firearm subculture or recursively, how the firearm subculture captures individuals from narrowly defined social and structural characteristics.

Marks and Stokes (1976) have been credited as providing one of the first attempts at the examination of socialization into a firearm subculture through the use of a non-probability sample of university students dichotomized as being from Southern and non-Southern states (Wright, Rossi, & Daly, 1983). Overall, the sample had a distinguished familiarity with firearms. Nearly 69% of the sample had fired a firearm at some time in their life with approximately 59% firing a firearm prior to their thirteenth birthday. Male family members, overwhelmingly fathers, introduced most respondents to firearms and guided their first firing activity.

To account for regional differential socialization effects (Dixon & Lizotte, 1987), respondents from Southern versus non-Southern residences were compared. Based upon bivariate analyses, Southern males were more likely to have ever fired a firearm and fired a firearm for the first time at an earlier age relative to non-Southerners. Additionally, both Southern males and females were more likely to have been brought up in a household with a firearm or firearms present.

Consistent with the propositions of social learning theory, the family provides the initial and continued sources of conditioning, reinforcement, and imitation that lead to the formulation of normative ideologies, values, and behavior regarding firearm use (Akers, 1985; Akers & Sellers, 2004; Jensen, 1972; Loeber & Stouthamer-Loeber, 1986). Based

upon the transmission of firearm normative ideologies, values, and behavior, the family and the household in which an individual was raised becomes an important agent of socialization not only in the prediction of subsequent firearm ownership but also for the onset age in which an individual has handled a firearm for the first time (Caetano, 1979; Diener & Kerber, 1979; Kleck, 1997; O'Connor & Lizotte, 1978).

The Dichotomy of Sport Versus Protective Ownership

Lizotte and Bordua (1980; Lizotte, Bordua, & White, 1981) have expanded the knowledge of socialization pathways through the recognition that firearms may be owned for sporting, protection, and criminal purposes. That is, the larger firearm subculture encompasses subsets of individuals who have been socialized into sporting, protective, or criminal subcultures, with each respective category of ownership having their own socialized and learned normative ideologies, values, and behaviors regarding use. Congruent with the subculture of violence thesis (Wolfgang & Ferracuti, 1967), the researchers posit three constructs that provide evidence of an existence of a sporting, protective, or criminal subculture. First, normative ideologies, values, and behaviors will be observed and should, to a variable extent, be different from the dominant society. Second, there must be a mechanism of generational transmission that socializes an individual into normative ideologies, values, and behavior of the subculture. Finally, group membership within the subculture should be identifiable based upon contact and association with similarly situated persons.

Overall, the research provided strong evidence for the existence of a sporting subculture and partial evidence for the existence of a protective ownership subculture. The existence of a criminal subculture utilizing firearms to further criminal behavior

could not be made since the sample represented 764 telephone interviews with heads of households that are assumed to be lawful owners. A key aspect that explained a portion of the differential socialization pathways into general firearm ownership is the effect of cultural and environmental socialization. Cultural socialization processes encompass learned normative ideologies and values that are exchanged within a distinct social group (Kleck, 1991; Luckenbill & Doyle, 1989). Firearm ownership in this regard, is considered to be a product of differential association among specific individuals or groups that generally accept firearm ownership and use behaviors in excess of alternative ideologies, norms, and values that condone firearm ownership and use (Cao, Cullen, & Link, 1997). Environmental socialization processes, on the other hand, are related to the actual and perceived levels of criminality as well as the extent of inequality found within a measure of residence generally operationalized at the neighborhood level (Kleck, 1991; Luckenbill & Doyle, 1989). Ownership in this regard is considered a reactionary product of self-preservation needs in an apparent hostile environment. While there appears to be two separate and easily categorized socialization mechanisms available, the difference between cultural and environmental socialization processes is not clear-cut and may, in fact, be interrelated. Both processes are grounded upon distinct social groups with cultural processes examining the effect of small intact groups and environmental processes examining the effect of the larger spatial area. Further, both processes provide continued sources of individual learning and behavior adaptation through normative ideology and value transmission, reinforcement, modification, modeling, and imitation.

Familial socialization was found to be an important predictor of firearm ownership for sport. Parental ownership and household residency within presumably

rural counties, as measured by counties with large concentrations of hunting licenses, were correlated with younger ages of firearm ownership. In combination, parental ownership, rural residence, and the youthfulness of first firearm ownership were key variables in the path model prediction of sporting ownership. Based upon these findings, the researchers find support for their hypothesis that parents who own firearms for hunting or recreational purposes socialize their children into the acceptable, and socially approved, sporting use of firearms at an early age, which developmentally influences sporting ownership later in life.

Comparatively, environmental socialization was found to be an important predictor of ownership for protective purposes. The rate of violent crime within the respondent's county as well as the respondent's perception of crime within the county, their fear of crime, and their victimization experiences were moderate predictors of protective ownership. Moreover, the level of perceived and actual crime found within the respondent's environment was correlated with urban rather than rural populations. Based on these findings, protective ownership is a function or a reaction to the presence or perceived presence of crime with urban environments explaining a large portion of the link between crime and protective ownership. Yet, the researchers did not completely rule out the effect of cultural socialization on firearm ownership for protection. Familial socialization, in terms of parental ownership for sport, enhanced the predictive power of the protection model. Thus, parental ownership of a firearm has the ability to produce both sport and protective firearm owners.

The protective path model included an additional measure of socialization that was not included in the sporting model in the form of peer association. Peer ownership

for protective purposes was found to be a strong predictor of subsequent firearm ownership for protection. Based upon the strength of the correlation between peers and protective firearm ownership, peer association is hypothesized as being the key agent of socialization that modifies ownership for sport into ownership for protection. That is, familial socialization forms the foundation for subsequent firearm ownership, which can then be altered into sporting or protective ownership based upon the socialization processes within an individual's peer group. Although a measure of peer association was not included in the sporting model, it is not unreasonable to assume under the propositions of social learning theory and the subculture of violence thesis that association with peers within a sporting subculture may validly predict sporting ownership. Unfortunately, there appears to be a dearth of information regarding sporting subculture socialization beyond familial influence and rural residence correlates.

Research continues to expand Lizotte and Bordura's (1980; Lizotte, Bordura, & White, 1981) socialization dichotomy of firearm ownership for either sport or protection, which national surveys have consistently shown to be the primary and secondary motives for ownership (Kleck, 1991; Kleck, 1997; Wright, Rossi, & Daly, 1983). A number of characteristics have been used to differentiate between the two types of ownership. Firearm ownership for sport is considered to be more legitimate and behaviorally of lower risk to self and society relative to protective firearm ownership (Lizotte & Bordura, 1980; Lizotte et al, 1994). Generally, firearm ownership for sport is considered a throwback to American frontier traditions of the self-sufficient and adept firearm owner who utilizes firearms for hunting and enhancing hunting skills through recreational activities (Kennett & Anderson, 1975; Kohn, 2004). The type of firearms owned

contributes to the hunting utility of the sporting subculture. Rifles and shotguns are the predominant type of firearm owned with the frequency of carrying such weapons paralleling state aggregates of seasonal hunting days (Bjerregaard & Lizotte, 1995; Kleck, 1991; Kleck, 1997; Lizotte et al., 1994).

Comparatively, ownership for protection is often considered to be reflective of high-risk behaviors due to its theorized and implicit association with criminal activity (Lizotte & Bordua, 1980; Lizotte, Bordua, & White, 1981). Wright and Rossi (1994) have argued that firearm ownership for protection, in addition to any other self-preservation motives, includes “protection in the context of the commissions of crimes” (p. 139). For instance, Sheley and Wright (1995) found readiness to defend oneself, the potential that the victim would be armed, and the ability of a firearm to ease escape from a criminal encounter to be the most important reasons for possessing a firearm during the commission of a crime. Thus, in a rationalistic sense, protective ownership is thought to encompass a subset of criminal offenders that utilize firearms in order to protect themselves from a resistant, and sometimes armed victim, in addition to citizens who legitimately own firearms for the sole purpose of self and family preservation.

Protective firearm ownership has been strongly correlated with individual participation in drug markets and gangs (Bjerregaard & Lizotte, 1995; Lizotte et al., 2000; Lizotte et al., 1994). Research examining individual involvement in drug markets, whether for purchase and subsequent use or for sales, have suggested that firearms are threatened, shown, or used in the criminal obtainment of monies or capital to support habits, to settle disputes between purchasers and dealers, and to diffuse the potential for a violent encounter between the purchaser and dealer during a drug transaction (Blumstein,

1995; Fagan & Wilkinson, 1998). As a source of informally regulated revenue, gangs have become prominent in the drug market and utilize firearms to advance entrepreneurial business interests (Fagan & Wilkinson, 1998; Howell & Decker, 1999; Spergel, 1990). In addition to participation in a drug market economy, gang members threaten, show, or utilize firearms to manifest identity in a specific gang or sect of a larger gang, to defend territory, to participate in criminal behaviors, and for interactions with other members of the same gang or members of rival gangs (Spergel, 1990).

While the nexus between drug market participation, gang membership, and protective firearm ownership or use is expected, research suggests that the agents of socialization may provide differential effects across ages. Overall, individual involvement in drug sales has been identified as the strongest predictor of subsequent firearm ownership for protection controlling for variables capturing frequencies of drug use and purchase as well as gang membership (Bjerregaard & Lizotte, 1995; Lizotte et al., 2000; Lizotte et al., 1994). When analyses have examined the time-order sequence between drug market and gang participation, Lizotte et al. (2000) found gang involvement to be the most influential predictor of firearm carrying for protection for 14 to 16 year olds. Drug dealing and association with peers who own firearms for protective purposes were found to be the most influential predictor for 17 to 20 year olds. Thus, individual involvement in drug sales may provide the strongest predictor of protective firearm ownership, possession, and use, but gang participation provides an early socialization exposure to firearms in the context of ownership, possession, or use.

Firearm Utilization for Criminal Purposes

While firearm ownership for protective purposes has been associated with criminal behaviors, most of the data available for the examination of the criminal use of firearms is derived from surveys of arrestees and felons measuring ownership and utilization. Kleck (1991) has suggested that arrestee data provides a glimpse into lower level or first time offending, while felon data highlights serious and relatively active offending patterns. Purposive sampling of arrestees and inmates captures not only generalized criminal activity, but also criminal behavior involving firearms.

The pervasiveness of firearm ownership and use among arrestees is so widespread that it has led some researchers to conclude that the “possession and use of guns is not only common, but also tolerated and accepted as the norm” (Decker, Pennell, & Caldwell, 1997, p. 1). In order to understand the normative ideology of firearm possession and use among the arrestees, it is important to consider the arrestees’ participation in high-risk behaviors in high-risk environments. Many of the arrestees interviewed by Decker, Pennell, and Caldwell (1997) as well as Treatment Alternatives for Safe Communities (1997) staff indicated gang and drug sale involvement, which was correlated with an increased likelihood for frequent firearm carrying and utilization in crime. Many of the arrestees valued the respect and the ability to retaliate that only a firearm could provide them, which may be explained by the finding that arrestees were often found to be both the victims and perpetrators of firearm offenses (Decker, Pennell, & Caldwell, 1997). Not surprisingly, most of the arrestees own or possess a firearm for protection or self-defense, with a handgun as the firearm of choice.

Additionally, many arrestees perceived the need to carry their firearm routinely in order to protect themselves within their own neighborhoods. Arrestee interviews

conducted within the city of Chicago (Treatment Alternatives for Safe Communities, 1997) found 70% of arrestee firearm owners agreed that there were a large number of firearms available within their neighborhood and 40% agreed that it is important to have a firearm for protection within their neighborhood. In combination with the high-risk behaviors of involvement in gang membership and drug sales, arrestees appear to consider firearm ownership and possession a necessity “as much to protect themselves against the uncertainties of an unfriendly environment as to prey upon the larger population” (Wright & Rossi, 1994, p. 15).

Wright and Rossi (1994) have provided one of the most comprehensive examinations into the link between firearm ownership and criminal behavior through their non-probability survey of 1,874 felons in 10 states. Similar to arrestee information, felons’ ownership and use of firearms during crimes is just as pervasive. Nearly 75% of the sample had owned some type of a firearm, with more than 85% of the owners owning handguns. A majority of the respondents carried a firearm all of the time or during perceived instances in which a firearm may be necessary. In terms of involvement in firearm offending, approximately half of the sample had indicated that they had committed at least one crime with a firearm.

Given the carrying prevalence and levels of involvement in firearm offending amongst the sample, the authors developed four categorical typologies of firearm offenders based upon criminal history record information for comparison purposes. The “one-time firearm user” consisted of felons who have used any type of firearm in the commission of a single criminal act. The “sporadic handgun user” used only handguns in the commission of relatively few criminal acts. The “handgun predator” used only

handguns in the commission of nearly every criminal act that they had been involved in. Finally, the “shotgun predator” only utilized shotguns or rifles for more than one criminal act.

Across the typologies, the primary offense leading to current incarceration was robbery. Homicides and aggravated assaults followed as secondary and tertiary crimes for the one-time firearm user, while burglary and aggravated assault or weapons offenses were the secondary and tertiary crimes for the sporadic handgun user, handgun predator, and shotgun predator. Based on these findings, it is apparent that institutionalized firearm offenders specialize in robbery offenses and also have a tendency to commit homicides, aggravated assaults, and burglaries.

Wright and Rossi (1994) also captured information concerning firearm socialization. In general the family was credited as providing the initial introduction to firearms for the sample, with approximately half of the sample indicating that their father had provided their first shooting experience. On average, the first firing experience occurred at the age of 13, with subsequent ownership of their first shotgun or rifle at 15 and handgun at age 18. Additionally, many of the respondents had family members who had received intervention by the criminal justice system. Unfortunately, statistics were only presented at the univariate level without any bivariate or multivariate analyses linking parent or sibling criminality to future firearm ownership or utilization in the commission of criminal acts. Nonetheless, approximately 25% of the sample had a father who had been arrested at some point in time, with 18% having a father who had served a jail or prison sentence. Additionally, over half of the sample had a sibling that had been

arrested, with 40% of the sample having a sibling who had served jail or prison sentences.

