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Robert Archer
Florida International University, rarch016@fiu.edu

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ELABORATING THE CAUSES AND CONSEQUENCES OF UNSTRUCTURED

SOCIALIZING WITH PEERS: A CONSIDERATION OF MEDIATING,

RECIPROCAL, AND NONLINEAR EFFECTS

A dissertation submitted in partial fulfillment of

the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

INTERNATIONAL CRIME AND JUSTICE

by

Robert Joseph Lee Archer

2019

To: Dean John F. Stack, Jr.
       Steven J. Green School of International and Public Affairs

This dissertation, written by Robert Joseph Lee Archer, and entitled Elaborating the Causes and Consequences of Unstructured Socializing with Peers: A Consideration of Mediating, Reciprocal, and Nonlinear Effects, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this dissertation and recommend that it be approved.

_____
Stephen F. Pires

_____
Elisa M. Trucco

_____
Jamie L. Flexon, Co-Major Professor

_____
Ryan C. Meldrum, Co-Major Professor

Date of Defense: November 8, 2019

The dissertation of Robert Joseph Lee Archer is approved.

_____
Dean John F. Stack, Jr.
Steven J. Green School of International and Public Affairs

_____
Andrés G. Gil
Vice President for Research and Economic Development
and Dean of the University Graduate School

Florida International University, 2019

DEDICATION

I would like to dedicate this dissertation to my loving and supportive family. For one, to

my mother, and although he is no longer here with me on earth, to my father. To my

supporting wife, and also to my most missed companion, my dog Knight. Without all of

your support and love, I would not have made it through the Ph.D. program and this

dissertation.

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Next, I would like to express gratitude toward my parents. First, to my mother for her continued support. Next, I am grateful for the constant support my father showed me throughout his entire life and constant hard work to provide a better life for my mother and myself. For that, I am forever grateful. Although he is looking down on me from above, I know that he will be bragging about me in heaven (thanks dad). I am also highly appreciative of my wife Alaiza for her constant love and support. With you by my side, we can conquer the world. In addition, although you are in heaven with my father, I want to thank my dog Knight for all the love he showed me while he was by my side and to my dogs Daisy and Timber as well.

Last, I want to thank my closest friends for their support and always being there for me through the good times and the hard times. Indeed, Austin, Caleb, Victoria, Monica, Melody, and Talia are my life long best friends.

ABSTRACT OF THE DISSERTATION

ELABORATING THE CAUSES AND CONSEQUENCES OF UNSTRUCTURED

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Florida International University, 2019

Miami, Florida

Professor Ryan C. Meldrum, Co-Major Professor

Professor Jamie L. Flexon, Co-Major Professor

An abundance of research provides evidence that unstructured socializing with

peers (USWP) is positively associated with a wide variety of delinquent acts. What

remains less clear is the degree with which proximate and more distal variables affect this

association, the reciprocal nature of theoretically important variables implicated in the

relationship between USWP and deviance, and whether these mechanisms are nonlinear.

This lack of clarity represents significant voids in the research examining USWP and

deviancy and gives rise to the purpose of the present work.

While a number of approaches have been used to nest research examining USWP,

the routine activity theory of general deviance (Osgood, Wilson, O'Malley, Bachman, &

Johnston, 1996) is particularly well-positioned to provide a foundation for this line of

inquiry and will be used to guide the current effort. Indeed, the three essential

components of USWP described by Osgood and colleagues (1996) (the presence of peers,

lack of structure, and absence of authority figures) are highly conducive to deviance. The

presence of peers makes deviance easier and more rewarding, a lack of structure leaves greater opportunities for deviance, and an absence of authority figures removes individuals like parents or teachers who would be in a position to prevent deviance or put a stop to deviance when it occurs.

In furtherance of the above objectives, data was collected from students in early adolescence as part of the longitudinal Gang Resistance Education and Training (GREAT) program. The first analysis in this dissertation examined whether the influence of parental knowledge on delinquency operated indirectly through both USWP and peer delinquency. Second, the relationship of USWP and delinquency was investigated over time to determine if this relationship may be reciprocal. Third, the possible nonlinear nature of the relationship between USWP and antisocial behavior was assessed.

Three findings emerged from these analyses. First, the relationship between parental knowledge and delinquency/substance use is mediated by both USWP and peer delinquency/substance use. Second, USWP and property delinquency have reciprocal effects on one another, such that USWP predicts property delinquency, and property delinquency predicts USWP. This pattern of reciprocal effects also emerged when the focus was the relationship between USWP and substance use. Third, the relationship between USWP and property delinquency is nonlinear, with a decelerating effect, meaning the positive effect of USWP on property delinquency weakens at greater amounts of USWP. A similar finding emerged when examining the relationship between USWP and substance use. This dissertation concludes with a discussion of the implications of these findings for policy and theory, study limitations, as well as directions for future research.

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I. INTRODUCTION

Situational theories of crime contend that several proximal causes of crime are found in the immediate context of behavior. These situations commonly include where the individuals are, who they are with, and what they are doing. Such approaches have proven to be useful for explaining why some situations lead to crime, others do not, and why the same individual offends in some situations but not others (Pervin, 1978). One such crime-inducive situation is unsupervised peer-oriented social activities during adolescence.

Social control theory (Hirschi, 1969), subcultural theory (Cohen, 1955), and multiple strain theories (Cohen, 1955; Cloward & Ohlin, 1960; Merton, 1938) have been used to explain the influence of time spent in unsupervised peer-oriented social activities, such as hanging out and riding around in a car, on antisocial behavior (Agnew & Peterson, 1989). However, the most prominent explanation for why such activities relate to antisocial behavior is the reformulation of routine activities theory (RAT) by Osgood, Wilson, O'Malley, Bachman, and Johnston (1996). This theory, coined the routine activity theory of general deviance, was derived from the basic tenets of RAT (Cohen & Felson, 1979; Felson, 1998).

Commonly viewed as a theory of victimization, RAT contends crime is dependent upon the circumstances in which offenders carry out predatory criminal acts (Cohen & Felson, 1979). According to the theory, the convergence of three elements are necessary for a predatory crime to occur: (1) motivated offenders, (2) suitable targets, and (3) an absence of capable guardians. A lack of any one of these elements is sufficient to prevent a crime from happening. Cohen and Felson's (1979) RAT was originally focused to

explain offending among the individual; however, the perspective was reformulated by Osgood and colleagues (1996) to better explain patterns of situational offending. Osgood et al. (1996) argue that a situation is more conducive to deviance when it lacks structure (e.g., joyriding in a car), when peers are present, and if no authority figure (i.e., someone whose duty in a situation is to exert social control) is present. Thus, unstructured socializing with peers (USWP) describes a situation characterized by these factors.

As the principal test of whether USWP is related to delinquency, Osgood et al. (1996) found that routine activities, such as riding around in a car for fun and recreation, getting together with friends informally, going to parties, and spending evenings out for fun and recreation were each positively associated with within-individual changes (i.e., causes inferred from changes within individuals) for at least three of the five deviant behaviors examined (criminal behavior, heavy alcohol use, marijuana use, other drug use, dangerous driving). Research has since supported Osgood et al.'s (1996) theory using cross-sectional and longitudinal designs, finding that adolescents who spend more time engaging in unstructured socializing have greater involvement in delinquency (Bernburg & Thorlindsson, 2001; Gerstner & Oberwittler, 2018; Haynie & Osgood, 2005; Hoeben & Weerman, 2016; Maimon & Browning, 2010; Osgood & Anderson, 2004). Narrative reviews have also been conducted on this topic and support the same general conclusion (Hoeben, Meldrum, Walker, & Young, 2016).

Collectively, these studies reveal a distinct relationship between involvement in USWP and delinquency, which has been the primary focus of the literature on USWP. Three issues, however, have been neglected. First, there is a lack of research devoted to considering the multiple indirect pathways linking the causes and consequences of

USWP. To be clear, some research has examined the processes that mediate the relationship between USWP and antisocial behavior (Bernasco et al., 2013; Greene & Bamerjee, 2009; Hughes & Short, 2014; Wong, 2005), and other studies have examined if USWP mediates the association between other factors and antisocial behavior (Bernburg & Thorlindsson, 2001, 2007; Matsuda et al., 2013; Melde & Esbensen, 2011; Osgood et al., 1996; Walters, 2017). Few studies, however, has examined these multiple associations together to assess multiple steps of mediation (Hoeben & Weerman, 2016). Therefore, additional investigation is needed to better understand why adolescents who engage in unstructured socializing are at greater risk for antisocial behavior. Such a study that examines multiple indirect effects would not only speak to the validity of recent studies (e.g., Hoeben & Weerman, 2016; Walters, 2017), but also provide an additional layer to complexity to the routine activity theory of general deviance proposed by Osgood and colleagues (1996).

Second, even though an abundance of research finds that USWP is positively associated with delinquency (for a review, see Hoeben et al., 2016), recent research suggests that delinquency may influence USWP (Fleming, et al., 2008; McHale, Crouter, & Tucker, 2001; Melde & Esbensen, 2011). Despite research linking USWP to antisocial behaviors such as delinquency, as well as recent findings suggesting delinquency may influence USWP, sufficient attention has not been devoted to whether the relationship between USWP and delinquency may be reciprocal. If evidence of this is found, such findings would suggest Osgood et al.'s (1996) theory requires modification to account for the complex interplay between USWP and delinquency. Further, while Osgood and colleagues' (1996) assertions that USWP results in delinquency is clearly supported

through research, if findings produced from this dissertation support a relationship between delinquency and later USWP, Osgood et al.'s (1996) theory may not be as empirically valid as previously suggested.

Third, what Osgood and colleagues' theory does not specify is the extent to which spending more time in USWP may increase antisocial behavior in a nonlinear manner, either accelerating or decelerating. Findings supportive of a nonlinear effect would suggest that Osgood and colleagues' (1996) theory should be modified to consider more specifically whether spending greater time in USWP reveals an accelerating or decelerating effect on delinquency. Specifically, an accelerating effect would be observed if the more time an individual spends in USWP increases delinquency, particularly at higher amounts of USWP. Conversely, a decelerating (or diminishing) effect would be observed if the more time an individual spends in USWP increases delinquency, particularly at lower amounts of USWP, but the positive effect weakens or levels off at higher amounts of USWP. Such a study would serve to build on the limited prior research that already considers nonlinear effects of USWP on delinquency and substance use (Gage, Overpeck, Nansel and Kogan,2005; Meldrum & Leimberg, 2018).

Overall, despite numerous studies examining the causes and consequences of USWP (Hoeben et al., 2016), few studies have examined USWP as a mediator of more distal factors influencing delinquency/substance use (Bernburg & Thorlindsson, 2001, 2007; Matsuda et al., 2013; Melde & Esbensen, 2011; Osgood et al., 1996; Walters, 2017), and, even fewer studies have examined the factors that mediate the relationship between USWP and delinquency/substance use (Bernasco, Raiter, Bruinsma, Pauwels, & Weerman, 2013; Greene & Bamerjee, 2009; Hoeben & Weerman, 2016; Hughes & Short,

2014; Wong, 2005). Likewise, little empirical attention has focused on assessing the cross-lagged or reciprocal association between USWP and antisocial behavior (Fleming et al., 2008; McHale et al., 2001; Vasquez & Zimmerman, 2014; Ward, Forney, & Bennett, 2017). Finally, very little research examines the possibility of nonlinear effects of USWP on antisocial behaviors (Gage, et al., 2005; Meldrum & Leimberg, 2018). This dissertation seeks to address each of these three issues to provide a better understanding of the causes and consequences of USWP.

This dissertation will proceed in the following order. Chapter 2 will be devoted to a review of prior theory and research. This includes the various theories that have been used as frameworks for understanding why USWP is related to antisocial behavior. Research on the causes of USWP, as well as the possible role of antisocial behavior in the etiology of USWP will then be reviewed. Following this, attention will be directed at how USWP may develop over time. Next, discussion will be given to USWP and its various consequences. Thereafter, studies will be reviewed focusing on USWP as a mediating variable between various distal factors and outcomes including antisocial behaviors, and the extent to which certain factors mediate the association between USWP and antisocial behavior. The chapter concludes by directing attention to studies suggesting the potential for reciprocal effects between USWP and delinquency and the possible nonlinear effects of USWP on delinquency and substance use.

Chapter 3 will discuss the objectives of the dissertation that includes greater detail as to how the studies presented in this dissertation will improve three areas of research relating to USWP. The specific hypotheses for each study will also be given. Thereafter, Chapter 4 will provide the methodology of the dissertation. This section will provide

details of the data used to conduct each study and descriptions of the measures necessary to probe each hypothesis. The analytic plans and how missing data were dealt with will also be discussed.

Chapter 5 provides the results for the studies of the dissertation. The findings for the study that examines mediation will be first discussed, followed by results of the reciprocal effects studies, and finally, findings of the study which examined nonlinear effects. Figures of these findings will also be provided in studies one and two. In Chapter 6 discussion of the results pertaining to each study are given. Specifically, this section will review the results of each study and how these findings offer implications for theory and policy. Last, attention will be given to the limitations of each study and directions for future research. The remaining chapters of this dissertation will include a list of references, appendices, and vita.

II.   LITERATURE REVIEW

Routine Activity Theory

Essential to the theoretical framework of USWP is routine activity theory (RAT), established by Cohen and Felson (1979) as one of the most important advancements in criminological theory (Osgood et al., 1996). The underlining premise of RAT is that changes in people's routine activities may influence behavioral patterns. Routine activities are defined as "any recurrent and prevalent activities which provide for basic population and individual needs, whatever their biological or cultural origins" (Cohen & Felson, 1979, p. 593). According to RAT, the structural nature of routine activities may influence trends in direct contact predatory violations, defined as illegal acts wherein "someone definitely and intentionally takes or damages the person or property of another" (Glaser, 1971, p. 4).

According to Cohen and Felson's (1979) routine activity perspective, environmental changes in routine activity patterns can influence crime rates due to the convergence in time and space of three key things: motivated offenders, suitable targets, and an absence of capable guardians. As a theory of opportunity, RAT contends that daily activities can increase the risk of criminal victimization while providing would be offenders with opportunities for engagement in delinquent and criminal behavior. Specifically, when a motivated offender establishes contact with a suitable target (e.g., an individual, motor vehicle, empty house, etc.), in the absence of a capable guardian (e.g., a household resident, security guard), antisocial behavior should be more likely to occur.

Even though RAT was initially developed to explain patterns of victimization and aggregate crime rates (Birbeck & LaFree, 1993; Cohen, Cantor, & Kluegel, 1981;

Kennedy & Forde, 1990; Messner & Tardiff, 1985), the theory has since been reformulated to explain patterns of offending by individuals in particular settings (Osgood et al., 1996). The key assumption underlying the reformulation put forth by Osgood et al. (1996) replaces the element of motivated offenders found in RAT with the notion that "motivation resides in the deviant behavior itself" (p. 639). In other words, focus is given to motivation based on situational factors, rather than the offender's characteristics. In the context of USWP, such situational factors are implicit in unstructured activities, which leave more time available for individuals to engage in deviance than structured activities (e.g., employment, afterschool sporting activities).

