

UNSTRUCTURED TIME USE: A MULTI-LEVEL INVESTIGATION OF THE ROLE OF  
ROUTINE ACTIVITIES, INDIVIDUAL DIFFERENCES, AND COLLECTIVE EFFICACY  
IN ADOLESCENT ALCOHOL USE

By

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In memory of my best friend, Anthony Frank Madias

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Abstract of Thesis Presented to the Graduate School  
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Adolescents who engage in alcohol use are at increased risk to experience short- and long-term consequences as a result. Although adolescents who spend time in unstructured activities away from adult supervision are more likely to use alcohol, past studies which have only considered those activities risk over-simplifying the complexities of social interactions by neglecting the larger social context in which routine activities occur and the propensity for substance use. This study extends the individual-level routine activities approach by developing a framework that considers the neighborhood context in which activities occur in combination with one's propensity to engage in use.

Using data from the Project on Human Development in Chicago Neighborhoods Community Survey, Longitudinal Cohort Study, and the 1990 U.S Census, three hypotheses were examined from the proposed framework: 1) neighborhood collective efficacy is inversely related to the frequency that adolescents use alcohol; 2) the time adolescents spend in unstructured activities with peers is directly related to the frequency of alcohol use; 3) neighborhood collective efficacy moderates the relationship

between time spent in unstructured activities with peers and adolescent alcohol use. To test these hypotheses, a series of multilevel random intercept and random coefficient ordinal regression models were estimated. Results from these models partially support the hypotheses examined here. In particular, the amount of time that adolescents spend in unstructured activities increased the likelihood that they would report frequently using alcohol; however collective efficacy was not related to between-neighborhood differences in use, nor did it moderate the influence of time use.

## CHAPTER ONE INTRODUCTION

### **Unstructured Time with Peers, Social Control, and Individual Propensity**

In their extension of routine activities theory, Osgood and colleagues (1996) found that time spent in unstructured socializing with one's peers—spending time with peers without a tangible purpose in the absence of capable guardianship or social control—is directly related to the use of alcohol, marijuana, and other illegal substance. Moreover, Maimon and Browning (2010) extended Osgood et al.'s routine activities theory by situating adolescents' time in unstructured activities within the context of neighborhoods. Specifically, they found that collective efficacy—defined by Sampson and colleagues (1997) as the combination of social cohesion and trust among residents and their willingness to act as agents of informal social control for the common good of their neighborhood—moderates the effect of unstructured socialization on violent offending, even after considering the effect of associating with deviant peers. However, it is still currently unknown how the competing mechanism of collective efficacy influences adolescent substance use, especially when adolescents spend increasing amounts of time in unstructured activities. This study examines how the contextual influence of collective efficacy moderates the relationship between unstructured socialization and adolescent substance use. Further, this study extends Osgood et al.'s (1996) initial findings by going beyond the situational inducements for substance use found in unstructured time spent with peers by also considering low self-control as an individual trait that contributes to differences in propensity to engage in drug use.

Osgood et al. (1996) extend the routine activities perspective to adolescent behavior by considering the time adolescents spend in unstructured activities with peers

to be a situation that is conducive to delinquent behavior. While it is true that time spent informally socializing with one's peers carries no direct connotations of deviance, Osgood and Anderson (2004, p.521) argue that "the presence of peers will make deviant acts easier and more rewarding, the absence of authority figures will reduce the potential for social control responses, and the lack of structure will leave time available for deviance." This interpretation of peer association as simply a source of opportunity could be considered a contrast to theories of socialization, such as social learning theory, which consider peers to be a central element of the socialization process (Akers, 2009, 1985, 1996). Several studies have found that such behavior may lead to opportunities that are conducive to deviant behavior. For example, rates of delinquency have been found to be greater among adolescents who spend time talking with friends or riding in a car (Hirschi, 1969), "hanging out" with peers (Agnew and Peterson, 1989), being away from home or with groups of friends (Riley, 1987), and spending evenings out for fun and recreation (Wallace and Bachman, 1991).

Osgood and colleagues (1996) hypothesize that the explanation for this association is that unlike structured activities, unstructured activities are less likely to be organized, thus making it more likely for individuals responsible for social control to be absent (Osgood et al, 1996). Moreover, unstructured activities that occur away from the purview of work, school, and family are more likely to be conducive to deviance, as limited supervision considerably reduces the perceived risk of apprehension (Jacobs, 2010). Further, individuals who spend more of their time in structured activities, as opposed to unstructured, have relatively less time available to spend on deviant endeavors. On the other hand, social learning theory suggests that this relationship is

spurious after considering the quality of the peers which one associates with. Studies which have simultaneously considered time spent with peers in unstructured activities and the quality of the peers which one is spending time with have, however, failed to confirm this alleged spuriousness (Svensson and Oberwittler, 2010; Haynie and Osgood, 2005; Maimon and Browning, 2010).

According to routine activities theory, perhaps the most influential aspect of a situational context on adolescents' behavior is the presence of a guardian or handler. If guardianship is present, deviant behavior is considered to be less likely to occur (Cohen and Felson, 1979; Felson, 2006). As Osgood et al. (1996) pointed out, the relationship between the offender and the authority figure is not necessarily the important aspect of the situation. Rather it is the authority figure's perceived or proscribed obligation to act within the context of the situation that stifles deviant behavior (Sampson, Raudenbush, and Earls, 1997; Bursik, 1988; Sampson, 1997; Osgood and Anderson, 2004). If this obligation is absent or no guardians are present, deviant behavior is more likely to occur. Thus, the frequency of and the opportunity for unstructured socializing with peers is theorized to be strongly conditioned by the larger social context, including neighborhoods (Osgood and Anderson, 2004).

Generally, guardians may be formal, such as police officers, or informal, such as parents, teachers, or community members. The importance of each type is relative, however, and it has been suggested that when it comes to crime prevention and deterrence that occurs within the course of one's every day, routine activities, informal guardianship is more important (Sampson and Groves, 1989; Felson, 1994). Similarly, social disorganization theory emphasizes the role of parents and family in monitoring

neighborhood youth as a means to maintain order within the community (Sampson, 1987, 1992, 1997). Unfortunately, informal guardians do not necessarily have the proscribed duty to act in order to prevent crime and deviance from occurring. The probability that they will do so is shaped by several factors, including the level of collective efficacy within the community. Influenced by a sense of trust and cohesion among residents, collective efficacy is essentially the expectation or willingness of residents to act as informal social control agents for the common good of their community when they observe disorderly conduct and crime occurring in their neighborhood (Sampson, Raudenbush, and Earls, 1997). Specifically, communities with high levels of collective efficacy will have limited opportunities for unstructured socializing among adolescents (Maimon and Browning, 2010; Osgood and Anderson, 2004). That is, the contextual influence of collective efficacy should partially account for differences in the availability for unstructured socializing among adolescents across neighborhoods, which in turn should influence adolescent substance use. Moreover, substance use among adolescents is expected to be more common in neighborhoods with less collective efficacy where adolescents are more likely to spend their time in unstructured activities with peers.

As has been previously mentioned, studies utilizing the routine activities perspective have primarily focused on rates of victimization. Typically, these studies have sought to explain *how* crime occurs by discerning the relationship between suitable targets and capable guardians rather than explain *why* one chooses to commit crime and delinquent acts. As a result, the offender's motivation is often assumed to either be ever-present, or considered to be induced by the situation itself (Schreck,

Wright, and Miller, 2002). Overlooking variation in criminal motivation is a relatively minor shortcoming from a crime prevention perspective, as the central concern is often not interested with why an offender chooses to commit crime in general (Felson, 1998). From an offender perspective, however, this omission can be quite significant.

Osgood and colleagues (1996) consider situational inducements to be the primary source of criminal and delinquent motivation. They thereby do not directly address possible sources of individual variation in criminal/antisocial propensity, although they do acknowledge that individuals will vary in their susceptibility to situational inducement (Osgood et al. 1996 p. 638). Specifically they state:

We reject a categorical distinction between offenders and non-offenders. Instead, we assume that people vary widely in their susceptibility to deviance, that this variation is continuous and not discrete (Rowe, Osgood, and Nicewander 1990), and that most people have the potential for at least occasionally succumbing to an opportunity for deviant behavior.

We replace Cohen and Felson's (1979) "motivated offender" with an assumption that the *motivation resides in the deviant behavior itself*. Their second element, the "suitable target," provides a situational motivation appropriate to the domain of their analysis, namely, direct contact predatory crime (p. 589). To apply the routine activity perspective to a broader range of deviant behavior, we substitute the more general notion of situations in which *a deviant act is possible and rewarding*. (Osgood et al, 1996 p.639 emphasis in original)

Based on this interpretation, Osgood and colleagues posit that unstructured situations with friends are likely to induce deviance when the deviant act is easily perpetrated, and the symbolic (e.g., status and reputation) or tangible rewards are expected to be great. However, the probability that a situation will be interpreted as an opportunity for criminal behavior is based not only on characteristics of the situation, but also on those of the individual (Cook, 1980; Gottfredson and Hirschi, 1990; Pogarsky, 2002; Jacobs, 2010). In fact, Gottfredson and Hirschi specifically state that personal

traits, i.e., low self-control, and situational theories of crime are logical complements (Gottfredson and Hirschi, 1990, p. 22 – 25). Therefore, by being primarily concerned with the way in which the distribution of opportunities influence the prevalence of crime and delinquency, the perspective of Osgood and colleagues fails to recognize the specific individual differences that contribute to the motivation to offend.

Specifically, population heterogeneity-based or criminal propensity theories of crime suggest that the presence of an opportunity alone is not enough for crime to occur; a criminal propensity is also required. Indeed, many individuals would never consider the possibility of offending no matter how large the situational inducements may be (Pogarsky, 2002), while others vary in their level of criminal motivation and commitment to antisocial behavior and offending (Jacobs, 2010; Gottfredson and Hirschi, 1990). Moreover, evidence has shown that individual differences predispose some individuals to be more inclined to offend than others, even when faced with the same situations (Nagin and Paternoster, 1993; Piquero and Tibbetts, 1996). To address this issue, it is necessary to integrate Osgood's theory of unstructured activities with individual characteristics that may account for differences in criminality. To this end, low self-control is a trait that is theoretically argued to account for selection into unsupervised, unstructured activities with peers, drug using peer groups, individual substance use, and other deviant lifestyles or activities (Schreck, Wright, Miller, 2002; Piquero and Pogarsky, 1996).

While unstructured socializing with peers may present an individual with situations that are conducive to substance use, it is equally important to consider the type of peers which one associates (Haynie and Osgood, 2005). Even if an individual is inclined to

commit an offense or engage in deviance should the opportunity should arise, it is possible that the presence of conforming peers may constrain or prevent it from occurring. Conversely, unstructured associations with deviant, drug using peers may lead to increased substance use if drugs become more available, or if one believes use is required to be accepted within the group. However, while it is important to consider the quality of peers, this is not to say that unstructured socializing will only influence substance use indirectly through peers. The current evidence suggests that increased opportunity, created through unstructured socializing, will have a direct effect on substance use independent of the type of peers one youth associate with (Haynie and Osgood, 2005; Bernburg and Thorlindsson, 2001).

### **Overview of Research Questions and Methodology**

This study presents an integrated framework incorporating three distinct, yet conceptually compatible, theories which have been found to condition the opportunity and motivation for deviant behavior in order to advance a more complete view of social interaction. Previous studies based on a single perspective which only consider the opportunity for deviant behavior or the personal characteristics that make one more likely to engage in such behaviors risk over simplifying the dynamic ways by which one interacts with their surroundings. As a result, this framework considers collective efficacy to be a mechanism that links the structural conditions in which one lives to the type of activities available to take part in. In short, collective efficacy is one mechanism which patterns one's routine activities. The differential availability of some activities compared to others is therefore a primary source of variability in the distribution of opportunities for deviant behavior. As described above, the activities of central importance are those which Osgood et al. (1996) describe as unstructured, as they

have consistently been identified as producing deviant compared to other types of activities. Hence, individuals who spend more time in unstructured activities are assumed to have more opportunity for deviant behavior. Self-control, on the other hand, is expected to make one more or less likely to utilize the opportunities they are exposed to for deviant behavior. Taken together, this framework more accurately represents the complex process by which deviance occurs.

This study aims to address several empirical questions based on this framework by independently and jointly considering collective efficacy as a form of social control for both behavior and opportunity to advance knowledge on substance use, in particular alcohol use, among adolescents. Although alcohol use may not have the same negative connotations or stigma as heroin or cocaine use, the side effects and consequences of use are more prevalent being that it is legal and readily available. For instance, alcohol consumption is linked to increased incidence of violence, criminal behavior and traffic fatalities, as well as physical addiction, liver sclerosis, and other health problems (Goode, 2011). The prevalence of alcohol abuse and dependency has also been found to be greater among individuals who begin use at an earlier age (Hawkins, Graham, Maguin, Abbott, Hill, Catalano, 1997; Grant and Dawson, 1997). Further, youth who drink heavily are significantly more likely to also engage in illicit drug use (Chen and Kandel, 1995; Kandel and Logan, 1984). While this relationship may not be causal in nature, better understanding the factors associated with increased alcohol use is informative for understanding other types of illicit use.

The following research questions are empirically investigated in the current study. First, does collective efficacy decrease adolescent alcohol? It is expected that

neighborhoods with higher collective efficacy are more willing and better able to exercise informal social control over adolescents who reside within them. As a result, it is hypothesized that highly efficacious neighborhoods are better able to limit alcohol use among adolescents than neighborhoods with low collective efficacy.

Second, does spending time in unstructured, unsupervised activities with one's peers increase the likelihood adolescents will engage in alcohol use after taking into account neighborhood differences? Based on findings from Osgood et al. (1996), it is expected that the time adolescents spend in unsupervised, unstructured activities with their peers will be directly related to adolescent alcohol use, independent of collective efficacy. Further, incorporating this with the expected results of the first empirical question, it follows that collective efficacy will indirectly reduce the likelihood adolescents will engage in substance use by limiting the opportunities adolescents have to engage in unstructured activities in highly efficacious neighborhoods. In general, Osgood et al. (1996) found that time spent in supervised and unstructured peer groups was directly associated with criminal behavior and substance use, even after controlling for the types of peers which one is associated with (Haynie and Osgood, 2005). It is expected that the frequency of unstructured activities is expected to vary across neighborhoods as a function of collective efficacy, as highly efficacious neighborhoods are better able to monitor their youth relative to neighborhoods that lack collective efficacy, and will thus reduce the likelihood of adolescent alcohol use as a result.

Finally, are adolescents residing in low collective efficacy neighborhoods who also spend more time in unstructured activities with peers more likely to engage in alcohol use? According to Sampson (2002 p.102) informal social control (i.e., collective

efficacy) is instrumental in the maintenance of public order to prevent acts such as truancy and “hanging” out by teenage peer groups. When informal social control is minimized, adolescent peer groups are less restrained and are therefore free to engage in acts of deviance, including substance use (Sampson, 1997). Similarly, Sampson and Groves (1989) find that unsupervised peer groups are an important link between structural characteristics of the community and rates of delinquency therein. For neighborhoods that already lack collective efficacy, those who spend the most time in unstructured activities with peers will have substantial opportunity to engage in alcohol use (Osgood and Anderson, 2004). Therefore, it is expected that the association between unstructured socialization with peers and alcohol use will be moderated by the level of neighborhood collective efficacy.

This study uses data collected during waves 1 and 2 (1994-1997 and 1997-1999) from the 12 and 15-year old cohorts of the Longitudinal Cohort Study (LCS) in the Project on Human Development in Chicago Neighborhoods (PHDCN). The PHDCN-LCS is designed to further the understanding of how neighborhood contextual and social influences affect the development of both positive and negative behaviors of children and adolescents. To this end, the project’s design contains several data collection efforts that will be used for the current study including: 1) an independent community survey administered in 1995 designed to reliably and accurately measure social processes occurring in Chicago neighborhoods, 2) 1990 U.S decennial Census data to capture structural aspects of neighborhoods such as poverty, unemployment, residential turnover, and immigrant concentration, and 3) measures of behavioral,

psychosocial, and cognitive variables collected on a random sample of seven cohorts of children and adolescents within 80 selected neighborhoods.

Multilevel statistical models will be used to answer the research questions proposed in this study. First, the PHDCN data are clustered in that children, adolescents, and their primary caregivers are nested within neighborhoods; therefore, because the PHDCN-LCS data allow for variation between individuals at one level and between neighborhoods at another, multilevel analysis was used. Discussed in detail in the methods section, the remaining questions, concerning the prevalence of alcohol use among adolescents, will require a series of two-level hierarchical generalized models (HGLM) (Raudenbush and Bryk, 2002). The level one model includes individual-level differences in the characteristics of adolescents such as low self-control and unstructured time spent with peers and how these characteristics influence alcohol use; the level two model pertains to neighborhood influences on adolescents alcohol use across neighborhoods including collective efficacy, concentrated disadvantage, and other structural neighborhood characteristics

## CHAPTER TWO LITERATURE REVIEW

### **Adolescent Substance Use**

Early substance use, especially among adolescent youths, has been considered a serious problem since the 1980s, and has been the subject of numerous public policies aimed at preventing use. Although the national prevalence of substance use has declined since its peak in the 1990s, usage rates are still relatively high among adolescents (Johnston, O'Malley, Bachman, Schulenburg, 2011). To better understand the antecedents of substance use, this literature review will first discuss recent trends in substance use behavior among adolescents, and then review the findings from major studies concerning unstructured, unsupervised socialization with peers and collective efficacy theory, as they relate to tobacco, alcohol, and marijuana use, specifically.

The Monitoring the Future (MTF) survey, funded by the National Institute of Drug Abuse, has measured substance use and related attitudes of adolescents since 1991 and is one of the longest running, systematic research efforts on the subject. The most recent survey, conducted in 2010, surveyed 46,482 students in a nationally representative sample of 396 public and private schools (Johnston, et al. 2011). Each year, the survey asks respondents to report their use of alcohol, cigarettes, marijuana, and several other drugs over various periods of time, including lifetime, yearly, monthly, and in some cases, daily use.

Results show that of 8th graders, 13.7% used marijuana and 29.3% used alcohol at least once over the past year, while 7.1% smoked at least one cigarette over the past month. Additionally, 35.8% of 8th graders report alcohol use at least once in their lives. Compared to the previous year, 8th graders' cigarette and marijuana use has increased,

while alcohol use has slightly decreased. Of 10th graders, 27.5% used marijuana and 52.1% used alcohol at least once over the past year, while 13.6% smoked at least one cigarette over the past month. Among 10th graders, cigarette and alcohol use has stayed roughly the same, while the prevalence of marijuana use has increased by nearly 1% from the previous year (Johnston, et al. 2011).

With the exception of 10th grade alcohol use which began at its highest rate of prevalence, adolescent substance use over the 30 days prior to survey administration showed a substantial increase in prevalence between 1991 and 1996, when the 30 day prevalence rates were at the highest for 8th and 10th grade marijuana, alcohol, and tobacco use. Specifically among 8th graders between 1991 and 1996, reports of use went from 3.2% to 11.3% for marijuana; 25.1% to 26.2% for alcohol; and 14.3% to 21.0% for cigarette use over the last 30 days. Similarly for 10th graders, reports of use go from 8.7% to 20.4% for marijuana; 42.8% to 40.4% for alcohol; and 20.8% to 30.4% for cigarettes over the last 30 days. The highest reported 30 day prevalence rates for these three substances all occurred in 1996, with the exception of 10th grade alcohol use (Johnston, et al. 2011). In comparison, 8% and 16.7% of 8th and 10th graders used marijuana, respectively; 13.8% and 28.9% used alcohol; and 7.1% and 13.6% used cigarettes over the last 30 days in 2010, respectively. While use has decreased from the highest rates in 1996, overall prevalence continues to remain relatively high (SAMHSA, 2010).