While the family provided the initial introduction into a firearm subculture for the felons, peers were found to have provided the socialization link between legitimate ownership and the criminal utilization of a firearm. Nearly 90% of the sample had associated with peers who owned or possessed a firearm. Association with these same peers was moderately correlated with younger ages of first firearm crime and handgun obtainment, increased numbers of firearms owned, and the likelihood of a firearm being involved in the conviction offense and the frequency of firearm carrying.

Sheley and Wright (1995) provided a partial replication of Wright and Rossi's (1994) study using survey data from a non-probability sample of juveniles from inner-city high schools and correctional institutions in four states. Of interest in this discussion is the extent of firearm involvement in crime for the sample of 835 institutionalized juveniles. Family, peers, and the environment as a whole were again found to be important agents of socialization. Nearly 80% of the sample grew up in a household with male family members owning firearms, 90% of the sample was associated with peers who owned firearms and possessed them on person frequently, and over 80% of the sample indicated that they had been threatened or shot at with a firearm at some point in their life.

The socialization nexus of gang membership, drug use and sales, firearm ownership and use was also apparent for the sample. Approximately 60% of the sample indicated affiliation with a gang. Forty percent of the sample indicated an experience with cocaine use, 30% indicated crack use, and 20% indicated a use of heroin. While the

minority of the sample was involved in drug use, over 70% was involved in drug sales. Nearly 90% of the sample had owned a firearm at some point in time, with handguns being the most commonly owned firearm. Almost all of the respondents who indicated ownership carried their firearm occasionally and a majority of the sample had used a firearm for a criminal act, with 70% of the criminal actions occurring, on average, prior to the respondent's sixteenth birthday.

Research Question

Consistent with Wolfgang and Ferracuti's (1967) subculture of violence thesis, legitimate firearm subcultures for sport do not appear to be that much different from subcultures that utilize firearms for criminal purposes in terms of the initial exposure to firearms. The family provides the initial firearm socialization process at an early age through the presence of a firearm within the household or by the process of parents firing firearms with their children. Yet, there are empirical differences between the two groups. Individuals within the firearm subculture of sport are more likely to reside in rural areas and own and use longer guns such as rifles and shotguns. Urban residence and utilization of handguns are characteristics commonly identified with subcultures that utilize firearms for criminal purposes. A number of measures have been identified in the literature that may explain differential socialization processes into a subculture that utilizes firearms for criminal purposes beyond the initial familial socialization. Peer association, gang membership, drug use or sales, and the context of one's environment are correlated with individualized use of firearms in crime and younger ages of firearm ownership, possession, and use for arrestees and incarcerated individuals. As such, there is a need to examine the effect of cultural and environmental socialization measures on individuals

who specialize their offending patterns, not in terms of specific crimes, but through their utilization of firearms during criminal activities.

CHAPTER III: DATA AND METHODS

The data used for this research were initially collected for a 1996 study examining the prevalence and incidence of youthful firearm ownership, possession, and use for a random sample of incarcerated male offenders between the ages of 17 to 25 within the state of Michigan. In terms of the sampling technique for the original study, 3 out of 26 state managed correctional facilities were first selected based upon their inmate populations and security levels. Of the three facilities selected for data collection, Institution One was an initial processing center for male offenders under the age of 25 and housed inmates across all security levels. Institution Two was classified as a medium security facility housing male inmates over the age of 17. The third and final institution housed male inmates over the age of 14 and was classified as a medium security facility.

Inmates were selected from the three correctional institutions based upon the criteria of age (inmates between the ages of 17 to 25) and commitment date (inmates committed to the institution within the past seventeen months). A simple random sample was selected from a Department of Corrections management information system list of inmates who matched age and prison commitment criterion. In turn, the inmate list of offenders selected through the simple random sample formed the pool of potential participants to be included in the study.

In terms of the research design, surveys were administered to small groups of 10 to 15 inmates. Two research assistants were present to monitor and administer the survey. At the beginning of each session, inmates were informed that their participation was voluntary and their identity would be kept anonymous. Respondents were not asked to provide their name, prison identification number, or any other information that could

allow for future identification. Furthermore, the respondents were not given any incentive for their participation beyond their participation and break from the routine.

In the administration of the survey, each question and potential response were read aloud in order to maximize inmate comprehension. The results of the individual surveys were only available to members of the research team, as individualized survey results were aggregated for reporting purposes. Further, none of the individual responses were or could be singled out for reporting purposes as unique and personal identifiers are not available.

The final data set contains self-report survey information from a total of 501 respondents reflecting an assortment of variables concerning offender demographics, familial characteristics, employment history, firearm use and acquisition patterns, attitudes and perceptions of firearm use and violence, drug use history, as well as the nature and level of involvement with crime and peers⁴. Supplemental current offense, criminal history, and drug and alcohol use and treatment history information for the respondents were captured from the respondent's pre-sentence investigation report and included within the data set⁵. As such, the data provides a wealth of information concerning the acquisition, possession, and use of firearms amongst a sample of relatively serious youthful offenders incarcerated during or relatively soon after their theorized peak offending period (Hirschi & Gottfredson, 1983; Laub & Sampson, 1993).

Dependent Variable

⁴ The response rate for the initial 1996 study was 57%, with 929 inmates selected for participation based upon the criteria of age and commitment date and 404 of the inmates refusing participation (Huebner, Bynum, & Hinduja, 2001). With 24 incomplete surveys, the final analyses were reduced to 501.

⁵ Michigan Compiled Law 771.14 states that a pre-sentence investigation report be prepared for the sentencing judge in every case in which a person is charged with and convicted of a felony.

As mentioned previously, the objective of this research was to determine the effects of socialization and developmental variables on levels of involvement in firearm offending. In order to capture data regarding individual involvement in firearm offending, a typology of firearm offending behavior was adapted from Wright and Rossi (1994). The operationalization of the typology is based upon whether or not the respondent had committed any crimes involving a firearm as well as the frequency in which the respondent carried a firearm prior to incarceration. The four measures used to develop the dependent variable include:

- (a.) "Did you ever use a gun to commit a crime?"
- (b.) "Have you ever committed any other crime using a gun?"
- (c.) "Was the offender in possession of a weapon at the time of the offense?"
- (d.) "While on the street, how often did you carry a gun?"

The first two measures are based upon self-report survey responses and include a dichotomous response set of "yes" or "no" describing prior firearm involvement in crime. The third measure is used to verify self-report survey responses through the use of pre-sentence investigation report information. In the circumstance in which a respondent provides a "no" response for questions of "ever use a gun to commit a crime" and "ever committed any other crime with a gun," pre-sentence investigation report indications of firearm involvement will serve the purpose of overriding a "no" response to a "yes" response. The final measure is used to capture the respondent's frequency of firearm carrying based upon self-report survey information and includes a discrete response set consisting of six categories: "never," "couple of times a year," "once a month," "couple of times a month," "once a week," and "every day."

Table 1 provides the coding strategy used to formulate a rank ordered dependent variable typology consisting of three levels ranging from low (e.g., “no involvement in firearm offending”) to high (e.g., “serious involvement in firearm offending”) degrees of firearm offending seriousness. In general, the coding strategy is contingent upon the frequency of firearm carrying, which is based upon research suggesting that the distinguishing feature between individuals who use firearms to commit crimes and those who do not is the frequency of firearm carrying (Wright & Rossi, 1994). For example, if a respondent provides a “no” or missing response for the variable of prior utilization of a firearm for a crime, but does provide an indication of firearm carrying behavior, then the subsequent coding is one of moderate involvement.

Table 1: Coding Strategy for the Levels of Involvement in Firearm Offending

In Crime	<u>Firearm Carrying Frequency†</u>						Missing
	Never	Couple Times a Year	Once a Month	Couple Times a Month	Once a Week	Every Day	
Yes	MI	MI	MI	MI	SI	SI	MI
No	NI	MI	MI	MI	MI	MI	NI
Missing	NI	MI	MI	MI	MI	MI	Missing

†Key: NI=No Involvement, MI=Moderate Involvement, SI=Serious Involvement.

Independent Variables

Ten variables were selected from the self-report survey data in order to observe their effect on levels of involvement in firearm offending. Table 2 presents an overview of the independent variables as well as their levels of measurement. Eight of the independent variables were used to observe the effect of socialization on the respondent’s level of involvement in firearm offending. The socialization variables rely upon the theoretical perspective of social learning theory with emphasis on the differential association processes of parents, peers, gangs, drug markets, and the overall

neighborhood environment as a whole. The remaining two independent variables are used to observe the effect of onset behaviors on the level of involvement in firearm offending.

Table 2: Independent Variables Used for Analyses

Independent Variables	Level of Measurement
<u>Socialization/Social Learning Variables</u>	
Parents Own or Possess Firearms	Dichotomous (Yes/No)
Arrested/Incarcerated for Possession/Use	Dichotomous (Yes/No)
Peers Own or Possess Firearms	Dichotomous (Yes/No)
Arrested/Incarcerated for Possession/Use	Dichotomous (Yes/No)
Gang Membership	Dichotomous (Yes/No)
Hard Drug Use Scale	Ordinal Scale (0-5)
Drug Sales Frequency	Ordinal Range (1-6)
Neighborhood Exposure to Violence Scale	Ordinal Scale (0-8)
<u>Onset Variables</u>	
Age of First Firearm Ownership	Continuous
Age of First Arrest for Any Crime	Continuous

Familial socialization consists of a dichotomous measure of parental ownership or possession of firearms and a dichotomous measure of parental arrest or incarceration for firearm possession or use. Similarly, peer socialization consists of a dichotomous measure of peer ownership or possession of firearms and a dichotomous measure of peer arrest or incarceration for firearm possession or use. The inclusion of multiple measures for familial and peer socialization variables will be for comparative purposes, as bivariate and multivariate modeling will attempt to observe the effect of legitimized ownership or possession (i.e., parents and peers own or possess firearms) versus criminalized

possession or use (i.e., parents and peers arrested or incarcerated for firearm possession or use) on the level of involvement in firearm offending.

The remaining socialization variables include gang membership, drug market participation, and environmental violence. Gang membership is a dichotomous measure, which has been validated based upon a secondary response indicating whether or not the gang was organized. Drug market participation consists of separate measures for drug use and sales. A hard drug use scale was gleaned from Sheley and Wright (1995) and measures the respondent's experimentation with heroin, crack, cocaine, PCP, and methamphetamines. The continuum of the scale ranges from no hard drug use (0) to use of every hard drug included in the scale (5). The drug sales frequency measure provides a continuous range of sale activity from "never sold drugs" (0) to sold drugs "almost every day" (6). Finally, environmental violence is measured by a scale of neighborhood exposure to violence consisting of prior neighborhood victimization experiences as well as attitudinal responses to the statements of "in your neighborhood, there are many firearms on the street" and "in your neighborhood, it is important to have a firearm for protection." Along a continuum, the scale ranges from no exposure to violence (0) to maximum exposure (8). More information regarding the creation of hard drug use and neighborhood exposure to violence scales are contained in Appendix A, Tables 13 and 14.

The two developmental or onset variables are continuous measures of self-reported age at first firearm ownership and age at first arrest for any crime. Similar to familial and peer socialization measures discussed previously, the use of two separate measures of onset behavior will be used to compare their effect on the level of

involvement in firearm offending. Four additional variables will be used in order to control for demographic differences. Control variables include respondent's age, race, and population of previous residence⁶. The final control measure includes the respondent's institution from which they were sampled.

Methods

Univariate statistics will be provided for all independent and control variables as well as the dependent variable. Bivariate statistics, through the use of contingency tables, will be provided for each of the independent and control variables in order to assess individual relationships with the dependent variable. Multivariate modeling through the use of ordered logit regression analyses will be used to examine the individual and collaborative relationships of the control variables and selected independent variables on the level of involvement in firearm offending. Two sets of multivariate models will be produced. One set will consist of restricted and full models measuring the effect of socialization variables. The second set of models will consist of restricted and full models measuring the effect of onset variables in addition to socialization variables.

The purpose behind the use of restricted and full modeling is to observe the changes in the overall fit of the model and logit coefficients with the addition of the theoretically relevant socialization variables of gang membership and drug market participation to a baseline model that only contains variables controlling for the effect of demographic characteristics, familial socialization, peer socialization, and environmental socialization. Therefore, the purpose is theoretical in nature by attempting to develop

⁶ Survey respondents were asked to provide the name of the city in which they resided prior to incarceration. Based upon their response, U.S. Census Bureau (2000) population information was captured and used to develop the respondent's population of previous residence.

parsimonious models that include variables empirically used to predict participation in a subculture that utilizes firearms for criminal purposes. Restricted modeling in this manner is different from “reduced” modeling in criminological literature, which attempts to improve the overall fit of a model for the purpose of maximizing the model’s ability to explain the variance in the dependent variable. Reduced modeling first develops a full model including theoretically relevant variables and selects only those variables found to be statistically significant for inclusion in a reduced model. Insignificant variables are removed.

Hypotheses

Six alternative hypotheses are derived from the literature and data available for analyses:

H_{a1}: There is a relationship between family firearm ownership, possession, and use and individual levels of involvement in firearm offending.

H_{a2}: There is a relationship between peer firearm ownership, possession, and use and individual levels of involvement in firearm offending.

H_{a3}: There is a relationship between gang membership and individual levels of involvement in firearm offending.

H_{a4}: There is a relationship between drug market participation, in terms of use and sales, on individual levels of involvement in firearm offending.

H_{a5}: There is a relationship between the levels of violence found within one’s environment and individual levels of involvement in firearm offending.

H_{a6}: There is a relationship between the age of firearm ownership onset and the age of first arrest on individual levels of involvement in firearm offending.