Osgood and colleagues (1996) also departed from the original formulation of RAT by replacing the element of *suitable targets* with *situations are more conducive to deviance*, as they also made clear that the presence of friends makes deviant behavior both easier and more rewarding. The authors argued that peers can serve as useful resources, both as lookouts to increase the success of theft and as a source of protection if challenging a rival to a fight (Osgood et al., 1996). Therefore, spending more time with peers generates situations conducive to delinquency (Osgood et al., 1996). The likelihood of delinquency is further increased if authority figures (e.g., parents or guardians) are absent.

When revising RAT, rather than emphasizing an absence of capable guardians, Osgood et al. (1996) focused on contexts wherein situations that lack social control are more conducive to deviance than those where an authority figure is present. In doing so, they borrowed from Gibb's (1981) conceptual analysis of social control arguing that it is particularly useful for explaining why deviance is more likely in situations such as

USWP, which lack social control. Gibbs (1981) defined social control as "the use of social means to manipulate the behavior of others" (p. 78). As absence of authority figures reduces social control, and therefore time spent in unstructured and unsupervised activities should increase the likelihood of delinquency (Osgood et al., 1996).

According to these preceding arguments, USWP is characterized by 1) adolescents spend time with their friends, 2) in the absence of authority figures, and 3) without a specific agenda (Osgood et al., 1996). Under such conditions, there are greater opportunities for delinquent behavior. Given that three specific conditions are required for delinquency to occur, it is necessary to elucidate whether the reformulation of RAT can be applied to identify situational factors conducive to delinquency. One of the key tenets of RAT is that motivated offenders are a necessary element for predatory crime to occur (Cohen & Felson, 1979). On the other hand, Osgood and colleagues (1996) posited that motivation derived from specific situational factors is the driver of delinquency. Thus, rather than focusing on individual characteristics, attention should be given to the potential role of these factors in USWP. The ideas noted above are not novel, as scholars have proposed similar explanations for some time. For one, Briar and Piliavin (1965) claim delinquency is "prompted by short-term situationally induced desires experienced by all boys to obtain valued goods" and to portray courage or be loyal while in the presence of peers (p. 36). Matza (1964) similarly noted that delinquency arises from "drift," or a state of openness to deviant values but not a rejection of conventional values. Concurring with these authors, Gold (1970) argued that delinquency can be viewed as a "pickup game" of basketball wherein deviance is often viewed as casual and spontaneous.

Although not every situation gives rise to deviant behaviors, prior theories have helped pave the way for the routine activity theory of general deviance (Osgood et al., 1996). In Gottfredson and Hirschi's (1990) general theory of crime, the motivation for crime is posited to be "inherent in or limited to immediate gains provided by the act itself" (p. 256). The authors further purported that self-control in association with situational opportunities is responsible for virtually any kind of criminal behavior. However, according to Cornish and Clarke's (1986) rational choice theory, offending is based upon a self-interested appraisal of the costs and benefits of alternative methods of action, in which the action with the greatest perceived utility is taken, thus emphasizing the role of opportunity. This is in line with Osgood and colleagues (1996) routine activity theory of general deviance, which also focuses on opportunities for deviance.

With recognition to the above theoretical advancements, several lines of research have evolved examining USWP that focus on: 1) the causes of USWP (e.g., parenting practices), 2) the development of USWP over time, and 3) outcomes associated with USWP (e.g., non-violent, violent, and substance use behaviors as well as other behaviors). These different lines of research are instructive as they inform the three different sets of analyses that serve as the foci of later chapters of this dissertation. The different methodological approaches used in this prior work also inform the current study and call attention to the need to consider multiple mediation pathways, reciprocal effects, and nonlinear effects. The work by others in this area, then, is laudable and also shows that further exploration is clearly needed. The following sections review these areas of research and serve to couch the current approach.

Past Research

  Causes of unstructured socializing with peers. Osgood and colleagues' (1996) reformulation of RAT paved the way for research into the various causes of USWP. As part of this line of research, individual and contextual variables as sources of USWP have been examined (Bernburg & Thorlindsson, 2001, 2007; Janssen, Bruinsma, Deković, & Eichelsheim, 2016; Janssen, Deković, & Bruinsma, 2014; Osgood & Anderson, 2004), including adolescent autonomy (i.e., freedom from parental control) (Bernburg & Thorlindsson, 2001; Goldstein, Davis-Kean, & Eccles, 2005; Meldrum & Piquero, 2017), gang involvement (Melde & Esbensen, 2011; Taylor, Peterson, Esbensen, & Freng, 2007), employment (Staff, Osgood, Schulenberg, Bachmanm & Messersmith, 2010), and gang involvement Among these studies, the role of parenting practices was prominently featured as a precursor to USWP and therefore warrants further elaboration.

  Adolescence is a stage in life when children spend greater time with peers away from their parents (Janssen et al., 2014). Parenting practices are crucial in this period as some children may not be able to set proper boundaries when seeking greater autonomy (Smetana, Campione-Barr, & Metzger, 2006). In this respect, it is essential for parents to exert a level of control over adolescents' activities, while offering support to ensure open communication (Dishion & Patterson, 2006). Given these assertions, past research has been conducted examining such factors. For example, in following work by Wikstrom and Butterworth (2006), Janssen et al. (2014) used data from the Peterborough Youth Study and found that greater parental oversight, stricter rules, and better parent-to-child relationship quality were associated with less USWP. An extension of that work demonstrated that more parental monitoring, greater rule-setting, and positive parent-to-

child relationship quality operate indirectly through self-control to influence USWP (Janssen et al., 2016). Hence, low self-control is a more proximate factor associated with USWP than parenting practices. Results also indicate that the aforementioned parenting measures operate indirectly through delinquent attitudes to influence USWP, and tolerance to delinquency appears to be more proximately associated with USWP. Taken together, these findings suggest that an adolescent's ability to self-regulate behavior is a more proximate factor than parenting practices in determining adolescent propensity for USWP.

Work further examining the link between parenting practices and USWP reported that greater parental knowledge of children's socialization practices was associated with less adolescent involvement in USWP (Osgood & Anderson, 2004). Their analyses revealed that attending schools with peers whose parents are more involved in their social lives reduces the likelihood of engagement in USWP. Such findings are in concert with similar work in this area that found that contextual effects (i.e., embeddedness in social ties) were significantly associated with less engagement in unsupervised peer activities (Bernburg & Thorlindsson, 2007). In this manner, social ties are viewed as parental awareness of who are their child's friends and whether parents know the parents of their child's friends (Bernburg & Thorlindsson, 2007). Given this, social ties link parents and their children while exerting social control on the adolescent (Coleman, 1988). Subsequently, Hoeve et al. (2009) argued that parental support during a time where adolescents are seeking autonomy promotes better parent-to-child-relationships, which would in turn make it less likely for teenagers to engage in delinquency when socializing away from home.

Given the importance of adolescence in the formation of one's personality and inconsistent findings regarding the role of parental monitoring and knowledge of adolescents in situations like USWP, Stattin and Kerr (2000), along with Kerr and Stattin (2000), examined these issues further. Based on their findings, Stattin and Kerr (2000) claimed that parental knowledge, which is often used synonymously with parental monitoring, may not be an effective means of adolescent control and surveillance. Instead, the scholars asserted that parents should strive to gain information on how their child spends his or her time and with whom via 1) voluntary child disclosure, 2) asking their children and their children's friends for information (parental solicitation), and 3) imposing rules and limits on their children's activities and with whom they associate toward restraining children's freedom to do things without seeking parental approval (parental control). Although all aforementioned strategies were advocated, Stattin and Kerr (2000) concluded that greater child disclosure was most predictive of less norm-breaking behavior. Similarly, Kerr and Stattin (2000) found that both boys and girls who had better relationships with their parents were more adjusted (i.e., exhibited less delinquency, less school problems, better teacher relationships, among others). Related work has also demonstrated that parent-to-child communication was effective in reducing substance use, while control and surveillance were not (Cohen & Rice,1995).

In a more recent study focusing on rural youth, Lippold, Greenberg, Graham, and Feinberg (2014) found that parenting efforts to monitor youth and voluntary child disclosure were more effective than parental control efforts at reducing problem behaviors such as delinquency and substance use. Fletcher, Steinberg, and Williams-

Wheeler (2004), however, claimed that all three of these measures were useful in reducing adolescent involvement in substance use.

In an attempt to explicate the causes of USWP, Goldstein et al. (2005) examined the influence of autonomy on unstructured, unsupervised leisure time with friends of adolescents in 7th and 8th grade and demonstrated that having greater autonomy during the seventh grade predicted greater engagement in unstructured, unsupervised leisure time with friends in the eighth grade. More recently, Staff et al. (2010) used the same data as Osgood and colleagues (1996) to examine the role of employment (as a means of gaining greater financial autonomy) in USWP. These authors found that youth were more likely to spend greater time engaging in USWP if they had their own income. These findings suggest that employment may provide youth with financial resources, as well as respect from parents. Such circumstances may in turn reduce parental supervision resulting in more autonomy and opportunities for USWP. In sum, employment may play a causal role in unstructured socializing during adolescence and early adulthood.

Other factors that contribute to unstructured socializing with peers. As previously discussed, Osgood and Anderson (2004) examined a range of factors other than just parenting practices that are likely to contribute to greater involvement in USWP. They concluded that living in a single-parent household, limited educational opportunities, inadequate school commitment, being male, being Black and Hispanic, as well as propensity for risk-seeking behaviors were associated with greater involvement in USWP.

Beyond the study by Osgood and Anderson (2004), Bernburg and Thorlindsson (2007) found that weak attachment to social norms, as well as living in an urban area,

was also associated with greater involvement in unsupervised peer activities. This finding is consistent with the postulates of Shaw and McKay's (1942) social disorganization theory suggesting that communities characterized by high levels of residential mobility and family disruption, which is typically the case for urban, but not rural communities, would provide adolescents more opportunities to engage in delinquency.

Adolescent attachment to conventional social agents (e.g., school bonding) and unstructured peer activities in the absence of authority figures has also been examined with results revealing that the more tied an adolescent is to school and family, the less likely he/she would be to spend time in unstructured peer activities (Bernburg & Thorlindsson, 2001) .

Other factors leading to USWP have been examined by Taylor et al. (2007) who assessed the influence of gang and non-gang youth membership on USWP. Their analyses revealed that both victims of crime and gang members tend to report greater exposure to USWP than do non-victims/non-gang members. Further, gang members who are victims are at the greatest risk to spend time in USWP. Similarly, Melde and Esbensen (2011) concluded from their work that an adolescent's involvement in gangs was associated with greater USWP. Taken together, these findings highlight the importance of understanding deviant lifestyles among adolescents' leading to USWP.

Summarily, research has focused on the role of parenting practices, autonomy, and several other factors that may cause an individual to spend greater time engaging in USWP. Understanding how USWP may develop over time, however, is also necessary for understanding why spending time in such a situation may be more common among adolescents. It is to this literature that attention is now directed.

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Development of unstructured socializing with peers. Osgood et al. (1996) contended that USWP reflects situations of relative opportunity (i.e., the amount of time an individual spends in situations that are conducive to deviance), and that the theory accounts for the continuation of delinquent behavior (Higgins & Jennings, 2010). Considering adolescents spend the greatest amount of time with their peers, view their peers as important, and are most strongly influenced by their peers during this time than any other time during the life course (Brown, 1990), understanding how USWP may develop over time is of particular importance.

Framing their study in the routine activity theory of general deviance (Osgood et al., 1996), Higgins and Jennings (2010) sought to examine the extent to which USWP is a dynamic process that may follow distinct developmental trajectories during adolescence. Their investigation focused on a specific cohort of adolescents aged 12-16 years, aiming to elucidate factors that may result in different trajectories of USWP. Drawing on data from the GREAT program (Esbensen, 2002), the authors identified three developmental trajectories of unstructured socializing, which were denoted as G1-G3. Although the authors established that the propensity for USWP increases from age 12 to 16 across all trajectories, certain differences emerged. Specifically, 21% of the sample that reported no involvement in unstructured socializing at age 12 increased engagement in USWP to one hour per week by the age of 16 (G1 trajectory). Similarly, 63% of the sample began by spending about one hour of their daily free time engaged in unstructured socializing, which gradually increased to two hours by the time they turned 16 (G2 trajectory). However, 15.5% of the sample that reported spending little over three hours per day in unstructured socializing at the age of 12 continued to spend increasing amounts of time

with their peers until the age of 15, after which a slight decline was reported (G3 trajectory).

Higgins and Jennings (2010) further established that adolescents that are prone to risk taking were more likely to follow the G2 or G3 trajectory. However, being female was found to marginally decrease an adolescent's odds of following the G2 trajectory, suggesting that adolescent females may be more closely monitored than their male counterparts. Similarly, the likelihood of adolescents following the G3 trajectory decreased under greater parental supervision. These findings suggest that the development of USWP is not only dependent on age, but also other factors.

To pursue this line of research further, Osgood, Anderson, and Shaffer (2005) sought to examine how age was associated with USWP on weekends, weekday afternoons, and weekday evenings. Their analysis of data drawn from the National Youth Survey indicated that most adolescents engage in USWP on weekends, as they have more free time and less parental supervision on non-school days. Moreover, with the exception of weekday afternoons, as youth aged in the study, they tended to spend more time in USWP, likely because they became more independent and were granted greater autonomy by their parents.

Similar to Higgins and Jennings (2010) discussed above, Wong (2005) attempted to establish the link between adolescents' age and time spent in USWP finding that respondents in grades 5−6, 7−8, 9−10, and 11−12 respectively, spent an average of 13.4, 14.7, 15.4, and 17.6 hours per week engaging in USWP. These results confirm a temporal trajectory to USWP and suggest that interventions during youths' developmental stages must be put in place early to reduce the potential for delinquent behaviors as adolescents

mature. Parents should be increasingly vigilant in this sensitive developmental period, given that USWP can lead to a wide range of negative consequences, many of which are described in the section below.

Consequences of unstructured socializing with peers. Given that adolescence is a time of exploration during which increased engagement in USWP occurs, an extensive body of research has been dedicated to the consequences of USWP, such as non-violent crimes (Barnes, Hoffman, Welte, Farell, & Dintcheff, 2007; Bernburg & Thorlindsson, 2001; Haynie & Osgood, 2005; Higgins & Jennings, 2010; Hughes & Short, 2014; Hundleby, 1987; Melde & Esbensen, 2011; Meldrum, Young, & Weerman, 2009; Osgood & Anderson, 2004;Wong, 2005). Research has also examined violent crimes (Agnew & Peterson, 1989; Bernasco et al., 2013; Bernburg & Thorlindsson, 2001; Haynie & Osgood, 2005; Maimon & Browning, 2010; Wong, 2005), drug use (Barnes et al., 2007; Bernasco et al., 2013; Green & Banerjee, 2009; Hawdon, 1996), and victimization (Taylor et al., 2007). Each of these research streams is discussed in greater detail below.

Unstructured socializing with peers and non-violent behavior. According to Osgood and colleagues (1996), involvement in USWP presents greater opportunities for deviance to occur. In support of this argument, research shows that adolescents who spend more time engaging in USWP are more likely to commit delinquency (Osgood et al., 1996). Given this early supportive evidence, it is not surprising that a link between USWP and minor forms of anti-social behavior among adolescents has been established in several studies. Indeed, more than half a century ago, Briar and Piliavin (1965) suggested that unstructured activities may prompt adolescents to break social norms.