It is important to recognize that adolescence is perhaps the most important stage in the life-course when it comes to the prevention of substance use and abuse. Typically, it is at this stage in which initiation into illicit substance use begins with

experimentation, usually with tobacco or alcohol, and may persist and escalate from there into harder substances (Kandel and Logan, 1984). If initiation does not begin at this stage, the likelihood that it occurs in adulthood is considerably decreased (Kandel and Logan, 1984). Conversely, the earlier experimentation with substance use occurs, the more likely it is that it will persist. In particular, age of substance use onset has been found to be indirectly related to delinquency through association with deviant peers, continued substance use, and unstructured activities, such as going to bars and hanging around on street corners or vacant property (Zhang, Wieczorek, and Welte, 1997).

Not all harms produced by substance use and abuse are direct and short-term. A number of consequences can be indirect and may cause lasting damage. In particular, this type of harm often relates to the adverse effects caused by substance use on developmental trajectories. Generally speaking, all adolescents will experience a number of transitions in their lives (e.g., leaving home, finishing school, entering the workforce, having a family). The time at which these transitions occur is of vital importance in determining the course that their adult life will take (Krohn, Lizotte, Perez, 1997). Adolescents who experience precocious transitions that stem from substance use are at increased risk of continued use and abuse of substances, as well as other maladaptive consequences. It has also been suggested that the relationship between substance use and maladaptive outcomes is bidirectional (Thornberry, 1987; Krohn, Lizotte, Perez, 1997; Nagin and Paternoster, 1993; Sampson and Laub, 1993). Thornberry (1987), for instance, posits that substance use during adolescence will lead to negative consequences, which, in turn, increases the probability that substance use

will continue to occur as an individual's bonds to conventional society are weakened or broken. For example, becoming a parent before one is mentally or financially prepared can negatively impact one's ability to finish their education or maintain quality employment, which then can perpetuate substance use and other maladaptive behavior. This is similar to what Sampson and Laub (1993) refer to as cumulative continuity of disadvantage. The potential for long-term, continued harm emphasizes the need to understand the antecedents associated with early substance use before problems can develop.

The harm caused by early substance use and abuse continues to be a considerable concern for policy makers, especially in regard to adolescent use, as evidenced by the plethora of prevention programs that target adolescents and children through schools (e.g., drug abuse resistance education (D.A.R.E) and the ongoing war on drugs. In many instances, the goal of these efforts is to discourage adolescents from engaging in substance use through abstinence-only or zero-tolerance education. However, despite the millions of dollars spent on control efforts, as well as the strain placed on the criminal justice system, many accounts suggest that the ability of such programs to prevent use and reduce harm associated with addiction has been wanting. For example, Gottfredson (1998) found that students that experience the D.A.R.E. program are no less likely to use drugs than students who do not receive the program. In fact, there is evidence to suggest that students who complete the D.A.R.E. program are actually more likely to use drugs and alcohol (Rosenbaum and Hanson, 1998).

Rather than focus resources on supply-side efforts of control, which have consistently proven difficult or ineffective, it may be more fruitful to identify and address

risk factors that lead to substance use (Hawkins, Catalano, and Miller, 1992). For example, the Communities that Care program—a program designed to prevent substance use and other problem behavior by building social cohesion within communities against use—has been shown to reduce the rate of initiation into alcohol and tobacco in treatment groups by the 8th grade (Hawkins, Oesterle, Brown, Arthur, Abbott, Fagan, Catalano, 2009). Although initial results have not shown significant differences between treatment and control groups for 8th graders who had initiated use prior (Hawkins, et al. 2009; Oesterle, Hawkins, Fagan, Abbott, Catalano, 2010), the positive treatment effects for those who have not yet begun using drugs suggest that community-level intervention efforts are viable strategies for preventing adolescent substance. To this end, it is essential to identify social and contextual influences, which promote the use of substances, as well as, mechanisms that constrain use. By better understanding the contextual and individual correlates of adolescent substance use, it is possible to conceive of more effective mechanisms of control than currently available.

Following recent research considering individual differences within social contexts, (Gibson, 2012; Gibson and Krohn, 2012; Maimon and Browning, 2010), the framework proposed in the current study focuses on a particular type of opportunity for substance use—unstructured socialization among adolescents—as it occurs within the context of neighborhoods and individual differences in propensity to explain substance use. Within the neighborhood context, opportunities for unstructured socialization have been found to vary as a function of collective efficacy (Maimon and Browning, 2010). That is, adolescents residing in neighborhoods with more collective efficacy report engaging in unstructured activities with peers less frequently than those who reside in

neighborhoods with less collective efficacy (Maimon and Browning, 2010). In addition to neighborhood collective efficacy and opportunity for use adolescents likely differ in their propensity to use alcohol. In order to correctly estimate the importance of contextual differences, it is necessary to control for this propensity. One important source of individual propensity described by Gottfredson and Hirschi (1990) as an enduring personal trait which contributes to all types of deviant behavior is low self-control. Further, without considering differences in self-control the effect of neighborhood context may be obfuscated, as some evidence suggests that self-control may vary across neighborhoods (Gibson, Sullivan, Jones, and Piquero, 2010).

Similarly, adolescents who have low self-control may differ in the way they interpret situational contexts—a possibility that opportunity theories often fail to consider. For instance, in their multilevel theory of criminal opportunity, Wilcox, Land, and Hunt (2002) emphasize the ecology of crime, and believe that opportunity theory (e.g., Meithe and McDowall, 1993) is inherently well-suited to explain criminal and deviant behavior in terms of individuals interacting within particular environments which they are embedded. They argue that theories focusing solely on individual-level explanations of crime tend to neglect the influence that social contexts may exert, while exclusively relying on contextual-level factors may obfuscate important individual characteristics (Wilcox et al. 2002). But like other opportunity theories (e.g., Cohen and Felson, 1979; Hindelang, Gottfredson, and Garofalo, 1978), Wilcox et al. (2002, p. 54) only consider individual-level differences in routines that place individuals in situations that promote criminal behavior. In contrast, the framework offered here takes the opposite approach, and considers criminality to be differentially distributed across the

population. This interpretation of criminality is consistent with theories of population heterogeneity (Nagin and Paternoster, 2000). In particular, the framework presented here adopts Gottfredson and Hirschi's (1990) general theory of crime (i.e., self-control theory) as one of the primary individual characteristics that moderates the relationship between social context, opportunity, and substance use. While this study put forth an integrate framework adolescent substance use, several hypotheses from this framework will not be explored herein. For instance, hypotheses related to self-control are not explicitly tested herein; however, self-control will serve as a control variable.

### **Routine Activities Theory and Unstructured Activities**

Perhaps the most popular of the opportunity theories, routine activities theory posits that crime trends vary in time and space based on the intersection of motivated offenders with suitable targets that are not protected by capable guardianship. Crime will occur when all three are present, but it can also be prevented by removing one or more of these aspects. The validity of this theory has generally been supported through the study of macro-level crime trends (Cohen and Felson, 1979; Hindelang, Gottfredson, and Garofalo, 1978; Sherman, Gartin and Buerger, 1989; Kennedy and Ford, 1990). However, the routine activities perspective has, thus far, been underutilized to explore the antecedents of substance use (Goode, 2011).

Although the routine activities theory often examines crime from a victimization perspective, one of the most enduring contributions of this perspective has been to reify the importance of the situational context on crime commission. Perhaps the most important function of a situation is to provide opportunity for crime (Birkbeck and LaFree, 1993; Coleman, 2006; Wilcox, et al 2002), yet opportunity is often neglected in most criminological theories, and typically left unspecified. This practice can be

problematic for assessing criminological theory, as crime varies as a function of criminality and opportunity (Gottfredson and Hirschi, 1990; Cohen and Felson, 1979). Thus, it is of limited utility to focus solely on individual characteristics while neglecting opportunity. In general, the opportunity for crime is assumed to be a necessary (if not sufficient) condition in all theories of criminal behavior (Wilcox, Land, and Hunt, 2003).

Not all situations, however, may be construed as opportunities for deviant behavior or substance use. For example, time spent in the classroom under teacher supervision would not be a situation conducive to substance use for most adolescents. On the other hand, an adolescent may perceive being left home alone for a weekend with an unlocked liquor cabinet as an opportunity for use. In the former instance, the probability of substance use is reduced due to the presence of guardianship and the social context of the classroom, whereas in the latter, the lack of supervision and availability of alcohol increases the probability of use through opportunity. Therefore, it is necessary to identify situations that may be conducive to substance use.

Unlike predatory and property crime, the typical foci of routine activities theory, substance use does not require a suitable target to be present in order for this crime to occur. To the extent that substance use is a so-called victimless crime, only two situational elements of the routine activities perspective are necessary for this form of crime to occur, assuming substances are available. Therefore, an opportunity for substance use might be best characterized as the convergence in time and space of motivated users with the absence of capable guardianship, such as in the example of the adolescent alone at home with alcohol. Recent research has shown that the same principles generally applied to victimization can be applied equally well to patterns of

individual offending (Osgood et al 1996). Therefore, the routine activities perspective can then be utilized to explain how the relative distribution of opportunities influence the occurrence of crime and deviance (Osgood et al, 1996; Haynie and Osgood, 2005; Osgood and Anderson, 2004; Maimon and Browning, 2010); a possibility that Cohen and Felson (1979, p.605) did not rule out.

Thus moving beyond macro-level explanations of victimization, Osgood et al. (1996) offered a reconceptualize of the routine activities perspective that accounts for individual micro-level opportunities for delinquency and substance use. In particular, they build upon the link between adolescent leisure time and delinquency (Agnew and Petersen, 1989; Hundleby, 1987; Wallace and Bachman, 1991) to explore how the time adolescents spend with peers in unstructured activities removed from capable guardians can increase opportunities for deviant behavior (Osgood, et al. 1996). In doing so, they develop an individual-level theory of routine activities which posits that simply spending more time in unstructured activities with peers is directly related to involvement in delinquency and substance use, as the unstructured nature of these activities makes it less likely for authority figures to be present, while the presence of peers makes deviance easier and more rewarding (Osgood et al. 1996; Osgood, Anderson, and Shaffer, 2005).

Osgood and colleagues assert that situations in which adolescents are without adult supervision, lack restrictions on the way time is to be spent (i.e., structured), and spend time in the company of their peers are more likely to lead to crime and delinquency than situation without these qualities (Osgood, et al. 1996). Based on individual-level routine activities theory, situations with all three qualities are most

conducive to delinquent behavior, while situations which lack one or more are relatively less so (Osgood, Anderson, and Shaffer, 2005). For example, after-school programs intended to provide structure and supervision are considered to be beneficial for child and adolescent development, while limiting the development of behavioral problems (Marshall, Coll, Marx, McCartney, Keefe, and Rush, 1997). However, evaluations of after-school programs, designed to limit the time adolescents spend in self-care, have shown an inconsistent relationship to the development of problem behaviors (Pettit, Laird, Bates, and Dodge, 1997). These inconsistencies may be attributable to the failure to consider the aforementioned qualities of time use, as time spent in self-care does not necessarily lead to substance use in itself (Osgood, et al. 2005).

Similarly, Hirschi qualifies involvement in conventional activities to exclude time spent in leisure. Based on social bonding theory, Hirschi (1969) posits that involvement in conventional activities, such as school and homework, will decrease the probability one will engage in delinquent behavior, as those activities enhance one's bond to conventional society while leisure activities do not. Leisure activities, which might be considered conventional per se, such as time spent riding around in cars or talking on the phone with friends, have been found to be positively related to delinquency. Thus, the quality of activities is a central element in the construction of opportunity, especially based on the routine activities perspective, which emphasizes situational characteristics. Moreover, certain patterns of routine activities which decrease the amount of social control one experiences are directly related to delinquency (Hawdon, 1996; Osgood, et al. 1996; Osgood and Anderson, 2005, Haynie and Osgood, 2005). In particular, adolescents who engage in recreational patterns of behavior, characterized

by reduced adult supervision and a lack of conventional goal orientation, including riding in a car for fun, going to parties, and going out unattended, are significantly more likely to report higher rates of annual marijuana use than others who do not engage in such activities.

In addition to activities characterized by a lack of structure and an absence of adult supervision, the situational context must also provide sufficient motivation to engage in substance use. For example, while such activities as watching television, reading, and spending time alone often occur without supervision and are adequately unstructured, they have not been found to be associated with increased marijuana use (Hawdon, 1996). In comparison, unstructured activities in which peers are present have been found to be associated with increased substance use by providing situational motivation (Osgood, et al. 1996). Therefore, the presence of peers is an important component of the opportunity for substance use that unstructured time use affords. Peers provide an external source of motivation for substance use which may otherwise be absent, or enhance already present motivation, as adolescence seek to fit in with their peers, appear “cool”, or showoff, by which substance use is one means. In addition, peers also provide opportunity by making substances available for use (Akers, 1985).

Taken together, situations that do not dictate how adolescents spend their time, provide little to no adult supervision, and take place in the company of peers amount to opportunities in which the risk for substance use is heightened. Following high school seniors into adulthood, Osgood and colleagues (1996) identify four activities with these characteristics that are consistently and directly related to substance use across five waves of longitudinal data. Specifically, they found that (1) riding around in a car for fun,

(2) getting together with friends informally, (3) going to parties, (4) and spending evenings out for fun and recreation are significant predictors of marijuana use, alcohol consumption, and the use of other illicit drugs, as well as an index of general criminal behavior. They assert that these activities are less open to alternative explanations, than say, activities that are more likely to expose the adolescent to different inducements or controls, such as time spent at school. Moreover, these activities have no direct positive or negative connotations, consistent with the routine activities perspective's "pestilence hypothesis" (Felson, 1994; Birkbeck and LaFree, 1993). That is, unstructured socializing with peers is not deviant or antisocial per se, in fact, unstructured activities could be equally likely to be used for pro-social pursuits.

One of the key factors that influences whether such activities will be used for deviant behavior rather than prosocial behavior is the presence of peers. Although Osgood et al. (1996) assert that time spent in unstructured activities with peers would lead to an increase in delinquency and crime due solely to an increase in opportunity, regardless of type of peers one associated with, this proposition was not initially tested. This is a considerable limitation, given the emphasis that other theories, such as social learning, place on the quality of peers which one is associated with as a source of normative influence (Akers, 1985; Elliot et al, 1985; Warr, 2002). Following from social learning theory, peer groups oriented toward delinquency are more likely to seek situations which provide opportunities to engage in deviant behavior, suggesting that any relationship between unstructured time use and peer delinquency is spurious. In contrast to Osgood's routine activities theory, Akers' social learning theory posits that delinquent behavior is learned by associating and interacting with others through a

process of differential reinforcement by which one acquires definitions favorable or unfavorable to delinquency making delinquent behavior more or less likely, respectively (Burgess and Akers, 1977; Akers, 2008). Unlike social learning theory which places the main emphasis on the socialization or normative influence which peers may assert, Osgood's routine activities theory considers peers to be an important source of situational motivation but limits their import to the extent that they can make deviant acts easier or more rewarding, ignoring any normative influence associated with peer quality. In particular, peers provide an external source of motivation for deviant behavior which may otherwise be absent, or enhance already present motivation, as adolescence seek to fit in with their peers, appear "cool", or showoff, by which deviance is one means to achieve status (Osgood et al. 1996).

Yet even limiting the function of peers solely to a source of situational motivation, as Osgood's routine activities perspective does, implicitly acknowledges the importance of considering peer quality, differential association, and other social learning principles. For instance, Osgood et al. (1996) asserts that the presence of peers makes deviant acts easier and more rewarding; however this presupposes that one is associated with peers who are accepting of such behavior, would help facilitate its commission, and deem it worthy of praise. It is unlikely that one's peers would fulfill these roles if they are not accepting of deviant behavior, that is, if they do not have definitions favorable to deviance. Therefore, the behavioral and cultural preferences among peer group members are a central contingency as to whether an individual will perceive a situation in which peers are present as one that will reward them for deviant behavior (Bernburg and Therlindsson, 2001). Similarly, the decision to engage in deviant behavior based on

the expectation that one would be rewarded by peers is precisely the principle of differential reinforcement found in social learning theory. Based on one's perception of the normative orientation of their peers, it is unlikely that one would expect to be lauded for displaying antisocial behavior by peers who do not share those values (Akers, 2008; Stafford and Warr, 1991). Instead, it is more likely that one would anticipate some form of punishment or informal social control from peers who are normatively prosocial, suggesting that the mere presence of peers is not a fully sufficient source for situational motivation.

Further, Osgood et al. (1996 p. 639) asserts that "companions can serve as useful resources. Friends are a common source of illicit drugs; being accompanied by friends reduces the danger in challenging a rival to a fight; and having a partner to serve as look-out can enhance the chances of success at theft." However, the obvious implication is that one is or is associating with peers who are drug users, fighters, and thieves, initiatives counter to the idea that the quality of one's peers is less important than the time one spends socializing in unstructured activities with them. Thus following from social learning theory, it is likely that peer groups oriented toward delinquency are more likely to seek situations which provide opportunities to engage in deviant behavior.

Haynie and Osgood (2005) tested the plausibility of this alternative hypothesis using data from the National Longitudinal study of Adolescent Health. After controlling for peer's deviance, they found that the relationship between unstructured activities and general delinquency remains significant as well as finding no evidence of an interaction between peer quality and time spent in unstructured activities with peers. Maimon and Browning (2010) obtained similar results between the relationship between unstructured

activities and violent behavior after controlling for deviant peer associations using the PHDCN data. Also using the PHDCN data, Gibson (2012) finds that adolescents who spend more time in unstructured activities are more likely to report being violently victimized independent of peer delinquency and across levels of neighborhood disadvantage. Further, using an Icelandic sample, Bernburg and Thornlindsson (2001), found that the relationship between unstructured activities and delinquency remains significant even after controlling for one's definitions favorable to crime and peer associations. In fact, they also find evidence to suggest the relationship between associating with delinquent peers and engaging in delinquent behavior is mediated by one's routine activities. In the long-term, 8th graders who spent more time in unstructured, unsupervised activities with their peers were at an increased risk to develop problem behavior in the 11th grade, including alcohol and drug use, even after controlling for prior deviant behavior (Goldstein, Davis-Kean, Eccles, 2005). Hence, the direct effects of unstructured activities with peers on deviant behavior persists independent of the quality of one's peers. Taken together, these results suggest considerable evidence in support of the relationship between this specific form of opportunity and delinquency independent of the quality of one's peers.. Intuitively, it makes sense that crime requires opportunity for its commission. As discussed above, however, opportunity is only one aspect of the etiology of criminal events. The requisite motivation is also a necessary condition for crime, especially for the routine activities perspective.

### **Self-Control and Opportunity**

As discussed above, self-control is a central part of the more general framework presented here, so it is important to describe the role in which it plays; however,

interactions concerning self-control and other key variables will not be tested in the current study. Presently, it will serve as a control in order to correctly specify the models and will be further explored in future analyses. The routine activities perspective does not focus on the etiology of individual criminality. Rather, opportunity theories, such as this, explicate the factors that are responsible for the occurrence of socially structured criminal events (Wilcox et al. 2003). As a result, offender motivation has largely been neglected in empirical examinations of the routine activities perspective, despite its inclusion as one of the three necessary elements for crime to occur. Rather, the traditional victim-centric routine activities theories consider motivated offenders to be ever present, thereby orienting the focus on patterns of routines by victims. Although victims may be able to describe the situations in which they were victimized, a victim-centric focus is a limitation for examining the etiology of crime, as victims most often will never know the process by which an offender chose that situation to strike or how it compares to other possible opportunities the offender may have had yet chose to forego. Therefore, previous evaluations of routine activities theory and other theories of opportunity (e.g., Hindelang, et al. 1978) based on victimization surveys, by definition, cannot speculate about situational selection on the part of the offender or the source of their motivation (Birkbeck and LaFree, 1993). As a result of this shortcoming, studies that use victimization surveys, as well as aggregate crime rate data, are inadequate for identifying how the interaction between individuals and situations leads to the decision to commit crime (Birkbeck and LaFree, 1993).