Hypotheses 1 through 4 reflect cultural agents of socialization (Kleck, 1991; Luckenbill & Doyle, 1989) that have been empirically shown to influence legitimate and criminal firearm ownership, possession, and use behaviors. Hypothesis 5 builds upon prior research suggesting that environmental socialization processes (Kleck, 1991; Luckenbill & Doyle, 1989) have an effect on ownership, possession, and use. Finally, hypothesis 6 predicts, under the auspices of developmental or life-course theories, that earlier onsets of ownership or criminal activity may lead to an increased risk of persistent and specialized firearm offending (Dean, Brame, & Piquero, 1996; Moffitt, 1993; Piquero et al, 1999).

CHAPTER IV: RESULTS

Univariate Statistics

Table 3 provides the univariate statistics for the ordinal dependent variable level of involvement in firearm offending consisting of three categories of increasing seriousness. Overall, the majority of the sample has some level of involvement in firearm offending behavior with only 22% lacking involvement. The modal category of serious involvement suggests that the sample captures a large portion of individuals who utilize firearms for criminal purposes and carry their firearm on a regular basis. In fact, the overall distribution of the dependent variable appears to be biased toward the severe end of the continuum.

Due to the self-report nature of the data and potential for respondent non-response, the number or percent of missing cases will be provided throughout the univariate results section. Accordingly, the dependent variable is missing for approximately 2% of the sample.

Table 3: Univariate Statistics for the Levels of Involvement in Firearm Offending (n=501).

Variables	Frequency (n)	Percentage
No Involvement	112	22%
Moderate Involvement	146	29%
Serious Involvement	235	47%
Missing	8	2%

Table 4 provides the univariate statistics for the socialization independent variables used in the analyses.

Table 4: Univariate Statistics for Socialization Independent Variables (n=501).

Variables	Frequency (Percent)	Percent Missing	Mean (s.d.)
Parents Own/Poss.	501	0%	.40 (.49)
Parents Arr./Incarc.	500	<1%	.07 (.25)
Peers Own/Poss.	488	3%	.87 (.34)
Peers Arr./Incarc.	489	2%	.72 (.45)
Gang Membership	472	6%	.30 (.46)
Hard Drug Use*	433	14%	.90 (1.42)
<i>Never Used (0)</i>	267 (62%)		
<i>Mod. User (1-2)</i>	100 (23%)		
<i>Serious User (3-5)</i>	66 (15%)		
Drug Sales Frequency*	480	4%	3.98 (2.17)
<i>Never Sold (1)</i>	133 (28%)		
<i>Few Life/Year (2-3)</i>	55 (11%)		
<i>Few Mo./Week (4-5)</i>	78 (16%)		
<i>Every Day (6)</i>	214 (45%)		
Exposure to Violence*	455	9%	4.65 (2.22)
<i>No Exposure (0)</i>	30 (7%)		
<i>Low Exposure (1-3)</i>	100 (22%)		
<i>Mod. Exposure (4-6)</i>	223 (49%)		
<i>Max. Exposure (7-8)</i>	102 (22%)		

*Hard drug use scale, frequency of drug sales, and neighborhood exposure to violence scale will be utilized as ordinal measures for bivariate and multivariate analyses. The nominal groupings shown here are provided for presentation purposes.

Approximately 40% of the sample had parents who owned or possessed firearms, with the majority of the respondents lacking parents who owned or possessed firearms. Few of the respondents, approximately 7%, had parents who were arrested or incarcerated for firearm possession or use. Most of the respondents were associated with peers who owned or possessed firearms and were associated with peers who had been arrested or incarcerated for firearm possession or use. The final dichotomous

socialization measure indicates that 30% of the respondents identified themselves as gang members. In terms of the overall variability in response for the dichotomous variables, parental ownership or possession of firearms had the most variance in response, as exemplified by the closest approximation to an even split amongst the dichotomous categories, followed by gang membership, association with peers arrested or incarcerated for firearm possession or use, association with peers who own or possess firearms, and parents arrested or incarcerated for firearm possession or use respectively.

For the ordinal socialization independent variables, the hard drug use scale ranges in value from “never used” (0) to “serious hard drug user” (5) and has a mean of .90 and a standard deviation of 1.42. The statistics appear to be concentrated toward the lower end of the scale and suggest that many of the respondents are not partaking in hard drug use or use only one type of substance. Sixty-two percent of the respondents indicated that they had never used heroin, crack, cocaine, PCP, or methamphetamines. Twenty-three percent indicated that they had used one or two hard drugs, while 15% indicated that they had used three or more of the hard drugs. Furthermore, the hard drug use scale appears to have a substantial proportion of missing cases, with approximately 14% of the respondents failing to provide a response.

The second ordinal socialization measure, frequency of drug sales, ranges in value from “never sold” (1) to “sold every day” (6) and has a mean just below 4 with a standard deviation of 2.17. The marginal percentages of the variable indicate that approximately 72% of the sample reported some experience in drug sales with the remaining 28% indicating that they have never sold drugs. Of the respondents indicating experience in drug sales, approximately 45% sold almost every day.

Finally, the neighborhood exposure to violence scale ranges in value from “no exposure to violence” (0) to “maximum exposure to violence” (8) with a mean just below 5 and a standard deviation of 2.22. Very few of the respondents indicated that they had not been exposed to any violence in their neighborhood. Most, in fact, have been exposed to some form of violence within their neighborhood as both the marginal percentages and mean statistic suggest that the respondents are exposed to moderate amounts of violence in their neighborhood. Approximately 9% of the respondents also failed to provide a response for the neighborhood exposure to violence scale, which represents the second highest proportion of missing cases for the socialization independent variables.

Table 5 provides the univariate statistics for the onset independent variables used in the analyses.

Table 5: Univariate Statistics for Onset Independent Variables (n=501).

Variables	n	Percent Missing	Min	Max	Mean (s.d.)
First Firearm	386	23%	5	21	13.83 (2.66)
First Arrest	472	6%	7	23	15.31 (2.71)

The average age of first firearm ownership is nearly 14 years old with a standard deviation of 2.66. The youngest self-reported age in which the respondents first owned a firearm was 5 years of age and the oldest self-reported age was 21. Overall, the standard deviation statistic is quite low in comparison to the mean, which suggests an approximate normal distribution of the variable as the dispersion of ages is relatively centered near the mean. The age of first firearm ownership also contained the highest proportion of missing cases among all the variables included in the analyses. For the second onset

independent variable, the average age of first arrest for any crime is 15 years of age with a standard deviation of 2.71. The youngest self-reported age of first arrest was 7, while the oldest age of first arrest was 21. Similar to the age of first firearm ownership, the age of first arrest for any crime approximates a normal distribution as revealed by the standard deviation statistic.

Univariate statistics for the control variables used in the analyses are presented in Table 6. The average respondent is approximately 20 years of age with a standard deviation of 1.86. Considering that the sample was restricted to respondents between the ages of 17 to 25, the observed average is just below the midpoint of the range. In terms of the average respondent's race or ethnicity, the marginal percentages indicate that 49% of the respondents were black, 38% were white, 7% were Hispanic, and 6% provided an "other" indication of race. The variable capturing the respondent's population of previous residence indicates that the sample includes a blend of individuals from sparsely populated as well as heavily populated areas⁷. The marginal percentage mode was at the low end of the continuum, with 38% of the respondents previously residing in cities with populations less than 50,000 inhabitants, which is followed by 27% of the respondents at the high end of the continuum from populations in excess of 250,000. Interestingly enough, all of the respondents from populations in excess of 250,000 persons indicated residence within the city of Detroit⁸. Finally, the majority of the respondents,

⁷ According to the U.S. Census Bureau (2000), an urban area is generally operationalized as densely settled census blocks with total populations of at least 2,500 for urban clusters, or at least 50,000 for urbanized areas. Alternatively, rural areas are generally considered areas that are not urban. Since census block information could not be captured and differentiations between urban clusters and urbanized areas cannot be made based upon the self-report nature of the survey, there is an assumption that respondents from cities with populations less than 50,000 are presumably more "rural" than those respondents from populations of 50,000 or more.

⁸ U.S. Census Bureau (2000, Summary File 1) information suggests that the city of Detroit (population of 951,270) accounted for approximately 10% of Michigan's total population (9,938,444).

approximately 58%, were sampled from Institution two, which was a medium security facility housing male inmates over the age of 17.

Table 6: Univariate Statistics for Control Variables (n=501).

Variables	Frequency (Percent)	Percent Missing	Mean (s.d.)
Respondent Age	498	<1%	20.43 (1.86)
Respondent Race	477	5%	1.70 (.85)
<i>Black</i>	235 (49%)		
<i>White</i>	179 (38%)		
<i>Hispanic</i>	33 (7%)		
<i>Other</i>	30 (6%)		
R. Pop. of Residence	493	2%	2.34 (1.23)
<50,000	186 (38%)		
50,001-100,000	86 (17%)		
100,001-250,000	89 (18%)		
250,001+	132 (27%)		
Respondent Facility	501	0%	1.65 (.82)
<i>Institution 1</i>	112 (22%)		
<i>Institution 2</i>	288 (58%)		
<i>Institution 3</i>	101 (20%)		

Bivariate Statistics

Chi-square tests of independence are used to examine bivariate relationships between two discrete variables containing dichotomous or multinomial distributions (Agresti, 1989; Agresti, 2002; Bachman & Paternoster, 2004). Specifically, the chi-square test examines the joint occurrence of two discrete variables and the probability that the co-occurrence of the two variables is above and beyond the product of their separate probabilities (Bachman & Paternoster, 2004). In order to test for the independence of a selected independent variable and the level of involvement in firearm

offending, separate chi-square analyses will be produced for each control and independent variable.

Three independent variables measuring age are collapsed into discrete categories in order to complete the chi-square analyses. All three of the variables were collapsed into dichotomous categories based upon the variable's mean. The control independent variable of respondent age had a mean of 20 years of age and was collapsed into two categories consisting of 17 to 20 year olds and 21 to 25 year olds. The age of first firearm ownership had a mean of 14 years of age and was collapsed into categories of 0 to 13 years old and 14 years of age and above. Finally, the age of first arrest for any crime had a mean of 15 years of age and was collapsed into 0 to 14 years of age and 15 years of age and above. The remaining ordinal measures, hard drug use scale, drug sales frequency range, and neighborhood exposure to violence scale, were kept in their original ordinal level of measurement.

Table 7 provides the chi-square and measure of association statistics for the control, socialization, and onset independent variables⁹. For presentation purposes, Table 7 includes the percentage not involved and the percentage involved (i.e., the combination of moderate and serious involvement) in firearm offending. Separate contingency tables for each of the control (Tables 16 through 19), socialization (Tables 20 through 27), and onset (Tables 28 and 29) independent variables across the three categories of the ordinal dependent variable are provided in Appendix B.

⁹ According to Bachman and Paternoster (2004) lambda measures of association (λ) are used for nominal variables and gamma measures (γ) are used for ordinal variables. For Table 7, the use of the lambda or gamma statistic will be dependent upon the specific independent variable's level of measurement. Thus, nominal independent variables will result in a lambda statistic discussion while ordinal independent variables will result in a gamma statistic discussion.

Table 7: Relationship Between Select Independent Variables and Involvement in Firearm Offending.

Variables	Percent Not Involved	Percent Involved	χ^2	Measure of Association
<u>Control</u>				
R's Age	23%	77%	6.51*	-.19
R's Race	23%	77%	17.95**	.00
R's Pop of Residence	22%	78%	25.95***	.28
R's Facility	23%	77%	10.06*	.00
<u>Socialization</u>				
Parents O/P	23%	77%	1.30	.00
Parents A/I	23%	77%	9.06**	.00
Peers O/P	23%	77%	66.60***	.13
Peers A/I	22%	78%	119.56***	.21
Gang Membership	23%	77%	60.34***	.00
Hard Drug Use	22%	78%	15.36	.18
Drug Sales Freq.	23%	77%	123.15***	.58
Violent Exposure	23%	77%	157.91***	.58
<u>Onset</u>				
First Firearm	11%	89%	9.28**	.28
First Arrest	22%	78%	5.59	.13

*p < 0.05, **p < 0.01, ***p < 0.001

All of the control variables are significantly related to the level of involvement in firearm offending ($\alpha < .05$). Despite the significance of the control variables, lambda statistics for the respondent's race and facility from which they were sampled are well under one percent ($\lambda = .00$) revealing a relatively non-existent level of association with the dependent variable. Gamma statistics for the respondent's age ($\gamma = -.19$) and population of previous residence ($\gamma = .28$) suggest a weak relationship with the level of involvement in firearm offending. Respondent's age is negatively related to the

dependent variable, suggesting that as age increases (ceiling limit of 25) the level of involvement in firearm offending decreases. Reciprocally, as age decreases (floor limit of 17) the level of involvement in firearm offending increases. In terms of previous residence, respondents from areas of larger populations are more likely to be involved in serious firearm offending than respondents from smaller populated areas.

Two socialization variables, parental ownership or possession of firearms and hard drug use, produced insignificant chi-square statistics revealing a lack of a relationship between the variables and involvement in firearm offending. In fact, for the variable parental ownership or possession of firearms, the probability of obtaining a chi-square statistic as large as 1.30 by chance with repeated sampling of a similar sample size is quite large ($\alpha = 0.52$). Beyond these two variables, the remaining socialization variables were significantly related to the level of involvement in firearm offending ($\alpha < .05$). The six significant socialization variables include: parental arrest or incarceration for firearm possession or use, association with peers who own or possess firearms, association with peers who have been arrested or incarcerated for firearm possession or use, gang membership, frequency of drug sales, and the level of neighborhood exposure to violence.