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More recently, Barnes et al. (2007) used data on 606 adolescents who took part in a six-wave longitudinal study to examine whether adolescents who spend more time with peers were more likely to engage in various forms of delinquency, such as truancy and arguing with one's parents. The findings of the study indicated that spending more time in USWP increased the likelihood of delinquent behavior.

In an earlier study, Bernburg and Thorlindsson (2001) sought to examine the relationship between USWP and property offending. Measures used to assess the severity of such offenses included stealing something worth more than $50, breaking into a building or a car with the intent to steal something, and ruining something that did not belong to them. The results indicated that time spent in USWP was positively associated with engaging in property offending within the last 12 months. Using longitudinal data, Haynie and Osgood (2005) examined whether spending time with peers was associated with delinquency. However, the authors were unable to measure whether adults were present during unstructured socializing activities—a key element in the conceptualization of USWP by Osgood and colleagues (1996). To gather data for the study, the authors developed a questionnaire probing respondents' delinquency within the last 12 months, including property damage, painting graffiti, shoplifting, stealing something less/more than $50. Results showed that spending time while hanging out with peers is positively associated with delinquency.

As previously discussed, Higgins and Jennings (2010) examined whether there is a possible overlap between the USWP and delinquency trajectories among adolescents aged 12 to 16 years. For this purpose, the authors adopted 14 items from the GREAT survey to measure delinquency, focusing on less serious offenses, such as skipping school

without an excuse and attempting to steal something worth more than $50 (see Esbensen, Osgood, Taylor, Peterson, & Freng, 2001 for a full list of delinquency items). The authors found a positive link between greater engagement in USWP and delinquency.

More recently, Hughes and Short (2014) analyzed cross-sectional data from the Group Process and Gang Delinquency Project (Short & Strodtbeck, 1965), establishing a significant positive link between USWP and delinquency (e.g., gambling, drinking, illegal money making). Support for the link between delinquency and time spent with peers was also offered over thirty years ago by a cross-sectional study conducted by Hundleby (1987) who analyzed data obtained from over 2,000 boys and girls attending ninth grade in Ontario. Considering the emphasis provided by Osgood et al. (1996) that lack-of authority figures are a necessary element for activities like USWP to lead to delinquency, it is particularly interesting that Hundleby (1987) found that routine activities like boating and camping, which one might think would include authority figures like parents, were positively associated with property delinquency (e.g., destroying property just for the fun of it). Although the authors did not specify whether such activities were supervised, their findings suggest that the likelihood of delinquent behaviors increases in the presence of peers. Melde and Esbensen (2011) similarly sought to examine the extent of the relationship between USWP and a variety of delinquent acts. By analyzing three waves of panel data from more than 1,400 youth (sixth to ninth graders) across the United States, the authors found that youth who spend greater time in USWP are more likely to engage in delinquency.

The influence of the amount of time spent with peers on delinquency was also the topic of Meldrum et al.'s (2009) study based on data drawn from the Netherlands-based

NSCR School Project focusing on peer network formation, personal development, and school interventions aimed at behavior and delinquency prevention. The authors found a positive link between time spent in USWP and prior delinquency, as well as self-reported delinquency one year later. Similarly, through use of the GREAT data (Esbensen 2002), Osgood and Anderson (2004) examined acts of delinquency resulting from time spent in USWP like status offending (e.g., truancy), drug sales, and minor forms of offending. The authors established that individuals who engage in more USWP are more likely to engage in delinquency, especially if in a social environment supportive of such acts.

Wong (2005) also drew a link between routine activities, such as dating and spending time with friends (without specifying the extent if parents were around), and various outcomes, such as property crime, trivial offenses (e.g., truancy, cheating during an exam, and public disorder, among others) and other delinquent acts (e.g., skipping class, cheating, assault, and robbery, among others) within the last 12 months. Results indicated that spending more time with friends is positively associated with property crime, trivial offenses, and other delinquent acts. In turn, these effects weakened social bonds, thus increasing delinquency. In sum, extant studies indicate that unstructured socializing with peers is conducive to non-violent behaviors like damage to property, theft, academic cheating, truancy, among others. Considering the association between USWP and non-violent behavior has been provided, what still warrants discussion is how USWP may lead to more serious antisocial behaviors.

Unstructured socializing with peers and violent behavior. The growing body of evidence indicating that USWP is associated with non-violent behaviors has prompted some researchers to examine its link with violent offending. More recently, Maimon and

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Browning (2010) demonstrated that spending greater time in USWP provides

opportunities for conflicts to occur among peer group members. Hence, it is not

surprising that such internal conflict may be extended to outward violence (Osgood et al.,

1996), necessitating that the link between USWP and violent behavior be investigated

further.

Agnew and Peterson (1989) were among the first to examine the association

between unsupervised social activities with peers and violent behavior. While their study

was theoretically focused on social control (Hirschi, 1969), subcultural theory (Cohen,

1955), and strain theory theories (Cohen, 1955; Cloward & Ohlin, 1960; Merton, 1938)

the authors adopted measures of delinquent behavior that included whether the

respondent had hurt someone badly, set fire to property, and trespassed, reporting

positive associations between USWP and deviant behavior. Bernburg and Thorlindsson

(2001) analyzed cross-sectional data pertaining to Icelandic adolescents aiming to

elucidate the relationship between unstructured peer interactions in the absence of

authority figures and violent behavior (defined as punching, kicking, or seriously hurting

someone with a weapon within the past 12 months). The results obtained after controlling

for gender and parents' education revealed that unstructured peer interaction in the

absence of authority figures has a significant and positive effect on violent behavior.

Drawing on three waves of data from the Project on Human Development in

Chicago Neighborhoods (PHDCN) Community Survey and Longitudinal Cohort Study,

Maimon and Browning (2010) adopted a multi-item measure to examine the strength of

the link between unstructured socializing and violent offending. Once again, findings

indicated that USWP was positively related to violent offending. While the relationship

between USWP and violent behavior has been discussed, and that the seminal work of Osgood and collogues (1996) found USWP leads to substance use, attention is now warranted towards this research area.

   Unstructured socializing with peers and substance use. The strong links between USWP and a wide variety of antisocial behaviors suggest that adolescents involved in such acts would also be more likely to engage in substance use. Given that Osgood et al. (1996) claimed that friends are a frequent source of illegal drugs, spending time in USWP is bound to increase the likelihood of substance abuse. Moreover, USWP creates greater opportunities for substance use, thus warranting further investigation of the nature of this relationship.

   Barnes et al. (2007) provided a valuable contribution to this research topic by examining whether USWP leads to substance use. The authors analyzed data collected as part of a six-wave longitudinal study and reported that USWP was positively associated with heavy drinking, cigarette smoking, and illicit drug use. Similarly, in their study based on the space-time budget data from The Hague, Netherlands, Bernasco and colleagues (2013) found that USWP was linked to both alcohol and cannabis use. These findings concur with the results obtained by Greene and Banerjee (2009), who, after administering a cross-sectional survey to 248 middle-school students from two schools in the northeastern United States, reported that USWP was positively associated with adolescent cigarette smoking.

   In an earlier study, Hawdon (1996) examined the relationship between adherence to routine behavioral patterns and marijuana use. Though commonly deemed a mild act of deviance, marijuana use is highly correlated with the use of other drugs and with the

performance of other delinquent behaviors (Akers, 1992; Goode, 1989; Inciardi, 1992; McBroom, 1994). After analyzing data collected as part of the Monitoring the Future Study, Hawdon (1996) reported that routine patterns such as getting together with friends informally and going to parties or other social gatherings were significantly and positively related to marijuana use. These findings also support Hundleby's (1987) research results, suggesting that even recreational activities like boating and camping can lead to substance use (e.g., tobacco, marijuana, and alcohol).

  Other outcomes associated with USWP. Given the growing body of evidence linking USWP with deviance (including offending, drug use, among others), some authors posited that it may also lead to other adverse outcomes such as victimization (Taylor et al., 2007). Taylor et al. (2007) examined the associations between USWP and both general and serious violent victimization among gang and non-gang members, where victimization was defined as being hit by someone (i.e., simple assault), being attacked by someone with a weapon (i.e., aggravated assault), or being a victim of armed robbery. The authors found that spending greater time in USWP was significantly and positively associated with general violent victimization, but not with serious violent victimization.

  Summarily, research has examined a wide variety of outcomes resulting from USWP. Such outcomes include non-violent behaviors like skipping school, arguing with one's parents, property delinquency such as theft, simple assault, among others. More violent outcomes resulting from USWP have also been found such as aggravated assault, setting fire to property, and other forms of violent offenses. To date, a wide variety of substance use like marijuana, alcohol, cigarettes, and other illicit drugs has also received

copious amounts of attention from research on USWP. Given attention has been devoted

to the various causes and consequences of USWP, further consideration is still needed to

mechanisms which appear as more proximate or distal factors of USWP and anti-social

behavior.

Unstructured socializing with peers and mediating effects. While the various

causes and consequences of USWP have received considerable attention in extant

research, there is a paucity of studies aiming to ascertain whether USWP may mediate the

association between various causal mechanisms and antisocial behavior (Bernburg &

Thorlindsson, 2001, 2007; Matsuda et al., 2013; Melde & Esbensen, 2011; Osgood et al.,

1996; Walters, 2017). Similarly, little is presently known about factors that may mediate

the association between USWP and antisocial behavior (Bernasco et al., 2013; Greene &

Bamerjee, 2009; Hoeben & Weerman, 2016; Hughes & Short, 2014; Wong, 2005). The

research that has been done indicates that USWP does play an important mediational role

when seeking to explain antisocial outcomes. Given these considerations, further

attention is needed to this line of research.

Unstructured socializing with peers as a mediator between various causal

factors and antisocial behavior. In their landmark study of USWP, Osgood et al. (1996)

examined whether USWP (e.g., riding around in a car for fun and getting together with

friends informally) mediated the relationship between certain sociodemographic variables

(age, gender, and socioeconomic status) and deviant behaviors (heavy alcohol use,

marijuana use, use of other drugs, and dangerous driving). Findings revealed that USWP

mediates nearly 100% of the relationship between gender and drug use. Moreover, the

authors found that nearly 50% of the relationship between school grades and deviant

behavior (with the exception of dangerous driving) was explained by USWP. Further, USWP mediated 73% of the relationship between parental education and deviance, while 87% of the effect of parental education on heavy alcohol use was mediated by USWP.

Further research supports the idea that USWP is an important mediator in models seeking to explain youth antisocial behaviors. USWP has been found to mediate the association between differential social relations (e.g., school bonding, family commitment) and deviant behavior (Bernburg & Thorlindsson, 2001). While the evidence in support of these associations was very weak, it was argued that school attachment would reduce propensity for delinquency, which would be more likely to occur if adolescents predominantly socialized with delinquent peers. Along these lines, USWP has been found to partially mediate the relationship between gang membership (as a form of delinquent peer affiliation) and violent delinquency (Matsuda et al., 2013; see also Melde & Esbensen, 2011).

Other work has also examined the role of USWP as a mediator. Research has evaluated the degree to which unsupervised peer activity mediated the relationship between community structure and delinquency finding that participation in USWP did not mediate the relationship between community structure and delinquency, and that greater social ties have a significant negative effect on unsupervised peer activity.

In a more recent study focusing on the effect of parental knowledge of adolescents' socialization practices on delinquency operating through USWP, Walters (2018) examined data collected as a part of the longitudinal Pathways to Desistance Study. Results showed significant support for the indirect negative influence of parental knowledge on delinquency operating through USWP. In sum, these results indicated that

lack of parental knowledge leads to greater USWP, which in turn gives rise to greater

delinquency.

Research examining how USWP may mediate the relationship between various

factors such as gender, school grades, parental education, school bonding, family

commitment, parental knowledge, among others and antisocial behavior has been

discussed so far. Research has also gone on to examine the role of various factors which

have appeared as mediators between USWP and antisocial behavior, which are discussed

next.

Proximate factors as mediating mechanisms in the relationship between

unstructured socializing with peers and antisocial behavior. A number of scholars have

examined various mediators between USWP and antisocial behaviors that offers some

guidance here. The potential role of alcohol as a mediator between unstructured

socializing (i.e., presence of peers, absence of adult handlers, public space, and

unstructured activities) and offending has been evaluated, with results demonstrating that,

although alcohol use more than doubles the odds of offending, it does not mediate the

association between USWP and offending (Bernasco et al. 2013). However, another

study reported that the association between USWP and adolescent smoking was partially

mediated by having delinquent peers, social expectancies about cigarette smoking, and

cigarette offers from peers (Greene & Bamerjee, 2009). A more recent study also

reported that exposure to opportunities (i.e., perceived temptations), tolerance for

offending and substance use, and peer delinquency each separately mediated the

association between USWP and delinquency (Hoeben & Weerman (2016). Support was

also found for two sequential indirect relationships, namely 1) USWP influenced

propensity for associating with delinquent peers, which in turn influenced tolerance for substance use and offending, ultimately influencing involvement in delinquency; and 2) USWP exposes adolescents to delinquent peers, which in turn affects their perceived temptations, thus influencing their involvement in delinquent behavior. On the other hand, Hoeben and Weerman (2016) found that exposure to group pressure did not mediate the association between USWP and delinquency. The authors further reported that, based on their analyses of sequential mediating effects, exposure to group pressure and tolerance for delinquency, irrespective of the order in which they occurred, failed to mediate the relationship between USWP and delinquency.

Other work has demonstrated that the more time boys spent hanging out in the streets or attending parties, the more likely they were to signify (i.e., testing status boundaries and self-presentations in the streets), which would in turn make them more likely to engage in fights. Hughes & Short, 2014). used cross-sectional data gathered as a part of the Short and Strodtbeck's (1965) study of Black and White gang and non-gang males to assess whether signifying mediated the relationship between USWP and fighting. Their analyses revealed that the more time boys spent hanging out in the streets or attending parties, the more likely they were to signify, which in turn made them more likely to engage in fights. Specifically, signifying mediated 34.9% of the effect of hanging around in the streets on fighting. In addition, signifying mediated 14.1% of the effect of between time spent attending parties and fighting. Yet, signifying did not mediate the relationship between time spent riding around in a car for fun and fighting (Hughes & Short, 2014).

Wong (2005) sought to establish whether delinquent peer associations and social bonds mediated the relationship between spending time with friends and delinquency in the past 12 months. Results showed that delinquent peer associations partially (36%) mediated the relationship between spending time with friends and delinquency, while to a lesser degree social bonds partially mediated the relationship of spending time with friends and delinquency (21% mediation).

Taken together, the above demonstrates that factors like delinquent peers, social expectations about cigarette smoking, cigarette offers from peers, signifying, exposure to opportunities for delinquency, tolerance for offending, substance use, and peer delinquency, and also attachment to things like school, peers, and parents each mediated the association between USWP and antisocial behavior.