Even the individual-level, offender-centric routine activities theory advanced by Osgood, et al. (1996) has neglected to examine the extent to which an offender's

characteristics influence their routines and propensity to engage in deviant behavior (Hay and Forrest, 2008). Osgood, et al. (1996) purposefully leaves the role of individual differences unexplored, as they argue that the motivation and the opportunity for substance use are derived from the situational context of unstructured socialization with peers. In particular, they advocate a “strictly situational explanation of individual deviation that does not invoke individual characteristics, such as social bonds” (Osgood et al. 1996, p. 640). By theorizing that the motivation for deviant behavior resides in the behavior itself, Osgood and colleagues (1996, p. 639) specifically do not explore how differences in criminal propensities may result in differences in substance use, net of time spent in unstructured activities with peers. This omission is considerable given the evidence that suggests criminal propensity remains a significant predictor of deviant behavior and violent victimization, even when unstructured time is controlled for (Gibson, 2012; Hay and Forrest, 2008). Additionally, Osgood et al.’s theoretical conceptualization ignores the possibility of selection effects. That is, individuals with a propensity for substance use may seek out situations that allow them the opportunities to use, such as unstructured socialization with peers away from guardians, as opposed to enticement through situational inducements (Schreck, Stewart, and Fisher, 2006; Schreck, Wright, and Miller, 2002; McGloin and Shermer, 2009).

In contrast, Gottfredson and Hirschi (1990) distinction between crime and criminality implicitly acknowledges the importance of both situational opportunity and individual differences in the etiology of crime (see also Grasmick, Tittle, Bursik, Arneklev, 1993). In their opinion, opportunity is a necessary condition for crime to occur, however it is not a sufficient condition, as they believe that self-control is the individual-

level cause of crime, deviance, and other analogous behaviors. Specifically they state that, “the generality of the [self-control] theory thus stems from its conception of the offender, a conception that must be taken into consideration before situational or “structural” influences can be understood” (Hirschi and Gottfredson, 1993, p.50).

Based on their conceptualization, all offenders share the same basic lack of self-control, which they describe as an enduring trait characterized by a desire for short-term pleasure, the inability to delay gratification, a preference for simple activities, risky or thrill-seeking behavior, insensitivity toward others and, minimal regard for the long-term consequences of one’s actions (Gottfredson and Hirschi, 1990, p. 90). As such, low self-control is theorized to be the underlying source of variation in deviant behavior between individuals. Assuming that the same opportunity for crime is available to everyone, variance in criminal behavior is attributable to only differences in self-control (Gottfredson and Hirschi, 2003). Additionally, individuals with low self-control are more likely to traverse daily routines that put them in situations conducive to criminal and delinquent behavior (Schreck, et al, 2002; Evans, Cullen, Burton, Dunaway, Benson, 1997). As a result, low self-control is characterized as the primary source of criminal propensity, and the influence by which motivated offenders find opportunity for criminal behavior. Thus propensity being equal, crime and delinquency are expected to vary across individuals as a function of the opportunities for criminal behavior one encounters (Hay and Forrest, 2008; Grasmick, et al. 1993; Forde and Kennedy, 1997; Longshore, 1998; LaGrange and Silverman, 1999; Osgood and Anderson, 2004). Taken together, opportunity without an underlying criminal propensity is as unlikely to lead to crime as the desire to commit crime without the opportunity to do so (Jacobs, 2010).

## **Self-Control and Substance Use**

Although the general theory of crime has not proven to be the cause of crime, as Gottfredson and Hirschi (1990) have posited, it has demonstrated a consistent and moderate relationship with crime and many other “analogous” behaviors, even after considering other important theoretical antecedents, including social learning theory (Pratt and Cullen, 2000). While not specifically a crime of force or fraud, Gottfredson and Hirschi (1990) argue that engaging in substance use demonstrates the same underlying desires for short-term, immediate pleasure indicative of low self-control. Such behavior has also been referred to as behavior “analogous” to crime or “imprudent” behavior (Arneklev, Grasmick, Tittle, and Bursik, 1993). As such, low self-control is theorized to be a significant predictor of substance use.

In one of the first studies testing the relationship between low self-control and analogous behavior, drinking behavior was indeed significantly related to low self-control in the expected direction; however, tobacco use was not related (Arneklev et al. 1993). Although modestly supportive of the general theory of crime, subsequent examinations find consistent support across a variety of samples and statistical designs.

Using the nationally representative sample of youth found in the National Longitudinal Study of Adolescent Health (Add health), self-control was found to be significantly related to an index of analogous behaviors, including tobacco, alcohol and marijuana use, even after statistically controlling for deviant peer associations (Perrone, Sullivan, Pratt, and Margaryan, 2004). Specifically, adolescents with low self-control were significantly more likely to report tobacco, alcohol, and marijuana use compared to those adolescents with more self-control.

Similarly, in two samples of eighth grade adolescents who had undergone the Gang Resistance Education and Training (GREAT) program in Phoenix, AR and Las Cruces, NM middle schools, adolescents who scored highly on risk-taking dimension of low self-control were significantly more likely to engage in substance use, after controlling for social learning variables (Winfrey and Bernat, 1998). Additionally, adolescents in the Phoenix sample who reported less parental monitoring were also significantly more likely to report substance use.

Using data from the longitudinal Cambridge Study in Delinquent Development, Paternoster and Brame (1998) examine the generality of the general theory of crime to explain both crime and analogous behavior. The longitudinal design allowed the relationship between childhood self-control and subsequent adolescent self-reported involvement in analogous behaviors to be assessed. Employing a behavioral measure of self-control independent of the outcomes of interest, they found that adolescents who were characterized as having low self-control during childhood were significantly more likely to report involvement in analogous behaviors—including heavy alcohol and tobacco use.

Low self-control has also been found to predict binge drinking and drug use among college level freshmen (Tibbetts and Whittimore, 2002; Gibson, Schreck, and Miller, 2004; Miller, Griffin, Gibson, and Khey, 2009). Moreover, low self-control was found to account for a considerable portion of the relationship between binge drinking and other alcohol related behaviors (Piquero, Gibson, and Tibbetts, 2002). Using behavioral-based measures, Keane and colleagues found that behavioral indicators of low self-control were associated with driving while impaired by alcohol (Keane, Maxim,

Teevan, 1993). In particular, they found that male and female drivers over the legal BAC limit are less likely to wear their seatbelt. Moreover, male drunk drivers were found to be more likely to discount the probability of apprehension, and make the decision to drive despite being asked not to. Similarly, drivers who believe they were over the legal limit were more likely to drive (Keane et al. 1993).

Substance use and self-control are also theorized to share an etiological source with regard to familial attachment and care. This suggests the possibility that low self-control may be a mediating variable that connects parental attachment and socialization efforts to their children's substance use. Specifically, Gottfredson and Hirschi (1990) argue that self-control stems from an effective parenting style, which is based on parents' ability to closely monitor and consistently identify and punish unwanted or deviant behavior. Achieving this, they argue, will foster the development of self-control in children, who, as a result, will then refrain from deviance in adolescences and crime as an adult. Research examining this proposition has generally found support for it (Hay, 2001; Gibbs, Giever, and Martin, 1998; Dina, et al. 2004). Conversely, it follows that children of ineffective parents will be at risk for deviance and crime later in life, due to a lack of self-control.

Wikström and Sampson (2003) posit that, in addition to parental influences, neighborhoods can also have enduring influence on criminality by affecting the development of self-control. They hypothesize that children will differentially develop self-control based on differences in the socialization practices (i.e., parenting styles), community resources, and behavioral standards within the community which vary as a function of collective efficacy and community capital. Therefore, highly disorganized

neighborhoods are less likely to foster parenting styles conducive to the development of self-control (Bursik and Grasmick, 1993). As a result, collective efficacy or supervision can influence a child's self-control development and behavior outside of the home (Pratt, et al. 2004; Gibson et al. 2009; Wikström and Sampson, 2003). In addition, community characteristics are expected to have a greater influence as children age into adolescence and the importance of parental influence decreases, suggesting that adolescents who reside in neighborhoods with less collective efficacy and fewer resources are likely to have lower self-control.

At the same time, many scholars posit the theoretical antecedents of adolescent substance use lie in the strength of the attachment adolescents have with their parents. For example, Brook, Brook, Gordon, Whiteman, and Cohen (1990) posit a family interaction approach to adolescent substance use. Specifically, they hypothesize that those parents with conventional values, who use affectionate or supportive parenting styles, while exercising control over their children decrease the likelihood that their children will experiment with substance use. Moreover, those children will also be more likely to develop conventional, well-adjusted personalities and be less likely to associate with deviant peers as adolescents. Conversely, adolescents who do not develop these qualities are more likely to develop maladjusted personalities, associate with substance-using peers, and engage in substance use themselves. Other studies also support the role of parents and family in substance use initiation and continuation (Brook, Whiteman, and Gordon, 1982; Brook, Whiteman, and Gordon 1983; Hawkins and Weis, 1985; Hirschi, 1969).

Taken together, the studies discussed above demonstrate consistent empirical support for the relationship between low self-control and substance use. In particular, individuals who lack self-control are at increased risk for substance use, a result that is robust across samples, a number of different measures of self-control, various statistical methods, and after considering the effects of many important correlates of substance use. Moreover, these results demonstrate the importance of considering individual propensity for substance use concurrently with the situational characteristics emphasized by the routine activities perspective.

### **Neighborhood Social Disorganization, Routine Activities, and Substance Use**

Unstructured activities that provide opportunities for substance use also take place within a larger social context, one of which is the neighborhoods where youth reside. Similar to Maimon and Browning (2010), who found that the relationship between adolescent violence and unstructured activities is conditioned by neighborhood social disorganization, the framework proposed in the current study considers opportunities for substance use to take place in the context of neighborhoods.

Prior to Osgood et al.'s (1996) respecification, the essence of routine activities theory has been a macro-level explanation of criminal events, based partially on the distribution of criminal opportunities (Cohen and Felson, 1979). On the other hand, social disorganization theory posits that crime and delinquency are the result of the breakdown of informal social control (Kornhauser, 1978; Bursik, 1988). Integrating these two perspectives, it follows that the distribution of opportunities for adolescents to spend time in unstructured, unsupervised activities are partly determined by the level of guardianship, social control, and organization within the neighborhoods where they

reside (Shaw and McKay, 1942; Sampson and Groves, 1989; Bursik and Grasmick, 1993; Sampson, Raudenbush, and Earls, 1997).

The study of social disorganization flourished under Shaw and McKay (1942). Their historic study of juvenile delinquency arrest rates in Chicago between 1900 and 1930 found that delinquency tends to concentrate in communities characterized by low economic status, poor education, ethnic heterogeneity, and residential mobility. They hypothesized that these qualities created social disorganization—the inability to establish informal social control—within these neighborhoods and communities, which in turn, fostered the development of crime and delinquency. Most importantly, Shaw and McKay stressed that crime and delinquency are not the result of any biological or psychological abnormality of those living in the community. Rather, crime and delinquency is a normal response by normal people to abnormal situations.

The 1980s saw a revitalization of interest in social disorganization theory (Bursik, 1988; Sampson and Groves, 1989; Bursik and Grasmick, 1993). At this time, scholars began to formalize the causal link between disorganization and delinquency in systematic terms (Bursik, 1988; Kornhauser, 1978; Sampson and Groves, 1989). Specifically, social disorganization undermines a community's ability create social networks and develop social ties with other community members in order to exercise informal social control (or guardianship in the language of routine activities theory) over its residents, resulting in crime and delinquency (Kornhauser, 1978; Bursik and Grasmick, 1993; Sampson and Groves, 1988; Sampson, 2006).

Traditional social disorganization theory was in some ways revived by Sampson and colleagues (1997) when they introduced the concept of collective efficacy.

Collective efficacy is conceptualized as the capacity for neighborhood residents to intervene and regulate its members as a means to maintain safety and order within their community upon witnessing social disorder, crime, and delinquency (Sampson, Raudenbush, and Earls, 1997). According to Sampson et al. (1997), neighborhood collective efficacy largely stems from social cohesion and trust among neighborhood residents who share a common desire to protect their community.

In their seminal study of Chicago neighborhoods, Sampson and colleagues (1997) posit that neighborhoods are differentially able to activate informal social control. Moreover, the willingness for local residents to intervene for the common good is dependent upon mutual trust and solidarity among neighbors (p. 919). Using data from the Project on Human Development in Chicago Neighborhoods, Sampson and colleagues first explore the antecedents of collective efficacy and then turned to collective efficacy's relationship with interpersonal violence.

The 847 census tracts that comprise Chicago neighborhoods were combined into 343 neighborhood clusters. Collective efficacy was operationalized by combining scales designed to measure (1) residents' belief their neighbors would intervene in specific situations and (2) social cohesion and trust amongst neighbors. Their results indicate that concentrated disadvantage and immigrant concentration were significantly and negatively related to collective efficacy, while residential stability was positively related. Moreover, these three constructs, which often typify social disorganization, accounted for over 70% of the variation in collective efficacy across neighborhoods. In addition, their analysis showed that collective efficacy mediated much of the relationship between neighborhood structural characteristics and various types of interpersonal

violence, including levels of neighborhood violence, violent victimization, and homicide. Considerable support for the theory of collective efficacy has been found, especially in relation to violence (Sampson, Raudenbush, and Earls, 1997; Browning, Feinberg, Dietz, 2004), but has also been found to be important across many other outcomes, including homicide (Morenoff, Sampson, Raudenbush, 2001), self-rated physical health (Browning and Cagney, 2002), intimate partner violence (Browning, 2002), fear of crime (Gibson, Zhao, Lovrich, Gaffney, 2002), risky sexual behavior (Browning, Burrington, Leventhal, Brooks-Gunn, 2008), and mental health (Xue, Leventhal, Brooks-Gunn, and Earls, 2005).

Currently, no study has examined the relationship between neighborhood collective efficacy and adolescent substance use. Despite this gap, there is reason to believe that collective efficacy would be related to substance use among adolescents given the support that it has received in relation to other developmental outcomes, as discussed above (Leventhal and Brooks-Gunn, 2000, 2003; Sampson, Morenoff, Gannon-Rowley, 2002), and its similarity to the related concept of informal social control (Sampson et al. 1997; Kornhauser, 1978). While collective efficacy and informal social control are conceptually distinct, there is enough similarity to suggest that collective efficacy will be an important mediating factor between adolescent substance use and neighborhood features. Therefore, some discussion of the informal social control to the extent that it bears support for the relationship between collective efficacy and adolescent substance use is warranted.

To this end, Elliot, Wilson, Huizinga, Sampson, Elliot, and Rankin (1996) elaborate the general ecological features of disadvantaged neighborhoods, and explore the social

process by which those features are linked to adolescent developmental outcomes across Chicago and Denver at the aggregate- and individual-levels. They examine informal social control, informal networks, and social integration as possible mediating processes between social structure and behavior. Their results indicate that only informal social control is inversely related to neighborhood disadvantage at the aggregate level in Chicago, and is the only mediating factor between neighborhood characteristics and aggregate rates of adolescent problem behavior, including substance use. Similarly at the individual-level, informal social control was the only neighborhood factor related to individual problem behavior and substance use in Chicago. In Denver, however, informal social control was related in the expected direction at both the aggregate- and individual-level, but did not reach statistical significance.

Musick, Seltzer, and Schwartz (2008) use a measure of child-centered social control that is derived from items contained in Sampson et al's (1997) measure of collective efficacy, and includes the willingness to intervene when witnessing (1) hanging out on a street corner during school hours, (2) spray-painting graffiti on a local building, or (3) showing disrespect to an adult (Sampson, Morenoff, and Earls, 1999). While not a full test of collective efficacy, as it omits aspects of social cohesion which collective efficacy includes, this measure provides an empirical basis for a potential relationship to adolescent substance use. Using data from the Los Angeles Family and Neighborhood Survey, they examine how neighborhood factors influence adolescent smoking, alcohol, and marijuana use. Their results indicate that neighborhoods with high levels of child-centered social control significantly reduce the prevalence of

cigarette use, especially in neighborhoods with strong anti-smoking norms. Child-centered social control, however, was not significantly related to either alcohol or marijuana use.

It has also been noted that the collective efficacy theory and the routine activities perspective provide complementary frameworks for the study of neighborhoods and crime (Bursik, 1988; Sampson and Groves, 1989; Bursik and Grasmick, 1993). For instance, Massey, Krohn, and Bonati (1989) identify relevant constructs derived from guardianship in the routine activities theories that makes the similarities to systemic social control (i.e., social organization) clear. Specifically, capable guardianship is indicated by the general level of protectiveness exhibited by neighbors, and the willingness to utilize formal and informal social control (Massey, et al. 1989, p.386), which is clearly characteristic of highly efficacious neighborhoods. Similarly, Osgood, et al (1996) posits that a situation is more conducive to deviance when authority figures are not present—a proposition follows directly from the routine activities perspective. Osgood and colleagues, however, generalize the role of capable guardian to any authority figure “whose role in a situation carries a responsibility for attempting to exert social control in response to deviance” (p.640). Thus, they argue that the role of guardianship in routine activities is directly compatible with the theory of collective efficacy, in which residents of highly efficacious neighborhoods are expected to act as agents of informal control (Morenoff, et al. 2005; Bursik, 1988; Maimon and Browning, 2010; Osgood and Anderson, 2005; Sampson, 1997; Elliot et al. 1996). Additionally, Felson (1986) posits that a tight-knit community offers little opportunity for criminal

behavior as residents are more familiar with the people and property within their community and are thus able to function as capable guardians.

As discussed above, the willingness of agents of informal social control to act in order to prevent crime and deviance is directly related to the amount of collective efficacy present in a neighborhood (Sampson et al 1997). The basis of Sampson, Raudenbush, and Earls's (1997) measure of collective efficacy implicitly acknowledges the importance of the willingness for community members to act in response to adolescents "hanging out"—similar to Osgood et al.'s (1996) concept of unstructured activities with peers, as both imply a lack of predetermination of how youth spend their time and a general lack of adult supervision—in order to prevent and control the occurrence of crime and delinquency, further suggesting the presence of a relationship between collective efficacy and adolescent substance use. This becomes apparent as three of the five items that comprise the social control aspect of Sampson et al.'s (1997) original measure concerns the likelihood neighbors would react if they witnessed (i) children skipping school and hanging out on a street corner, (ii) children spray-painting graffiti on a local building, (iii) children showing disrespect to an adult.

The ability of a community to collectively supervise adolescent peer groups, in particular, is often considered to be one of the most important neighborhood characteristics that link neighborhoods structural dimensions to delinquency (Sampson, 1997, Elliot, et al 1996; Osgood and Anderson, 2005; Sampson and Groves, 1989; Veysey and Messner, 1999; Shaw and McKay, 1969; Thrasher, 1963; Reiss, 1986). For instance, Sampson and Groves (1989) find that neighborhoods that have a higher concentration of unsupervised teenage peer groups have higher rates of delinquency as

a result. Similarly, Osgood and Anderson (2004) find that aggregate differences in the amount of time adolescents are able to spend in unstructured, unsupervised activities is directly related to aggregate differences in delinquency. Since highly efficacious neighborhoods are better able to monitor and control the behavior of adolescent peer groups (Maimon and Browning, 2010), it may be inferred that those neighborhoods are better able to limit adolescent substance use, than neighborhoods with low collective efficacy. It follows that neighborhoods high in collective efficacy affect adolescent substance use through unstructured socialization in at least two ways.

First, while adolescents may report spending time in unstructured activities, the supervision provided in socially organized neighborhoods with high collective efficacy will mean that these situations of unstructured socializing will provide fewer opportunities for substance use. Second, social organization will directly reduce the amount of time adolescents are able to spend in unstructured activities, thus reducing substance use. In the first instance, substance use is reduced despite adolescents spending time in unstructured activities, whereas, in the second instance, social organization precludes unstructured activities to begin with. Following from the first proposition, neighborhoods will have adolescents who report less substance use as a result of fewer opportunities to engage in such behavior even though the prevalence of socializing in unstructured activities with their peers may be high. Specifically, collective efficacy is related to substance use by its moderating effect on unstructured socialization with peers. Following from the second proposition, unstructured activities mediates the relationship between collective efficacy and substance use, as

adolescents in highly efficacious neighborhoods will not be able to spend as much time in unstructured activities compared to less efficacious neighborhoods.