Parental arrest or incarceration for firearm possession or use and gang membership lambda statistics suggest that the utilization of these two socialization variables does little to reduce errors in the prediction of involvement in firearm offending ($\lambda = .00$). On the other hand, errors in the prediction of involvement in firearm offending can be reduced by approximately 13% through the use of the peer ownership or possession of firearms ($\lambda = .13$). Moreover, errors in the prediction of the dependent

variable can be reduced by approximately 21% with the inclusion of the peer arrest or incarceration for firearm possession or use ($\lambda = .21$). Both frequency of drug sales ($\gamma = .58$) and the level of neighborhood exposure to violence ($\gamma = .58$) gamma statistics revealed moderately positive relationships with involvement in firearm offending. Frequent drug sale activity is more likely to lead to serious involvement in firearm offending relative to individuals whose drug sale activity is rather infrequent. Additionally, increased exposure to neighborhood violence is more likely to lead to serious involvement than lower levels of exposure to neighborhood violence.

Finally, the onset variable of age at first firearm ownership was significantly related to involvement in firearm offending ($\alpha < .05$), while the second onset variable, age at first arrest for any crime was insignificant. The gamma statistic for the age of first firearm ownership variable reveals a weak positive relationship with involvement in firearm offending ($\gamma = .28$). That is, as the age of first firearm ownership increases the likelihood for serious involvement in firearm offending also increases.

It is important to note the number of cases used for each of the contingency tables presented in Appendix B. For the control independent variables, the sample size used for analysis ranged from 470 to 493 cases. The sample size ranged from 427 to 493 cases for the socialization variables and the sample size ranged from 384 to 464 cases for the onset variables. The variability of the sample size used for each of the separate independent variables is due to the use of complete case chi-square analyses (Brame & Paternoster, 2003). That is, chi-square analyses were performed on respondent information that was complete for the independent and dependent variable, with missing cases excluded from analyses. Therefore, observations that contain substantial proportions of missing cases

(i.e., hard drug use scale, neighborhood exposure to violence scale, age of first firearm ownership and age of first arrest) may bias the chi-square results as chi-square estimates are heavily influenced by sample size (Bachman & Paternoster, 2004). Multivariate modeling will attempt to control for the effect of missing cases for variables with a large number of missing cases.

Multivariate Modeling Through Ordered Logit Regression

Ordered logit regression is a common multivariate statistical procedure for ordinal level response categories as opposed to linear regression or binary logistic regression modeling (Agresti, 1989; Agresti, 2002; Long, 1997; McKelvey & Zavoina, 1975; Winship & Mare, 1984). Linear regression considers response categories as interval or continuous variables having constant and measurable intervals between increasing and decreasing variable values. Based on the assumption of linearity, linear regression attempts to fit a straight line through observed data and examine the change in the dependent variable produced by a change in the independent variable (Berk, 2004). Comparatively, ordered logit acknowledges the lack of constant intervals between the categories of an ordinal variable and controls for the limited distribution of the variable. Regression coefficients are produced and interpreted as the amount of change in the dependent variable on its underlying scale continuum (e.g., less to more severe) brought about by a unit change in the independent variable holding other variables constant (McKelvey & Zavoina, 1975). Moreover, ordered logit reduces the number of assumptions held by linear regression (i.e., homoscedasticity and normal distribution of errors) since the residuals produced by the model are assumed to be correlated with the

values of the dependent variable, thus producing more reliable estimates (Winship & Mare, 1984).

Binary logistic regression is another multivariate procedure that may be used to analyze ordinal level response categories. For instance, the dependent variable level of involvement in firearm offending may be collapsed into three separate binary logistic regressions: moderate involvement (1) relative to no involvement (0), serious involvement (1) relative to no involvement (0), and moderate involvement (1) relative to serious involvement (0). While the creation of separate binary logistic regressions is feasible, numerous firearm researchers (Bjerregaard & Lizotte, 1995; Cao, Cullen, & Link, 1997; Lizotte et al., 1994) have expressed caution that the creation of separate binary logistic regressions will systematically exclude at least one category of the dependent variable unless two categories are combined into one variable that may or may not be theoretically relevant to the research at hand (e.g., no involvement and moderate involvement could be combined and coded 1 for analysis relative to serious involvement coded 0). The pragmatic danger in excluding a single category of the dependent variable is the reduction of the original sample size, which increases the potential for under or over-estimated logit coefficients due to inflations in standard error. Moreover, the binary logistic regression, as presented above, produces three separate sets of regression coefficients that must be interpreted relative to their respective binary categories. Ordered logit, on the other hand, simultaneously estimates multiple logits through the use of all ordinal categories, which therefore reduces the standard error of prediction, and produces one set of coefficients (Agresti, 2002). As such, ordered logit is able to efficiently produce parsimonious and powerful models without the loss of observed data

(Agresti, 1989; Agresti, 2002; Long, 1997; McKelvey & Zavoina, 1975; Winship & Mare, 1984).

In order to produce simultaneous estimates or cumulative logits for all of the ordinal categories of the dependent variable, ordered logit rests on the assumption of proportional odds. Since the ordinal dependent variable values are considered arbitrary thresholds of an underlying continuum of firearm offending seriousness, the y-intercepts used for the maximum likelihood estimation should vary across the values of the observed and predicted values of the dependent variable while the logit coefficients for each of the independent variables should remain the same for each of the maximum likelihood estimates (Agresti, 1989; Long, 1997). Therefore, the proportional odds assumption contends that the cumulative algorithms used to produce maximum likelihood estimates (i.e., contrasts between no involvement, moderate involvement, and serious involvement) are not significantly different from estimates that would be obtained if the algorithms were obtained separately (i.e., contrasts only made between any two of the three categories of the dependent variable).

A Score Test using a chi-square distribution is commonly applied to test for the assumption of proportional odds (Long, 1997). If non-significant, the odds ratios can be interpreted as constant across all levels of the dependent variable since the maximum likelihood lines of prediction will be essentially parallel. If the test is significant, however, the interpretation of odds ratios as constant may be erroneous as the maximum likelihood lines of prediction are non-parallel with logit coefficients taking on different values across the distribution of the dependent variable. In the event that the assumption

of proportional odds is rejected, Long (1997) has suggested that multinomial logit models should be used since they do not adhere to the assumption of proportional odds.

Multivariate Statistics

A number of the control independent variables were collapsed into dummy variables for the ordered logit regression analysis. The dummy variable for the respondent's race ("black") will examine the level of involvement in firearm offending for black individuals relative to the reference category of all other races or ethnicities. The selection of "black" as the racial or ethnic category was purposely made in order to control for the frequency in which black respondents completed surveys relative to other racial or ethnic groups (see Table 4). The dummy variable "Detroit" will examine the level of involvement in firearm offending for individuals from the city of Detroit relative to the reference category of all other geographic and lesser-populated locations within the state of Michigan¹⁰. Finally, the respondent's survey facility ("Institution 2") will examine the level of involvement in firearm offending for those individuals who were surveyed in the institution providing the most surveys relative to the reference category of the remaining institutions.

Variable transformations were also made in order to control for the effect of missing data on the independent and dependent variables. Univariate statistics presented earlier indicated that 0 to 23% of the distribution of any one independent or dependent variable may be missing information. Due to the amount of missing cases, bivariate results indicated a large variability in the sample sizes between any one relationship

¹⁰ The logic behind the inclusion of a dummy variable specifically for Detroit is based upon the frequency of violence found within the city and federal initiatives to control firearms through mandatory sentencing (Heumann, Loftin, & McDowall, 1982; Loftin & McDowall, 1981; McDowall, 1991).

between a specified independent variable and the dependent variable. Moreover, the reduction in sample size may be quite high when all of the independent variables are added into a regression model. In order to maintain a sample size that will produce reliable logit regression estimates, individual independent variables missing 5 or more percent of their univariate distribution were selected for transformation based upon their univariate statistics; they include: the control independent variable of “black,” the socialization independent variables of hard drug use scale, level of neighborhood exposure to violence scale, and gang membership, and the onset independent variables of age of first firearm ownership and age of first arrest. For the remaining independent and dependent variables missing 4 or fewer percent of their univariate distribution, the missing cases were excluded from the multivariate analyses.

For the six variables selected for transformation, a new independent variable was created that mirrored the distribution of the original variable, however missing data was included into the overall distribution and coded 0¹¹. An additional missing data indicator variable was created for each independent variable and coded 0 to reflect valid or non-missing data and 1 to represent missing data (Brame & Paternoster, 2003). When the two new variables are entered into the ordered logit regression analysis, “the missing data [indicator] takes the uncertainty associated with the missing survey data into account and adjusts the standard errors of the parameter estimates accordingly” (Brame & Paternoster, 2003, p. 74). Regression coefficients produced for both the new independent variable including the missing data and the missing data indicator variable will allow for the comparison of significant differences between missing and non-missing data on the

¹¹ An example of the variable transformation is provided in Appendix C.

dependent variable. Most importantly, the transformation produces a constant sample size of 453, which encompasses 90% of the original sample size.

Multivariate models are presented additively, with the addition of one new theoretically relevant socialization variable (i.e., gang membership and drug market participation) made to a baseline or restricted model (i.e., control, familial socialization, peer socialization, and environmental socialization variables) in order to reach a full model that contains all the theoretically relevant variables. Additionally, secondary models will be created that exchange primary variables measuring legitimized firearm socialization influences (i.e., parents and peers own or possess firearms) with variables measuring criminalized firearm socialization influences (i.e., parents and peers have been arrested for firearm possession or use).

Socialization Modeling

Table 8 provides the multivariate results for socialization models including variables of legitimized parental and peer firearm ownership or possession.

Table 8: Firearm Involvement Regressed on Socialization Variables Including Legitimized Firearm Ownership or Possession (n=453).

	Model 1	Model 2	Model 3	Model 4
<u>ML Estimates</u>				
Constant 3	.73	.43	-1.00	-1.02
(SE)	(1.15)	(1.18)	(1.23)	(1.23)
Constant 2	2.51*	2.26	.98	.96
(SE)	(1.16)	(1.18)	(1.23)	(1.23)
<u>Odds Ratios</u>				
R's Age	.81***	.82***	.84**	.84**
BlackNew	1.25	1.31	1.28	1.29
MissBlack	1.56	1.54	1.36	1.40
Detroit	1.64	1.73*	1.82*	1.82*
Institution 2	.91	.93	.90	.91
Parents O/P	1.01	1.03	1.06	1.06
Peers O/P	3.75***	3.39***	2.36**	2.38**
V. ExposeNew	1.61***	1.54***	1.49***	1.49***
MissVE	6.45***	5.51***	4.56***	4.49***
GangNew		2.96***	2.53***	2.51***
MissGang		.85	.76	.75
Drug Sales Freq.			1.36***	1.36***
H. Drug UseNew				1.02
MissH DU				1.16
Score Test χ^2	12.33	14.06	13.14	19.46
	(9 df)	(11 df)	(12 df)	(14 df)
-2LL	763.02	741.06	702.53	702.30
LR χ^2	179.64***	201.61***	240.13***	240.36***
	(9 df)	(11 df)	(12 df)	(14 df)

*p < 0.05, **p < 0.01, ***p < 0.001

Across all of the socialization models, the reduction of the -2 log likelihood (-2LL) value and significance of the likelihood ratio (LR) chi-squared test implies that each of the independent variables used in the models provides an adequate measure of the level of involvement in firearm offending. That is, the -2LL and LR chi-square statistics reveal that the inclusion of the selected independent variables in the models provide an enhanced ability to predict the levels of involvement in firearm offending than the constant alone. Moreover, the two statistics reveal that at least one of the regression coefficients for the independent variables used in each model is non-zero.

A number of highly significant independent variable predictors of involvement in firearm offending were obtained ($p < 0.001$). Individuals who provided missing responses on the variable of neighborhood exposure to violence relative to those who provided a non-missing response were more likely to be involved in serious firearm offending controlling all other variables across models. Interestingly enough, missing responses on the variable of neighborhood exposure to violence provided the largest effect of the variables considered across models. Gang membership increases the likelihood of involvement in serious firearm offending by a factor of approximately 2.5 to 3 controlling for all other variables across models. Increased exposure to violence in one's neighborhood increases the likelihood for involvement in serious offending, while frequent activity in drug sales was also found to increase the likelihood of involvement in serious firearm offending.

Association with peers who own or possess firearms was highly significant in Models 1 and 2 and maintained a strong significance ($p < 0.01$) through Model 4. Controlling for all other variables across models, association with peers who own or possess firearms increases the likelihood for involvement in serious firearm offending. Similarly, respondent age was also found to be highly significant in restricted models ($p < 0.001$) and maintained significance in the full model including all of the theoretically relevant variables ($p < 0.01$). Considering that the sample was restricted to respondents between the ages of 17 to 25, older respondents were less likely to be involved in serious firearm offending. The dummy variable "Detroit" was also found to be significant ($p < 0.05$) with the inclusion of additional theoretically relevant variables to the baseline Model 1. Although the addition of variables to a misspecified ordered logit regression

model may increase the standard errors of the logit coefficients and produce significant results, the significance of the dummy variable “Detroit” in Model 4 is attributable to the theoretical relevance of the predictors (Allen, 1997). Respondents from Detroit were more likely to be involved in serious firearm offending relative to the remainder of the respondents who resided in other locations within the state of Michigan while controlling for all other variables. The nonsignificant logit coefficients for parental firearm ownership or possession and hard drug use indicate no relationship with involvement in firearm offending.

A second set of socialization models (Models 5 through 8) were produced that include variables of criminalized parental and peer firearm socialization in the form of arrest or incarceration for firearm possession or use. Table 9 provides the results.

Table 9: Firearm Involvement Regressed on Socialization Variables Including Criminalized Firearm Possession or Use (n=453).