In this section, the ways that USWP operated as a mediating variable were examined, demonstrating that the association between certain factors (e.g., differential social relations, community structure, gang membership, age, sex, socioeconomic status, and parental knowledge of adolescent's socialization habits) and delinquency is partially mediated by USWP. Additionally, attention was given to prior research examining whether there are more proximate factors (e.g., exposure to opportunities for delinquency, tolerance for offending, substance use, peer delinquency, signifying, and social bonds) that mediate the effect of USWP on delinquency and other adverse outcomes. While research has examined the role of USWP in mediation, there is a dearth of research examining whether there is a reciprocal relationship between USWP and deviance. The following section discusses the few studies that have devoted attention to this topic.

Unstructured socializing with peers and reciprocal effects. The reciprocal

effects between USWP and antisocial behavior have rarely been examined in research

(Fleming, et al., 2008; McHale et al., 2001; Vasquez & Zimmerman, 2014; Ward et al.,

2017). Given this lack of attention, greater consideration is needed to better understand

the continuity of USWP and for a more rigorous understanding of the USWP and

delinquency relationship. By better understanding the USWP and delinquency

relationship, the legitimacy of Osgood and colleagues (1996) routine activity theory of

general deviance can be further probed to better explain adolescent deviant behavior.

Of the studies that have examined these relationships, findings lead toward the

idea that USWP and deviance are reciprocally related. For example, Fleming (2008)

examined the effect of activities similar to USWP (such as hanging out in a mall,

shopping center, or arcade, and hanging out in one's neighborhood) on delinquency (e.g.,

fighting, school misbehavior among 6th to 8th graders). After controlling for relevant

factors such as prior antisocial behavior, results showed that greater involvement in

unstructured activities in seventh grade was associated with teacher reports of greater

misbehavior and delinquency in eighth grade. Additionally, misbehavior in school during

sixth grade was associated with involvement in unstructured activities in seventh grade.

Other research also points toward the potential of reciprocal causation. Using data

from Wave 1 and 3 of a non-representative survey on family influences assessing gender

development during middle childhood and early adolescence, McHale et al. (2001)

examined the relationship between hanging out with friends (unsupervised) and conduct

problems, such as fighting and lying. Results showed that adolescents who spend more

time in USWP at age 10 have greater conduct problems at ages 10 and 12. In addition,

having conduct problems at age 10 predicted spending greater time in USWP at age 12. Based on these findings, the authors posited that the processes linking activities in childhood and adjustment in adolescence may influence one another over time.

Considering delinquency is an inherently social event involving peers (Felson, 2003; Reiss, 1986; Warr, 2002), and that research tracing back to the early 1900's has demonstrated that 90% of juvenile court cases involve two or more peers (Shaw & Myers, 1929), it is plausible that delinquents would spend time in a social setting such as USWP. Additionally, Elliot and Menard (1986) found that the majority of adolescents at age 17 reported moderate to high levels of delinquent peers. Given this finding, antisocial behavior is an attractor of peers during adolescence where these individuals are seeking out activities associated with mature status like drinking and smoking, which are common outcomes of USWP (Meldrum & Leimburg, 2018).

Rebellon (2006) and Riley (1987) offer further insight as to why delinquency may influence USWP. For instance, deviant peers are viewed as being more fun and entertaining than their normative counterparts. This then offers opportunities for deviant youth to become the cool and more popular kids. This assertion is in concert with the notions of Osgood and colleagues (1996) that spending time among peers can increase status among those peers. It is also consistent with the argument made by Gold (1970) that deviance is a performance where the presence of peers can provide an appreciative audience.

Vasquez and Zimmerman (2014) drew upon the data collected during Wave 3 (1978) and Wave 4 (1979) of the National Youth Survey to examine whether delinquency (such as substance use, property offending, and violent acts) is positively associated with

an increase in time spent with peers. The authors reported that engagement in drug-related, property-related, and violent-related delinquency was associated with an increase in time spent with peers. These findings suggest that delinquents are more likely to seek peer groups with whom they can commit such acts, which would in turn exacerbate their antisocial behavior.

Most recently, at the American Society of Criminology annual meeting, Ward et al. (2017) presented cross-lagged associations (i.e., one mechanism influencing the other over time in a reciprocal fashion) between USWP and delinquency using data collected as part of the Pathway to Desistance study. In this presentation, USWP was measured with three items, such as how often the respondent got together with friends informally; twenty items were used to measure delinquency. Results showed that USWP predicts delinquency but delinquency did not influence USWP. Considering that the reciprocal effects between USWP and delinquency have rarely been studied, exploring the cross-lagged effects between USWP and antisocial behavior is needed to better understand the dynamics of this relationship. While the majority of research on USWP has focused on how USWP may cause antisocial behavior (Hoeben et al., 2016), the research above offers evidence that this relationship may in fact be reciprocal.

Nonlinear effects of unstructured socializing with peers on antisocial behavior. Given the paucity of studies on the reciprocal effects between USWP and antisocial behavior, it is not surprising to find that the potential for nonlinear effects of USWP on various forms of antisocial behavior has also been understudied. Thus far, only two such studies have been conducted (Gage et al., 2005; Meldrum & Leimberg, 2018). Therefore, a detailed description of these two studies and what they found is warranted.

Gage et al. (2005) analyzed data obtained through the Health Behaviors of School-aged Children Survey, a nationally representative cross-sectional survey of youth in grades 6−10. Their aim was to explore the association between the number of evenings per week spent out with friends, aggressive behaviors (e.g., physical fights, bullying, carrying a weapon), and substance use (drinking and smoking tobacco). Bivariate analysis results revealed that both male and female students who reported spending 5-7 evenings out with friends per week were more likely than those spending 0-1 and 2-4 to be involved in frequent fighting, frequent bullying, carrying weapons, consuming alcohol, and smoking tobacco.

Multivariate analyses were also performed as a part of this study, revealing that boys who spend 5-7 evenings per week out with friends were over four times more likely to be involved in physical fighting, over three times more likely to report frequent bullying, weapon carrying, consume alcohol and smoke tobacco than those spending 0-1 evenings out with friends each week with friends. Moreover, for girls who spent 5-7 evenings out per week, the risk of fighting was similar to that reported for boys. However, they were five times more likely than boys to carry a weapon, and four times more likely to engage in bullying than those spending 0-1 evenings out a week with friends. The findings yielded by this study suggest that students who report spending at least five evenings per week out with friends are most likely to exhibit problem behaviors, providing support for the contention that the relationship between time spent in USWP and problem behaviors is nonlinear and is particularly pronounced among adolescents who spend most of their evenings out with friends.

In a more recent study, Meldrum and Leimberg (2018) utilized data collected as part of the 2017 Florida Youth Substance Abuse Survey to examine whether the association between USWP—measured in hours per week socializing with friends, not doing anything in particular where adults are not present and substance use is nonlinear. The study participants reported whether they had used a wide variety of substances within the past 30 days, including cigarettes, e-cigarettes, alcohol, and marijuana. Results showed that increase in the risk of cigarette use was only significant for adolescents who spend 20 or more hours per week in USWP relative to those who spend zero hours per week. Risk for e-cigarette use, however, begins at 6-10 hours per week, and gradually increases, peaking for adolescents who report spending more than 20 hours per week in USWP. The risk of alcohol use begins at 3-5 hours per week, but levels off at 6-10 hours per week, suggesting a saturation point. Regarding the effect of USWP on marijuana use, risk also begins at 3-5 hours per week (relative to 0 hours) and gradually increases until reaching a maximum for those reporting spending more than 20 hours in USWP.

When focused on a variety index composed of the aforementioned items measuring substance use, Meldrum and Leimberg (2018) further reported that adolescents who spend 1-2 hours per week in USWP were 30% more likely to engage in substance use compared to those that did not engage in any USWP (0 hours per week). Thereafter, the risk of using a variety of substances increases as time spent in USWP increases until 6-10 hours and remains constant thereafter, indicating a saturation point. Supplementary analyses using a squared term (which enables the researcher to assess whether an effect may be decelerating or accelerating) for USWP indicated that the

relationship between USWP and drinking, marijuana use, and the variety index of

substance use is a decelerating one.

III.   OBJECTIVES

A review of the literature on USWP indicates there are at least three areas of research that are underdeveloped, which call attention to the research objectives of this dissertation. First, some studies examining USWP in models of mediation did so with USWP as the mediating variable of various factors on anti-social behavior (Bernburg & Thorlindsson, 2001, 2007; Matsuda et al., 2013; Melde & Esbensen, 2011; Osgood et al., 1996; Walters, 2017). Likewise, other studies have examined various factors that may mediate the relationship between USWP and anti-social behavior (Bernasco et al., 2013; Greene & Bamerjee, 2009; Hoeben & Weerman, 2016; Hughes & Short, 2014; Wong, 2005). Yet, almost no attention has been directed at examining the role of multiple indirect effects by joining together these two strands of research. Such a model would expand on work such as that by Walters (2018), who examined and supported a model of mediation involving: Parental Knowledge$\rightarrow$ USWP$\rightarrow$ Delinquency, and additionally the work of Hoeben and Weerman (2016), who examined and supported a model of mediation involving: USWP$\rightarrow$ Peer Delinquency$\rightarrow$ Delinquency. A study which includes multiple indirect effects would not only expand on past research by Walters (2018) along with Hoeben and Weerman (2016), it would provide a more rigorous explanation of the various ways in which USWP leads to anti-social behavior.

Summarily, Walters (2018) makes clear that parenting precedes peer influence when it comes to predicting delinquency. Thus, parental knowledge would have an effect on USWP, which would then impact peer delinquency and in turn delinquency/substance use. Considering that USWP is a situation that is conducive to deviance (Osgood et al., 1996), further support consistent with Hoeben and Weerman (2016) may be found that

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USWP contributes to associating with delinquent peers, and then, individual delinquency and substance use. The model to be tested in this dissertation extends these recent studies by examining multiple indirect effects on the outcomes of delinquency/substance use as presented in Figure 1.

In order to investigate these associations, structural equation modeling (SEM) will be utilized to estimate the following hypothesized effects: 1) the direct effect of parental knowledge on USWP (negative effect), 2) the direct effect of USWP on peer property delinquency (positive effect), and 3) the direct effect of peer property delinquency on property delinquency (positive effect). The next process to be estimated is the indirect effect of parental knowledge on peer property delinquency operating through USWP (negative effect). Thereafter, the indirect effect between USWP and property delinquency operating through peer property delinquency will be estimated (positive effect). Last, the estimation of the indirect effect of parental knowledge on property delinquency operating through both USWP and peer property delinquency will be conducted (negative effect). These processes will then be repeated separately for violent delinquency and substance use models (Model 2 and Model 3 in Figure 1).

Model 1:

Parental Knowledge → USWP → Peer Property Delinquency → Property Delinquency

(- from Parental Knowledge to USWP; + from USWP to Peer Property Delinquency; + from Peer Property Delinquency to Property Delinquency; + arc from USWP to Property Delinquency; - from Parental Knowledge to Peer Property Delinquency; - from Parental Knowledge to Property Delinquency)

Model 2:

Parental Knowledge → USWP → Peer Violent Delinquency → Violent Delinquency

(- from Parental Knowledge to USWP; + from USWP to Peer Violent Delinquency; + from Peer Violent Delinquency to Violent Delinquency; + arc from USWP to Violent Delinquency; - from Parental Knowledge to Peer Violent Delinquency; - from Parental Knowledge to Violent Delinquency)

Model 3:

Parental Knowledge → USWP → Peer Substance Use → Substance Use

(- from Parental Knowledge to USWP; + from USWP to Peer Substance Use; + from Peer Substance Use to Substance Use; + arc from USWP to Substance Use; - from Parental Knowledge to Peer Substance Use; - from Parental Knowledge to Substance Use)

Figure 1. Hypothesized Causal Mediation Models

Second, review of the literature makes clear that few studies have examined reciprocal effects involving USWP and delinquency. However, past research has consistently found that USWP is associated with delinquency (Hoeben et al., 2016) and substance use (Green & Banerjee, 2009; Hawdon, 1996; Hundleby, 1987), and some research suggests that delinquency may also influence USWP (Hughes & Short, 2014; Matsuda et al., 2013; Melde & Esbensen, 2011). Although unexplored, drug use may also cause adolescents to spend more time in USWP, as past research has found that adolescents seek out friends who are like themselves (Urberg, Degirmencioglu, & Tolson, 1998) especially among those who smoke cigarettes and drink alcohol (Eiser,

Morgan, Gammage, Brooks, & Kirby, 1991) and those who engage in aggressive

behaviors (Cairns, & Cairns, 1991; Poulin, et al., 1997). In this regard, people who use

substances like tobacco and marijuana may seek out situations where this behavior is

likely to occur (e.g., USWP). Therefore, drug use may be positively associated with

USWP.

On the issue of reciprocal effects, recent unpublished research presented at the

American Society of Criminology annual meeting explicitly explored reciprocal effects

between USWP and delinquency (Ward et al., 2017). Specifically, using a sample of

serious adolescent offenders, Ward et al. (2017) found evidence that USWP predicted

changes in delinquency (2 out of 3 waves), and that delinquency, however, did not

predict USWP. With these considerations in mind, further research on reciprocal effects

is needed for at least three reasons. First, the study by Ward and colleagues (2017) is

limited in its generalizability to the general population of adolescents because it focused

on serious offenders. Second, the study by Ward et al. (2017) limited its focus to

delinquency and did not consider reciprocal effects between USWP and substance use.

Third, research has found evidence that delinquency influences USWP (Vasquez and

Zimmerman, 2014). With attention to these considerations, a future study improving

upon these limitations would assess the cross-lagged effects of USWP and both

delinquency and substance use among a more representative sample of adolescents.

Figure 2 below displays the hypothesized models to be tested.