Maimon and Browning (2010) find evidence to support both propositions. Using data from the PHDCN, Maimon and Browning examine collective efficacy and unstructured activities as they relate to adolescent violence perpetration. Their results indicate that time spent in unstructured activities is directly related to adolescents' self-reported violent behavior. While collective efficacy was not directly related to violent behavior, it was inversely related to time adolescents spend in unstructured activities indicating mediation effects. Further, they found that collective efficacy moderates the effect of unstructured activities on violent behavior. The effect of unstructured activities on violent behavior was considerably stronger in neighborhoods with low collective efficacy relative to highly efficacious neighborhoods. They found that violent behavior is less likely to occur in highly collective efficacious neighborhoods compared to neighborhoods low in collective efficacy even when adolescents spend more time in unstructured activities with peers.

Similarly, also following from the second proposition, Osgood and Anderson (2005) theoretically integrated the individual-level routine activity perspective with social disorganization theory in order to explore the direct effects of neighborhood control on unstructured activities. To this end, they assess unsupervised peer groups as the proximal cause of delinquency, focusing on the opportunity for delinquency such activities provides. They next integrate this with the emphasis social disorganization theory places on the role of parents and community members to collectively supervise youth in the interest of maintaining community order (Sampson, 1997; Sampson and

Groves, 1989). In particular, the ability of a community to monitor and prevent the presence of unstructured peer groups is an essential part of maintaining social order within the community (Sampsons and Groves, 1989). Osgood and Anderson posit that the collective monitoring of neighborhood youth by parents and other adults should demonstrate an inverse effect on unstructured socializing, while at the same time, differences in the amount of time adolescents spend in unstructured activity should directly account for aggregate differences in delinquency across social contexts (Osgood and Anderson, 2005 p. 527). Although they theorized about community contexts, Osgood and Anderson (2005) use data from adolescents in 8th grade derived from 36 schools across ten states. Their results find support for their integrated framework. Specifically, aggregate levels of unstructured socialization vary between schools, which accounted for a large portion of the variance in mean levels of delinquency between schools. Further, aggregate levels of self-reported parental monitoring, were significantly related in the predicted direction to aggregated levels of unstructured activities, indicating that adolescents with higher levels of parental monitoring spend less time in unstructured activities, on average. This relationship accounted for nearly half of the between group variance in unstructured activities between schools, suggesting the mediating role that participation in unstructured activities plays in the relationship between social context and adolescent delinquency.

### **The Current Study**

This study tests a portion of the integrated framework of adolescent substance use elaborated above, which incorporates three distinct, yet conceptually compatible theoretical perspectives. On their own, research has shown it has been shown that low self-control, individual-level routine activities, and, to a certain degree, neighborhood

contextual variables have each been empirically linked to substance use among adolescents. However, by integrating all three into a single framework, a more accurate description of the social processes by which adolescents come to use substances (i.e., increased ecological validity) can be developed. Studies that focus on only one or two of these aspects risk over-simplifying a potentially complex process. Because opportunity for substance use is conditional on one's external social context, while the decision to actually use is predicated on an adolescent's own motivation, neglecting either opportunity or motivation provides only a partial explanation.

Additionally, this study seeks to address several gaps that remain in the study of adolescent substance use. First, it is currently unknown whether highly efficacious neighborhoods have lower rates of adolescent substance use than neighborhoods with less collective efficacy. Further, past research suggests that neighborhood structural characteristics have an influence on adolescent substance use. For instance, problem drinking and marijuana use is more likely to develop for adolescents who live in low-income neighborhoods, than for those who moved to middle income neighborhoods (Briggs, 1997). Similarly, another study of mid-western schools found that adolescents who attend schools located in neighborhoods with low residential instability are more likely to report higher rates of alcohol use, than those adolescents attending school located in more disadvantaged neighborhoods (Ennett, Flewelling, Lindrooth, and Norton, 1997). The extent to which collective efficacy explains the relationship between neighborhood structural characteristics and substance use is also unknown. In particular, neighborhoods characterized by high rates of unsupervised adolescents are

hypothesized to have more adolescent substance use, however it is hypothesized that this relationship depends on levels of collective efficacy.

Second, does spending time in unstructured, unsupervised activities with one's peers increase the likelihood adolescents will engage in substance use after taking into account neighborhood differences? Based on findings from Osgood et al. (1996), it is expected that the time adolescents spend in unsupervised, unstructured activities with their peers will be directly related to adolescent substance use, independent of collective efficacy. Further, incorporating this with the expected results of the first empirical question, it follows that collective efficacy will indirectly reduce the likelihood adolescents will engage in substance use by limiting the opportunities adolescents have to engage in unstructured activities in highly efficacious neighborhoods. In general, Osgood et al. (1996) found that time spent in supervised and unstructured peer groups was directly associated with criminal behavior and substance use, even after controlling for the types of peers which one is associated with (Haynie and Osgood, 2005).

Finally, are adolescents residing in low collective efficacy neighborhoods that also spend more time in unstructured activities with peers more likely to engage in alcohol use? According to Sampson (2002 p.102) informal social control (i.e., collective efficacy) is instrumental in the maintenance of public order to prevent acts such as truancy and "hanging" out by teenage peer groups. When informal social control is minimized, adolescent peer groups are less restrained and are therefore free to engage in acts of crime and delinquency, including substance use (Sampson, 1997). Similarly, Sampson and Groves (1989) find that unsupervised peer groups are an important link between structural characteristics of the community and rates of delinquency therein.

For neighborhoods that already lack collective efficacy, those who spend the most time in unstructured activities with peers will have substantial opportunity to engage in alcohol use (Osgood and Anderson, 2004). Therefore, it is expected that the association between unstructured socialization with peers and alcohol use will be moderated by the level of neighborhood collective efficacy.

### **Hypothesis One**

Adolescents who reside in neighborhoods with low collective efficacy are more likely to engage in a higher frequency of alcohol use than adolescents who reside in neighborhoods with high collective efficacy, independent of relevant control variables.

### **Hypothesis Two**

Adolescents who spend more time in unstructured, unsupervised activities with their peers are more likely to report a higher frequency of alcohol use than those who spend less time in such activities, independent of neighborhood collective efficacy and the other relevant control variables.

### **Hypothesis Three**

Adolescents who reside in neighborhoods with low collective efficacy and spend more time in unstructured, unsupervised activities with their peers will more frequently engage in alcohol use. Conversely, high collective efficacy neighborhoods will buffer the influence unstructured activities will have on the frequency of alcohol use.

## CHAPTER THREE METHODOLOGY

### **Data**

To test the hypotheses presented in this study, data from the Project on Human Development in Chicago Neighborhoods Longitudinal Cohort Study (PHDCN-LCS) 12- and 15-year-old cohorts will be analyzed. The PHDCN-LCS is a multi-wave data collection effort, designed to examine how the behavior and psychological development of children and adolescents is influenced by the social context in which they live. Adolescent alcohol, tobacco, and marijuana use is examined using predictors from waves one and two of the LCS. The analysis will utilize individual-level data drawn from the LCS and neighborhood-level measures from the 1990 U.S. Census and the 1995 PHDCN independent community survey drawn from Neighborhood Clusters (NC)—aggregates of one to three census tracts—to measure structural and social processes between clusters.

Data collection for the LCS began in 1995 by collapsing Chicago's 847 census tracts into 343 relatively homogenous NCs, based on similarity in characteristics such as income, family structure, and race and ethnicity of geographically contiguous census tracts, observing geographic boundaries, including railroad tracks, parks, and freeways. The NCs were then stratified on the basis of seven ethnic/racial composition categories and three socioeconomic status categories in an effort to eliminate the potential confounding of ethnic and SES composition and also to represent the diversity of neighborhoods in Chicago. Each NC contained about 8,000 people. From there, 80 NC's were randomly selected for inclusion in the LCS. Within each of the 80 NCs, block groups were randomly selected and screen for inclusion. Approximately 40,000

dwelling were screened. Approximately 6,500 children falling within seven age cohorts (3, 6, 9, 12, 15, and 18) and their primary caregivers were selected for participation, about 800-1200 children in each of the seven age groups. For inclusion, the potential participants had to fall within six months of one of the age cohorts. Extensive in-home interviews were conducted approximately every 2.5 years on three occasions. Wave one data collection began in 1995 and concluded in 1997, wave two data collection took place from 1997 – 1999, and wave 3 data collection took place from 2000 – 2002 (Earls and Visher, 1997).

To measure social processes independent of children and their primary caregivers in the LCS, a probability sample of was selected for inclusion in the Community Survey (CS) where subjects from between 20 to 50 households were drawn randomly from within each NC (Raudenbush and Sampson, 1999). The sampling procedure involved three stages which first randomly selected city blocks within each NC on the basis of size. Second, dwellings within each block were randomly selected. Finally, one adult resident was selected for participation. With a response rate of 75 percent, this process resulted in a sample of 8,782 Chicago residents representing all 343 NCs, including neighborhoods selected to be part of the LCS. Each NC selected for inclusion in the 80-cluster LCS averaged about 50 respondents within the CS (Earls and Visher, 1997).

### **Sample**

The analysis presented here uses data from the 12- and 15-year-old age cohorts, which are pooled together and analyzed as a single sample. The analysis sample contains 1,220 adolescents, 674 from cohort 12 and 546 from cohort 15, respectively. Overall, the sample is nearly split in half with regard to gender, as 51.48% are female and 48.52% are male. The racial composition is 15% white, 46.31% Hispanic, 35.40%

black, and 3.54% other races. Households that are headed by a single parent represent a total of 25%.

The 12- and 15-year-old cohorts were chosen for this analysis because incidence of alcohol use are increasingly rare at earlier ages, while alcohol use is beginning to become normative behavior by age 18 and beyond, meaning that it will not have the same social meaning at later ages. Moreover, as adolescents gain autonomy, they are often allowed to venture further from home, often outside of their neighborhood, making it more difficult to discern the true effects of neighborhood residence.

## **Measures**

### **Dependent variable**

**Self-reported alcohol use:** The dependent variable is self-reported frequency of alcohol use during the previous year assessed at the second wave of data collection. This measure was derived from the National Household Survey on Drug Abuse NIDA (1991). Respondents are asked to report how many days over the past year they drank an alcoholic beverage. Response choices range from 1 (never) to 9 (200+ days). Because response choices at the upper end of the scale were less utilized, the variable was recoded to correspond to a five-point scale ranging from 1 (never) to 5 (100+ days). The mean is .355 with a standard deviation of .479. The number of respondents in each category and the descriptive statistics for the other individual-level variables can be found in Table 3-1 while the descriptive statistics for the contextual-level variables can be found in Table 3-2.

### **Individual-level independent variables**

**Unstructured time with peers:** Consistent with past research (Gibson, 2012; Osgood et al. 1996; Maimon and Browning, 2010), unstructured socialization with peers

is a 4-item measure taken from Wave 2. The measure is designed to capture how often adolescents spend time with their peers without having any real purpose. This measure reflects situations in which their behavior is less likely to be monitored by adults, yet not inherently delinquent in nature. The questions ask adolescents about how often they “ride around in a car/motorcycle for fun,” “hang out with friends,” “go to parties,” and “go out after school/at night.” Responses to each question range from 1 (never) to 5 (almost every day). The mean of unstructured socialization with peers is 14.509 and the standard deviation is 3.909. This measure of has a Cronbach’s Alpha of .62.

**Low self-control:** The construct of low self-control is operationalized using a 17-item measure of behavioral indicators derived from the EASI-temperament instrument measures at wave 1. Primary caregivers were asked to report on their children’s inhibitory control, decision making, risk and sensation seeking, and diligence or persistence in completing tasks. This measure is consistent with Gottfredson and Hirschi’s (1990) conceptualization of self-control, past research (Grasmick, et al. 1993), and has gained empirical support and predict validity in relation to other behavioral outcomes (Gibson, 2012; Gibson, et al. 2009; Gibson, et al. 2010; Zimmerman and Messner, 2011; Zimmerman and Messner, 2010). Items are summed with higher scores indicate lower self-control. This scale has a mean of 53.334 and a standard deviation of 9.651. Past research has also found it to be a moderately reliable measure (e.g., see Gibson 2012; and Gibson et al. 2009; 2010), and has similar internal consistency here (alpha = .67).

**Peer Substance Use:** The type of peers one associates with is one of the most important predictors deviant behavior (Akers, 1985; Hawkins et al, 1992). Therefore,

having peers who use substances is an important determinant of whether one will use substance themselves, which must be taken into account. Peer substance use is measured at Wave 1 by a 4-item scale that ask subjects to report the portion of their friends who have used, tobacco, alcohol, marijuana, and other drugs. Response categories range from 1 (none of them) to 3 (all of them). Higher scores indicate more drug using friends. This scale has a mean of 5.567 with a SD of 1.688 and a Cronbach's alpha of .75.

**Family attachment and support:** Although Hirschi (2004) recently declared self-control theory and social bonding theory to be the same theory, this reconceptualization is inconsistent with the underlying assumptions of social bonding theory in that self-control implies a stable difference over time while bonds necessarily do not. Further, evidence suggests that there is not very much overlap empirically (Piquero and Bouffard, 2007; Morris, Gerber, and Menard, 2011) nor does it relate as Hirschi (2004) has theorized that it will to substance use (Jones, Lynam, and Piquero, 2011), so it would be inappropriate to exclude measures of parental attachment and other measures of parenting quality based on the inclusion of low self-control. Therefore, a measure of family attachment and support is derived from the Provision of Social Relations instrument and measured at Wave 1. It is designed to assess the level of emotional and social support adolescents perceive from their own parents. The scale is comprised of 6-items with response categories ranging from 1 (not true) to 3 (very true). Subjects were asked to indicate how true they perceive the following statements to be: "I know my family will always be there for me," "my family tells me they think I am valuable," "my family has confidence in me," "my family helps me find solutions to

problems,” “I know my family will always stand by me,” and “sometime I am not sure I can rely on family” (reverse coded). Higher scores indicate more family attachment and support. The mean and standard deviation of this scale are 16.269 and 1.893, respectively.

**Parenting quality:** Parenting quality is an important antecedent for substance use, and has also been linked to the development of self-control. Osgood and Anderson (2004) also find that parental monitoring limits the time adolescents are able to spend in unstructured activities with their peers. Measures of parenting quality were derived from the Home Observation for Measurement of the Environment (HOME) Inventory (Caldwell and Bradley, 1984; Leventhal, Selner-O’Hagan, Brooks-Gunns, Bingenheimer, and Earls, 2004). Parenting quality was assessed by observations of parent and child during the at home interview at Wave 1, and designed to indicate warmth, supervision, and hostility between parent and child. The parental warmth aspect of the measure is composed of 9-items ( $\alpha = .75$ ); the portion of the inventory designed to measure supervision is a comprised of a 13-item scale ( $\alpha = .52$ ); and the parental hostility measure is composed of a 4-item scale ( $\alpha = .88$ ). Higher scores indicate more warmth and supervision, with less hostility and include items such as, “Parent voices positive feelings to child” and “after school, child goes somewhere that adult supervision is provided.” Gibson et al. (2010) report reliabilities consistent with the ones reported here (see also Leventhal et al. 2004). The mean and standard deviation of the parental warmth scale are 6.396 and 2.081, respectively. The scale measuring parental supervision has a mean of 11.592 and a standard deviation of

1.530, while the scale measuring lack of parental hostility has a mean of 3.746 and standard deviation of .838.

**Adolescent and family demographics:** Adolescents' demographics include age, sex, and race. Family demographics include characteristics about the subject's family, including whether he or she lives in a single parent household, SES, and the length of time they have lived in the particular neighborhood. Following Gibson et al. (2010), SES is measured using the principal component of three variables including household income, maximum education level of primary caregiver and partner, and the socioeconomic index (SEI) for primary caregivers and partners jobs. Single parent households are considered to be less able to supervise their children, allowing them more opportunity for delinquent and criminal behavior. Similarly, the amount of time an adolescent has lived in a neighborhood may be differentially influenced by structural conditions depending on the amount of time in which they have lived there.

### **Neighborhood-level independent variables**

**Collective efficacy:** The measure of collective efficacy is the same as used by Sampson et al. (1997) in their seminal study. It is designed to measure a community's capacity to engage in informal social control based on their willingness to intervene in various situations and the amount of social cohesion and trust among residents. Derived from the PHDCN-CS, this scale is comprised of 10-items each measured on a 5-point Likert scale. Informal social control is measured by how likely they believe it to be that their neighbors would respond if in the following situations: children were skipping school and hanging out on a street corner, children were spray-painting graffiti on a local building, children were showing disrespect to an adult, a fight broke out in front of their house, and the fire station closest to their home was threatened with

budget cuts. Similarly, social cohesion and trust are measured by asking respondents how strongly they agreed that "people around here are willing to help their neighbors," "this is a close-knit neighborhood," "people in this neighborhood can be trusted," "people in this neighborhood generally don't get along with each other," and "people in this neighborhood do not share the same values" (the last two statements were reverse coded). Items were aggregated to the neighborhood-level through item response theory scaling procedure with higher scores indicating less collective efficacy. See Appendix B for further details related to the construction of this measure.

**Concentrated disadvantage:** Neighborhoods with high concentrated disadvantage have been found to have less collective efficacy than less disadvantaged neighborhoods. Concentrated disadvantage is a 6-item measure created by Sampson et al. (1997), derived from the 1990 U.S. Decennial Census. The following variables are included in the measure percentage neighborhood residents below the poverty line, percentage on public assistance, percentage of female-headed families, percentage unemployed, density of children by percentage younger than 18 years of age, and percentage of Black. These items were also scaled together using the first principle component from a principle components analysis of these two variables. Higher scores indicate more concentrated disadvantage.

**Immigrant concentration:** Sampson et al. (1997) also found that the concentration of immigrants within a neighborhood adversely affects collective efficacy. Immigrant concentration is measured by two variables: the percentage of Mexicans and the percentage of foreign-born persons. These items were also scaled together using

the first principle component from a principle components analysis of these two variables. Higher scores indicate a larger concentration of an immigrant population.

**Residential stability:** Neighborhoods with larger transient populations are less able to form the cohesion and behavioral expectations necessary for collective efficacy, than neighborhoods with more stable populations. Originally constructed by Sampson et al. (1997) originally, residential stability is measured by two variables that capture the percentage of persons living in the same house as 5 years earlier and the percentage of owner-occupied homes. Similar to the previous variables, these items were also scaled together using the first principle component from a principle components analysis of these two variables. Higher scores indicate more residential stability.

### **Analytic Strategy**

Because the PHDCN data possess measures of neighborhoods and adolescents and their families nested within them, multi-level modeling is most appropriate in order to account for the possible reduction in standard errors associated with non-independence. In particular, the use of an OLS framework, which includes both neighborhood-level and individual-level predictors in the same model, can be problematic as adolescents who live in the same neighborhood are exposed to the same experiences and environments and therefore tend to be more “similar” to one another than they would be compared to adolescents who reside in a different neighborhood and exposed to a dissimilar environment. As a result of this differential exposure, interdependencies can, and often do, exist between individual observations on the basis of neighborhood residence that, without correction, would otherwise amount to a violation of the statistical assumptions associated with the ordinary least squares (OLS) regression technique. In statistical terms, the OLS regression technique

assumes that the estimated residuals are independent of one another, which is often violated when examining individuals nested within neighborhoods. The violation of this assumption results in residuals that are underestimated causing significance test to be too liberal, leading to type-I error.

The multilevel model proposed here is composed of two levels in which individual-level predictors are specified at level-1 and neighborhood-level predictors are estimated at level-2 to predict variance in adolescents substance use between neighborhoods. The two-level model allows both the between- and within-neighborhood differences to be specified estimating the equations corresponding to each level simultaneously, thus correcting for the violation of independent residuals (Raudenbush and Bryk, 2002). Further, the multilevel modeling technique permits the effects of predictors at each level to be estimated together by partitioning the variance into its separate between- and within-neighborhood components in order to accurately estimate the unique effects at each level.