	Model 5	Model 6	Model 7	Model 8
<u>ML Estimates</u>				
Constant 3	.96	.73	-1.02	-1.03
(SE)	(1.13)	(1.17)	(1.22)	(1.22)
Constant 2	2.83**	2.66*	1.05	1.04
(SE)	(1.14)	(1.17)	(1.22)	(1.22)
<u>Odds Ratios</u>				
R's Age	.82***	.82***	.86**	.86**
BlackNew	1.12	1.19	1.14	1.15
MissBlack	1.20	1.18	1.07	1.09
Detroit	1.67*	1.76*	1.87*	1.88*
Institution 2	.88	.89	.87	.88
Parents A/I	1.59	1.38	1.75	1.76
Peers A/I	4.45***	4.20***	3.32***	3.33***
V. ExposeNew	1.48***	1.43***	1.38***	1.38***
MissVE	4.56***	3.96**	3.30*	3.24**
GangNew		2.93***	2.43***	2.41***
MissGang		.85	.78	.77
Drug Sales Freq.			1.36***	1.36***
H. Drug UseNew				1.01
MissH DU				1.19
Score Test χ^2	9.13	10.58	11.05	18.12
	(9 df)	(11 df)	(12 df)	(14 df)
-2LL	741.32	720.85	684.47	684.19
LR χ^2	201.34***	221.82***	258.19***	258.47***
	(9 df)	(11 df)	(12 df)	(14 df)

*p < 0.05, **p < 0.01, ***p < 0.001

Overall, Models 5 through 8 that include criminalized parental and peer firearm socialization variables mirror the prior socialization model including legitimized variables. The -2LL and LR chi-square values indicate that each of the independent variables used in the models provide an adequate measure of the level of involvement in firearm offending. The effect of respondent age, neighborhood exposure to violence, gang membership, and frequency of drug sales is relatively similar to Models 1 through 4 in terms of odds ratio value, directionality, and significance across all four of the models. Moreover, the variables capturing parental firearm socialization and hard drug use were

again found to be insignificant. Therefore, controlling for all other variables in the models, parental arrest or incarceration for firearm possession and use as well as hard drug use are unrelated to involvement in firearm offending.

A few of the variables in the second set of models were slightly different from the models including legitimized parental and peer firearm agents of socialization. Peer association was again found to be a highly significant predictor of involvement in firearm offending and also provided the largest effect of the variables considered in the full model ($p < 0.001$). That is, association with peers who had been arrested or incarcerated for firearm possession or use increases the likelihood of involvement in serious firearm offending by a factor of approximately 3 to 4.5 controlling for all other variables across models. The prior variable providing the largest effect, missing responses on the variable of neighborhood exposure to violence, was highly significant in the reduced Model 1 ($p < 0.001$), but was found to reduce significance in subsequent models (ranging from $p < 0.05$ to $p < 0.01$) that included additional theoretically relevant variables. Finally, the dummy variable “Detroit” was consistently significant ($p < 0.05$) across all of the models.

Summary of Socialization Modeling

Gang membership, increased exposure to neighborhood violence, and active participation in drug sales were generally found to be strong predictors of serious involvement in firearm offending across models that include legitimized and criminalized parental and peer firearm ownership, possession, and use variables. Peer association, measured both by association with peers who own or possess firearms and association with peers who had been arrested or incarcerated for firearm possession or use, was also found to be a significant predictor of serious firearm offending involvement.

Based on these findings, there is strong evidence in support of Hypothesis 2 predicting a relationship between peer firearm ownership, possession, and use and individual levels of involvement in firearm offending. Hypothesis 3 is strongly supported, as the relationship between gang membership and individual levels of involvement in firearm offending has been observed. The predicted relationship between drug market participation (Hypothesis 4) and involvement in firearm offending is only partially supported as the frequency of drug sale activity is found to be a significant predictor of involvement in levels of firearm offending, whereas the use of hard drugs is insignificant. Hypothesis 5, predicting a relationship between the levels of violence found within one's environment and individual levels of involvement in firearm offending, was also strongly supported. A relationship between parental firearm ownership, possession, and use and involvement in levels of firearm offending was unfounded. Therefore there is no evidence to accept Hypothesis 1.

Onset Socialization Modeling

Subsequent models consider the effect of onset age at first firearm ownership (Models 9 through 16) and first arrest for any crime (Models 17 through 24) in combination with the socialization variables used in the prior models. In order to avoid the potential for variable confound and misspecified regression estimates for onset age variables, the respondent's age was removed from all onset analyses. Table 10 provides the results for ownership onset and socialization models including variables of legitimized parental and peer firearm ownership or possession.

Table 10: Firearm Involvement Regressed on Ownership Onset and Socialization Variables Including Legitimized Firearm Ownership or Possession (n=453).

	Model 9	Model 10	Model 11	Model 12
<u>ML Estimates</u>				
Constant 3	-.98	-1.16	-2.00**	-2.12**
(SE)	(.79)	(.79)	(.82)	(.83)
Constant 2	1.07	.95	.26	.13
(SE)	(.79)	(.79)	(.81)	(.82)
<u>Odds Ratios</u>				
First FirearmNew	.91*	.92*	.92*	.92
MissFF	.02***	.02***	.03***	.03***
BlackNew	1.52	1.59	1.55	1.57
MissBlack	1.61	1.62	1.45	1.52
Detroit	1.96*	2.02**	2.16**	2.18**
Institution 2	.70	.73	.72	.74
Parents O/P	.66	.67	.72	.72
Peers O/P	2.33*	2.18*	1.62	1.67
V. ExposeNew	1.47***	1.41***	1.38***	1.37***
MissVE	6.83***	5.72***	4.77**	4.55**
GangNew		2.77***	2.46***	2.44***
MissGang		1.04	.98	.96
Drug Sales Freq.			1.33***	1.32***
H. Drug UseNew				1.01
MissH DU				1.58
Score Test χ^2	20.34*	20.85**	18.98	22.25
	(10 df)	(12 df)	(13 df)	(15 df)
-2LL	693.63	676.38	646.66	644.94
LR χ^2	249.04***	266.28***	296.00***	297.72***
	(10 df)	(12 df)	(13 df)	(15 df)

*p < 0.05, **p < 0.01, ***p < 0.001

Models 9 through 12 provide an indication of model fit as the -2LL values decrease across models and LR chi-square values are significant. Importantly however, Models 9 and 10 are found to be in violation of the proportional odds assumption according to the significant Score Test chi-square values. As such, caution is needed in the interpretation of the odds ratios since the logit lines of prediction are non-parallel with regression coefficients taking on different values across the distribution of the dependent variable. Alternative multinomial logit regression models for these two models are presented in Appendix D. Overall, the ordered and multinomial logit regression models

produced similar results in terms of the odds ratio coefficient values and directionality. Slight differences were found in terms of the significance of the logit coefficients for the age of first firearm ownership (only significant in ordered logit models), the dummy variable “Black” (only significant in multinomial logit models), and the dummy variable “Detroit” (only significant in ordered logit models) which may be attributable to the comparatively higher standard error values in multinomial logit models.

Gang membership, neighborhood exposure to violence, the frequency of drug sales, and missing responses on the variable of age of first firearm ownership were found to be highly significant predictors of involvement in firearm offending across the models that were not in violation of the proportional odds assumption ($p < 0.001$). Gang membership not only increased the likelihood of involvement in serious firearm offending controlling for all other variables, it also provided the strongest effect for all the highly significant variables. Frequent activity in drug sales and increased exposure to violence within one’s neighborhood increased the likelihood of involvement in serious firearm offending. Individuals who provided missing responses on the variable of age of first firearm ownership were less likely to be involved in serious firearm offending, which is a finding that seems to be somewhat intuitive. Individuals that have never owned or possessed a firearm may not have indicated an age of first ownership and would be considered less at risk for involvement in firearm offending.

Missing responses on the variable of neighborhood exposure to violence reduced in its level of significance while the dummy variable “Detroit” gained in its level of significance with the addition of theoretically relevant variables. However, the increase or decrease in levels of significance may be due to the proportional odds assumption

violation and potential for erroneous regression coefficient estimates (see Appendix D for multinomial logit regression results). Models 11 and 12 indicate that both of the variables were positively related to the dependent variable ($p < 0.01$). Individuals who provided missing responses on the variable of neighborhood exposure to violence were more likely to be involved in serious firearm offending, while those respondents from the city of Detroit were also more likely to be involved in serious offending.

The age of first firearm ownership was significant ($p < 0.05$) in Models 9 through 11. Since the sample had been restricted to 17 to 25 year olds, presumably the ceiling age in which an individual could own a firearm would be 25. Interpreting the odds ratio, individuals who gained ownership of a firearm at older ages were less likely to be involved in serious firearm offending. However, the variable was insignificant for the final model that includes all of the theoretically relevant variables. Peer association was found to be significant ($p < 0.05$) in the models that were found to be in violation of the proportional odds assumption, but was not found to be significant in Models 11 and 12 that did not violate the assumption (See Appendix D for multinomial logit regression results). Finally, parental ownership or possession of firearms and hard drug use were again found to be independent of firearm offending involvement.

Table 11 provides the results for alternative ownership onset and socialization models (Models 13 through 16) that include variables of criminalized parental and peer firearm socialization.

Table 11: Firearm Involvement Regressed on Ownership Onset and Socialization Variables Including Criminalized Firearm Possession or Use (n=453).

	Model 13	Model 14	Model 15	Model 16
<u>ML Estimates</u>				
Constant 3	-.88	-1.07	-2.03**	-2.12**
(SE)	(.70)	(.70)	(.73)	(.74)
Constant 2	1.29	1.16	.33	.24
(SE)	(.70)	(.70)	(.65)	(.73)
<u>Odds Ratios</u>				
First FirearmNew	.90**	.90*	.91*	.91*
MissFF	.02***	.02***	.03***	.03***
BlackNew	1.55	1.62*	1.57	1.56
MissBlack	1.35	1.34	1.21	1.25
Detroit	1.98*	2.05**	2.20**	2.21**
Institution 2	.70	.73	.72	.75
Parents A/I	1.43	1.29	1.52	1.56
Peers A/I	4.17***	3.99***	3.25***	3.28***
V. ExposeNew	1.34***	1.28***	1.26***	1.26***
MissVE	4.38**	3.70**	3.14*	2.98*
GangNew		2.70***	2.38***	2.36***
MissGang		1.13	1.07	1.07
Drug Sales Freq.			1.30***	1.30***
H. Drug UseNew				1.00
MissH DU				1.61
Score Test χ^2	17.34	17.73	17.00	20.68
	(10 df)	(12 df)	(13 df)	(15 df)
-2LL	669.73	654.13	628.81	626.83
LR χ^2	272.93***	288.53***	313.86***	315.83***
	(10 df)	(12 df)	(13 df)	(15 df)

*p < 0.05, **p < 0.01, ***p < 0.001

Models 13 through 16 are relatively similar to Models 9 through 12, with the – 2LL and LR chi-square values providing a good indication of model fit. Comparatively, models including criminalized parental or peer firearm socialization in the form of arrest or incarceration for firearm possession or use were not found to be in violation of the proportional odds assumption as the Score Test chi-square values were insignificant. The effect of gang membership, neighborhood exposure to violence, frequency of drug sales, the dummy variable “Detroit,” missing responses on the variable for age of first firearm ownership, and missing responses on the variable for neighborhood exposure to violence

are comparable to Models 9 through 12 that include legitimized firearm agents of socialization in terms of odds ratio value, directionality, and significance across all four of the models. Moreover, variables capturing parental firearm socialization and hard drug use were again found to be insignificant.

Unlike the previous model, however, peer association was found to be a highly significant predictor of involvement in firearm offending and provided the largest effect of all the variables found to be highly significant in the full model ($p < 0.001$). Thus, association with peers who had been arrested or incarcerated for firearm possession or use increased the likelihood of involvement in serious firearm offending, net all other variables included in the models. The onset age of first firearm ownership was also negatively associated with involvement in firearm offending across all of the models. Although the variable decreased in its level of significance with the inclusion of additional variables, the significance remained throughout the final model ($p < 0.05$). Finally, Model 14 indicates a somewhat anomalous finding that has yet to be observed in any of the previous models. Specifically, black individuals are more likely to be involved in serious firearm offending relative to non-blacks. It is important to note, however, that the effect for the dummy variable “black” is not found in Models 15 and 16 that additively include all the theoretically relevant variables.

Table 12 provides the results for arrest onset and socialization models including variables of legitimized parental and peer firearm ownership or possession. Whereas Tables 10 and 11 presented the effect of the age at first onset of firearm ownership, the subsequent models will examine the age of first arrest for any crime in conjunction with socialization variables.

Table 12: Firearm Involvement Regressed on Arrest Onset and Socialization Variables Including Legitimized Firearm Ownership or Possession (n=453).

	Model 17	Model 18	Model 19	Model 20
<u>ML Estimates</u>				
Constant 3	-2.57***	-2.78***	-3.93***	-3.96***
(SE)	(.74)	(.75)	(.79)	(.80)
Constant 2	-.84	-.98	-1.98**	-2.01**
(SE)	(.73)	(.74)	(.77)	(.78)
<u>Odds Ratios</u>				
First ArrestNew	.94	.95	.97	.97
MissFA	.19*	.20*	.44	.44
BlackNew	1.19	1.25	1.24	1.25
MissBlack	1.47	1.46	1.38	1.41
Detroit	1.68*	1.78*	1.84*	1.85*
Institution 2	.78	.81	.82	.82
Parents O/P	1.01	1.03	1.07	1.07
Peers O/P	4.05***	3.63***	2.47**	2.49**
V. ExposeNew	1.59***	1.53***	1.47***	1.47***
ETVMiss	6.43***	5.35***	4.40**	4.35**
GangNew		3.10***	2.62***	2.61***
GangMiss		1.01	.88	.87
Drug Sales Freq.			1.37***	1.37***
H. Drug UseNew				1.01
MissH DU				1.11
Score Test χ^2	14.83	16.33	15.06	21.48
	(10 df)	(12 df)	(13 df)	(15 df)
-2LL	772.98	749.45	709.95	709.84
LR χ^2	169.68***	193.22***	232.71***	232.83***
	(10 df)	(12 df)	(13 df)	(15 df)

*p < 0.05, **p < 0.01, ***p < 0.001

Models 17 through 20 again provide a good indication of model fit for the variables used according to the reduction in -2LL values and significance of LR chi-squares. Controlling for all the variables used, gang membership, neighborhood exposure to violence, and frequency of drug sales were highly significant predictors and positively associated with involvement in firearm offending across all of the models ($p < 0.001$). Additionally, gang membership provides the largest effect among the highly significant variables used in the final model. The dummy variable “Detroit” was also found to be

significant ($p < 0.05$), as individuals from the city of Detroit were more likely to be involved in serious firearm offending.