Model 1:

USWP $\xrightarrow{\quad + \quad}$ USWP $\xrightarrow{\quad + \quad}$ USWP

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Property Delinquency $\xrightarrow{\quad}$ Property Delinquency $\xrightarrow{\quad}$ Property Delinquency

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Model 2:

USWP $\xrightarrow{\quad + \quad}$ USWP $\xrightarrow{\quad + \quad}$ USWP

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Violent Delinquency $\xrightarrow{\quad}$ Violent Delinquency $\xrightarrow{\quad}$ Violent Delinquency

\+

\+

Model 3:

USWP $\xrightarrow{\quad + \quad}$ USWP $\xrightarrow{\quad + \quad}$ USWP

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Substance Use $\xrightarrow{\quad}$ Substance Use $\xrightarrow{\quad}$ Substance Use

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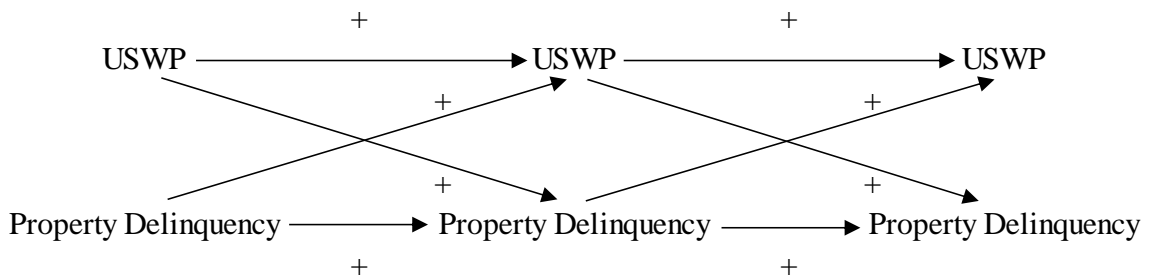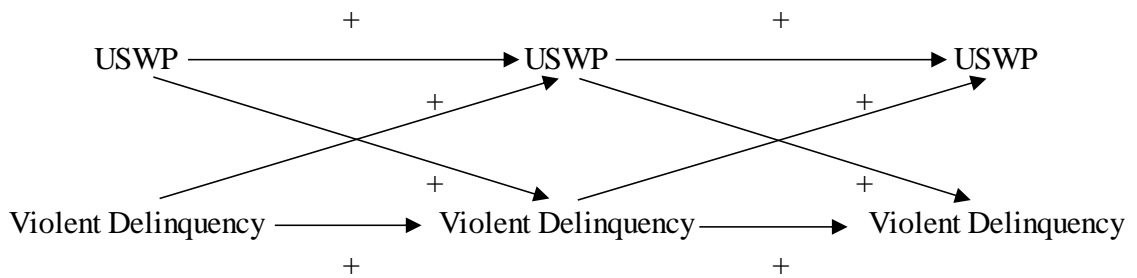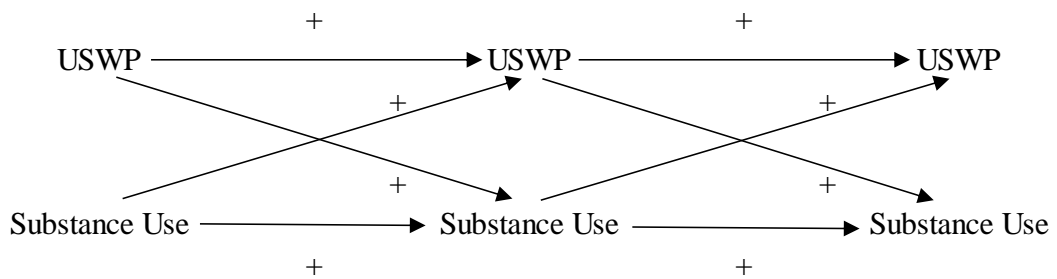
Figure 2. Hypothetical Causal Reciprocal Effects Models

Third, a review of the literature establishes that there has been little attention given to examining whether the association between USWP and delinquency/substance use is nonlinear. For one, past research has found that the relationship between time spent with friends and delinquency is most likely to occur among adolescents who spend most evenings out with friends each week (5-7) than those spending less evenings out (Gage et al., 2005). Additionally, adolescents who spend several evenings out with friends each week (2-4) were only *slightly* more likely to engage in delinquent behaviors than those spending less evenings out further demonstrating individuals who are spending the

greatest amount of time in activities such as USWP are more likely to engage in deviance. Given the findings of Gage and colleagues (2005) that adolescents spending five to seven evenings out each with friends per week have a greater chance of engaging in delinquency than those spending less time out each week is suggestive of an accelerating effect. Therefore, the hypothesis to be examined is of an accelerating relationship between USWP and delinquency.

Comparatively, as Meldrum and Leimberg (2018) found, the effect of USWP on substance use (e.g., alcohol and marijuana) reaches a certain saturation point where adolescents spending even more time with their friends are no more likely to engage in greater substance use. Given this, a study that examines whether the relationship between USWP and property delinquency, USWP and violent delinquency, and also USWP and substance use is nonlinear, is needed to better understand how much time is necessary to be spent in USWP before the risk of anti-social behavior increases. The hypothesis to be tested is of a decelerating relationship between USWP and substance use. With consideration to the above assertions, this suggests the arguments set forth by Osgood and colleagues' (1996) that individuals who spend more time in USWP should have higher deviance rates may in fact be a nonlinear association as opposed to linear.

If the findings produced from this dissertation support a nonlinear accelerating effect of USWP on delinquency, then these results would be consistent with Osgood and colleagues' (1996) assertions. Namely, that if delinquent behavior arises from conducive situations, then individuals who spend greater time in these situations should have higher deviance rates. However, this does not require much time for deviance to begin when spending time in such situations. Further, if the findings produced from this dissertation

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support a nonlinear decelerating effect for substance use, this would then be in line with

Osgood and colleagues' (1996) assertion that situational factors can give rise to deviance,

and that this does not require much time. Evidence from such a study would not only

solidify the assertions of Osgood et al. (1996) but would reinforce the findings of Gage et

al. (2005). Figure 3 below displays the hypothesized model of the effect of USWP on

delinquency (property and violent) illustrating an accelerating effect. Figure 4 displays

the hypothesized model of the effect of USWP on substance use illustrating a

decelerating effect.
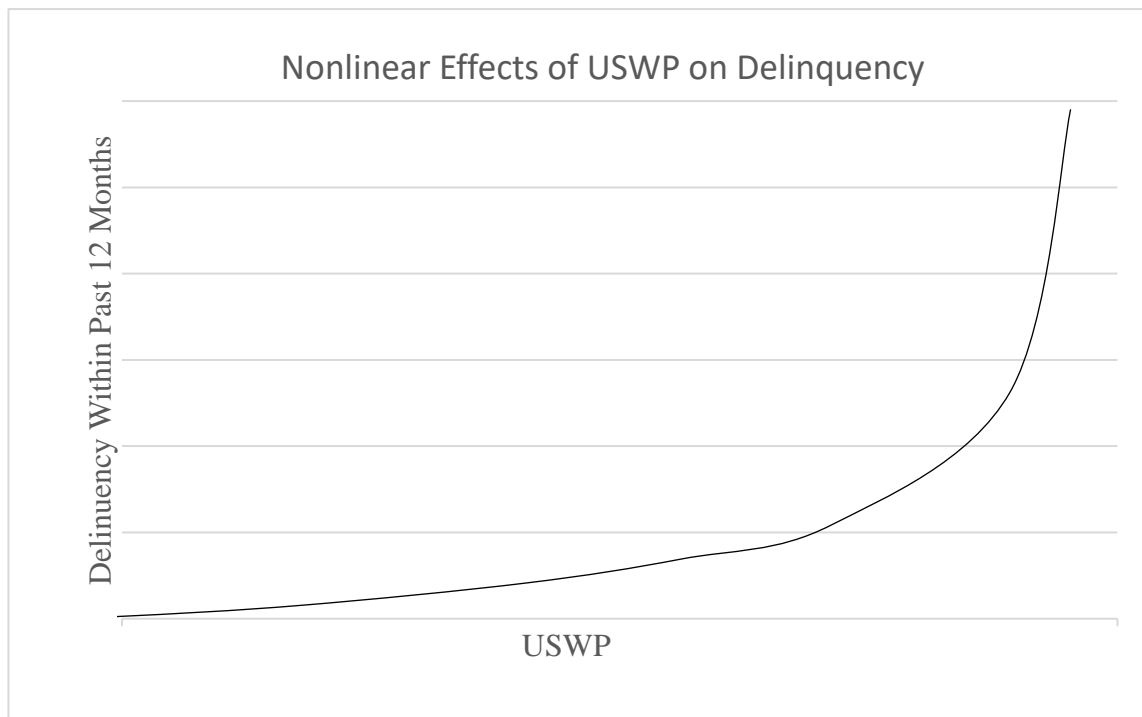
Figure 3. Hypothesized Model Demonstrating an Accelerating Effect
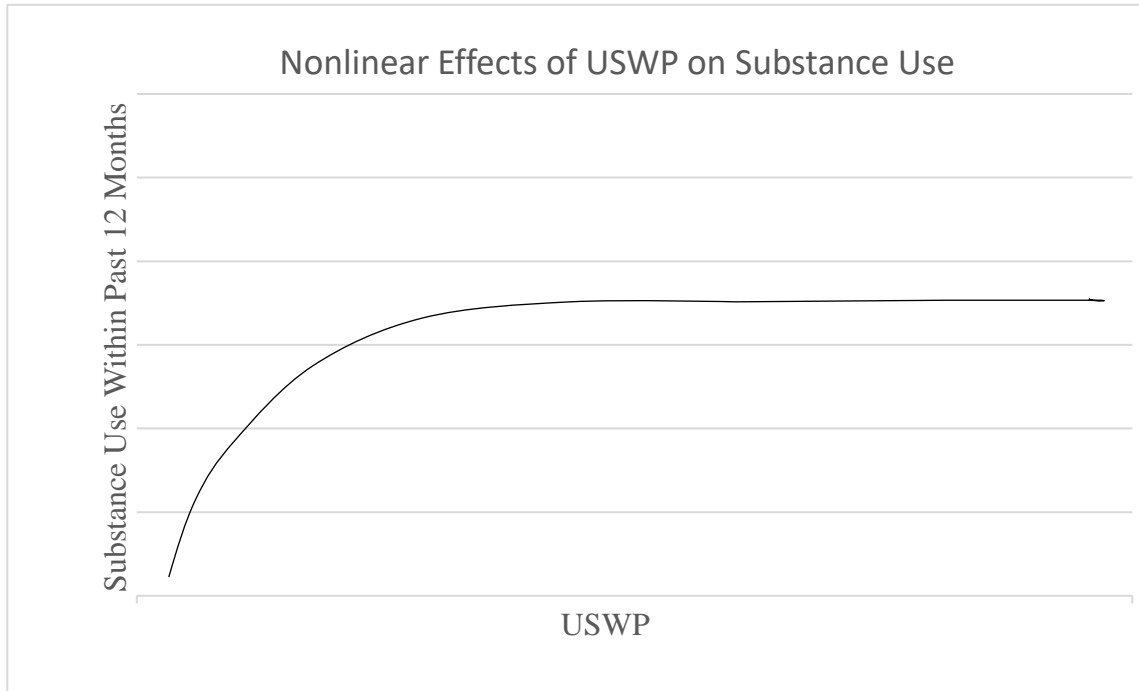
Figure 4. Hypothesized Model Demonstrating a Decelerating Effect

Hypotheses

Based on prior empirical findings concerning USWP in relation to antisocial

behavior, noteworthy associations between USWP and delinquency/substance use are

expected. Furthermore, guided theoretically by the most widely recognized

conceptualization of USWP (see Osgood et al., 1996), the following hypotheses are

tested.

The first hypothesis tested is that the association between parental knowledge and

delinquency/substance use will be mediated by both USWP and peer delinquency.

While prior research has found that USWP mediates the association between

parental knowledge and delinquency (e.g., Walters, 2018), and that exposure to peer

delinquency mediates the association between USWP and delinquency (e.g., Hoeben &

Weerman, 2016), a complete model integrating all four constructs and the separate

outcome of substance use has not been tested. Such a study would be useful to better

understand the nuances of how USWP operates to predict delinquency. Better

understanding of this process would be useful so parents can better protect their children

from anti-social behavior. Such a study would also be useful to reinforce the findings of

both Walters (2018) and Hoeben and Weerman (2016).

The second hypothesis tested is that there are reciprocal (cross-lagged) effects

between USWP and delinquency/substance use over time.

Specifically, it is expected that USWP will be correlated with subsequent USWP

and a similar association is expected for delinquency/substance use. Next, USWP and

delinquency/substance use will influence one another over time in a cross-lagged manner.

Particularly, a cross-lagged analysis is used to describe directional associations between

variables over time. In a cross-lagged analysis, the association between a causal variable

at Time 1 with an outcome variable at Time 2 is compared with the association of the

outcome variable at Time 1 and the causal variable at Time 2. In this manner, an

examination in the stability of and relationships between variables over time can be better

understood (Kearney, 2017).

Past research has found that USWP is correlated with later USWP (Higgins &

Jennings, 2010) and similar associations have been found for delinquency/substance use

(Ford, 2004). Additionally, an abundance of research finds that USWP predicts

delinquency (Hoeben et al., 2016) and, to a lesser degree, that delinquency impacts

USWP (Hughes & Short, 2014; Matsuda et al., 2013; Melde & Esbensen, 2011. Given

this, a study is needed to better understand how the relationship between USWP and

delinquency/substance use develops over time. By better understanding this relationship,

strategies targeting individuals who are spending time in unstructured activities with peers and those who are already delinquent can be implemented.

The third hypothesis tested is that there will be an accelerating nonlinear effect of USWP on delinquency and that a decelerating nonlinear effect of USWP on substance use will be found with the possibility of a saturation point.

Past research has found that adolescents spending five to seven evenings out with friends each week are more likely than those spending less evenings out per week to engage in acts of delinquency and substance use (Gage et a., 2005). In addition, those who are spending two to four evenings out with friends each week are only slightly more likely to engage in deviant behavior than those spending less time out with friends. In more recent examinations of the relationship between USWP and substance use, Meldrum and Leimberg (2018) found that the minimum number of hours per week to pose an increased risk for alcohol or marijuana use is three to five hours per week of USWP, the increased risk for e-cigarette use begins at 6-10 hours per week of USWP, and the increased risk for cigarette use begins at more than 20 hours per week of USWP. The findings of Meldrum and Leimberg (2018) further suggest once adolescents have reached the minimum hourly threshold of increased risk for substance use (e.g., alcohol and marijuana) posed by USWP, the effect of additional time spent in USWP on alcohol and marijuana use is a decelerating one.

Thus, a point may be reached where greater time spent engaging in USWP fails to continue to further increase the risk of substance use. Given that Gage et al. (2005) examined the effects of time spent in USWP on delinquency and substance use measured as evenings per week, and that Meldrum and Leimberg (2018) examined substance use in

categorical formats (e.g., 6-10 hours per week), a finer grain measure of USWP is needed. A future study which examines the amount of time spent in USWP in individual hours per week would not only improve on the limitations of past studies but would help to disentangle a more exact measure of how much time spent in USWP is needed to pose an increased risk for delinquency and substance use.

Findings supportive of this would also buttress the assertion of Osgood et al. (1996) that not much time is needed for situational factors to give rise to deviance. Additionally, the findings supportive of a non-linear, accelerating association between USWP and delinquency would also support the assertion of Osgood et al. (1996) that individuals who spend greater time in situations conducive to deviance (e.g., USWP) should have higher deviance rates.

IV.   DATA AND METHODS

This dissertation uses data from the evaluation of the Gang Resistance Education and Training (GREAT) program (see Esbensen, 2002). The GREAT evaluation was sponsored by three agencies within the United States through The Department of Justice, including the Bureau of Justice Statistics, the National Institute of Justice, and the Office of Juvenile Justice and Delinquency Prevention. Though intended as an evaluation of a school-based gang and violence prevention program that sought to reduce adolescent involvement in criminal behavior and gangs, the evaluation collected data that will be useful in testing the hypotheses outlined in the previous chapter. Although the development of the GREAT curriculum was not theory driven, the design of the national evaluation was (see Esbensen & Osgood, 1999).

Elements of Akers' (1985) social learning theory introduced definitions of laws, values, norms, and rules in support of pro-social behavior. Elements of Gottfredson and Hirschi's (1990) self-control theory introduced anger and coping strategies, (conflict resolution), along with impulsive behavior, among others. Further, the GREAT evaluation includes a survey item tapping all three elements of Osgood and colleagues (1996) construct of USWP. Thus, the presence of theoretical constructs in the GREAT evaluation design makes the data useful for this dissertation. Considering the six-wave (Spring 1995, Fall 1995, Fall 1996, 1997, 1998, 1999) longitudinal design of the student questionnaire, and the previously noted strengths of this dataset, discussion of the student sample, recruitment strategies, and survey items used to measure key variables is warranted.