### **The Multilevel Ordinal Regression Model**

Due to the dependent variable being measured as an ordinal categorical variable, multilevel ordinal regression is most appropriate for dependent variables with more than two discrete ordered response categories (Hedeker and Gibbons, 1993; Long, 1997). This model can be thought of as an extension of the standard logistic regression model, but instead of comparing the probability of being in a single category (often referred to as a “success”) compared to the probability of not being in that category (a “failure”), the ordinal regression model compares the probability of being in a category *greater than m* to the probability of being in a response category *less than or equal to m*, as can be seen in equation 3.1:

$$\eta_{mij} = \log(P(R_{ij} > m)/P(R_{ij} \leq m)) \quad (3-1)$$

From equation 3-1,  $\eta_{mij}$  is log-odds of the probability that response  $R$  of respondent  $i$  nested within neighborhood  $j$  responds is greater than category  $m$ . This model is also often referred to as the cumulative logit as the probabilities associated with each category are cumulative (Raudenbush and Bryk, 2002).

Using this formulation of ordinal regression model, the analysis will be conducted in several logically-related steps. The initial steps of this analysis examine the univariate and bivariate statistics related to each variable, in order to determine the distribution of the variables and the correlations between them. The next step begins the specification of the multilevel model. The basic two-level random intercept model that is used here can be represented as a pair of nested equations which allows individual between-neighborhood differences to vary as a function of neighborhood-level characteristics as follows:

$$\text{Level 1: } \eta_{mij} = \beta_{0j} + \sum_{q=1}^Q B_q X_{qij} + \sum_{m=1}^{M-1} \delta_m \quad (3-2)$$

$$\text{Level 2: } \beta_{0j} = \gamma_{00} + \sum_{s=1}^S \gamma_{0s} W_{sj} + u_{0j} \quad (3-3)$$

From equation 3-2,  $\eta_{mij}$  represents the log-odds from equation 3.1 associated with person  $i$  in neighborhood  $j$ ,  $\beta_{0j}$  is the model intercept term associated with neighborhood  $j$ ,  $\sum_{q=1}^Q B_q X_{qij}$  are the effects associated with the  $Q$  independent variables across all persons  $i$  and neighborhoods  $j$ , while  $\sum_{m=1}^{M-1} \delta_m$  is the sum of the threshold parameters associated with each response category. Threshold parameters are unique to ordinal regression, and are derived from the conceptualization of categorical variables as measuring an unobserved latent variable (Snijders and Bosker, 1999). These parameters may be interpreted as simply an adjustment to the intercept term

associated with the particular category,  $m$ , which is being compared (Long, 1997). It can be seen, based on equation 3-2, that inclusion of these parameters does not influence the effect of the independent variables, and it is assumed that an independent variables associated effect is constant across response categories.

Equation 3-3 models the level-1 intercept term,  $\beta_{0j}$ , as the outcome of level-2 neighborhood-level parameters, where  $\gamma_{00}$  represents the neighborhood-level model intercept,  $\sum_{s=1}^S \gamma_{0s} W_{sj}$  is the effect of neighborhood-level variables on the level-1 intercept term, and  $u_{0j}$  represents the neighborhood-level random error term. Equation 3-2 and Equation 3-3 can be combined by substituting equation 3-3 for  $\beta_{0j}$  in the level-1 equation resulting in a single equation 3-4 resembling the familiar logistic regression equation, with the exception of the additional threshold parameters which account for differences in comparing multiple ordered responses, as discussed above:

$$\eta_{mij} = \gamma_{00} + \sum_{s=1}^S \gamma_{0s} W_{sj} + \sum_{q=1}^Q B_q X_{qij} + \sum_{m=1}^{M-1} \delta_m + u_{0j} \quad (3-4)$$

First, an unconditional model is estimated to determine the extent to which alcohol use varies between neighborhoods. Assuming that significant variance exists between neighborhoods, models containing the neighborhood-level structural and social process predictors will be estimated. Specifically, the influence of collective efficacy is assessed to determine whether adolescent residing in neighborhoods with less collective efficacy are more likely to engage in substance use while controlling for neighborhood structural variables. Next, models are built using the individual-level predictors and neighborhood-level variables. These models proceed in a step-wise fashion, with the predictors of self-control and peer delinquency together with the parental and peer control variables are

included to assess. After that, unstructured activities will be added to the model with these other controls to test the second hypothesis.

Finally, random coefficient models containing all variables are estimated to determine the extent to which the association between unstructured activities and alcohol use varies between neighborhoods followed by the hypothesized cross-level interaction between unstructured time and collective efficacy to test the final hypothesis predicting adolescent alcohol use. Another benefit of the multilevel approach is that it allows for the examination of interaction effects across levels of analysis, which is done by allowing the coefficient of an individual-level predictor to vary randomly as a function of one or more neighborhood-level predictors. In particular, the set of equations 3-5 specifies the basic multilevel ordinal model including the cross-level interaction:

$$\begin{aligned}
 \text{Level 1: } \eta_{mij} &= \beta_{0j} + \sum_{q=1}^Q B_q X_{qij} + \sum_{m=1}^{M-1} \delta_m \\
 \text{Level 2: } \beta_{0j} &= \gamma_{00} + \sum_{s=1}^S \gamma_{0s} W_{sj} + u_{0j} \\
 \beta_{1j} &= \gamma_{10} + \sum_{s=1}^S \gamma_{1s} W_{sj} + u_{1j}
 \end{aligned} \tag{3-5}$$

In equation 3-5, it can be seen that the effect of the level-1 predictor  $X_{ij}$ ,  $\beta_{1j}$ , is modeled as a function of the level-2 predictors,  $W_{sj}$ , across neighborhoods, where  $\gamma_{1s}$  represents the cross-level interactions between  $X_{ij}$  and  $W_j$ . The following sections will present and discuss results that are statistically significant at the  $p < .05$  alpha level and marginally significant at the  $p < .10$  alpha level in order to present a clear picture of the relationships found here.

Table 3-1. Level-1 descriptive statistics (n = 1,220)

	N	Mean (SD)	Min	Max
Alcohol use	-	.355 (.479)	0	4
Category 1 (No Use)	784			
Category 2 (1-5 days)	257			
Category 3 (6 -24 days)	108			
Category 4 (25-99 days)	53			
Category 5 (100-200+ days)	18			
Female		.485 (.500)	0	1
Age		13.500 (1.525)	10.8	16.38
Single parent		.25 (.433)	0	1
SES		-.124 (1.420)	-2.99	3.523
White		.15 (.357)	0	1
Black		.354 (.478)	0	1
Hispanic		.463 (.499)	0	1
Other		.034 (.182)	0	1
Warmth		6.396 (2.081)	0	9
Supervision		11.592 (1.530)	4	13
Lack of hostility		3.746 (.838)	0	4
Family attachment		16.269 (1.893)	7	18
Low self-control		53.334 (9.651)	17	81
Peer substance use		5.567 (1.688)	4	12
Unstructured socializing		14.509 (3.909)	4	21

Table 3-2. Level-2 descriptive statistics (n = 78)

Neighborhood Characteristics	Mean (SD)	Min	Max
Collective efficacy	-.016 (.482)	-1.538	.819
Concentrated disadvantage	-.598 (3.477)	-5.362	11.915
Immigrant concentration	1.208 (3.007)	-3.912	7.364
Residential stability	-.163 (1.754)	-3.700	3.675

## CHAPTER FOUR RESULTS

Bivariate correlations between level-1 variables and level-2 variables can be found in Table 4-1 and Table 4-2, respectively. As can be seen, unstructured time spent with peers is correlated positively and significantly ( $r = 0.323$ ;  $p < .05$ ) with alcohol use, as would be expected based on previous findings (Osgood et al, 1996). Similarly, peer use is also significantly correlated in the positive direction with alcohol use, however the correlation coefficient is slightly stronger for peer use than it is for time use ( $r = 0.365$ ;  $p < .05$ ). As might be expected, parental supervision, parental warmth, and family attachment are significantly and inversely related to reported alcohol use, meaning that increased attachment to one's family ( $r = -0.113$ ;  $p < .05$ ), increased parental supervision ( $r = -0.132$ ;  $p < .05$ ), and parental warmth ( $r = -0.056$ ;  $p < .05$ ), are associated with less alcohol use at the bivariate level. Additionally, the respondent's SES is positively and significantly correlated with alcohol use ( $r = 0.093$ ;  $p < .05$ ), meaning that higher SES is associated with more alcohol use.

Interestingly, low self-control is only weakly associated with alcohol use ( $r = 0.0839$ ;  $p < .05$ ) at the bivariate level. In particular, adolescents who have less self-control are more likely to use alcohol frequently, but the correlation coefficient is the smallest among all the level-1 variables associated with alcohol use. Further, as would be expected based on Gottfredson and Hirschi's (1990) claim that self-control is developed through socialization by one's parents, parental supervision ( $r = -0.1083$ ;  $p < .05$ ), warmth ( $r = -0.102$ ;  $p < .05$ ), hostility ( $r = -0.082$ ;  $p < .05$ ), and attachment to family ( $r = -0.178$ ;  $p < .05$ ) are all significantly and inversely related to low self-control. With regard to unstructured activities with peers, adolescents who have low self-control, and

report that their peers use substance are positively and significantly more likely to report frequent alcohol use. Specifically, those who have less self-control ( $r = 0.068$ ;  $p < .05$ ) and those adolescents who report that a larger proportion of their friends use substances ( $r = 0.162$ ;  $p < .05$ ), are more likely to report that they spend increasing amounts of time in unstructured activities with their peers. In addition, adolescents who have high SES are significantly more likely to report spending time in unstructured activities with their peers ( $r = 0.102$ ;  $p < .05$ ).

Table 4-2 presents the correlations between level-2 variables. Noting that higher scores on collective efficacy scale represent less neighborhood collective efficacy, the relationships are all in the expected directions and consistent with previous findings (Sampson, et al. 1997). Concentrated disadvantage ( $r = 0.372$ ;  $p < .05$ ) and immigrant concentration ( $r = 0.500$ ;  $p < .05$ ) are significantly and positively associated with collective efficacy, while residential stability ( $r = -0.540$ ;  $p < .05$ ) is significantly and negatively associated with collective efficacy. In general, neighborhoods that have high concentrated disadvantage are more likely to have low collective efficacy. This is also true for residential stability. Conversely, neighborhoods that have more residential stability tend to also have high collective efficacy. Further, concentrated disadvantage is significantly and negatively related to both residential stability ( $r = -0.153$ ;  $p < .05$ ) and immigrant concentration ( $r = -0.088$ ;  $p < .05$ ). Neighborhoods that have high concentrated disadvantage tend to have low residential stability and low immigrant concentration. The relationship between residential stability and immigrant concentration is also negatively and statistically significant ( $r = -0.455$ ;  $p < .05$ ), meaning

that neighborhoods characterized by a high concentration of immigrants tend to have low residential stability.

With the exception of parental hostility, all level-1 variables were associated with the frequency at which adolescents use alcohol. More importantly, these associations were not large enough to suggest that multicollinearity may be an issue. Similarly, as can be seen in upper portion of Table 4-1, there does not seem to be cause to suspect that the association between any two level-1 independent variables is large enough to create concern over collinearity in the analysis. On the other hand, the relationships between some of the level-2 variables may be large enough to adversely affect the analysis; in particular, the associations between collective efficacy, immigrant concentration, and residential stability. However, it does not seem to have negatively influenced the results.

Turning now to the results of the random intercept multilevel ordinal regression models displayed in Table 4-3 and Table 4-4, model 1 presents the results of the unconditional random intercept model. This unconditional model indicates the variance in alcohol use that is attributable to between neighborhoods differences. Based on the significance of the  $\sigma_0^2$  (0.170) term associated with this model, there is evidence to suggest that a significant amount of variance indeed exists between neighborhoods. Next, model 2 specifies the random intercept as a function of neighborhood structural characteristics, including collective efficacy. After accounting for neighborhood characteristics, the amount of variance,  $\sigma_0^2$  (0.126), between neighborhoods is reduced, yet remains statistically significant indicating that neighborhood variables account for some but not the entirety of the between neighborhood variance.

Based on the first hypothesis examined here, it was expected that alcohol use among adolescents would be significantly less in neighborhoods with more collective efficacy. However, as it can be seen in model 2 of Table 4-3, collective efficacy does not have a statistically significant association with alcohol use. As a result, hypothesis one is not supported. On the other hand, concentrated disadvantage has a negative and statistically significant association with alcohol use (OR = .950;  $p = .05$ ), indicating that adolescents from more disadvantaged neighborhoods are less likely to report frequent alcohol use.

Model 3 in Table 4-3 and Table 4-4 displays results from a multilevel ordinal regression model after controlling for each level-2 covariate and all level-1 predictors with the exception of unstructured time spent with peers. Interestingly, concentrated disadvantage is no longer statistically significant after controlling for family and parenting variables, peer drug use, low self-control, demographic characteristics, and SES. Of the demographic characteristics, age (OR = 1.645;  $p < .05$ ) and SES (OR = 1.114;  $p = .10$ ) were positive and significantly associated with alcohol use, meaning that older adolescents and those from higher socioeconomic status families are more likely to report frequent alcohol use. Additionally, black adolescents are less likely to report frequent alcohol use, compared to white adolescents (OR = .445;  $p < .01$ ). Hispanics and adolescents of other races are no more or less likely to report frequent alcohol use than white adolescents. Not surprisingly, peer substance use is positively and significantly related to self-reported frequency of alcohol use (OR = 1.232;  $p < .01$ ). That is, adolescents who report that their peers use substances at wave 1 are more likely to report frequent alcohol use at wave 2. Self-control is also significantly and

positively related, although only at the .10 significance level, to self-reported frequency of alcohol use (OR = 1.130;  $p < .10$ ) even after controlling for peer use. Adolescents who have low self-control are more likely to report frequent alcohol use. After including these predictors, the variance in frequent alcohol use between neighborhoods,  $\sigma_0^2$ , is again reduced from 0.126 to 0.091.

Model 4 introduces unstructured time spent with peers, while controlling for each of the neighborhood and individual-level predictors. Consistent with the second posited hypothesis, time spent in unstructured activities with peers has a positive and statistically significant association with the likelihood of reporting frequent alcohol use (OR=1.348;  $p < .01$ ). This result implies that spending more time with peers in unstructured activities increases the likelihood that adolescents will report frequent alcohol use. Similar to model 3, age, SES, and being black (compared to white) are still statistically significant, although SES has fallen to marginal significance. Interestingly, being raised in a single family household has become marginally significant at the .10 alpha-level after including time spent with peers in the model. In particular, being raised in a single family household is associated with a marginally significant increase in the likelihood of reporting frequent alcohol use (OR = 1.348;  $p < .10$ ), while being black is associated with a significant decrease (OR = .407;  $p < .01$ ). Also consistent with model 3, peer substance use remains statistically significant, however, its effect was reduced compared to the previous model when unstructured time use was not included as a predictor. Further, the between neighborhoods variance,  $\sigma_0^2$ , again falls to 0.089—nearly a 50% reduction from the unconditional random intercept model to the fully specified

conditional random intercept model. However, the variance of frequent alcohol use across neighborhoods still remains statistically significant.

The final hypothesis examines whether collective efficacy moderates the relationship between unstructured time use with peers and frequent alcohol use. In order to examine the cross-level interaction, a random coefficient model was estimated which allows the coefficient of unstructured time use on alcohol use to vary between neighborhoods. Model 5, which can be found in Table 4-5 and Table 4-6, specifies a random coefficient model. The coefficient associated with unstructured time use does indeed vary randomly across neighborhoods, which can be seen on Table 4-6. In particular,  $\sigma_1^2$ , the variance component associated with unstructured time use is 0.014. All of the variables which were statistically significant in model 4 remain so in model 5. Additionally, low self-control becomes marginally significant (OR = 1.119; p = .10).

The final model, model 6, explores whether the random coefficient associated with unstructured time use is a function of neighborhood structural and social characteristics, and of particular interest is collective efficacy, as can be seen, collective efficacy does not have a statistically significant influence on the relationship between unstructured time use and frequency of alcohol use. Inconsistent with the current study's hypothesis, increased neighborhood collective efficacy did not buffer the effect of unstructured time use on alcohol use nor did less neighborhood collective efficacy amplify the effect of unstructured time use on alcohol use. Although not originally hypothesized in the current study, neighborhood concentrated disadvantaged exhibited a statistically significant cross-level interaction. That is, the relationship between unstructured time use and frequent alcohol use was partially a function of the level of

neighborhood concentrated disadvantage (i.e., poverty and segregation). Specifically, a unit increase in the amount of neighborhood concentrated disadvantage is associated with a .980 unit decrease in the effect of unstructured activities on alcohol use, meaning that the influence of unstructured time use on frequent alcohol use was smaller in neighborhoods characterized as having higher concentrated disadvantage. Moreover, concentrated disadvantage fully accounts for the significant variance in the relationship between unstructured time use and alcohol use across neighborhoods, as  $\sigma_1^2$  is no longer statistically significant. Further, by allowing the coefficient associated with unstructured activities to vary between neighborhoods the coefficients associated with low self-control and parental supervision are marginally significant. As might be expected, parental supervision decreases the likelihood of frequent alcohol use while low self-control increases it.

Table 4-1. Level-1 Bivariate Correlations (n = 1,220)

	Alcohol use	Peer use	Unstructured activities	Low self-control	Supervision	Warmth	Hostility	Family attachment
Peer use	0.365*							
Unstructured activities	0.323*	0.162*						
Low self-control	0.084*	0.173*	0.068*					
Supervision	-0.132*	-0.174*	0.023	-0.108*				
Warmth	-0.056*	-0.076*	-0.022	-0.103*	0.174*			
Hostility	-0.028	-0.070*	0.000	-0.082*	0.179*	0.071*		
Family attachment	-0.113*	-0.272*	-0.030	-0.178*	0.123*	0.118*	0.041	
SES	0.093*	-0.010	0.102*	-0.120*	0.034	0.074*	0.084*	0.132*

\*  $p \leq .05$

Table 4-2. Level-2 Bivariate Correlations (n = 78)

	Collective efficacy	Concentrated disadvantage	Immigrant concentration
Concentrated disadvantage	0.372*		
Immigrant concentration	0.500*	-0.088*	
Residential mobility	-0.540*	-0.153*	-0.455*

\*  $p \leq .05$

Table 4-3. Random Intercept Ordinal Model Predicting Alcohol Use (Level-1)

	Model 1 OR (SE)	Model 2 OR (SE)	Model 3 OR (SE)	Model 4 OR (SE)
Intercept	.014 (.246)*	.014 (.245)*	.010 (.297)*	.007 (.319)*
Female			1.193 (.141)	1.006 (.131)
Age			1.645 (.044)*	1.660 (.048)*
Single parent			1.272 (.162)	1.348 (.158)†
SES			1.114 (.049)*	1.110 (.055)†
Black			.445 (.001)*	.407 (.001)*
Hispanic			1.377 (.218)	1.096 (.244)
Other			.668 (.396)	.809 (.364)
Warmth			.972 (.066)	.967 (.069)
Supervision			.931 (.068)	.905 (.065)
Lack of hostility			1.006 (.067)	1.027 (.068)
Family attachment			.925 (.064)	.915 (.065)
Low self-control			1.130 (.063)*	1.113 (.068)
Peer substance use			1.232 (.037)*	1.200 (.041)*
Unstructured socializing				1.348 (.028)*

\*  $p < .05$  †  $p < .10$  OR = Odds Ratio SE = Standard Error

Table 4-4. Random Intercept Ordinal Model Predicting Alcohol Use (Level-2)

	Model 1 OR (SE)	Model 2 OR (SE)	Model 3 OR (SE)	Model 4 OR (SE)
Intercept	.014 (.246)*	.014 (.245)*	.010 (.297)*	.007 (.319)*
Collective efficacy	-	.881 (.215)	.939 (.207)	1.026 (.220)
Concentrated	-	.950 (.034)*	.996 (.043)	.997 (.027)
disadvantage	-	.985 (.026)	.956 (.034)	.949 (.037)
Immigrant concentration	-	.992 (.057)	.995 (.057)	.986 (.053)
Residential stability				
$\sigma_0^2$	0.170*	0.126*	0.091*	0.089*
$df_0$	77	73	73	73
$\chi^2$	-3491.62	-3514.66	-3.147.43	-3035.80

\*  $p < .05$  †  $p < .10$  OR = Odds Ratio SE = Standard Error

Table 4-5. Random Coefficient Ordinal Model Predicting Alcohol Use (Level-1)

	Model 5 OR (SE)	Model 6 OR (SE)
Intercept	.007 (.321)*	.466 (.360)*
Female	.995 (.132)	.987 (.156)
Age	1.652 (.048)*	1.657 (.041)*
Single parent	1.347 (.159)†	1.333 (.166)†
SES	1.112 (.055)†	1.108 (.053)†
Black	.524 (.248)*	.391 (.284)*
Hispanic	1.479 (.246)	1.123 (.247)
Other	.756 (.372)	.734 (.374)
Warmth	.960 (.069)	.959 (.069)
Supervision	.900 (.065)	.899 (.064)†
Lack of hostility	1.034 (.069)	1.045 (.069)
Family attachment	.912 (.065)	.910 (.069)
Low self-control	1.119 (.068)†	1.126 (.065)†
Peer substance use	1.207 (.042)*	1.206 (.033)*
Unstructured socializing	1.360 (.032)*	1.362 (.030)*

\*  $p < .05$  †  $p < .10$  OR = Odds Ratio SE = Standard Errors

Table 4-6. Random Coefficient Ordinal Model Predicting Alcohol Use (Level-2)

	Model 5 OR (SE)	Model 6 OR (SE)
Intercept	.007 (.321)*	.466 (.360)*
Collective efficacy	1.010 (.197)	1.029 (.211)
Concentrated disadvantage	.996 (.042)	1.016 (.045)
Immigrant concentration	.948 (.035)	.940 (.036)†
Residential stability	.978 (.056)	.990 (.058)
Unstructured socializing	1.360 (.032)*	1.362 (.030)*
Collective efficacy	-	.994 (.064)
Concentrated disadvantage	-	.980 (.010)*
Immigrant concentration	-	1.006 (.013)
Residential stability	-	.993 (.019)
$\sigma_0^2$	0.120*	0.125*
$df_0$	71	71
$\sigma_1^2$	0.014*	0.013
$df_1$	76	76
$\chi^2$	-2987.22	-3016.21

\*  $p < .05$  †  $p < .10$  OR = Odds Ratio SE = Standard Errors

Note:  $\sigma_0^2$  corresponds to the variability of the intercept between level-2 neighborhood clusters while  $\sigma_1^2$  corresponds to the coefficient of unstructured activities

## CHAPTER FIVE DISCUSSION, LIMITATIONS, AND FUTURE DIRECTIONS

### **Discussion**

Since the development of the routine activities perspective and Osgood et al.'s (1996) extension of this perspective to the individual-level, a considerable body of research has developed which examines how adolescents spend their time and their choice of activities influences the occurrence of criminal and deviant behavior. Research primarily supports the premise that certain activities are more likely to contribute to the likelihood that antisocial behavior will occur because they place adolescents in situations of increased opportunity (Osgood et al. 1996; Haynie and Osgood, 2005; Agnew and Peterson, 1989; Riley, 1987).