The level of significance was reduced for missing responses on the variable of neighborhood exposure to violence and association with peers who own or possess firearms with the inclusion of additional variables. However, both of variables remained significant and positively associated with involvement in firearm offending through Model 20 ($p < 0.01$). Missing responses on the variable of age of first arrest was found to be significant ($p < 0.05$) for Models 17 and 18, therefore indicating that individuals who provided missing responses on the age of their first arrest were less likely to be involved in serious firearm offending. However, the variable was found to be insignificant in models that include additional theoretically relevant variables.

The onset measure, age of first arrest for any crime, and socialization measures, parental ownership or possession of firearms and hard drug use, were found to be insignificant and therefore unrelated to involvement in firearm offending.

Criminalized parental and peer firearm socialization variables in the form of arrest or incarceration for firearm possession or use are included for alternative models of arrest onset and socialization. Table 13 provides the results.

Table 13: Firearm Involvement Regressed on Arrest Onset and Socialization Variables Including Criminalized Firearm Possession or Use (n=453).

	Model 21	Model 22	Model 23	Model 24
<u>ML Estimates</u>				
Constant 3	-2.20**	-2.39***	-3.79***	-3.82***
(SE)	(.70)	(.71)	(.77)	(.77)
Constant 2	-.36	-.49	-1.74*	-1.78*
(SE)	(.69)	(.70)	(.75)	(.75)
<u>Odds Ratios</u>				
First ArrestNew	.95	.95	.98	.98
MissFA	.25	.26*	.57	.58
BlackNew	1.07	1.13	1.10	1.11
MissBlack	1.17	1.15	1.09	1.10
Detroit	1.71*	1.81*	1.89*	1.89*
Institution 2	.76	.79	.79	.80
Parents A/I	1.93	1.62	2.06	2.07
Peers A/I	4.50***	4.24***	3.36***	3.37***
V. ExposeNew	1.47***	1.41***	1.37***	1.37***
MissVE	4.50***	3.85**	3.19**	3.14*
GangNew		3.02***	2.48***	2.46***
MissGang		1.00	.89	.88
Drug Sales Freq.			1.37***	1.37***
H. Drug UseNew				1.01
MissH DU				1.15
Score Test χ^2	10.71	11.80	12.19	19.49
	(10 df)	(12 df)	(13 df)	(15 df)
-2LL	750.77	729.30	690.82	690.64
LR χ^2	191.89***	213.36***	251.85***	252.02***
	(10 df)	(12 df)	(13 df)	(15 df)

*p < 0.05, **p < 0.01, ***p < 0.001

The model fit statistics produce four significant LR chi-square values across the models. Gang membership, neighborhood exposure to violence, frequency of drug sales, the dummy variable “Detroit,” and missing responses on the variable for neighborhood exposure to violence produce similar odds ratio values, directionality, and levels of significance across all four of the models as compared to Models 17 through 20 that utilize legitimized parental and peer firearm socialization variables. Moreover, the variables capturing onset age of first arrest for any arrest, parental firearm socialization, and hard drug use were again found to be insignificant.

Compared to the previous regression results from Table 10, peer association provided the largest effect of all the variables used and was also found to be a highly significant predictor ($p < 0.001$) when criminalized parental and peer firearm agents of socialization are exchanged with legitimized variables. Missing responses on the variable for onset age of first arrest was only significant in the restricted Model 22 and was not found to be significant in the subsequent full model.

Summary of Onset Socialization Modeling

Based on the findings, there is marginal to no support for Hypothesis 6 predicting a relationship between the onset age at first firearm ownership and first arrest on involvement in levels of firearm offending. The onset age of first firearm ownership was a significant predictor of involvement across all the models when criminalized parental and peer firearm possession or use variables were used. However, when legitimized parental and peer ownership or possession variables were used, the onset age of first firearm ownership was significant for only the restricted models and not the full model including all the theoretically relevant variables. The age of first arrest was insignificant across all models.

Adding to the consistency of socialization modeling, the onset socialization models strongly support Hypotheses 2, 3, and 5 and supports the drug sales premise of Hypothesis 4. Onset socialization models produced strongly significant predictors among the variables of gang membership, exposure to neighborhood violence, frequency of drug sale activity, and association with peers who had been arrested or incarcerated for firearm possession or use. Association with peers who own or possess firearms was also significant across all models including the onset measure of first arrest, but was only

significant in the restricted Models 9 and 10 that include the onset measure of first firearm ownership¹². Hypothesis 1 and the drug use premise of Hypothesis 4 were unsupported across all of the onset socialization models.

¹² It is important to note that multinomial logit regression Models 9 and 10 (Appendix D) found the likelihood for serious involvement in firearm offending to be increased by association with peers who owned or possessed firearms

CHAPTER V: DISCUSSION

The identification of individual offenders who utilize firearms for criminal purposes and the prediction of specific offending patterns is an arduous process full of inherent difficulty. The purpose of this research was to model theoretical propositions of social learning theory with developmental or life course theory in order to examine socialization pathways into a subculture that utilizes firearms for criminal purposes. This research assumes that specific socialization mechanisms or onset behaviors place an individual at a greater risk for initial and persistent involvement in firearm offending, which may therefore lead to specialization in firearm offending patterns. Numerous models were created that allowed for comparisons between socialization versus onset models and legitimized (i.e., ownership or possession of firearms) versus criminalized (i.e., arrest or incarceration for firearm possession or use) parental and peer firearm socialization variables. Despite the creation of these comparative models, nearly every model produced similar results.

In general, socialization or social learning variables measuring cultural and environmental context served as the best predictors of involvement in serious firearm offending. Variables measuring gang membership, peer association, and participation in drug sales all suggest that differential association and socialization within distinct social groups account for a significant portion of serious firearm offending involvement. Regarding peer association specifically, association with criminal peers provided the strongest predictor of serious involvement in firearm offending. When the alternate variable of association with peers who own or possess firearms was left in the models,

gang membership, neighborhood exposure to violence, and drug sales typically provided larger effects than the measure of peer association.

In conjunction with the cultural agents of socialization, spatial socialization by means of specific neighborhood environments places an individual more at risk for involvement in firearm offending. The environmental socialization measure, neighborhood level of exposure to violence, was significant and positively related to involvement in firearm offending across all of the models. Moreover, the control dummy variable of “Detroit,” which was purposely selected due to the frequency of violence found within the city of Detroit and federal initiatives to curtail firearm offending (Heumann, Loftin, & McDowall, 1982; Loftin & McDowall, 1981; McDowall, 1991), was also found to be significant across all of the models. Informed by the work of Wright and Rossi (1994), the environment influences the levels of involvement in firearm offending and may produce firearm offenders. That is, individuals from hostile and violent environments may become seriously involved in firearm offending due to the increased need for self-preservation and the utility of a firearm to fulfill those needs (Decker, Pennell, & Caldwell, 1997; Wright & Rossi, 1994).

There is a noteworthy, and unexpected, exception to the notion of cultural socialization variables providing the best predictors of involvement in firearm offending. Based upon the literature, the family has been identified as providing the initial orientation into the mechanics and use of firearms among both criminal (Sheley & Wright, 1995; Wright & Rossi, 1994) and non-criminal samples (Lizotte & Bordua, 1980; Lizotte, Bordua, & White, 1981; Marks & Stokes, 1976). Subsequently, the initial familial exposure to firearms is considered to produce a firearm owning adult that has

been socialized into firearm ownership, possession, and use. The current results fail to provide any support for the notion of parental socialization and its effect on involvement in firearm offending. At the bivariate level, parental arrest or incarceration for firearm possession or use was found to be significant with a very weak measure of association. When added to multivariate modeling controlling for the effect of other theoretically relevant variables, the measure of parental arrest or incarceration for firearm possession or use was found to be insignificant across all of the restricted and full models. The measure of parental ownership or possession of a firearm was also insignificant across all the bivariate and multivariate analyses. Therefore, the exchange of learned normative ideologies and values between parent and child does not predispose an individual toward involvement in firearm offending. Instead, the significant agents of socialization that shape involvement in firearm offending are beyond the immediate family – gangs, peers, individuals involved in drug sales, and the larger environment as a whole.

Onset variables were marginal to non-existent predictors of involvement in firearm offending in comparison to the socialization variables. The age of first arrest provided no support for the prediction of involvement in firearm offending as the bivariate and multivariate modeling results found the variable insignificant across all of the analyses. On the other hand, the age of first firearm ownership was found to be a significant predictor of serious involvement in restricted models that controlled for legitimized parental or peer firearm ownership or possession and across all models that controlled for criminalized parental or peer firearm possession or use. Thus, there is some evidence that younger ages of first firearm ownership increased the likelihood of serious involvement in firearm offending. Inadvertently, the variable of respondent age

validated the onset age of first ownership findings. Across all of the socialization models, older respondents (ceiling limit of 25) were significantly less likely to be involved in serious firearm offending, while younger respondents (floor limit of 17) were more likely to be involved in serious offending.

Extending developmental theory to the current research context (Hirschi & Gottfredson, 1983; Moffitt, 1993; Sampson & Laub, 1992), those individuals who have obtained their first firearm at earlier ages would have more of an opportunity to utilize their firearm for legitimate or criminal purposes with the progression of age through the theorized peak offending period, which may explain the negative relationship between the onset variable of age at first firearm ownership and the control variable of respondent age on the level of involvement in firearm offending. Of interest to criminal justice policy is this population; those individuals that have obtained a firearm early in life and have committed crimes involving firearms prior to or during adolescence since they are most at risk for continued firearm offending (Moffitt, 1993).

Missing Variable Responses

In general, literature has suggested that prisoner self reports can provide valid and reliable measures of prior criminal behavior, especially compared to the information captured in official arrest and conviction reports (Marquis, 1981). However, some degree of incomplete information is often captured in self-reports since the respondents have the opportunity to selectively answer questions or reactively chose not to answer sensitive questions (Singleton & Straits, 1999). In the current research, a number of unintended results occurred that are of relevance to the methodological utility of prisoner self-report survey data. Missing responses on the variable of neighborhood exposure to violence, on

the variable of age at first firearm ownership, as well as on the variable of age at first arrest were significant predictors in socialization and onset socialization modeling. Ad hoc bivariate analyses through the use of ANOVA were conducted in order to observe any patterns in the missing data that may bias results. The results are provided in Appendix E.

Missing responses on the variable of neighborhood exposure to violence increased the likelihood of involvement in serious firearm offending across all of the socialization and onset socialization models. The ad hoc analyses found five significant relationships with the missing responses. On average, black respondents were more likely to have provided a missing response relative to all other races or ethnicities and the onset age of first firearm ownership was approximately two years younger for the respondents that provided a missing response. The remaining variables suggest that those respondents who provided missing responses for the variable of neighborhood exposure to violence also provided omissions for race or ethnicity, gang membership, and the age of first firearm ownership. Therefore, there is reason to believe that certain respondents only partially completed the survey or selectively chose to answer non-personal questions.

Missing responses on the variable of first firearm ownership decreased the likelihood of involvement in firearm offending. As mentioned previously, respondents who have never owned or possessed a firearm may not have indicated an age of first ownership but rather glanced over the question. Seven variables were significantly related to missing responses for the ad hoc analyses. Black respondents were again more likely to have provided a missing response relative to all other races or ethnicities. Respondents were also more likely to have provided a missing response on the variable

of neighborhood exposure to violence if they failed to respond to the variable of first firearm ownership. Beyond these two relationships, the remaining five variables reinforced the notion that the respondents who provided missing responses were more likely to have lacked involvement in firearm offending based upon the findings. Those who have provided missing responses were also less likely to have parents who owned or possessed firearms, parents who had been arrested or incarcerated for firearm possession or use, associations with peers who owned or possessed firearms, been involved in gangs, and less exposure to violence within their neighborhoods relative to those who provided a non-missing response. Therefore, respondents that chose not to provide a response on the variable of first firearm ownership do not appear to be systematically shielding patterns of criminal behavior. Instead, they appear to have skipped the age of first firearm ownership due to its irrelevance with their background.

Finally, missing responses on the onset variable of first arrest provided one significant relationship. Those respondents that have provided a missing response on the age of first arrest were less likely to be involved in frequent drug sale activity. Unlike the previous two variables capturing missing responses, the variable capturing missing responses on the variable of first arrest does not provide any room for speculation as to why some respondents opted not to respond.

Study Limitations

The effect of non-response was omnipresent throughout the research. Bivariate analyses produced variable sample sizes that were contingent upon the frequency of missing cases found within the control, independent, and dependent variables. Variable transformations were made to the multivariate models in order to control for the effect of

missing cases. However, the creation and addition of two similar measures into a multivariate model induces additional interrelation or multicollinearity among the predictors that existed prior to the variable transformation¹³. As a result, the multivariate models suffer from misspecification and result in biased logit coefficients from which inference and results were discussed (Fox, 1991). Although ad hoc analyses suggested that missing cases were a product of general omission by a proportion of the respondents as well as omission on a specific variable by respondents least likely to be involved in firearm offending, the prevalence of missing cases adds a degree of ambiguity to the validity of the results.