Participants

The evaluation of the GREAT program used a classroom-based assignment (i.e.,

some classrooms were selected to participate in the GREAT program [treatment] and

other classrooms were not [control]). The initial longitudinal sample consists of 22

schools, 153 classrooms, and approximately 3,500 students (Esbensen, et al., 2001). Of

the 3,568 students who were eligible to participate in the GREAT program, 2,934

students participated in the first wave of the survey during spring of 1995. At the second

wave, during fall of 1995, 2,287 students completed the survey, resulting in a 22%

reduction in sample size. Thereafter, follow-up surveys continued yearly, with

completion rates representing 1,596 students at fall of 1996 (Wave 3) (46% reduction),

1,407 students at fall of 1997 (Wave 4) (52% reduction), 1,286 students at fall of 1998

(Wave 5) (56% reduction), and 1,261 students at fall of 1999 (Wave 6) (57% reduction),

respectively. Due to the largest amounts of missing data present in Waves 5 and 6 of the

GREAT data, this dissertation utilizes data collected through Wave 4. Additional details

of the sample are provided in the subsequent sections.

Procedure

The research strategy of the GREAT evaluation employed a quasi-experimental

design of equally sized groups of treatment (GREAT) and control (non-GREAT) students

in the seventh grade, which was initiated at the outset of the project. This approach

allowed for data collection on two groups of students: (1) those participating in GREAT,

and (2) those not participating in GREAT. Furthermore, the random assignment process

varied from city to city, as well as from school to school, helping to minimize the

possible differences between sets of treatment and control classes. For the student

questionnaire, six cities were purposively selected for inclusion in the longitudinal phase of the study based on three criteria: (1) the existence of a viable GREAT program, (2) geographical diversity, and (3) the cooperation of the school districts and the police department in each site. The selected sites were: (1) Philadelphia, Pennsylvania, (2) Portland, Oregon, (3) Phoenix, Arizona, (4) Omaha, Nebraska, (5) Lincoln, Nebraska, and (6) Las Cruces, New Mexico.

The University of Nebraska Institutional Review Board approved a component of the research design allowing passive parental consent (i.e., students were included unless specifically prohibited by parents) during the pre and post-test data collection phase. At the beginning of the 1994-1995 academic year, class lists from all participating classrooms were obtained. Each student appearing on these lists was assigned a uniquely identifiable number to be used throughout the longitudinal data collection phase. These lists contained names of students who had moved or failed to enroll for some other reason. Students whose names did not appear on the lists but who were in attendance were added to the list. The pre-test was administered during the spring of 1995 (Wave 1) and the first post-test was administered during fall of 1995 (Wave 2) to 6th and 7th-graders (after GREAT program administration). Follow-up post-test surveys were administered to students annually from 1996-1999 (Waves 3-6).

Study 1 (Multiple Mediation) Measures

The GREAT student questionnaire includes several key items that can be divided into attitudinal and behavioral indicators. The survey questionnaire also contains important items that were captured in all data collection waves, which were used to measure the key variables of interest for the present investigation, namely parental

knowledge, USWP, peer delinquency/peer substance use, and individual delinquency/substance use.

Parental knowledge. To measure parental knowledge, respondents that took part in Wave 1 during spring of 1995 were asked to indicate to what extent they agree or disagree with the following statements: "When I go someplace, I leave a note for my parents or call them to tell them where I am."; "My parents know where I am when I am not at home or at school."; "I know how to get in touch with my parents if they are not home."; and "My parents know who I am with if I am not at home." For each of the four items, the participants were instructed to select one of the following options: 1 = "*Strongly Disagree*," 2 = "*Disagree*," 3 = "*Neither Agree nor Disagree*," 4 = "*Agree*," and 5 = "*Strongly Agree.*" A four-item latent factor was created measuring parental knowledge. The factor loadings for this factor and all other variables measured as latent factors are provided in Table 1.

Unstructured socializing with peers. To measure USWP, focus must be given to situations that reflect time spent with peers, in the absence of authority figures, without a structured agenda (Osgood et al., 1996). Therefore, a survey item which captures all of these criteria is an appropriate measure of USWP. In other words, if the survey item of USWP does not include one of these criteria, such as "absence of authority figures," the construct validity of the measure would be weakened. Consistent with prior research using the GREAT data (Higgins & Jennings 2010; Turanovic & Pratt, 2014; Wolfe & McLean, 2017), the survey question utilized from Wave 2 (Fall 1995) reads: "Do you ever spend time hanging around with your current friends not doing anything in particular where no adults are present?" (No = 1; Yes = 2). An additional item includes: "If YES,

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how many hours do you spend doing this during an average week?" (_____hours). As

Osgood and Anderson (2004) and Higgins and Jennings (2010) have discussed, the open-

ended nature of this question could lead to issues with misreporting and skewness. In an

effort to address the first challenge, and in accordance with the recoding procedure

adopted by Higgins and Jennings (2010), in the present study, any responses above 150

hours were coded as missing values and those in the 50−150 h range were coded as 49

hours. Additionally, to overcome the potential for skewness, the process (square root

transformation) utilized by Higgins and Jennings (2010) was adopted. The transformation

resulted in a 0 - 7 range.

Peer delinquency/substance use. To examine the extent to which respondents'

friends had engaged in *property delinquency* (Model 1) in Wave 3 (conducted in the fall

of 1996), respondents were read the following prompt: "During the last year, how many

of your current friends have done the following?" The items used to measure peer

property delinquency included: "Purposely damaged or destroyed property that did not

belong to them"; "Stolen something worth less than $50"; "Stolen something worth more

than $50"; and "Gone into or tried to go into a building to steal something." The

participants responded to each of the items by selecting one of the five options: 1 =

"*None of them*"; 2 = "*Few of them*"; 3 = "*Half of them*"; 4 = "*Most of them*"; and 5 = "*All

of them.*" A four-item latent factor was created measuring peer property delinquency.

In the second model developed as a part of the current study, the items used to

measure the three-item latent factor of *peer violent delinquency* (Model 2) at Wave 3

included whether the respondent's friends had: "Attacked someone with a weapon," "Hit

someone with the idea of hurting them," and "Used a weapon or force to get money or

things from people." Respondents were provided the same five response options as for the property delinquency questions. In the third model of the current study, the items used for measuring the three-item latent factor of *peer substance use* (Model 3) at Wave 3 included whether the respondent's friends: "Used tobacco products," "Used alcohol," and "Used marijuana." Respondents were again provided with the same five response options noted above.

Individual/Respondent delinquency/substance use. Measures similar to the respondent's friends' delinquency were constructed for individual delinquency/substance use at Wave 4 (conducted in the fall of 1997), wherein respondents were read the following prompt: "Studies have found that everyone breaks the rules and laws sometimes. Indicate how many times in the past 6 months you have done each thing. If you have not done these things, enter 0." Items measuring *property delinquency* included: "Purposely damaged or destroyed property that did not belong to you," "Stolen or tried to steal something worth less than $50," "Stolen or tried to steal something worth more than $50," and "Gone into or tried to go into a building to steal something." A four-item latent factor was created measuring individual property delinquency.

This process was repeated for the *violent delinquency* and *substance use* measures for each model. Items used to measure *violent delinquency* asked the respondent to indicate in the past 6 months whether he/she had: "Attacked someone with a weapon," "Hit someone with the idea of hurting them," and "Used a weapon or force to get money or things from people." In accordance with the procedures adopted in previous waves, a three-item latent factor was created measuring violent delinquency. Items used for measuring *substance use* asked the respondent to indicate in the past 6 months whether

he/she had: "Used tobacco products," "Used alcohol," and "Used marijuana." Once again, a three-item latent factor was created measuring substance use. In line with the recoding process utilized by Osgood and Schreck (2007) and Higgins and Jennings (2010), the items measuring respondent property delinquency were dichotomized, whereby 0 indicated no participation in each act, while any amount of participation in each act was denoted by 1 (creating a participation index). By following this transformation process, the potential bias in overly skewed results was removed. This process was repeated for the *violent delinquency* and *substance use* measures for each model. The descriptive statistics for the latent variables in each model are provided in Table 1 below and the descriptive statistics for the observed variables can be found in Table 2.

Table 1. *Descriptive Statistics of Latent Variables for Mediation Models*

Variable	Model 1 Property Delinquency (N=1,616)					Model 2 Violent Delinquency (N=1,609)					Model 3 Substance Use (N=1,604)				
	Mean	SD	FL	Min	Max	Mean	SD	FL	Min	Max	Mean	SD	FL	Min	Max
Parental Knowledge (Wave 1)															
Parental Knowledge Item 1	4.037	0.987	0.488	1	5	4.037	0.992	0.496	1	5	4.034	0.989	0.503	1	5
Parental Knowledge Item 2	3.789	1.104	0.825	1	5	3.778	1.116	0.838	1	5	3.774	1.116	0.846	1	5
Parental Knowledge Item 3	4.041	0.944	0.410	1	5	4.039	0.948	0.411	1	5	4.049	0.941	0.409	1	5
Parental Knowledge Item 4	3.683	1.073	0.765	1	5	3.672	1.084	0.766	1	5	3.677	1.080	0.753	1	5
Peer Property Delinquency (Wave 3)															
Peer Property Delinquency Item 1	1.840	1.041	0.780	1	5	---	---	---	---	---	---	---	---	---	---
Peer Property Delinquency Item 2	1.748	1.026	0.910	1	5	---	---	---	---	---	---	---	---	---	---
Peer Property Delinquency Item 3	1.374	0.790	0.920	1	5	---	---	---	---	---	---	---	---	---	---
Peer Property Delinquency Item 4	1.455	0.851	0.889	1	5	---	---	---	---	---	---	---	---	---	---
Peer Violent Delinquency (Wave 3)															
Peer Violent Delinquency Item 1	---	---	---	---	---	2.143	1.168	0.751	1	5	---	---	---	---	---
Peer Violent Delinquency Item 2	---	---	---	---	---	1.351	0.792	0.965	1	5	---	---	---	---	---
Peer Violent Delinquency Item 3	---	---	---	---	---	1.241	0.645	0.892	1	5	---	---	---	---	---
Peer Substance Use (Wave 3)															
Peer Substance Use Item 1	---	---	---	---	---	---	---	---	---	---	1.882	1.129	0.901	1	5
Peer Substance Use Item 2	---	---	---	---	---	---	---	---	---	---	1.939	1.168	0.954	1	5
Peer Substance Use Item 3	---	---	---	---	---	---	---	---	---	---	1.676	1.087	0.888	1	5

Table 1 Continued. *Descriptive Statistics of Latent Variables for Mediation Models.*

Variable	Model 1 Property Delinquency (N=1,616)					Model 2 Violent Delinquency (N=1,609)					Model 3 Substance Use (N=1,604)				
	Mean	SD	FL	Min	Max	Mean	SD	FL	Min	Max	Mean	SD	FL	Min	Max
Property Delinquency (Wave 4)															
Property Delinquency Item 1	0.218	0.412	0.676	0	1	---	---	---	---	---	---	---	---	---	---
Property Delinquency Item 2	0.187	0.390	0.743	0	1	---	---	---	---	---	---	---	---	---	---
Property Delinquency Item 3	0.064	0.245	0.596	0	1	---	---	---	---	---	---	---	---	---	---
Property Delinquency Item 4	0.083	0.276	0.681	0	1	---	---	---	---	---	---	---	---	---	---
Violent Delinquency (Wave 4)															
Violent Delinquency Item 1	---	---	---	---	---	0.387	0.487	0.445	0	1	---	---	---	---	---
Violent Delinquency Item 2	---	---	---	---	---	0.062	0.241	0.749	0	1	---	---	---	---	---
Violent Delinquency Item 3	---	---	---	---	---	0.026	0.158	0.579	0	1	---	---	---	---	---
Substance Use (Wave 4)															
Substance Use Item 1	---	---	---	---	---	---	---	---	---	---	0.275	0.446	0.709	0	1
Substance Use Item 2	---	---	---	---	---	---	---	---	---	---	0.394	0.489	0.846	0	1
Substance Use Item 3	---	---	---	---	---	---	---	---	---	---	0.203	0.402	0.662	0	1

Notes: FL = Factor Loadings

Covariates. In addition to measuring the primary variables of interest, respondents also reported their biological sex (male = 1; female = 0), race (White = 1; non-White = 0; dummy coded), age (in years), whether the respondent lived in a single-parent household (yes = 1; no = 0), currently a gang member (yes = 1; no = 0), ever been a gang member (yes = 1; no = 0) measured at spring of 1995 (Wave 1), and whether the respondent completed the GREAT program assessed in fall of 1995 (yes = 1; no = 0).At Wave 1, the respondent's level of self-control was measured by an eight-item scale comprised of attitudinal measures assessing the respondent's impulsivity and risk-seeking behavior (Grasmick, Tittle, Bursik, & Arneklev, 1993). An example item measuring impulsivity is: "I often act on the spur of the moment without stopping to think." Risk-seeking behavior was measured with such items as: "Sometimes I will take a risk just for the fun of it." Respondents selected one of the following five options for each of the eight items: 1 = "*Strongly Disagree*," 2 = "*Disagree*," 3 = "*Neither Agree nor Disagree*," 4 = "*Agree*," and 5 = "*Strongly Agree.*" The measure for self-control was created by taking the average of the eight items (α = .74), whereby higher scores are indicative of lower self-control. Last, in each particular model of the present study, the respondent's own anti-social behavior (i.e., property delinquency, violent delinquency, substance use) assessed at Spring 1995 (Wave 1) was controlled for by taking the sum of each of the offending items, which were identical to those described above measured at Wave 4.

The descriptive statistics for the observed variables that were incorporated into each model are provided in Table 2. As can be seen, non-Whites (55%) and females (51%) comprised slightly more of the study sample than Whites and males. The youngest student in the sample at wave 1 was 10 and the oldest 14, with an average of 12 years old.

Additionally, 35% of respondents lived in a single-parent household, 8% reported having been a gang member at some point in their lives, 4% reported currently being a gang member, and 61% of the students indicated completing the GREAT program.