This study sought to contribute to this growing body of research through expanding on the relationship between time use and adolescent substance use by proposing a general framework of antisocial behavior that considers the broader social context in which these activities occur and the individual traits that adolescents possess. In doing so, several hypotheses were identified from this framework in order to explore the possibility that differences in neighborhood social context may condition the influence of the unstructured time use on substance use. Of primary interest here was the integration of the concept of unstructured time use with one's peers (Osgood et al. 1996) with the concept of neighborhood collective efficacy.

Unstructured activities with peers is theorized to create opportunities for deviant behavior, as such activities are more likely to occur away from parents without a prescribed agenda for how time is to be spent leading to an increased likelihood that time is spent on deviant endeavors. Based on this interpretation of the availability of

opportunity, it was hypothesized that collective efficacy would moderate the relationship established in prior research between unstructured activities and deviant behavior—in particular, the frequency adolescent alcohol use. The main hypothesis of this study posited that collective efficacy would, therefore, moderate the relationship between time use and the frequency of alcohol use.

In order to assess this hypothesis, data from the Project on Human Development in Chicago Neighborhoods (PHDCN) was utilized. These data were preferable because they contain both the original measures of unstructured activities with peers as utilized by Osgood et al. (1996) and the measure of collective efficacy developed by Sampson et al. (1997) thus providing high fidelity with regard to measurement. Further, the data collection process was designed specifically to explore the ways in which neighborhood structural conditions and social characteristics are associated with child and adolescent development. The potential for neighborhood-based differences in the frequency of alcohol use was hypothesized to be a product of differences in the level of collective efficacy across neighborhoods. Implicit within this hypothesis is the expectation that both neighborhood collective efficacy and unstructured activities at the individual-level would both be associated with the frequency of reported alcohol use. With regard to collective efficacy, this is the first study to examine its contextual effect on adolescent substance use of any type. Three main results were found and are elaborated on below.

First, results from the multilevel models support the expectations concerning the individual-level routine activities perspective. In particular, adolescents who reported more involvement in unstructured activities with their peers were more likely to report a higher frequency of alcohol use. This finding was also robust; the association between

unstructured time and alcohol use remained when controlling for important neighborhood and individual characteristics. This result is consistent with previous findings showing that unstructured activities are important sources of deviant opportunities (Osgood et al. 1996; Bernburg and Thorlindsson, 2001; Maimon and Browning, 2010; Svensson and Oberwittler, 2010). Importantly, the importance of unstructured activities persists even after controlling for the type of peers one is spending their time with. A critical distinction between opportunity theories and theories of socialization, such as social learning theory and differential association, is the importance placed on peer quality. Based on socialization theories, it follows that the influence of unstructured activities on alcohol use would be mitigated after controlling for delinquent peers since associating with prosocial peers would not promote or facilitate deviant behavior. The results here, however, indicate that while differential association with deviant peers is indeed associated with more frequent alcohol use, spending time in unstructured activities with peers is independently important. It should also be noted that peer quality was assessed at a temporally prior wave compared to the observed outcome, hence eliminating any obfuscation of the causal ordering of variables.

On the other hand, Osgood and other proponents of the individual routine activities perspective contend that peer quality is largely irrelevant, thus relegating the role of peers to providing opportunity or situational motivation for deviance. Based on the results found here, and contrary to the expectations of individual routine activities theory, the relationship between the frequency of alcohol use and peer quality is important as the relationship between the frequency of alcohol use and the amount of time spent in unstructured activities with peers. Such findings are not inconsistent with

the extant research, as previous studies examining both constructs have often found both to be important. For instance, Osgood and Haynie (2005) compare the relative importance of time spent with peers and peer quality as they relate to general delinquency and found that they have roughly the same effect sizes, concluding that both are important to take into consideration as causes of delinquency. Other studies that control for peer quality while examining unstructured time with peers reach similar conclusions (Maimon and Browning, 2010; Gibson, 2012). In conjunction with previous findings, the results found in the current study confirm the importance of considering opportunity for deviant behavior.

The distribution of opportunities, however, is not constant across time and space (Cohen and Felson, 1979), and as such, the second and third results found in this study focus on the structural and social factors that may directly and indirectly influence the frequency of alcohol use. It was hypothesized that collective efficacy would be directly related to the frequency of alcohol use across neighborhoods, since neighborhoods with more collective efficacy would be more likely and able to supervise adolescents to prevent use. Although the frequency of alcohol use was found to significantly vary across neighborhoods, this variance was not a function of collective efficacy. Collective efficacy did not have a statistically significant association with alcohol use. Because it is possible that the primacy of individual characteristics supersede the influence of more distal contextual-level factors, a contextual model without any individual-level predictors was estimated to further confirm this result. Based on this more liberal test, the association between collective efficacy and frequency of alcohol use remained non-significant. In a final effort to discern a relationship between collective efficacy and

alcohol use frequency, a bivariate multilevel ordinal regression model was estimated (not shown). This model differs from those estimated above in that, unlike the model which includes all of the contextual-level variables under examination here, the only variable controlled for is collective efficacy, yet even the relationship between collective efficacy and alcohol use from this model was non-significant.

This was one of the first studies to investigate the relationship between collective and any form of substance use. Considering extant research which has shown that collective efficacy is related to a number of other outcomes, including homicide (Morenoff, Sampson, Raudenbush, 2001), personal health (Browning and Cagney, 2002; Browning, Burrington, Leventhal, Brooks-Gunn, 2008; Xue, Leventhal, Brooks-Gunn, and Earls, 2005), intimate partner violence (Wright and Benson, 2010; Browning, 2002), and fear of crime (Gibson, Zhao, Lovrich, and Gaffney, 2002), this non-significant result was somewhat surprising. Primarily, it suggests that the frequency at which adolescents will use alcohol is not contingent upon the desires of neighborhood residents to maintain order within their neighborhood or their willingness to act in order to do so. The reasons for this are potentially numerous, however, the most obvious may have to do with the nature and availability of alcohol use. For example, since alcohol can be legally sold in stores unlike other substances, illegal markets centered on its distribution are largely non-existent. As a result, its availability is not contingent upon the presence of dealers, implying that the increased supervision or guardianship found in highly efficacious neighborhoods, which can serve to limit the presence of drug dealers and other sources of illicit substances, is less likely to affect the procurement and use of alcohol by those who are not of legal drinking age. Therefore, collective efficacy may be

unrelated to adolescent alcohol use because adolescents are able to obtain alcohol and find the opportunity to drink it outside of the purview of neighbors and other residents, such as at home or a friend's house while parents are away. Unfortunately, it is not possible to establish whether one's alcohol use takes place within the limits of the neighborhood in which they reside or outside of it given the data. Collectively efficacy may serve to reduce one's alcohol use within their neighborhood compared to other contexts, however without being able to disaggregate use on the basis of location this possibility could not be explored. Similarly, since it is currently unknown how collective efficacy relates to the use of other drugs, it is not possible to compare the current study's results relative to other substances. It is plausible that collective efficacy would be inversely related to other more illicit drugs, such as marijuana, so future research should begin by extending these results to other substances for comparison purposes.

Despite the fact that a relationship between collective efficacy and alcohol use was not observed, collective efficacy may still play an important causal role in its development and use based on whether or not families move to better or worse neighborhoods. The current study did not capture residential relocation of families and their children from one neighborhood to another. As a result, adolescents may be erroneously attributed to a neighborhood with characteristics in contrast from one wave to another, which would adversely influence the estimates of neighborhood effects. For example, if an adolescent who lives in a highly efficacious neighborhood at wave 1 then moves to a neighborhood with less collective efficacy prior to the second measurement, any change in their alcohol use would be incorrectly attributed to the original, highly efficacious neighborhood. Studies based on the Moving to Opportunity project found

that randomly selected adolescents who relocate with their families from impoverished neighborhoods to improved conditions are less likely to engage in violence and other antisocial behaviors compared to a control group of families that remained in their original neighborhoods (Katz, Kling, and Liebman, 2001; Kling, Ludwig, and Katz, 2005), suggesting that the advantages provided by moving into better neighborhoods are considerable, although these benefits may diminish over time (Kling, Ludwig, and Katz, 2004).

The third hypothesis of this study was proposed to test the cross-level interaction between collective efficacy, unstructured time, and adolescent alcohol use; specifically, the interaction between collective efficacy and unstructured activities with peers to predict alcohol use frequency. It was expected that neighborhoods with more collective efficacy would be better able to reduce opportunities for alcohol use thus actually reducing alcohol use. However, given that collective efficacy was not found to be related to the frequency at which adolescents reported using alcohol, it is not surprising that the interaction between it and unstructured. As a first step to determining the existence of an interaction, the association between unstructured activities and alcohol use was allowed to vary between neighborhoods, meaning that its relationship could potentially differ from one neighborhood to the next. It was found that this relationship did vary; the association between unstructured time and alcohol use varied across neighborhoods. Next, unstructured activities' influence on alcohol use was modeled as a function of neighborhood characteristics in an attempt to understand the sources of these differences. It is important to note that considerable research, theoretically and empirically, supports the relationship between a neighborhood's ability to monitor its

youth (e.g., collective efficacy) and the deviant behavior present therein (Sampson, 1997; Sampson and Groves, 1989; Elliot et al. 1997; Maimon and Browning, 2010). Therefore, it was theoretically expected that collective efficacy would account for the observed empirical differences in the relationship between unstructured activities and alcohol use across neighborhoods.

Although the expected hypothesis was not supported, the between-neighborhood differences in unstructured activities were fully accounted for by another neighborhood characteristic. In particular, differences in concentrated disadvantage, rather than collective efficacy, conditioned the influence that spending time in unstructured activities with their peers had on the frequency of alcohol use. This is not to say that adolescents who reside in areas with more concentrated disadvantage than others are spending less time in such activities. Rather, all else being equal, the influence of unstructured time on adolescent alcohol use was weaker in neighborhoods with more concentrated disadvantage compared to neighborhoods with less disadvantage. This finding suggests the need to further understand the social dynamics of unstructured time use and why these activities are less likely to culminate in alcohol use in neighborhood that are disadvantaged. One possible explanation of this finding has to do with the racial composition of disadvantaged neighborhoods. The measure of concentrated disadvantaged used here is the same as the one developed by Sampson et al. (1997) which includes the proportion of black residents in each neighborhood. This suggests that the relationship between neighborhood concentrated disadvantage and alcohol use is likely driven by presence of the considerable number of poor blacks often found to reside in these types of neighborhoods (Wilson, 1987; 1997), which is supported by the

result found here that blacks are less likely to report frequent alcohol use at the individual-level. This explanation is consistent with previous findings which suggest that whites are more likely to use alcohol than blacks (Substance Abuse and Mental Health Services Administration, 2010; Johnston, et al. 2010). Conversely, blacks may be more likely to use other substances, for instance crack cocaine, compared to whites, meaning that further research is necessary to determine if spending time in unstructured activities with peers increases the use of other illicit substances for adolescents who reside in disadvantaged neighborhoods.

Although it was not one of the hypotheses addressed here, the integrated framework which serves as the basis of this study considers low self-control as the primary individual characteristic which influences one's interpretation of their social context, therefore the results related to the relationship between self-control and alcohol use bear discussion. Following from Gottfredson and Hirschi's (1990) conceptualization of self-control as the single most important determinate of criminal propensity, it was expected that adolescents who have low self-control would be more likely to report frequent alcohol use. The results here, however, did not meet expectations. Prior to controlling for the time that adolescents spend in unstructured activities with their peers, Model 3 displayed Table 4-3 shows that self-control is significantly related to the frequency of alcohol use. However, it becomes non-significant after adjusting for time spent in unstructured activities. One explanation for this result is that adolescents who are inclined to use alcohol due to low self-control seek out opportunities for use, thus accounting for the previously observed relationship between alcohol use and self-control.

On the other hand, it may also be possible that the failure to find a relationship between alcohol use and self-control in the fully specified random intercept model is attributable to measurement error. In particular, self-control is assessed through the use of the EASI-Temperament instrument which asks primary care givers to describe their child's behavior across several domains, including inhibitory control, decision-making time, sensation seeking, and persistence. Clearly, validity and reliability of this scale is then dependent upon the primary caregiver's ability to provide complete and accurate information concerning their child. While children are young and spend much of their time at home with their parents or guardian, the use of a care-taker-based measure may be informative or even preferable. However, the use of such a measure may be detrimental during adolescence as youth being to spend to more time in the company others and less time with their parents (Warr, 2002), suggesting that parents may be less knowledgeable about their children's behavior during this time, and thus a source of measurement error.

Although this is certainly a possibility, it seems less probable than the former explanation based on previous studies which have utilized this same measure that have found it to be reliable with high predictive validity (Gibson, 2012; Gibson, et al. 2009; Gibson, et al. 2010; Zimmerman and Messner, 2011; Zimmerman and Messner, 2010). Further, it is probably not a coincidence that the influence of self-control becomes significant, albeit marginally ( $\alpha < .10$ ), once the effect of unstructured activities with peers is allowed to vary between neighborhoods in the random coefficient model, suggesting that the effect of self-control on alcohol use was being suppressed. This result is consistent with the theoretical framework adopted in this study, but further

research is necessary to determine how self-control and unstructured activities with peers are related.

### **Study Limitations**

This study is not without its limitations. A problem common to most neighborhood research is that the neighborhood which one resides is only one of a plethora of social contexts that one is exposed to. Therefore, it is difficult, if not impossible, to simultaneously take into account the other social settings, such as school which may influence one's behavior. Further, as adolescents go through their daily routine activities it is likely that they traverse the boundaries of multiple neighborhoods and spend differing amounts of time in each context. Therefore, in order to accurately assess the influence of neighborhood context, qualities of other social contexts in which adolescents spend their time must also be taken into consideration.

Additionally, as adolescents age they gain more autonomy and are often allowed to venture further from the home, stay out later, and associate with friends while fewer adults or others responsible for social control are present (Hirschi, 1969/2002; Berndt, 2002; Ainsworth, 1989). This leads to a problematic implication for determining the influences of neighborhood context on differences in individual behavior. Adolescents may seek opportunities found in neighborhoods with more permissive or lax social control in order to subvert the behavioral constraints found in the neighborhood in which they reside. Some efforts were taken to minimize this possibility by focusing the analysis on the 12- and 15-year-old adolescent cohorts. It was assumed that these cohorts would be less able to spend time in other neighborhoods or other social contexts relative to the older 18-year-old cohort. However, it was not possible to test this assumption given the unavailability of the necessary data.

This analysis implicitly assumes that alcohol use occurred within one's own neighborhood, yet it was not possible to determine the appropriateness of this assumption. It is equally possible that adolescents who reside in highly efficacious neighborhoods who report frequent alcohol use were able to do so because they consume it outside of the boundaries of their neighborhood in order to find opportunities not present in their own. This would not contradict the expectations of collective efficacy theory; in fact it would be consistent with it. In particular, collective efficacy explicitly relates the capacity and willingness of neighborhood residents to maintain order within their own space, meaning that if adolescents must venture outside of efficacious neighborhoods in order to find opportunities for use then collective efficacy has fulfilled its role. However, as discussed above, it would appear as though collective efficacy was not related to the frequency of alcohol use if adolescents from those neighborhoods reported use because they consumed it elsewhere. Therefore, without being able to determine where alcohol use is taking place, it may appear that collective efficacy does not influence individual outcomes, which may also serve to explain the unsupported hypotheses found here.

In order to avoid confounding Osgood's individual-level routine activities theory with Akers' social learning theory, and test the effects of the availability of opportunity on the frequency alcohol use, the analysis presented here controls for peer alcohol use, thereby reducing the likelihood that the relationship between unstructured activities and alcohol use is merely attributable to spending more time with peers who use alcohol. Of course, anyone familiar with Akers' social learning theory is aware that differential association has both a behavioral-interactional component (the behaviors to which one

is exposed to) and a normative component (the norms or “definitions” of others that one is exposed to) (Akers, 1998; 1984). According to Akers, both are important to the learning process (Sellers and Akers, 2006). Therefore, by controlling for the alcohol use of one’s peers, this analysis accounts for the behavioral-interaction component but does not account for the balance of definitions that one is exposed to. As a result, it cannot be said with full certainty that opportunity alone is the driving mechanism behind the finding that spending time in unstructured activities with peers and increases the frequency of alcohol use. Future studies exploring the role of opportunity in general and Osgood’s individual-level routine activities theory in particular would benefit by including additional measures of one’s own definitions as well as the definitions of peers to which one is exposed in order to avoid ambiguity as to which theory is being supported

It is also important to consider the possibility that “neighborhood” may have a different meaning for the respondents sampled in the PHDCN compared to the operationalization of neighborhood clusters actually utilized here. Neighborhood clusters, as defined here, are comprised of multiple contiguous U.S. Census tracts combined on the basis of geographic homogeneity and closeness to one another. As a result, the neighborhood clusters are larger than other potential geographic units, such as city blocks or single census tracts. Therefore, when residents were asked about their willingness to act in order to maintain the social order within their neighborhood, it is possible that they were actually referring to different geographical configurations than the ones considered by the PHDCN. Although these clusters were determined with knowledge of natural boundaries, such as railroad tracks and highways, as described by Earls and Visser (1997), it cannot be said with certainty that these units overlap

perfectly with residents' own interpretations of the span of their neighborhood. As such, operationalizing "neighborhood" differently may lead to different conclusions on the impact of collective efficacy on adolescent alcohol use.