Future research may wish to include alternate measures of neighborhood exposure to violence and drug use. In the current research, the measure of neighborhood exposure to violence scale blended survey questions that could be separated into theoretical measures of victimization and perceptions of violence. That is, there may be a strong relationship between the measure of prior victimization and involvement in firearm offending and an insignificant relationship between the perception of firearm density in the respondent's neighborhood and need for protection. Alternatively, the perceptual measures may provide the strong relationship with involvement in firearm offending

¹³ Correlation matrices, tolerance and variance inflation factors (VIF), as well as collinearity diagnostics were produced for all of the control, socialization, and onset independent variables used in the full multivariate analyses (Models 4, 8, 12, 16, 20, and 24). All of the relationships between the six new variables created that include missing information and the corresponding six missing data indicators were significant ($p < .001$) ranging in absolute value from $r = .20$ to $r = .92$, tolerance and VIF factors failed to approximate the value 1, and the condition index and variance proportions did not load strongly on a single concept. Beyond the six new variables, multicollinearity amongst the remaining independent variables continued to be problematic. There were 36 significant relationships ($p < .001$) ranging in absolute value from $r = .14$ to $r = .43$, 10 relationships ($p < .01$) ranging in absolute value from $r = .11$ to $r = .14$, and 13 relationships ($p < .05$) ranging in absolute value from $r = .05$ to $r = .12$. Tolerance factors, VIF factors, condition index, and variance proportions values suggest that the remaining variables are not providing a unique variation and may be measuring the same or larger construct (e.g., firearm offending subculture or lifestyle).

while the victimization measures are found to be insignificant. Either way, the combination of the two constructs into one scale may produce significant findings when one of the measures provides more of an effect than the other. Therefore, future research should attempt to control for the effect of victimization on perceptual measures.

Previous research involving firearm ownership, possession, and use has suggested that drug use is an insignificant predictor of involvement in firearm activity (Bjerregaard & Lizotte, 1995; Decker, Pennell, & Caldwell, 1997; Lizotte et al., 2000; Lizotte et al., 1994; Sheley & Wright, 1995; Treatment Alternatives for Safe Communities, 1997). Drug use in this research has been operationalized as use of harder or more illicit drugs (i.e., experimentation with heroin, crack, cocaine, PCP, and methamphetamines). Individuals who are frequent users or abusers of “softer” drugs (e.g., marijuana and alcohol) may be associated with increased levels of involvement in firearm offending, since the types of drugs used and frequency of use has been associated with persistent offending (Chaiken & Chaiken, 1990; Nurco et al., 1988). Future research should incorporate measures of soft drug use for comparison purposes with hard drugs in order to observe their effect on involvement in firearm offending.

Finally, the results are also limited in their generalizability. The sample includes a limited age group of 17 to 25 year old males from Michigan that have been incarcerated during or relatively soon after their theorized peak offending period of mid to late teens (Hirschi & Gottfredson, 1983). Based on this notion, the sample may be biased toward the severe end of an offending continuum and should not be considered representative of all 17 to 25 year old males in Michigan nor all institutionalized persons.

Conclusions and Policy Recommendations

The findings of this research suggest that the nexus between gang membership, associations with peers who own or possess firearms, associations with peers who had been arrested or incarcerated for firearm possession or use, drug sales, and neighborhood exposure to violence increases the risk for serious involvement in firearm offending. When these cultural and environmental socialization agents converge upon a youthful individual who may or may not have already obtained their first firearm, there is a significant potential for the individual to begin, persist, or increase their level of involvement in firearm offending. The key for criminal justice policy and practices is to reduce the frequency and proportion of crime involving firearms among at risk populations in order to reduce the overall frequency of crime within an area.

Extrapolating from the findings of the current research, there is an implicit notion that standalone general deterrence strategies may have marginal effects. The respondents, by virtue of being incarcerated in a state institution, have not been deterred from prior criminal involvement. Moreover, the respondent's associates also do not appear to be deterred from participation in criminal activity. A large majority of the sample, approximately 72% (see Table 2), has some degree of association with peers who have been arrested or incarcerated for firearm possession or use. Therefore, a targeted or directed approach is needed.

At the front end of the criminal justice system, problem-orientated policing strategies through the identification of "hot spots," or spatial locations within a community or neighborhood that are known to produce a disproportionate amount of violent crime, have been used to combat criminogenic areas prone to firearm violence that include individuals most at risk for involvement in firearm (Braga et al., 1999;

McGarrell et al., 2001; Sherman & Rogan, 1995), gang (Kennedy, Piehl, & Braga, 1996; Braga et al., 2001), and drug sale (Weisburd & Green, 1995) activities¹⁴. Optimally, a layered approach in the identification of a concentrated firearm hot spot is desired; where the rates of firearm violence, gang activity, and drug markets within a community or neighborhood are highest. From the identification of the hot spot, a directed effort could be made to increase police presence in the targeted areas and enforce firearm carrying statutes in order to decrease the frequency of firearm carrying among the infrequent and routine firearm carriers.

At one end of the continuum, the directed effort should deter the infrequent carrier as the certainty of arrest and perception of risk increases (Braga et al., 1999), which therefore may reduce the potential for opportunistic violent crimes involving firearms (Kleck, 1997). Since the infrequent carrier also will be deterred from carrying a firearm for protection, the likelihood for entering portions of the firearm hot spot area and participation in high-risk activities (e.g., drug sales and gang activity) is decreased. At the other end of the continuum, the routine firearm carrier may also be deterred from the frequency in which they have previously carried firearms due to the increased police presence. However, there is some suggestion that the routine carrier's needs for protection outweigh the costs of apprehension (Wright & Rossi, 1994). In these instances, the enforcement of firearm carrying statutes in high crime areas may serve the purpose of incapacitating those individuals most likely to utilize their firearm for criminal purposes (McGarrell et al., 2001). That is, the incapacitation effect through the use of

¹⁴ It is important to note that Kennedy, Piehl, and Braga (1996) do not consider Operation Ceasefire to be a hot spot intervention although the acknowledgement of concentrated gang areas drove the research methodology. The authors note, "unlike most efforts to attack such [gang] hot spots through place-focused interventions, our network-focused intervention will not necessarily be aimed at hot spots" (p. 181).

firearm carrying statutes may remove the routine carrier through formal criminal justice processing beginning at arrest and leading to incarceration for a set number of years. Figuratively, the incapacitation effect may only lead to arrest and firearm seizure, which would therefore “incapacitate” the routine carrier from having the ability to utilize their firearm. Although routine carriers are generally able to procure a new firearm in a relatively short amount of time (Wright & Rossi, 1994), the time lapse between arrest and firearm seizure to release back into the community may provide enough of a “cooling-off” period to lessen the probability of committing a firearm involved crime.

Criminal justice policy and practices at the tail end of the criminal justice system may also provide a focused deterrent effect for individuals that have been previously involved in firearm, gang, and drug sale activity. In large part however, the general idea is similar to that of problem-orientated policing of firearm hot spots – deter the marginal firearm carrier and deter or incapacitate the routine carrier who is most likely to be involved in future firearm offending. Utilization of “lever pulling” strategies (Kennedy, Piehl, & Braga, 1996) and a network of partnerships across the law enforcement, prosecutorial, and correctional institutions within a community could enhance the parole supervision efforts for known firearm offenders, gang members, and drug sellers in conjunction with mandatory state or federal penalties for new offenses and technical offenses involving firearms (see Project Safe Neighborhoods, 2004). Through the pre-parole identification of prisoners who have committed a firearm, gang, or drug sales offense leading to incarceration and the increased communication and subsequent action alluding to the notion that firearm offending will not be tolerated, the use of enhanced parole supervision may provide enough of a deterrent effect to reduce the likelihood of

firearm offending among the most at risk population for future involvement. When the deterrence strategies fail to deter, incapacitative efforts have the ability to revoke parole supervision and place at risk persons back into institutional supervision.

In the larger picture, the criminal justice policies and practices discussed should not been seen as panaceas. Policy and practices regarding firearms will continue to change with the progression of time and evaluative efforts may reinforce or dismantle the utility of various federal, state, and local initiatives. As suggested by Kleck (1997), “solving the [firearm] violence problem will have to involve reductions in economic inequality, injustice, and the social disorder these generate” (p. 396). Therefore, until larger social change is made to at risk communities, the maintenance of criminal justice policy and practices regarding firearm violence will continue to provide temporary relief.

APPENDIX A

ITEMS AND RELIABILITY FOR SOCIALIZATION INDEPENDENT VARIABLE

SCALES

Table 14: Items and Reliability for Hard Drug Use Scale (n=433).

Hard Drug Use Scale Items	Mean	Alpha if Item Removed
1. Have you ever tried heroin?	.12	.79
2. Have you ever tried crack?	.12	.78
3. Have you ever tried cocaine?	.33	.77
4. Have you ever tried PCP?	.16	.76
5. Have you ever tried methamphetamines?	.15	.77

Reliability Coefficient (Alpha) = .81

Table 15: Items and Reliability for Neighborhood Exposure to Violence Scale (n=455).

Neighborhood Exposure to Violence Scale Items	Mean	Alpha if Item Removed
1. Ever been threatened with a firearm?	.76	.68
2. Ever been shot at?	.76	.67
3. Ever been injured by gunshot?	.30	.73
4. Ever been injured by another weapon?	.54	.72
5. Ever been beaten up?	.62	.73
6. Ever been robbed?	.44	.73
7. In your neighborhood, lots of guns on the street?	.71	.69
8. In your neighborhood, important to have gun for protection?	.52	.70

Reliability Coefficient (Alpha) = .73

APPENDIX B

BIVARIATE CONTINGENCY TABLES

Separate chi-square contingency tables are provided for all of the control and independent variables. Tables 16 through 19 present the results of the control variables, Tables 20 through 27 present the results of socialization variables, and Tables 28 and 29 present the results of onset variables on the level of involvement in firearm offending. Summary statistics for the bivariate relationships are provided in the results section.

Control Variables

Table 16: Bivariate Relationship of Respondent Age and Involvement in Firearm Offending.

Respondent Age	<u>Involvement in Firearm Offending</u>			Row Totals
	No Involvement	Moderate Involvement	Serious Involvement	
17-20	56 (20%)	76 (27%)	146 (53%)	278
21-25	56 (26%)	69 (33%)	87 (41%)	212
Column Totals	112	145	233	490

$$\chi^2 (2, n = 490) = 6.506, \alpha = .04$$

Table 17: Bivariate Relationship of Respondent Race and Involvement In Firearm Offending.

Respondent Race	<u>Involvement in Firearm Offending</u>			Row Totals
	No Involvement	Moderate Involvement	Serious Involvement	
Black	40 (17%)	70 (30%)	121 (52%)	231
White	56 (32%)	50 (28%)	71 (40%)	177
Hispanic	4 (13%)	8 (25%)	20 (63%)	32
Other	9 (30%)	11 (37%)	10 (33%)	30
Column Totals	109	139	222	470

$$\chi^2 (6, n = 470) = 17.946, \alpha = .01$$

Table 18: Bivariate Relationship of Respondent's Population of Previous Residence and Involvement in Firearm Offending.

Pop. of Residence	<u>Involvement in Firearm Offending</u>			Row Totals
	No Involvement	Moderate Involvement	Serious Involvement	
<50,000	59 (32%)	56 (31%)	68 (37%)	183
50,001-100,000	19 (22%)	24 (28%)	42 (49%)	85
100,001-250,000	14 (16%)	30 (34%)	44 (50%)	88
250,001+	17 (13%)	32 (25%)	80 (62%)	129
Column Totals	109	142	234	485

$$\chi^2 (6, n = 485) = 25.945, \alpha = .00$$

Table 19: Bivariate Relationship of Respondent's Survey Facility and Involvement in Firearm Offending.

Facility	<u>Involvement in Firearm Offending</u>			Row Totals
	No Involvement	Moderate Involvement	Serious Involvement	
Institution 1	15 (14%)	32 (29%)	64 (58%)	111
Institution 2	74 (26%)	80 (28%)	131 (46%)	285
Institution 3	23 (24%)	34 (35%)	40 (41%)	97
Column Totals	112	146	235	493

$\chi^2 (4, n = 493) = 10.064, \alpha = .04$

Socialization Independent Variables

Table 20: Bivariate Relationship of Parental Ownership or Possession of Firearms and Involvement in Firearm Offending.

Parents O/P	<u>Involvement in Firearm Offending</u>			Row Totals
	No Involvement	Moderate Involvement	Serious Involvement	
No	72 (25%)	85 (29%)	137 (47%)	294
Yes	40 (20%)	61 (31%)	98 (49%)	199
Column Totals	112	146	235	493

$\chi^2 (2, n = 493) = 1.302, \alpha = .52$

Table 21: Bivariate Relationship of Parental Arrest or Incarceration for Firearm Possession or Use and Involvement in Firearm Offending.

Parents A/I	<u>Involvement in Firearm Offending</u>			Row Totals
	No Involvement	Moderate Involvement	Serious Involvement	
No	110 (24%)	139 (30%)	211 (46%)	460
Yes	2 (6%)	7 (22%)	23 (72%)	32
Column Totals	112	146	234	492

$\chi^2 (2, n = 492) = 9.056, \alpha = .01$

Table 22: Bivariate Relationship of Peer Ownership or Possession and Involvement in Firearm Offending.

Peers O/P	<u>Involvement in Firearm Offending</u>			Row Totals
	No Involvement	Moderate Involvement	Serious Involvement	
No	37 (59%)	21 (33%)	5 (8%)	63
Yes	72 (17%)	117 (28%)	228 (55%)	417
Column Totals	109	138	233	480

$\chi^2 (2, n = 480) = 66.599, \alpha = .00$

Table 23: Bivariate Relationship of Peer Arrest or Incarceration for Firearm Possession or Use and Involvement in Firearm Offending.