Table 2. *Descriptive Statistics of Variables for Mediation Models*

Variable	Model 1 Property Delinquency (N=1,616)				Model 2 Violent Delinquency (N=1,609)				Model 3 Substance Use (N=1,604)			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
Age (Wave 1)	12	0.632	10	14	12	0.628	10	14	12	0.628	10	14
Male (Wave 1)	0.478	0.500	0	1	0.484	0.500	0	1	0.484	0.500	0	1
White (Wave 1)	0.467	0.499	0	1	0.466	0.499	0	1	0.468	0.499	0	1
Single-Parent Household (Wave 1)	0.330	0.470	0	1	0.329	0.470	0	1	0.329	0.470	0	1
Great Program (Wave 2)	0.613	0.487	0	1	0.608	0.488	0	1	0.614	0.487	0	1
Low Self-Control (Wave 1)	2.864	0.675	1	4.875	2.869	0.677	1	4.875	2.867	0.675	1	4.875
Gang Membership Ever (Wave 1)	0.071	0.257	0	1	0.076	0.265	0	1	0.068	0.251	0	1
Gang Membership Currently (Wave 1)	0.034	0.182	0	1	0.037	0.187	0	1	0.032	0.176	0	1
Property Delinquency (Wave 1)	0.501	0.924	0	4	---	---	---	---	---	---	---	---
Violent Delinquency (Wave 1)	---	---	---	---	0.422	0.634	0	3	---	---	---	---
Substance Use (Wave 1)	---	---	---	---	---	---	---	---	0.457	0.835	0	3
Unstructured Socializing With Peers (Wave 2)	1.426	1.602	0	7	1.429	1.606	0	7	1.407	1.600	0	7

Study 1 analytic plan. To investigate the relationships of interest for the current study, the statistical package Mplus 8.1 was employed to conduct SEM of latent variables for the primary constructs of interest and observed variables (Muthén & Muthén, 2017). In order to investigate whether the variables representing the mediators explain the association between parental knowledge and delinquency/substance use, two conditions *must* be met: (1) the independent variable significantly affects the mediator, and (2) the mediator has a significant effect on the dependent variable, which establishes partial mediation (Kenny, Kashy, & Bolger, 1998). Further, if these two criteria are met, then it is implied, *but not required*, that a path from the independent variable (IV) to the dependent variable (DV) exists to further solidify *partial* mediation (Kenny et al., 1998). Contrary to what Baron and Kenny (1986) have noted in their seminal work, there is no requirement for mediation to occur if the IV is not associated with the DV (Collins, Graham, & Flaherty, 1998; Judd & Kenny, 1981; Kenny et al., 1998; MacKinnon, 1994, 2000; MacKinnon, Krull, & Lockwood, 2000; Shrout & Boulger, 2002). To establish *complete* mediation, the effect of the IV on the DV while controlling for the mediator should be reduced to zero.

Several fit indices were adopted in the present study to evaluate model fit, including the conventional chi squared (χ^2) statistic, along with the root mean square error or approximation (RMSEA), which takes into account sample size to correct for the tendency of the chi squared test to reject models based on large samples (Steiger, 1990). According to Browne and Cuedck (1993), values for the RMSEA of less than .05 denote close model fit, those between .05 and .08 are indicative of fair fit to data, and values above .10 are associated with poor fit. The comparative fit index (CFI) (Bentler, 1990)

was also calculated as a part of this investigation, wherein values of .90 to .95 are considered acceptable and those exceeding .95 are considered good (Hu & Bentler, 1999). Last, the latent factor R^2 is also reported as it indicates how much variation in a particular latent variable is explained by the structural model. Bootstrapped standard errors, indirect effects, and non-symmetric confidence intervals were obtained using the *cinterval bootstrap* option available in Mplus with 10,000 draws (Muthen, 2016; Muthen, 2018).

Missing data. Following the missing data process of Walters (2019), who also used the GREAT data, revealed that there were 40 relevant study items missing *less than 50%* of responses (participants who did not respond to the survey question were coded as 1, all other as 0) at all waves of the GREAT data used in the present study (Waves 1-4). Comparatively, there were 10 relevant study items which were missing *more than 50%* of responses (coded in the same manner as previously mentioned) at the final wave of the present study (Wave 4). Further, all responses missing more than 50% of data appear in Wave 4. Thereafter, each variable was summed to create a singular missing response variable representing less than 50% of all missing cases. The missing response variable, representing *less than 50%* of missing cases, resulted in a range of 0 to 32 wherein 0 represented all those who responded to each variable and all other values represented missing cases. The missing response variable representing *more than 50%* of cases was coded in a similar manner as the less than 50% variable; however, it resulted in a range of 0 to 10. Before a two-group comparison t-tests could be performed to determine if the missing data groups were statistically different, the variable representing missing values *less than 50%* and the variable representing missing cases *over 50%* were each

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dichotomized. Results of the t-test revealed that respondents who had less than 50% of missing data on the current study variables (Waves 1-3) were significantly different than those who had dropped out at later time points in the GREAT survey (Wave 4) ($p. < .001$).

When current participants from Waves 1-3 were compared to missing responses in variables with *over 50%* of missing cases at Wave 4, further analysis (t-tests for continuous variables and chi square tests for categorical variables) revealed that individuals who dropped out of the study at Wave 4 were more likely to be White ($p. < .001$), older ($p. < .01$), live in a single parent household ($p. < .001$), complete the GREAT program ($p. < .05$), currently be in a gang ($p. < .001$), ever in their lifetime be in a gang ($p. < .001$), and spend more time in USWP ($p. < .001$). Additionally, those leaving the study had greater low self-control at earlier waves ($p. < .001$), experienced greater parental knowledge ($p. < .001$), and reported more peer property delinquency ($p. < .001$), peer violent delinquency ($p. < .001$), peer substance use ($p. < .001$), individual property delinquency ($p. < .01$), individual violent delinquency ($p. < .01$), as well as individual substance use ($p. < .001$).

Although dropouts were different than participants who remained in the study, incomplete data is a common problem in longitudinal research (Hansen, Tobler, & Graham, 1990; Jeličić, Phelps, & Lerner, 2009). The pioneering work of Rubin (1976) and subsequent investigations conducted by Little and Rubin (2002) proposed three missing data mechanisms. First, missing data may be missing completely at random (MCAR), whereby the observed data can be considered a random subsample had the dataset been complete. Second, missing data may be missing at random (MAR),

indicating ignorable missingness that is correlated to other study-related variables. Third, data may be missing not at random (MNAR), whereby missingness is related to the hypothetical values that are missing.

The MCAR test developed by Little (1988) revealed that missingness in the GREAT dataset does not meet the assumptions of MCAR. It has been further established that it is only possible to test the assumptions of a MCAR mechanism, because MAR and MNAR assumptions depend on having knowledge of the missing data (Baraldi & Enders, 2010; Enders, 2010).

As it is common for the findings yielded by studies exploring antisocial behavior to be highly influenced by data pertaining to individuals who did not commit any offending at all, a weighted least squares estimator is preferred over maximum likelihood (ML) estimators because it makes no assumptions about joint normality and violations of these assumptions can produce distortions in model adequacy (Bentler & Yuan, 1999; Yuan & Bentler, 1998). In the present study, a robust weighted least squares means and variances (WLSMV) estimator based on a diagonal weight matrix was adopted. This estimator uses univariate and bivariate listwise deletion, in other words, pairwise deletion methods. Specifically, univariate full information maximum likelihood (FIML) is used during the first stage of estimation. Next, estimates are obtained by fixing data parameters to the first stage estimates and then maximizing over the second stage parameters (Asparouhov & Muthen, 2010). Moreover, pairwise deletion attempts to use all available information present in the data by "discarding cases on a variable to variable basis; each element is calculated separately and only those with cases with missing values on a particular bivariate pair are discarded" (Enders & Bandalos, 2001, p. 432). In this

manner, pairwise deletion uses a subset of cases with complete data on both the independent and dependent variables to compute the covariance matrix (Enders, 2010).

Study 2 (Reciprocal Effects) Measures

Unstructured socializing with peers. Consistent with prior research in which scholars used this survey question and data (Higgins & Jennings 2010; Turanovic & Pratt, 2014; Wolfe & McLean, 2017), the GREAT questionnaire included the survey question "Do you ever spend time hanging around with your current friends not doing anything in particular where no adults are present?" (No = 1; Yes = 2). This is followed by: "If YES, how many hours do you spend doing this during an average week?" (_____hours). As previously mentioned, and as Osgood and Anderson (2004) along with Higgins and Jennings (2010) have discussed, the open-ended nature of this question could lead to issues with misreporting and skewness. Thus, the same recoding procedure from the aforementioned studies, and Study 1 of this dissertation, was used to overcome this issue in Waves 1, 2, and 3. The transformation resulted in a 0-7 range at each of the three waves.

Individual/Respondent Delinquency/substance use. Individual delinquency/ substance use was measured at all three time points that are the focus of the reciprocal effects models (Spring 1995, Fall 1995, Fall 1996), wherein respondents were read the following prompt: "Studies have found that everyone breaks the rules and laws sometimes. Have you ever done any of the following? If yes, indicate how many times in the past 12 months you have done each thing." Respondents were asked at Wave 1 (Spring 1995) to indicate how many times they had done these things in the past 12 months, while responds at Wave 2 (Fall 1995) were asked to indicate how many times

they had done these things in the past three months. At Wave 3 (Fall 1996), respondents were required to state the same but for a period covering the preceding six months.

Items measuring *property delinquency* required the respondents to indicate whether they had: "Purposely damaged or destroyed property that did not belong to you?"; "Stolen or tried to steal something worth less than $50?"; "Stolen or tried to steal something worth more than $50?"; and "Gone into or tried to go into a building to steal something?" A four-item latent factor was created measuring property delinquency. Items used to measure *violent delinquency* required the respondent to indicate if he/she had: "Attacked someone with a weapon," "Hit someone with the idea of hurting them," and "Used a weapon or force to get money or things from people." In line with the above, a three-item latent factor was created measuring violent delinquency. Similarly, when responding to items measuring *substance use*, the participants indicated if they had: "Used tobacco products," "Used alcohol," and "Used marijuana." A three-item latent variable was created measuring substance use. As previously mentioned, when describing these measures for study one, and employed by Higgins and Jennings (2010), each of the items which represent the three measures (i.e., property delinquency, violent delinquency, substance use) were dummy coded (0 = no participation and 1 = participation in one or more delinquent acts) to address issues with skewness in each model. The descriptive statistics for the latent variables in each model are provided in Table 3.

Table 3. *Descriptive Statistics of Latent Variables for Reciprocal Effects Models*

Variable	Model 1 Property Delinquency (N=1,675)					Model 2 Violent Delinquency (N=1,670)					Model 3 Substance Use (N=1,665)				
	Mean	SD	FL	Min	Max	Mean	SD	FL	Min	Max	Mean	SD	FL	Min	Max
Property Delinquency **(Wave 1)**															
• Property Delinquency Item 1	0.199	0.399	0.593	0	1	---	---	---	---	---	---	---	---	---	---
• Property Delinquency Item 2	0.196	0.396	0.644	0	1	---	---	---	---	---	---	---	---	---	---
• Property Delinquency Item 3	0.047	0.212	0.578	0	1	---	---	---	---	---	---	---	---	---	---
• Property Delinquency Item 4	0.072	0.259	0.665	0	1	---	---	---	---	---	---	---	---	---	---
Property Delinquency **(Wave 2)**															
• Property Delinquency Item 1	0.178	0.382	0.536	0	1	---	---	---	---	---	---	---	---	---	---
• Property Delinquency Item 2	0.204	0.402	0.714	0	1	---	---	---	---	---	---	---	---	---	---
• Property Delinquency Item 3	0.048	0.214	0.571	0	1	---	---	---	---	---	---	---	---	---	---
• Property Delinquency Item 4	0.068	0.251	0.663	0	1	---	---	---	---	---	---	---	---	---	---
Property Delinquency **(Wave 3)**															
• Property Delinquency Item 1	0.281	0.449	0.560	0	1	---	---	---	---	---	---	---	---	---	---
• Property Delinquency Item 2	0.215	0.411	0.753	0	1	---	---	---	---	---	---	---	---	---	---
• Property Delinquency Item 3	0.059	0.237	0.586	0	1	---	---	---	---	---	---	---	---	---	---
• Property Delinquency Item 4	0.098	0.298	0.698	0	1	---	---	---	---	---	---	---	---	---	---

Table 3 Continued. *Descriptive Statistics of Latent Variables for Reciprocal Effects Models*

Variable	Model 1 Property Delinquency (N=1,675)					Model 2 Violent Delinquency (N=1,670)					Model 3 Substance Use (N=1,665)				
	Mean	SD	FL	Min	Max	Mean	SD	FL	Min	Max	Mean	SD	FL	Min	Max
Violent Delinquency (Wave 1)															
• Violent Delinquency Item 1	---	---	---	---	---	0.343	0.474	0.564	0	1	---	---	---	---	---
• Violent Delinquency Item 2	---	---	---	---	---	0.055	0.228	0.513	0	1	---	---	---	---	---
• Violent Delinquency Item 3	---	---	---	---	---	0.025	0.158	0.407	0	1	---	---	---	---	---
Violent Delinquency (Wave 2)											---	---	---	---	---
• Violent Delinquency Item 1	---	---	---	---	---	0.354	0.479	0.535	0	1	---	---	---	---	---
• Violent Delinquency Item 2	---	---	---	---	---	0.048	0.212	0.484	0	1	---	---	---	---	---
• Violent Delinquency Item 3	---	---	---	---	---	0.025	0.158	0.425	0	1	---	---	---	---	---
Violent Delinquency (Wave 3)															
• Violent Delinquency Item 1	---	---	---	---	---	0.431	0.495	0.611	0	1	---	---	---	---	---
• Violent Delinquency Item 2	---	---	---	---	---	0.074	0.261	0.500	0	1	---	---	---	---	---
• Violent Delinquency Item 3	---	---	---	---	---	0.035	0.184	0.382	0	1	---	---	---	---	---

Table 3 Continued. *Descriptive Statistics of Latent Variables for Reciprocal Effects Models*

Variable	Model 1 Property Delinquency (N=1,675)					Model 2 Violent Delinquency (N=1,670)					Model 3 Substance Use (N=1,665)				
	Mean	SD	FL	Min	Max	Mean	SD	FL	Min	Max	Mean	SD	FL	Min	Max
Substance Use (Wave 1)															
• Substance Use Item 1	---	---	---	---	---	---	---	---	---	---	0.170	0.375	0.713	0	1
• Substance Use Item 2	---	---	---	---	---	---	---	---	---	---	0.226	0.418	0.714	0	1
• Substance Use Item 3	---	---	---	---	---	---	---	---	---	---	0.078	0.268	0.599	0	1
Substance Use (Wave 2)															
• Substance Use Item 1	---	---	---	---	---	---	---	---	---	---	0.164	0.370	0.725	0	1
• Substance Use Item 2	---	---	---	---	---	---	---	---	---	---	0.227	0.418	0.703	0	1
• Substance Use Item 3	---	---	---	---	---	---	---	---	---	---	0.081	0.274	0.651	0	1
Substance Use (Wave 3)															
• Substance Use Item 1	---	---	---	---	---	---	---	---	---	---	0.241	0.428	0.734	0	1
• Substance Use Item 2	---	---	---	---	---	---	---	---	---	---	0.318	0.466	0.712	0	1
• Substance Use Item 3	---	---	---	---	---	---	---	---	---	---	0.146	0.354	0.692	0	1

Notes: FL = Factor Loadings

Covariates. In addition to measuring the primary theoretical constructs of interest (i.e., USWP, delinquency, and substance use), respondents also reported their biological sex (male = 1; female = 0), race (White = 1; non-White = 0; dummy coded), age (in years), whether the respondent lived in a single-parent household (yes = 1; no = 0), currently a gang member (yes = 1; no = 0), ever been a gang member (yes = 1; no = 0) measured at Wave 1, and whether the respondent completed the GREAT program assessed at Wave 2 (yes = 1; no = 0). The respondent's level of self-control was measured at Wave 1 by an eight-item scale comprising of attitudinal measures assessing the respondent's impulsivity and risk seeking behavior (Grasmick et al., 1993). One of the items measuring impulsivity— "I often act on the spur of the moment without stopping to think."—is given here as an example. An example item measuring risk-seeking behavior is: "Sometimes I will take a risk just for the fun of it." The respondent was required to select one of the following five options: 1 = *Strongly Disagree*," 2 = "*Disagree*," 3 = "*Neither Agree nor Disagree*," 4 = "*Agree*," and 5 = "*Strongly Agree.*" This measure of self-control was created by taking the average of the eight items (α = .74), whereby higher scores are indicative of lower self-control.