### **Future Directions**

The research presented here began with the premise that it is necessary to consider the social context in which individuals live and conduct their daily activities in addition to any personal characteristics that may make one more or less likely to engage in criminal, delinquent, or deviant behavior in order to fully understand its antecedents. To this end, an individual's ability to regulate their behavior (i.e., self-control) was assumed to influence the way they interpret their surroundings as potential opportunities for criminal behavior. The conceptualization of social interaction in this way results in a framework which nests individuals within situations and situations within a larger social structure, in this case neighborhoods. Although the primary focus here emphasized the time one spends in unstructured activities with their peers and the neighborhoods which these activities occur, this framework is general enough to focus on any situation or social context, leaving much room to build upon in future research.

An important extension to this study would be to consider the use of other substances. This study was one of the first to consider the influence of collective efficacy on any form of substance use, specifically, the use of alcohol. Given that it was found to be unrelated to alcohol use, it is necessary to consider its influence on other substances in order to determine the robustness of this finding. Similarly, it is also necessary to further explore where alcohol use takes place. It cannot be concluded with any certainty that collective efficacy does not influence the use of alcohol without knowing if it occurs within the highly efficacious neighborhoods. If it does occur within

such neighborhoods, then it may be said that collective efficacy is unrelated to alcohol use. Without determining where alcohol use takes place, the importance of collective efficacy remains somewhat ambiguous.

Future research should also include multiple social contexts in addition to neighborhoods. While neighborhoods are important contexts that can influence many aspects of one's life, it is only one of many contexts. In particular, it is unlikely that one spends the entirety of their time in their neighborhood. Rather, one's lifestyle or routine activities are likely to bring one into different neighborhoods and other locations, such as school or work, which may be just as important, if not more, than the neighborhood in which they live. It is necessary to compare the relative importance of each context, in order to more accurately determine how opportunities for criminal behavior and substance use arise and how those other contexts may influence its occurrence. In the same vein as determining where delinquent or criminal behavior takes place, it is also important to determine where it does not take place, as it may offer insight into how to better prevent its occurrence to begin with.

Besides the unstructured time one spends with their peers, other aspects of social interaction can also be examined. For instance, the quality of one's peers may also influence how situations are interpreted, or may influence the type or nature of the opportunities that are available. Perhaps spending time in unstructured activities with deviant peers increases the availability of opportunities for deviant behavior more so than spending time with prosocial peers, meaning that the amount of time spent would suggest an interaction between peer quality and the time spent in unstructured activities with them. This would require knowledge about the amount of time one spends which

each type of peer relative to the other. Therefore, this line of research would benefit greatly from the use of social network data which includes this information. Since the measure of unstructured time with peers developed by Osgood et al. (1996) and used here is concerned with only how often individuals spend their time in certain activities with their friends, it does not measure how long these activities last or the particular peers (or their qualities) that are also taking part. As a result, social network data which captures information beyond the simple 'how often' (e.g., 1 -2 times per month, once a week, everyday) would be better suited to explore the social dynamics that occur within situations of unstructured time use.

## APPENDIX A COLLECTIVE EFFICACY

Following Sampson et al. (1997), the measure of collective efficacy was constructed using a multilevel rating scale item-response model (Wright and Masters 1982; Raudenbush, Johnson, and Sampson, (2003). This model is preferable for several reasons. First, being a type of item-response model, it is able to adjust for the difficulty of endorsing each item, meaning that it is able to account for the possibility that some items may be harder to agree with or promote than others, and thus weight their contribution to the final scale score differently. Second, this model is able account for missing item data (but not respondent data) on an item-by-item level without the need to drop entire cases if data are missing from any one item in the scale. Third, scale scores are able to be account for characteristics of the respondent which may bias item responses. Rather than simple summation of items, scale scores from multilevel item response models are person-level empirical bayes (EB) residuals. EB residuals adjust for unreliability of estimates by regressing scale scores toward the grand mean by a factor proportional to the unreliability (Raudenbush and Bryk 2002). The data used to create this measure is from the PHDCN-CS. The sampling process used to collect these data is described in the methods section.

In general, the multilevel rating scale model can be thought of as a three-level ordinal regression model which specifies the responses for each of the ten item (see Appendix B for specific items) in the collective efficacy scale at level-1, which then adjusts for qualities specific to each respondent that may influence how they respond at the second level and qualities related to the larger context in which the person is nested at the third level. In particular, the multilevel rating scale model specified here considers

scale items to be nested within persons who are themselves nested within neighborhoods. Specifically, the ten items comprising the collective efficacy scale are modeled at level-one by the equation:

$$\ln\left(\frac{\phi_{mijk}}{1-\phi_{mijk}}\right) = \pi_{jk} + \sum_{p=1}^9 \alpha_p D_{pijk} + \sum_{m=1}^{M-1} \delta_m \quad (\text{A-1})$$

From equation A-1,  $\phi_{mijk}$  is the probability that response  $i$  of person  $j$  in neighborhood  $k$  is at response category  $m$  or below,  $\pi_{jk}$  is the intercept,  $D_{pijk}$  is a dummy variable taking on a value of 1 if response  $i$  is to item  $p$  in the ten-item collective efficacy scale and 0 otherwise,  $\alpha_p$  is the amount of collective efficacy represented by item  $p$  in the scale (or in the language of item response theory, the difficulty of endorsing item  $p$ ), and  $\delta_m$  is a threshold parameter separating categories  $m-1$  and  $m$ . Threshold parameters  $\delta_m$  are assumed fixed across items and respondents. Another benefit of the multilevel approach is that it allows the scale scores to be adjusted on the basis of individual characteristics that may contribute to response bias. This is done by modeling the intercept,  $\pi_{jk}$ , at level-2 as a function of personal characteristics as follows:

$$\pi_{jk} = \beta_{0k} + \sum_{q=1}^{12} \beta_q X_{qjk} + r_{jk} \quad (\text{A-2})$$

From equation A-2,  $\beta_{0k}$  is the individual-level intercept,  $X_{qjk}$  is the value of person-level predictor  $q$  for individual  $j$  in neighborhood  $k$ ,  $\beta_q$  is the effect of  $q$  on individual  $j$ 's expected score, and  $r_{jk}$  is an independently, normally distributed error term with variance  $\sigma^2$ . The covariates adjusted for at this level are consistent with the ones utilized by Sampson et al. (1997) and include the respondent's age, marital status (married, divorced vs. single), gender (female vs. male), race/ethnicity (black, Hispanic vs. white)

number of times the respondent has moved in the five years prior to measurement, the length of time the respondent has lived in their neighborhood, home ownership (own vs. rent), employment (employed vs. unemployed), income, and education.

Because this level cannot account for missing data in the same way level-1 can, it was not possible to ignore missing data here. With the exception of education and income, all level-2 covariates had less than 10% missing data, so it did not create a problem to delete these cases list-wise. Note that excluding cases list-wise also eliminates the items associated with these cases at level-1. The education and income covariates had considerably more missing data, so using list-wise deletion would seriously compromise the analysis. As a result, these variables were multiply imputed using the other covariates to estimate their values in order to preserve sample size.

At the top level, level-3, the neighborhood intercept,  $\beta_{0k}$ , is allowed to vary as:

$$\beta_{0k} = \gamma_{00} + u_{0k} \tag{A-3}$$

Based on equation a-3,  $\gamma_{00}$  is the grand mean of collective efficacy and  $u_{0k}$  is a level three random effect. As discussed above, collective efficacy is the empirical bayes (eb) residual from the level three model after controlling for item difficulty and personal characteristics of the respondents.

## APPENDIX B MEASURES

### **Substance use**

How many days over the past year they drank an alcoholic beverage

### **EASI-temperament instrument**

#### Inhibitory control

Has trouble controlling his/her impulses

Usually cannot stand waiting

Can tolerate frustration better than most (reverse code)

Has trouble resisting temptation

Finds self-control easy to learn (reverse code)

#### Decision time

Often says the first thing that comes into his/her head

Likes to plan things way ahead of time (reverse code)

Often acts on the spur of the moment

Always likes to make detailed plans before she/he does something (reverse code)

#### Sensation seeking

Generally seeks new and exciting experiences and sensations

Will try anything once

Sometimes does “crazy” things just to be different

Tends to get bored easily

#### Persistence

Generally likes to see things through to the end (reverse code)

Tends to give up easily

Unfinished tasks really bother (reverse code)

Once gets going on something she/he hates to stop (reverse code)

### **Unstructured socializing with peers**

How often do you ride around in a car/motorcycle for fun

How often do you hang out with friends

How often do you go to parties

How many days a week do you go out after school/at night

### **Peers' substance use**

During the past year, of the people you spend time with

How many have used marijuana or pot?

How many have used any form of alcohol, including wine, liquor, or beer?

How many have used tobacco?

How many have used drugs, such as heroin, Cocaine, crack, or LSD (other than marijuana)?

### **Home Observation for Measurement of the Environment (HOME) Inventory**

#### Parental warmth measure

Parent talks with child twice during visit

Parent answers child's questions orally

Parent encourages child to contribute

Parent mentions skill of child

Parent praises child twice during visit

Parent uses diminutive for child's name

Parent voices positive feelings to child

Parent caresses, kisses, or hugs child

Parent responds positively to praise of child

#### Lack of hostility measure

Parent does not shout at child during visit

Parent does not express annoyance with child

Parent does not slap or spank child

Parent does not scold or criticize child

#### Supervision/monitoring measure

Subject has a set time (curfew) to be home on school nights

Subject has a set time (curfew) to be home on weekend nights

Has established rules about homework and checks to see if homework is done

Requires subject to sleep at home on school nights

When primary caregiver is not at home, reasonable procedures are established for subject to check in with primary caregiver or other designee on weekends or after school

After school, subject goes somewhere that adult supervision is provided

Establishes rules for behavior with peers and asks questions to determine whether they are being followed

Subject is not allowed to wander in public places without adult supervision for more than three hours

Has had contact with two of the subject's friends in the past two weeks

Has visited with school or talked to the teacher or counselor within the past three months

Has discussed hazard of alcohol and drug abuse with subject in past year

Denies subject access to alcohol (including beer and wine in the home)

Knows signs of drug use and remains alert to possible type or experimentation

## **Provision of Social Relations instrument**

Family attachment and support

- I know my family will always be there for me
- My family tells me they think I am valuable
- My family has confidence in me
- My family helps me find solutions to problems
- I know my family will always stand by me
- Sometime I am not sure I can rely on family (reverse coded)

## **Collective Efficacy**

Informal Social Control

- Children were skipping school and hanging out on a street corner,
- Children were spray-painting graffiti on a local building,
- Children were showing disrespect to an adult,
- A fight broke out in front of their house,
- The fire station closest to their home was threatened with budget cuts

Social Cohesion

- People around here are willing to help their neighbors
- This is a close-knit neighborhood
- People in this neighborhood can be trusted
- People in this neighborhood generally don't get along with each other (reverse coded)
- People in this neighborhood do not share the same values (reverse coded)

## **Immigrant concentration**

- Percentage of Latinos
- Percentage of foreign-born residents

## **Residential stability**

- Percentage living in the same house as five years earlier
- Percentage of owner-occupied housing

## **Concentrated Disadvantage**

- Percentage neighborhood residents below the poverty line
- Percentage on public assistance
- Percentage of female-headed families
- Percentage unemployed
- Density of children by percentage younger than 18
- Percentage of Black.

## REFERENCE LIST

- Agnew, R. and Peterson, D. M. (1989). Leisure and delinquency. *Social Problems* 36: 332 – 350.
- Ainsworth, M. S. (1989). Attachment beyond infancy. *American Psychology* 44: 709 – 716.
- Akers, R. L. (1985). *Deviant Behavior: A Social Learning Approach*. Third Edition, Belmont, CA: Wadsworth.
- Akers, R. L. (1996). Is differential association/social learning cultural deviance theory? *Criminology* 34: 229 – 247.
- Akers, R. L. (2008). *Social Structure Social Learning Theory: A General theory of Crime and Deviance* Boston: Northeastern University Press
- Arneklev, B., H., Grasmick, C. T., and Bursik, R. Jr. (1993). Low self-control and imprudent behavior. *Journal of Quantitative Criminology* 9: 225 – 47.
- Bernburg, J. G. and Thorlindsson, T. (2001). Routine activities in social context: A closer look at the role of opportunity in deviant behavior. *Justice Quarterly* 18: 543 – 567.
- Berndt, T. J. (2002). Friendship quality and social development. *Current Directions in Psychological Science* 11: 7 – 10.
- Birkbeck, C. and LaFree, G. (1993). The situational analysis of crime and deviance. *Annual Review of Sociology* 19: 113 – 137.
- Briar, S., and Piliavin, I. (1965). Delinquency, situational inducements, and commitment to conformity. *Social Problems* 13: 35-45.
- Briggs, X. S. (Ed.). (1997). *Yonkers Revisited: The Early Impacts of Scattered-Site Public Housing on Families and Neighborhoods*. New York: Teachers College.
- Brook, J. S., Brook, D. W., Gordon, A. S., Whiteman, M., and Cohen, P. (1990). The psychosocial etiology of adolescent drug use: A family interactional approach. *Genetic, Social, and General Psychology Monographs* 116: 111 – 267.
- Brook, J. S., Whiteman, M., Gordon, A. S., (1982). Qualitative and quantitative aspects of adolescent drug use: Interplay of personality, family, and peer correlates. *Psychological Reports* 51: 1151 – 1163.
- Brook, J.S., Whiteman, M., Gordon, A. S., (1983). Stages of drug abuse in adolescence: Personality, peer, and family correlates. *Developmental Psychology* 19: 269 – 277.

- Browning, C. R. (2002). The span of collective efficacy: Extending social disorganization theory to partner violence. *Journal of Marriage and Family* 64: 833 – 850.
- Browning, C. R, and Cagney, K. A. (2002). Neighborhood structural disadvantage, collective efficacy, and self-rated physical health in an urban setting. *Journal of Health and Social Behavior* 43: 383 – 399.
- Browning, C. R., Feinberg, S. L., Dietz, R. D. (2004). The paradox of social organization: Networks, collective efficacy, and violent crime in urban neighborhoods. *Social Forces* 83: 503 – 534
- Browning, C. R., Burrington, L. A., Leventhal, T., Brooks-Gunn, J. (2008). Neighborhood structural inequality, collective efficacy, and sexual risk behavior among urban youth. *Journal of Health and Social Behavior* 49: 269 – 285.
- Burgess, R. L. and Akers, R. L. (1966). A differential association-reinforcement theory of criminal behavior. *Social Problems* 14, 128 – 147.
- Bursik, R. J., Jr. (1988). Social disorganization and theories of crime and delinquency: Problems and prospects. *Criminology* 26: 19 – 51.
- Bursik, R. J., Jr., Grasmick, H. G. (1993). *Neighborhoods and Crime: The Dimensions of Effective Community Control*. Lexington Books: New York.
- Caldwell, B., and Bradley, R. (1984). *Home Observation for Measurement of the Environment*. Little Rock: University of Arkansas.
- Cauffman, E., Steinberg, L., Piquero, A. R. (2005). Psychological, neuropsychological and physiological correlates of serious antisocial behavior in adolescence: The role of self-control. *Criminology* 43: 133 – 176.
- Chen, K. and Kandel, D. B. (1995). The natural history of drug use from adolescence to mid-thirties in a general population sample. *American Journal of Public Health* 85: 41 – 47.
- Cohen, L. E. and Felson, M. (1979). Social change and crime rate trends: A routine activity approach. *American Sociological Review* 44: 588 – 608.
- Coleman, J. W. (2006). *The Criminal Elite: Understanding White-Collar Crime*. 6th edition, Worth Publishing
- Cook, P. J. (1980). Research in criminal deterrence: Laying the groundwork for the second decade. *Crime and Justice* 2: 211 – 268.

- Earls, F. J., and Visser, C. A. (1997). Project on Human Development in Chicago Neighborhoods: A Research Update [NIJ Research in Brief]. Washington, D.C.: U.S. Department of Justice, Office of Justice Programs, National Institute of Justice. NCJ 163603 (9). Retrieved from <http://www.icpsr.umich.edu/icpsrweb/PHDCN/about.jsp>
- Elliott, D.S., Huizinga, D. and Ageton, S.S. (1985) .*Explaining Delinquency and Drug Use*. Sage
- Elliott, D. S., and Menard, S. (1996). Delinquent friends and delinquent behavior: Temporal and developmental patterns. In D. Hawkins (ed.), *Some Current Theories of Deviance and Crime*. New York: Springer-Verlag.
- Elliott, D. S., Wilson, W. J., Huizinga, D., Sampson, R. J., Elliott, A., and Rankin, B. (1996) The effects of neighborhood disadvantage on adolescent development. *Journal of Research in Crime and Delinquency* 33: 389 – 426.
- Ennett, S. T., Flewelling, R. L., Lindrooth, R. C., and Norton, E. C. (1997). School and neighborhood characteristics associated with school rates of alcohol, cigarette, and marijuana use. *Journal of Health and Social Behavior* 38: 55 – 71.
- Evans, T. D., Cullen, F. T., Burton, Jr., V. S., Dunaway, R. G., and Benson, M. L. (1997). The social consequences of self-control: Testing the general theory of crime. *Criminology* 35: 475 – 500.
- Felson, M. (1994/2002). *Crime and Everyday Life: Insights and Implications for Society*. Thousand Oaks, CA: Pine Forge Press.
- Felson, M. and Clarke, R. V. (1995). Routine precautions, criminology, and crime prevention. In Barlow, H. D. ed., *Crime and Public Policy: Putting Theory to Work*. Boulder, CO: Westview
- Felson, M. and Cohen, L. E. (1979). Human ecology and crime: A routine activities approach. *Human Ecology* 8: 389 – 406.
- Forde, D. R., and Kennedy, L. W. (1997). Risky lifestyles, routine activities, and the general theory of crime. *Justice Quarterly* 14: 265 – 294.
- Gibbs, J. J., Giever, D., Martin, J. S. (1998). Parental management and self-control: An empirical test of Gottfredson and Hirschi's General Theory. *Journal of Research in Crime and Delinquency* 35: 40 – 70.
- Gibson, C. L. (2012). An investigation of neighborhood disadvantage, low self-control, and violent victimization among youth. *Youth Violence and Juvenile Justice* 10: 41 – 63.

- Gibson, C. L., Morris, S. Z., and Beaver, K. M. (2009). Secondary exposure to violence during childhood and adolescence. *Justice Quarterly* 26: 30 – 57.
- Gibson, C., Sullivan, C., Jones, S., and Piquero, A. (2010). Does it take a village? Assessing neighborhood effects on children's self-control. *Journal of Research in Crime and Delinquency* 47: 31 - 62.
- Gibson, C. L., Schreck, C. J., Miller, J. M. (2004). Binge drinking and negative alcohol-related behaviors: A test of self-control theory. *Journal of Criminal Justice* 32: 411 – 420.
- Gibson, C. L., Zhao, J., Lovrich, N. P., Gaffney, M. J. (2002). Social integration, individual perceptions of collective efficacy, and fear of crime in three cities. *Justice Quarterly* 19: 537 – 564.
- Goode, E. (2011). *Drugs in American Society*. 8th edition. McGraw-Hill
- Goldstein, S. E., Davis-Kean, P. E., Eccles, J. S., (2005). Parents, peers, and problem behavior: A longitudinal investigation of the impact of relationship perceptions and characteristics on the development of adolescent problem behavior. *Developmental Psychology* 41: 401 – 413.
- Gottfredson, D. C. (1998). *School based crime prevention*. In *Preventing Crime: What Works, What Doesn't, What's Promising* report to the NIJ.
- Gottfredson, M. R., and Hirschi, T. (1990). *A General Theory of Crime*. Stanford, CA: Stanford University Press.
- Grant, B. F. and Dawson, D. A. (1997). Age at onset of alcohol use and its association with DSM-IV alcohol abuse and dependence: Results from the national longitudinal alcohol epidemiologic survey. *Journal of Substance Abuse* 9: 103 – 110.
- Grasmick, H., Tittle, C., Bursik Jr., R., and Arneklev, B. (1993). Testing the core implications of Gottfredson and Hirschi's general theory of crime. *Journal of Research in Crime and Delinquency* 30: 5 – 29.
- Hawdon, J. E. (1996). Deviant lifestyles: The social control of daily routines. *Youth Society* 28: 162 – 188.
- Hawkins, J. D., Catalano, R. F., Miller, J. Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin* 112: 64 – 105.