Peers A/I	<u>Involvement in Firearm Offending</u>			Row Totals
	No Involvement	Moderate Involvement	Serious Involvement	
No	69 (52%)	47 (35%)	18 (13%)	134
Yes	39 (11%)	92 (27%)	216 (62%)	347
Column Totals	108	139	234	481

$$\chi^2 (2, n = 481) = 119.564, \alpha = .00$$

Table 24: Bivariate Relationship of Gang Membership and Involvement in Firearm Offending.

Gang Membership	<u>Involvement in Firearm Offending</u>			Row Totals
	No Involvement	Moderate Involvement	Serious Involvement	
No	99 (31%)	107 (33%)	118 (36%)	324
Yes	8 (6%)	29 (21%)	104 (74%)	141
Column Totals	107	136	222	465

$$\chi^2 (2, n = 465) = 60.336, \alpha = .00$$

Table 25: Bivariate Relationship of Hard Drug Use and Involvement in Firearm Offending.

Hard Drug Use Scale	<u>Involvement in Firearm Offending</u>			Row Totals
	No Involvement	Moderate Involvement	Serious Involvement	
0 – Never Used	69 (26%)	82 (31%)	112 (43%)	263
1	13 (20%)	14 (22%)	37 (58%)	64
2	5 (14%)	10 (29%)	20 (57%)	35
3	2 (7%)	9 (31%)	18 (62%)	29
4	4 (22%)	7 (39%)	7 (39%)	18
5 – Used All	2 (11%)	8 (44%)	8 (44%)	18
Column Totals	95	130	202	427

$\chi^2 (10, n = 427) = 15.359, \alpha = .12$

Table 26: Bivariate Relationship of Drug Sales Frequency and Involvement in Firearm Offending.

Drug Sales Frequency	<u>Involvement in Firearm Offending</u>			Row Totals
	No Involvement	Moderate Involvement	Serious Involvement	
1-Never Sold	60 (46%)	44 (34%)	27 (21%)	131
2	13 (41%)	12 (38%)	7 (22%)	32
3	8 (36%)	9 (41%)	5 (23%)	22
4	7 (23%)	10 (32%)	14 (45%)	31
5	2 (4%)	18 (38%)	27 (57%)	47
6-Every Day	19 (9%)	43 (20%)	151 (71%)	213
Column Totals	109	136	231	476

$\chi^2 (10, n = 476) = 123.148, \alpha = .00$

Table 27: Bivariate Relationship of Neighborhood Exposure to Violence and Involvement in Firearm Offending.

Exposure to Violence	Involvement in Firearm Offending			Row Totals
	No Involvement	Moderate Involvement	Serious Involvement	
0-No Exposure	19 (66%)	8 (28%)	2 (7%)	29
1	13 (77%)	4 (24%)	0 (0%)	17
2	22 (52%)	15 (36%)	5 (12%)	42
3	7 (18%)	18 (46%)	14 (36%)	39
4	15 (27%)	24 (44%)	16 (29%)	55
5	12 (15%)	21 (26%)	49 (60%)	82
6	9 (11%)	20 (23%)	57 (66%)	86
7	4 (6%)	13 (19%)	51 (75%)	68
8 – Max. Exposure	1 (3%)	5 (16%)	25 (81%)	31
Column Totals	102	128	219	449

$\chi^2 (16, n = 449) = 157.912, \alpha = .00$

*Onset Independent Variables***Table 28: Bivariate Relationship of Age at First Firearm Ownership and Involvement in Firearm Offending.**

First Firearm	<u>Involvement in Firearm Offending</u>			Row Totals
	No Involvement	Moderate Involvement	Serious Involvement	
0-13	14 (8%)	44 (25%)	117 (67%)	175
14+	28 (13%)	73 (35%)	108 (52%)	209
Column Totals	42	117	225	384

$$\chi^2 (2, n = 384) = 9.277, \alpha = .01$$

Table 29: Bivariate Relationship of Age at First Arrest and Involvement in Firearm Offending.

First Arrest	<u>Involvement in Firearm Offending</u>			Row Totals
	No Involvement	Moderate Involvement	Serious Involvement	
0-14	31 (17%)	60 (33%)	93 (51%)	184
15+	73 (26%)	77 (28%)	130 (46%)	280
Column Totals	104	137	223	464

$$\chi^2 (2, n = 464) = 5.587, \alpha = .06$$

APPENDIX C

VARIABLE TRANSFORMATION ILLUSTRATION

Table 30 provides an illustrative table regarding the transformation process of the gang membership variable.

Table 30: Gang Membership Variable Transformation

	Gangmemb	Gangnew	MissGang
Non-Gang (0)	295 (65%)	319 (70%)	429 (95%)
Gang Member (1)	134 (30%)	134 (30%)	24 (5%)
Missing	24 (5%)	0	0
Total	453	453	453

With the removal of missing cases from the variables missing 4 or fewer percent of their univariate distribution, the original distribution of the dichotomous variable gang membership (variable “gangmemb”) was reduced to 295 non-gang members coded 0, 134 gang members coded 1, and an additional 24 missing responses. A new variable, “gangnew,” was created that included the 24 missing cases from the original variable “gangmemb.” Specifically, the 24 missing cases were coded 0 and added to the original “gangmemb” distribution of 295 resulting in a total “gangnew” frequency of 319 persons coded 0. In order to control for the effect of adding the missing cases into the variable “gangnew,” a missing data indicator variable (“missgang”) was created and coded 0 for non-missing cases and 1 for missing cases. The two new variables created, “gangnew” and “missgang,” are then entered into the ordered logit regression model as independent variables or predictors.

APPENDIX D

MULTINOMIAL LOGIT REGRESSION RESULTS

Table 31 provides the multinomial logit regression results for onset socialization Models 9 and 10 that examine the effect of the onset age at first firearm ownership. Again, Models 9 and 10 were found to be in violation of the proportional odds assumption. Therefore, alternate models were produced that did not include the constraint of the proportional odds assumption (Long, 1997).

Table 31: Multinomial Logit Regression Odds Ratios for Models 9 and 10 in Violation of the Proportional Odds Assumption† (n=453).

	<u>Model 9</u>		<u>Model 10</u>	
	Moderate Involvement (2) Odds Ratios	Serious Involvement (3) Odds Ratios	Moderate Involvement (2) Odds Ratios	Serious Involvement (3) Odds Ratios
<u>ML Estimates</u>				
Constant (SE)	-.62 (1.17)	-1.67 (1.33)	-.52 (1.17)	-1.75 (1.35)
<u>Odds Ratios</u>				
F. FirearmNew	1.07	.93	1.06	.93
FFMiss	.20	.01***	.18	.01***
BlackNew	3.07**	2.74*	3.16**	2.86*
RaceMiss	4.88	4.34	4.62	4.02
Detroit	.84	1.90	.81	1.97
Institution 2	.59	.54	.57	.55
Parents O/P	.72	.52	.73	.51
Peers O/P	1.32	6.94**	1.26	6.66**
V. ExposeNew	1.18*	1.81***	1.15	1.70***
ETVMiss	2.49	21.43***	2.21	15.89***
GangNew			2.77*	5.73***
MissGang			1.19	1.15
-2LL	670.48		653.65	
LR χ^2 (20 df)	272.18***		289.01***	

†No involvement in firearm offending (1) is held as the reference category.

*p < 0.05, **p < 0.01, ***p < 0.001

For the multinomial logit Model 9, black respondents and increased exposure to neighborhood violence increased the likelihood of moderate and serious involvement in

firearm offending. Association with peers who owned or possessed firearms and missing responses on the variable of age at first firearm ownership and the variable of neighborhood exposure to violence also increased the likelihood for serious involvement in firearm offending. The onset measure of age at first firearm ownership and the socialization measure of parental ownership or possession of firearms did not influence moderate and serious involvement. Although insignificant, the likelihood for moderate involvement in firearm offending was decreased for respondents from Detroit, while the likelihood for serious involvement was increased. Since the odds ratios differ in directionality, the dummy variable “Detroit” is speculated to be the variable producing the violation of the proportional odds assumption.

For multinomial logit Model 10, black respondents and gang membership increase the likelihood of moderate and serious involvement. Association with peers who own or possess firearms, neighborhood exposure to violence, and missing responses on the variable of age at first firearm ownership and the variable of neighborhood exposure to violence increased the likelihood of serious involvement. Once again, the onset measure of first firearm ownership and measure of parental socialization were found to be insignificant, while the directionality for the insignificant dummy variable “Detroit” differed in directionality between moderate and serious involvement¹⁵.

¹⁵ Multinomial logit Model 9 and 10 also produced logit coefficients for the variable of age of first firearm ownership that differed in directionality with the likelihood for moderate involvement increased for those respondents who have obtained their first firearm at older ages, while the likelihood for serious involvement decreased with older ages. However, the close approximation to 1 for each of the odds ratios in Models 9 and 10 suggest a miniscule difference between moderate or serious involvement and the reference category of no involvement.

APPENDIX E

AD HOC BIVARIATE ANOVA RESULTS

Tables 32 through 34 provide the ad hoc bivariate ANOVA analyses for missing responses on the variable of neighborhood exposure to violence (Table 32), the variable of age at first firearm ownership (Table 33), and the variable of age at first arrest for any crime (Table 34). For all of the analyses, the missing response variable was entered as an independent variable in order to gauge the effect the missing variable has on the remaining variables used to predict involvement in firearm offending. The ANOVA results are not presented for the new variable upon which the missing response indicator was created since the two measures are highly correlated. That is, the results of the missing responses on the variable of neighborhood exposure to violence will not include the predictor of neighborhood exposure to violence, missing responses on the variable of age at first firearm ownership will not include the predictor of age at first ownership, and missing responses on the variable of age at first arrest will not include the predictor of age at first arrest for any crime. An interpretation of the results is provided in the discussion section.

Table 32: Bivariate ANOVA of Missing Responses on the Variable of Neighborhood Exposure to Violence on Predictors (n=453).

Dependent Variable	F	Non-missing Values	Missing Values
		(n = 422) Mean (s.d.)	(n=31) Mean (s.d.)
R's Age	.82	20.41 (1.88)	20.10 (1.64)
BlackNew	4.44*	.45 (.50)	.65 (.49)
MissBlack	5.18*	.04 (.20)	.13 (.34)
Detroit	3.25	.24 (.43)	.39 (.50)
Institution 2	.21	.59 (.49)	.55 (.51)
Parents O/P	.06	.41 (.49)	.39 (.50)
Parents A/I	2.12	.06 (.24)	.13 (.34)
Peers O/P	.22	.87 (.33)	.90 (.30)
GangNew	.23	.30 (.46)	.26 (.44)
MissGang	7.88**	.05 (.21)	.16 (.37)
Drug Sales Freq.	.47	4.02 (2.16)	4.29 (2.07)
H. Drug UseNew	1.66	.81 (1.37)	.48 (1.21)
MissH DU	1.18	.13 (.33)	.19 (.40)
First FirearmNew	4.02*	11.13 (5.97)	8.87 (6.95)
MissFF	4.59*	.19 (.40)	.35 (.49)
First ArrestNew	.47	14.43 (4.49)	15.00 (3.45)
MissFA	.39	.06 (.24)	.03 (.18)

*p < 0.05, **p < 0.01

Table 33: Bivariate ANOVA of Missing Responses on the Variable of Age at First Firearm Ownership on Predictors (n=453).

Dependent Variable	F	Non-missing Values	Missing Values
		(n=360) Mean (s.d.)	(n=93) Mean (s.d.)
R's Age	2.77	20.32 (1.80)	20.68 (2.09)
BlackNew	4.32*	.44 (.50)	.56 (.50)
MissBlack	.52	.05 (.22)	.03 (.18)
Detroit	.18	.25 (.43)	.27 (.45)
Institution 2	.01	.59 (.49)	.59 (.49)
Parents O/P	28.65***	.47 (.50)	.17 (.38)
Parents A/I	3.80*	.08 (.27)	.02 (.15)
Peers O/P	59.12***	.93 (.25)	.66 (.48)
V. ExposeNew	59.81***	4.77 (2.25)	2.73 (2.35)
MissVE	4.59*	.06 (.23)	.12 (.32)
GangNew	20.74***	.34 (.48)	.11 (.31)
MissGang	.31	.05 (.22)	.06 (.25)
Drug Sales Freq.	52.64	4.39 (2.02)	2.73 (2.35)
H. Drug UseNew	13.35	.91 (1.42)	.33 (.98)
MissHDU	5.71	.11 (.31)	.20 (.41)
First ArrestNew	.16	14.43 (4.26)	14.63 (5.01)
MissFA	.69	.05 (.22)	.08 (.27)

*p < 0.05, **p < 0.01, ***p < 0.001

Table 34: Bivariate ANOVA of Missing Responses on the Variable of Age at First Arrest on Predictors (n=453).

Dependent Variable	F	Non-missing Values	Missing Values
		(n=427) Mean (s.d.)	(n=26) Mean (s.d.)
R's Age	.44	20.41 (1.86)	20.15 (2.07)
BlackNew	.69	.47 (.50)	.38 (.50)
MissBlack	1.34	.05 (.22)	0
Detroit	1.31	.25 (.43)	.35 (.49)
Institution 2	.27	.59 (.49)	.31 (.47)
Parents O/P	1.16	.41 (.49)	.31 (.47)
Parents A/I	.05	.07 (.25)	.08 (.27)
Peers O/P	.02	.88 (.33)	.88 (.33)
V. ExposeNew	.10	4.34 (2.41)	4.50 (2.47)
MissVE	.39	.07 (.26)	.04 (.20)
GangNew	.09	.30 (.46)	.27 (.45)
MissGang	.12	.05 (.23)	.04 (.20)
Drug Sales Freq.	8.55**	4.11 (2.14)	2.85 (2.11)
H. Drug UseNew	.05	.79 (1.37)	.73 (1.22)
MissH DU	.69	.13 (.34)	.08 (.27)
First FirearmNew	2.08	11.07 (6.05)	9.31 (6.14)
MissFF	.69	.20 (.40)	.27 (.45)

*p < 0.05, **p < 0.01

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