- Hawkins, J. D., Graham, J. W., Maguin, E., Abbott, R., Hill, K. G., Catalano, R. F. (1997). Exploring the effects of age of alcohol use initiation and psychosocial risk factors on subsequent alcohol misuse. *Journal of Studies on Alcohol and Drugs* 58: 280 – 290.
- Hawkins, J. D., Weis, J. G. (1985). The social development model: An integrated approach to delinquency prevention. *The Journal of Primary Prevention* 6: 73 – 97.
- Hawkins, J. D., Oesterle, S., Brown, E. C., Arthur, M. W., Abbott, R. D., Fagan, A. A., Catalano, R. F. (2009). Results of a type 2 translational research trial to prevent adolescent drug use and delinquency: A test of Communities That Care. *Archives of Pediatrics and Adolescent Medicine* 163: 789–798.
- Hay, C. (2001). Parenting, self-control, and delinquency: A test of self-control theory. *Criminology* 39: 707 – 736.
- Hay, C. and Forrest, W. (2008). Self-control theory and the concept of opportunity: The case for a more systematic union. *Criminology* 46: 1039 – 1072.
- Haynie, D. L. and Osgood, D. W. (2005). Reconsidering peers and delinquency: How do peers matter? *Social Forces* 84: 1109 – 1130.
- Hederker, D. and Gibbons, R. D. (1994). A random-effects ordinal regression model for multilevel analysis. *Biometrics* 50: 933 – 944.
- Hindelang, M. J., Gottfredson, M. R., and Garofalo, J. (1978). *Victims of Personal Crime: An Empirical Foundation for a Theory of Personal Victimization*. Cambridge, MA: Ballinger.
- Hirschi, T. (2004). Self-control and crime. In Baumeister, R. F. and Vohs, K. D. (eds) *Handbook of self-regulation: Research, theory, and applications*. New York, NY, US: Guilford Press, pp. 537-552
- Hirschi, T. (1969/2002) *Causes of Delinquency*. New Brunswick, N.J. Transaction Publishers.
- Hirschi, T. and Gottfredson, M. R. (1993). Testing the general theory of crime. *Journal of Research in Crime and Delinquency* 30: 47 – 54.
- Hundleby, J. D. (1987). Adolescent drug use in a behavioral matrix: a confirmation and comparison of the sexes. *Addictive Behaviors* 12: 103 – 112.
- Jacobs, B. A. (2010). Deterrence and deterrability. *Criminology* 48: 417 – 441.

- Johnston, L. D., O'Malley, P. M., Bachman, J. G., and Schulenberg, J. E. (2011). *Monitoring the Future national results on adolescent drug use: Overview of key findings, 2010*. (p. 77) Ann Arbor: Institute for Social Research, University of Michigan
- Jones, S., Lynam, D. R., and Piquero, A. R. (2011). Substance use, personality, and inhibitors: Testing Hirschi's predictions about the reconceptualization of self-control. *Crime and Delinquency*, Published online before print November 8, 2011, doi: 10.1177/0011128711420109
- Kandel, D. B. and Logan, J. A. (1984). Patterns of drug use from adolescence to young adulthood: I. Periods of risk for initiation, continued use, and discontinuation. *American Journal of Public Health* 74: 660 – 666.
- Katz, L. F., Kling, J. R., Liebman, J. B. (2001). Moving to opportunity in Boston: Early results of a randomized mobility experiment. *The Quarterly Journal of Economics* 116: 607 – 654.
- Kennedy, L. W. and Forde, D. R. (1990). Routine activities and crime: An analysis of victimization in Canada. *Criminology* 28: 137 – 152.
- Kilpatrick, D. G., Acierno, R., Saunders, B., Resnick, H. S., Best, C. L., and Schnurr, P. P. (2000). Risk factors for adolescent substance abuse and dependence: Data from a national sample. *Journal of Consulting and Clinical Psychology* 68: 19–30.
- Kling, J. R., Ludwig, J., and Katz, J. F. (2005). Neighborhood effects on crime for female and male youth: Evidence from a randomized housing voucher experiment. *The Quarterly Journal of Economics* 120: 87 – 130.
- Kling, J. R., Ludwig, J., Katz, J. F. (2004). Youth criminal behavior in the moving to opportunity experiment. Working Paper.
- Krohn, M. D., Lizotte, A. J., Perez, C. M. (1997). Interrelationship between substance use and precocious transitions to adulthood. *Journal of Health and Social Behavior* 38: 87 – 103.
- Kubrin, C. E. and Weitzer, R. (2003). New directions in social disorganization theory. *Journal of Research in Crime and Delinquency* 40: 374 – 402.
- LaGrange, T. C., and Silverman, R. A. (1999). Low self-control and opportunity: Testing the general theory of crime as an explanation for gender differences in delinquency. *Criminology* 37: 41 – 72.

- Lambert, S. F., Brown, T. L., Phillips, C. M., Jalongo, N. S. (2004). The relationship between perceptions of neighborhood characteristics and substance use among urban African American adolescents. *American Journal of Community Psychology* 34: 205 – 218.
- Leventhal, T., Selner-O'Hagan, M., Brooks-Gunns, J., Bingenheimer, J. B., and Earls, F. (2004). The home life interview from the project on human development in Chicago neighborhoods: Assessment of parenting and home environment for 3- to 15-year-olds. *Parenting: Science and Practice* 4: 211 – 241.
- Long, J. S. (1997). *Regression Models for Categorical and Limited Dependent Variables*. Thousand Oaks, CA: Sage.
- Longshore, D. (1998). Self-control and criminal opportunity: A perspective test of the general theory of crime. *Social Problems* 45: 102 – 113.
- Maddahian, E., Newcomb, M. D., and Bentler, P. M. (1986). Adolescent's substance use: Impact of ethnicity, income, and availability. *Advances in Alcohol and Substance Abuse* 5: 63 – 78.
- Maimon, D. and Brownig, C.R. (2010) Unstructured socializing, collective efficacy, and violent behavior among urban youth. *Criminology* 48: 443 – 474.
- Marshall, N. L., Coll, C. G., Marx, F., McCartney, K., Keefe, N., and Ruh, J. (1997). After-school time and children's behavioral adjustment. *Merrill Palmer Quarterly* 43: 497-514.
- Massey, J. L., Krohn, M. D, Bonati, L. M. (1989). Property crime and the routine activities of individuals. *Journal of Research on Crime and Delinquency* 26: 378 – 400.
- McGloin, J. M., Shermer, L. O. (2009). Self-control and deviant peer network structure. *Journal of Research in Crime and Delinquency* 46: 35 – 72.
- Meithe, T. D. and McDowall, D. (1993). Contextual effects in models of criminal victimization. *Social Forces* 71: 741 – 759.
- Menard, S. (1992). Demographic and theoretical variables in the age-period-cohort analysis of illegal behavior. *Journal of Research in Crime and Delinquency* 29: 178 – 199.
- Miller, B. L., Griffin, O. H.III, Gibson, C. L., Khey, D. N. Trippin' on Sally D: Exploring predictors of salvia divinorum experimentation. *Journal of Criminal Justice* 37: 396 – 403.

- Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review* 100: 674-701.
- Moore, D., Williams, J., and Qualls, W. (1996). Target marketing of tobacco and alcohol-related products to ethnic minority groups in the United States. *Ethnicity and Disease* 6: 83-98.
- Morenoff, J. D., Sampson, R. J., Raudenbush, S. W. (2001). Neighborhood inequality, collective efficacy, and the spatial dynamics of urban violence. *Criminology* 39: 517 – 560.
- Mustaine, E. E., and Tewksbury, R. (1998), Specifying the role of alcohol in predatory victimization. *Deviant Behavior* 19: 173 – 199.
- Morgan, (1978). P. A. (1978). The legislation of drug law: Economic crises and social control. *Journal of Drug Issues* 8: 53 – 62.
- Morris, R. G., Gerber, J., Menard, S. (2011). Social bonds, self-control, and adult criminality: A nationally representative assessment of Hirschi's revised self-control theory. *Criminal Justice and Behavior* 38: 584 – 599.
- Nagin, D. S. and Paternoster, R. (1993). Enduring individual differences and rational choice theories of crime. *Law and Society Review* 27: 467 – 496.
- Nagin, D. S. and Paternoster, R. (2000). Population heterogeneity and state dependence: State of the evidence and directions for future research. *Journal of Quantitative Criminology* 16: 117 – 144.
- Newcomb, M. D., and Felix-Ortiz, M. (1992). Multiple protective and risk factors for drug use and abuse: Cross-sectional and prospective findings. *Journal of Personality and Social Psychology* 63: 280–296.
- Oesterle, S., Hawkins, J. D., Fagan, A. A., Abbott, R. D., Catalano, R. F. (2010). Testing the universality of the effects of Communities that Care prevention system for preventing adolescent drug use and delinquency. *Prevention Science* 11: 411 – 423.
- Osgood, D. W. and Anderson, A. L. (2004). Unstructured socializing and rates of delinquency. *Criminology* 42: 519 – 549.
- Osgood, D. W., Anderson, A. L. and Shaffer, J. N. (2005). “Unstructured Leisure in the After-School Hours.” In Mahoney, J. L., Larson, R. W., and Eccles, J. S. (eds.) *Organized Activities as Contexts of Development: Extracurricular Activities, After-School and Community Programs*. Mahwah, NJ: Lawrence Erlbaum, pp. 45 - 64.

- Osgood, D.W, Wilson, J. K., O'Malley, P. M., Bachman, J. G., and Johnston, L. D. (1996). Routine activities and individual deviant behavior. *American Sociological Review* 61: 635–655.
- Paternoster, R. and Brame, R. (1998). The structural similarity of processes generating criminal and analogous behaviors. *Criminology* 36: 633 – 679.
- Piquero, A. R. and Bouffard, J. A. (2007). Something old, something new: A preliminary investigation of hirschi's redefined self-control. *Justice Quarterly* 24: 1 – 27.
- Piquero, A. R., Gibson, C. L., and Tibbetts, S. G. (2002). Does self-control account for the relationship between binge drinking and alcohol-related behaviors? *Criminal Behavior and Mental Health* 12: 135 – 154.
- Piquero, A. and Tibbetts, S. (1996). Specifying the direct and indirect effects of low self-control and situation factors in offenders' decision making: Toward a more complete model of rational offending. *Justice Quarterly* 13: 481 – 510.
- Perrone, D., Sullivan, C. J., Pratt, T. C., Margaryan, S. (2004). Parental efficacy, self-control, and delinquency: A test of a general theory of crime on a nationally representative sample of youth. *International Journal of Offender Therapy and Comparative Criminology* 48: 298 – 312.
- Petronis, K. R. and Anthony, J. C. (2000) Perceived risk of cocaine use and experience with cocaine: Do they cluster within us neighborhoods and cities? *Drug and Alcohol Dependence* 57: 183 – 192.
- Pogarsky, G. (2002). Identifying Deterrable offenders: Implications for deterrence research. *Justice Quarterly* 19: 431 – 452.
- Pratt, T. C., and Cullen, F. T. (2000). The empirical status of Gottfredson and Hirschi's general theory of crime: A meta-analysis. *Criminology* 38: 931 – 964.
- Pratt, T. C., Turner, M., and Piquero, A. R. (2004). Parental socialization and community context: A longitudinal analysis of the structural sources of self-control. *Journal of Research in Crime and Delinquency* 41: 219 – 243.
- Raudenbush, S. W. and Bryk, A. S. (2002). *Hierarchical Linear Models: Applications and Data Analysis Methods*, 2nd ed. Sage Publications.
- Raudenbush, S. W., Johnson, C., and Sampson, R. J. (2003). A multivariate, multilevel Rasch model for self-reported criminal behavior. *Sociological Methodology* 33: 169 – 211.

- Raudenbush, S. W. and Sampson, R. J. (1999). Ecometrics: Toward a science of assessing ecological settings, with application to the systematic social observation of neighborhoods. *Sociological Methodology* 29: 1 – 41.
- Reiss, A. J., Jr. (1986). Co-offender influences on criminal careers. In Blumstein, A., Cohen, J., Roth, J., Visher, C. (eds.), *Criminal Careers and Career Criminals* Washington, D.C.: National Academy Press, pp. 121 – 160.
- Riley, D. (1987). Time and crime: The link between teenager lifestyle and delinquency. *Journal of Quantitative Criminology* 3: 339 – 354.
- Rosenbaum, D. P. and Hanson, G. S. (1998). Assessing the effects of school-based drug education: A six-year multilevel analysis of project D.A.R.E. *Journal of Research in Crime and Delinquency* 35: 381 – 412.
- Rosenbaum, E. and Harris, L. E. (2001). Residential mobility and opportunities: Early impacts of the Moving to Opportunity demonstration program in Chicago. *Housing Policy Debate* 12: 321 – 346.
- Sampson, R. J. (1987). Urban black violence: the effect of male joblessness and family disruption. *American Journal of Sociology* 93: 348 - 382.
- Sampson, R. J. (1992). Family management and child development: Insights from social disorganization theory. In Joan McCord (ed.), *Facts, Frameworks, and Forecasts*. New Brunswick, NJ: Transaction Publishers.
- Sampson, R. J. (1997). Collective regulation of adolescent misbehavior: Validation results from eighty Chicago neighborhoods. *Journal of Adolescent Research* 12: 227 - 244.
- Sampson, R. J. (2002). Organized for what? Recasting theories of social (dis)organization. In Waring, E. and Weisburd, D. L. (eds.) *Crime and Social Organization*, New Brunswick, NJ: Transaction.
- Sampson, R. J. (2006). Collective efficacy theory: Lessons learned and directions for future inquiry. In Cullen, F. T., Wright, J. P., Blevins, K. R. (eds.) *Taking Stock: The Status of Criminological Theory*. Transaction Publishers: New Brunswick.
- Sampson, R. J. and Groves, B. (1989). Community structure and crime: Testing social-disorganization theory. *American Journal of Sociology* 94: 774 – 802.
- Sampson, R. J., and Laub, J. H. (1993). *Crime in the Making: Pathways and Turning Points Through Life*, Harvard University Press, Cambridge, MA.

- Sampson, R. J., and Laub, J. H. (1994). Urban poverty and the family context of delinquency: A new look at structure and process in a classic study. *Child Development* 65: 523 – 540.
- Sampson, R. J., Morenoff, J. D., and Earls, F. (1999). Beyond social capital: spatial dynamics of collective efficacy for children. *American Sociological Review* 64: 633 – 660.
- Sampson, R. J., Morenoff, J. D., Gannon-Rowley, T. (2002). Assessing “neighborhood effects”: Social processes and new directions in research. *Annual Review Sociology* 28: 443 – 478.
- Sampson, R. J., Morenoff, J. D., Raudenbush, S. (2005). Social anatomy of racial and ethnic disparities in violence. *American Journal of Public Health* 95: 224 – 232.
- Sampson, R. J., Raudenbush, S., Earls, F. (1997). Neighborhoods and violent crime: a multilevel study of collective efficacy. *Science* 277: 918 – 924.
- Schreck, C. J., Wright, R. A., Miller, J. M. (2002). A study of individual and situational antecedents of violent victimization. *Justice Quarterly* 19: 159 – 180.
- Schreck, C.J., Stewart, E. A., Fisher, B. S. (2006). Self-control, victimization, and their influence on risky lifestyles: A longitudinal analysis using panel data. *Journal of Quantitative Criminology* 22: 319 – 340.
- Scott, M. and Whitehead, P. C. (1983). Availability of outlets and consumption of alcoholic beverages. *Journal of Drug Issues* 13: 477 – 486.
- Sherman, L. W., Gartin, P. R., and Buerger, M. D. (1989). Hot Spots of predatory crime: Routine activities and the criminology of place. *Criminology* 27: 27 – 56.
- Simons, R. L., Simons, L. G., Burt, C. H., Brody, G. H. (2005). Collective efficacy, authoritative parenting and delinquency: A longitudinal test of a model integrating community- and family-level process. *Criminology* 43: 989 – 1030.
- Snijders, T. A. B. and Bosker, R. (2011). *Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling*. Thousand Oaks: Sage Publications.
- Substance Abuse and Mental Health Services Administration, *Results from the 2010 National Survey on Drug Use and Health: Summary of National Findings*, NSDUH Series H-41, HHS Publication No. (SMA) 11-4658. Rockville, MD: Substance Abuse and Mental Health Services Administration, 2011.

- Svensson, R. and Oberwittler, D. (2010). It's not the time they spend, it's what they do: The interaction between delinquent friends and unstructured routine activity on delinquency. Findings from two countries. *Journal of Criminal Justice* 38: 1006 – 1014.
- Tibbetts, S. G., and Whittimore, J. N. (2002). The interactive effects of low self-control and commitment to school on substance abuse among college students. *Psychological Reports* 90: 327 – 337.
- Thornberry, T. P. (1987). Toward an interactional theory of delinquency. *Criminology* 25: 863-891.
- Thrasher, F. (1963). *The Gang: A Study of 1,313 Gangs in Chicago*. Revised edition. Chicago: University of Chicago Press.
- Veysey, B. M. and Messner, S. F. (1999). Further testing of social disorganization theory: An elaboration of Sampson and Groves's "Community Structure and Crime". *Journal of Research in Crime and Delinquency* 36: 156 – 174.
- Wallace, J. M., Jr. and Bachman, J. G. (1991). Explaining racial/ethnic differences in adolescent drug use: The impact of background and lifestyle. *Social Problems* 38: 333 – 357.
- Warr, M. (1993). Parents, peers, and delinquency. *Social Forces*, 72, 247 – 264.
- Windle, M. (1994). Substance use, risky behaviors, and victimization among a U.S. national sample. *Addiction* 89: 175-182.
- Wikström, P. O. H. and Sampson, R. J. (2003). Social Mechanisms of Community Influences on Crime and Pathways in Criminality. In Lahey, B. B., Moffitt, T. E. and Caspi, A. (eds.) *The Causes of Conduct Disorder and Serious Juvenile Delinquency*, edited by. New York: Guilford Press, pp. 118 - 148
- Wallace, J. M., Jr. and Bachman, J. G. (1991). Explaining racial/ethnic differences in adolescent drug use: The impact of background and lifestyle. *Social Problems* 38: 333 – 357.
- Wilcox, P., Land, K. C., and Hunt, S. (2003). *Criminal Circumstance: A Dynamic, Multicontextual Criminal Opportunity Theory*. New York, NY
- Wilson, W. J. (1987). *The Truly Disadvantaged: The Innercity, the Underclass, and Public Policy*. University of Chicago Press, Chicago, Illinois
- Wilson, W. J. (1997). *When Work Disappears: The World of the New Urban Poor*. New York: Vintage Books.

- Winfree, L. T. and Bernat, F. P. (1998). Social learning, self-control, and substance abuse by eighth grade students: A tale of two cities. *Journal of Drug Issues* 28: 539 – 558.
- Wright, E. M. and Benson, M. L. (2010). Immigration and intimate partner violence: Exploring the immigrant paradox. *Social Problems* 57: 480 – 503.
- Wright, B. D. and Masters, G. N. (1982). *Rating scale analysis: Rasch measurement*. Chicago: MESA Press.
- Xue, Y., Leventhal, T., Brooks-Gunn, J. Earls, F. J. (2005) Neighborhood residence and mental health problems of 5- to 11-year-olds. *Archives of General Psychiatry* 62: 554 – 563.
- Zhang, L., Wieczorek, W. F., Welte, J. W. (1997). The impact of age of onset of substance use on delinquency. *Journal of Research in Crime and Delinquency* 34: 253 – 268.
- Zimmerman, G. M. and Messner, S. F. (2011). Neighborhood context and nonlinear peer effects on adolescent violent crime. *Criminology* 49: 873 – 903.
- Zimmerman, G. M. and Messner, S. F. (2010). Neighborhood context and the gender gap in adolescent violent crime. *American Sociological Review* 75: 958 – 980.

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