Respondents at Wave 1 also reported how much they agree or disagree with statements measuring parental knowledge. Parental knowledge was measured using such items as: "When I go someplace, I leave a note for my parents or call them to tell them where I am." Respondents could choose from a five-point likert scale ranging from *"Strongly Disagree"* to *"Strongly Agree."* This measure was created by taking the average of the four items (α = .70). Last, in each particular model of the present study, the peer anti-social behavior assessed at Spring 1995 (Wave 1) was controlled for by taking

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the average of each of the peer offending items previously described for Study 1

(property offending α = .85; violent offending α = .73; substance use α = .87).

In order to maintain a substantive sample size and avoid severe attrition in the

latter waves of the GREAT data collection (52%, 56%, and 57% reduction for Wave 4,

Wave 5, and Wave 6, respectively), the present investigation focuses on the data

collected during only the first three survey waves. Specifically, the aim of this study is to

elucidate the potential reciprocal influences of USWP and antisocial behavior (i.e.,

property delinquency, violent delinquency, substance use). These relationships are based

on the information obtained in Wave 1 (Spring 1995), Wave 2 (Fall 1995), and Wave 3

(Fall 1996), retaining a sample size of over 1,600 respondents at Wave 3. Table 4

provides the descriptive statistics for the variables used in the analysis.

Table 4. *Descriptive Statistics of Variables for Reciprocal Effects Models*

Variable	Model 1 Property Delinquency (N=1,675)				Model 2 Violent Delinquency (N=1,670)				Model 3 Substance Use (N=1,665)			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
Age (Wave 1)	12	0.629	10	14	12	0.628	10	14	12	0.627	10	14
Male (Wave 1)	0.486	0.500	0	1	0.484	0.500	0	1	0.483	0.500	0	1
White (Wave 1)	0.463	0.499	0	1	0.462	0.499	0	1	0.465	0.499	0	1
Single-Parent Household (Wave 1)	0.331	0.471	0	1	0.332	0.471	0	1	0.332	0.471	0	1
Great Program (Wave 2)	0.610	0.488	0	1	0.610	0.488	0	1	0.609	0.488	0	1
Low Self-Control (Wave 1)	2.884	0.680	1	4.875	2.883	0.680	1	4.875	2.882	0.678	1	4.875
Gang Membership Ever (Wave 1)	0.078	0.268	0	1	0.078	0.268	0	1	0.077	0.266	0	1
Gang Membership Currently (Wave 1)	0.039	0.192	0	1	0.039	0.192	0	1	0.038	0.192	0	1
Parental Knowledge (Wave 1)	3.871	0.745	1	5	3.871	0.745	1	5	3.875	0.742	1	5
Peer Property Delinquency (Wave 1)	1.506	0.725	1	5	---	---	---	---	---	---	---	---
Peer Violent Delinquency (Wave 1)	---	---	---	---	1.476	0.680	1	5	---	---	---	---
Peer Substance Use (Wave 1)	---	---	---	---	---	---	---	---	1.492	0.848	1	5
Unstructured Socializing With Peers (Wave 1)	1.450	1.617	0	7	1.446	1.611	0	7	1.449	1.625	0	7
Unstructured Socializing With Peers (Wave 2)	1.447	1.617	0	7	1.451	1.618	0	7	1.453	1.622	0	7
Unstructured Socializing With Peers (Wave 3)	1.844	1.724	0	7	1.843	1.726	0	7	1.843	1.724	0	7

Study 2 analytic plan. To investigate the potential reciprocal relationship between USWP and anti-social behavior, the statistical package Mplus 8.1 was employed to conduct SEM of latent and observed variables (Muthén & Muthén, 2017). SEM was used to analyze the reciprocal (cross-lagged) pathways between USWP and property delinquency, USWP and violent delinquency, and USWP and substance use. A cross-lagged panel model (CLPM) incorporated repeated measures of constructs over multiple waves of data to assess: 1) stability in the constructs over time, 2) associations occurring at the same period of time, and 3) cross-lagged effects over time. These associations were examined by means of longitudinal cross-lagged models ranging from 3 to 12-month intervals (i.e., Spring 1995, Fall 1995, Fall 1996) to elucidate the linkage between USWP and delinquency. As with Study 1 of this dissertation, the same fit indices are adopted for the current study.

Missing data. Using the procedure of Walters (2019) as a guiderevealed that, for the present study, there were 61 relevant items missing *less than 50%* of responses (participants who did not respond to the survey question were coded as 1, all other as 0) at all waves of the GREAT data (Waves 1-3). Comparatively, only one item was missing more than 50% of responses (USWP at Wave 3). Further, Esbensen et al. (2001) found that the majority of respondents dropped out at the later waves of the GREAT survey and given the benefits of using FIML to estimate missing data, loss of responses was a less severe issue for the present study than for Study 1.

For the current study, FIML was employed, which has been known to produce unbiased estimates when missing data meet the MCAR and MAR assumptions. Serious violations of the MAR assumptions, however, are relatively rare (Graham, Hofer,

Donaldson, MacKinnon, & Schafer, 1997; Schafer & Graham, 2002). Further, when missing data is MNAR, maximum likelihood approaches and multiple imputation tend to provide better outcomes compared to the traditional approaches, such as listwise deletion (Baraldi & Enders, 2010). Additionally, FIML has also been found to be robust in violations of its basic assumptions (Young & Johnson, 2013). In FIML estimation of unknown parameters, an iterative process that repeatedly auditions various values for the population mean and variances is conducted until the estimates that have most likely produced the data are found (Enders, 2010). Given these considerations and as a state-of-the-art missing data technique which yields unbiased parameter estimates under the MAR assumptions (Shafer & Graham, 2002), FIML was employed to analyze the SEM models in Study 2.

Study 3 (Nonlinear effects) Measures

Unstructured socializing with peers. Consistent with prior research who used the GREAT data and survey question which was measured in this study at Spring1995/Wave 1 (see Higgins & Jennings, 2010; Turanovic & Pratt, 2014; Wolfe & McLean, 2017), the survey question measuring USWP reads: "Do you ever spend time hanging around with your current friends not doing anything in particular where no adults are present?" (No = 1; Yes = 2). An additional item includes: "If YES, how many hours do you spend doing this during an average week?" (_____hours). As noted earlier, and as Osgood and Anderson (2004) and Higgins and Jennings (2010) have discussed, the open-ended nature of this question could lead to issues with misreporting and skewness. Thus, the same recoding procedure reported for Study 1 and Study 2 of this dissertation was used to overcome this issue. The transformation resulted in the [0, 7] range.

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Individual/Respondent Delinquency/substance use. In order to measure

delinquency/substance use at Fall 1995 (Wave 2), respondents were read the following

prompt: "Studies have found that everyone breaks the rules and laws sometimes. Indicate

how many times in the past 6 months you have done each thing. If you have not done

these things, enter 0." Four items were used to measure the frequency of *property*

delinquency, namely: (1) "Purposely damaged or destroyed property that did not belong

to you?"; (2) "Stolen or tried to steal something worth less than $50?"; (3) "Stolen or

tried to steal something worth more than $50?"; and (4) "Gone into or tried to go into a

building to steal something?" ($\alpha = .67$). To measure the frequency of *violent delinquency*

without the creation of a latent variable, preliminary analysis revealed a three-item

measure to have poor inter-item reliability ($\alpha = .39$). Thus, a two-item measure was

summed revealing a moderately strong correlation ($r = .56$). The respondent was asked to

indicate if he/she had: (1) "Attacked someone with a weapon?" and (2) "Used a weapon

or force to get money or things from people?" Last, three items used to measure the

frequency of *substance use*, prompting the respondent to indicate if he/she had: (1) "Used

tobacco products," (2) "Used alcohol," and (3) "Used marijuana" ($\alpha = .69$). Following the

procedure in the prior studies of this dissertation, to remove bias in overly skewed results,

each of the delinquency and substance use items were dichotomized and then summed

resulting in values of 0, 1, and 2.

      Covariates In addition to measuring the primary theoretical constructs of interest,

respondents at Wave 1 also reported their biological sex (male = 1; female = 0), race

(White = 1; non-White = 0; dummy coded), age (in years), whether the respondent lived

in a single-parent household (yes = 1; no = 0), currently or ever been in a gang (yes = 1;

no = 0), and whether the respondent completed the GREAT program assessed at Wave 2

(yes = 1; no = 0). As noted before, the respondent's level of self-control was measured by

an eight-item scale at Wave 1 where higher measures were indicative of lower self-

control (α = .74). Respondents were also able to choose from a five-point likert scale

ranging from whether they *"Strongly Disagree"* to *"Strongly Agree"* about items

inquiring of parental knowledge. An example of this item was: "My parents know where

I am when I am not at home or at school." As with Study 2, this measure was created by

taking the average of the four items (α = .70). Finally, in each particular model of the

current study, peer anti-social behavior assessed at Spring 1995 (Wave 1) was controlled

for by taking the average of each of the peer offending items (property offending α = .85;

violent offending α = .73; substance use α = .87). The descriptive statistics for each

model are provided in Table 5.

Table 5. *Descriptive Statistics for Nonlinear Effects Models*

Variable	Model 1 Property Delinquency (N= 1,404)				Model 2 Violent Delinquency (N= 1,302)				Model 3 Substance Use (N= 1,361)			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
Unstructured Socializing With Peers (Wave 1)	1.474	1.642808	0	7	1.474	1.643	0	7	1.474	1.643	0	7
Age (Wave 1)	12	0.654137	10	15	12.000	0.654	10	15	12	0.654	10	15
Male (Wave 1)	0.489	0.500	0	1	0.489	0.500	0	1	0.489	0.500	0	1
White (Wave 1)	0.451	0.497687	0	1	0.451	0.498	0	1	0.451	0.498	0	1
Single-Parent Household (Wave 1)	0.347	0.476111	0	1	0.347	0.476	0	1	0.347	0.476	0	1
Great Program (Wave 2)	0.622	0.485092	0	1	0.622	0.485	0	1	0.622	0.485	0	1
Low Self-Control (Wave 1)	2.918	0.686197	1	5	2.918	0.686	1	5	2.918	0.686	1	5
Gang Membership Ever (Wave 1)	0.083	0.27625	0	1	0.083	0.276	0	1	0.083	0.276	0	1
Gang Membership Currently (Wave 1)	0.037	0.18936	0	1	0.037	0.189	0	1	0.037	0.189	0	1
Parental Knowledge (Wave 1)	3.838	0.769124	1	5	3.838	0.769	1	5	3.838	0.769	1	5
Property Delinquency (Wave 1)	0.500	0.917146	0	4	---	---	---	---	---	---	---	---
Violent Delinquency (Wave 1)	---	---	---	---	0.351	0.520	0	2	---	---	---	---
Substance Use (Wave 1)	---	---	---	---	---	---	---	---	0.454	0.818	0	3
Peer Property Delinquency (Wave 1)	1.524	0.754178	1	5	---	---	---	---	---	---	---	---
Peer Violent Delinquency (Wave 1)	---	---	---	---	1.246	0.625	1	5	---	---	---	---
Peer Substance Use (Wave 1)	---	---	---	---	---	---	---	---	1.514	0.856	1	5
Property Delinquency (Wave 2)	0.463	0.888169	0	4	---	---	---	---	---	---	---	---
Violent Delinquency (Wave 2)	---	---	---	---	0.410	0.626	0	3	---	---	---	---
Substance Use (Wave 2)	---	---	---	---	---	---	---	---	0.430	0.820	0	3

Notes: SD = Standard Deviation

Study 3 analytic plan. To examine whether USWP influences delinquency and substance use in a nonlinear manner, two steps were taken. First, a series of negative binomial and Poisson regression models was used to assess the extent to which USWP (Wave 1) influences a count dependent variable, such as the number of times respondents had engaged in property delinquency (Wave 2) in the past three months (Fall 1995 questionnaire). Given that many adolescents engaged in few acts of delinquency, the data is skewed in a Poisson distribution. Further, as the variance of the outcome variables exceeds their mean values in the property delinquency and substance use models (Models 1 and 3), negative binomial regression is preferred to Poisson regression (Meldrum & Leimberg, 2018). On the other hand, as the variance of the outcome variables in the violent delinquency model did not exceed their mean values, Poisson regression was used in this instance (Model 2).

Second, analysis was conducted for each model through adding a squared (quadratic) term to assess the degree to which the relationship between USWP and delinquency may in fact be nonlinear. If the statistically significant incidence rate ratio (IRR) exceeded 1.00 (squared term), this would be interpreted as evidence indicating that the nonlinear association between USWP and delinquency is increasing in an *accelerating* manner. Conversely, a statistically significant IRR for the squared term below 1.00 would indicate that the relationship between USWP and delinquency is still strengthening, albeit in a *decelerating* manner. This same process was repeated separately for the models capturing the effect of USWP on property delinquency, violent delinquency, and substance use. All models are estimated using STATA 14.2, which handles missing data by default through listwise deletion (Long & Freese, 2006).

V.   RESULTS

Study 1 (Multiple Mediation)

Model 1, Property Delinquency

Table 6 provides the results of the structural equation modeling conducted to examine the hypothesized influence of parental knowledge (Spring 1995/Wave 1) on property delinquency (Fall 1997/Wave 4) running through both USWP (Fall 1995/Wave 2) and peer property delinquency (Fall 1996/Wave 3), as depicted earlier in Figure 1. The correlation matrix for the key variables used in the analysis appears in Appendix A. In addition, several demographic variables that served as controls in the model are reported in Table 6, along with the fit statistics. The model developed as a part of the present study incorporated one exogenous latent variable (parental knowledge), one endogenous observed variable (USWP), and two endogenous latent variables (peer property delinquency and individual property delinquency). Although the likelihood ratio test of Model 1 indicates unacceptable model fit (χ^2 of 487.607 $p. < .001$), this is a common issue for larger samples (Elmore, 2005; Kenny, 2015) and model complexity can affect interpretation of the chi square statistic (Bearden, Sharma, & Teel, 1982). Given this assertion, additional and more reliable model fit statistics are provided such as the RMSEA of .037, which indicate close fit to the data, that is further supported by the CFI (.952) and TLI (.938).

Study 1, Model 1, USWP (Wave 2) Equation

The model estimates of the direct effect of parental knowledge (Wave 1) on USWP (Wave 2) is statistically significant and suggests a relationship in the expected direction, providing support for the first hypothesis of the present study. Specifically, the

results show a direct negative effect of parental knowledge on USWP (b = **-**.271, $p.$ < .01; β = **-**.083,). The findings further indicate that being White (b = .332, $p.$ < .001, β = .104), living in a single-parent household (b = .196, $p.$ < .05, β = .058), having low self-control (b = .383, $p.$ < .001, β = .161), being a gang member at some point in life (b = .652, $p.$ < .001, β = .105), and prior engagement in property delinquency at Wave 1 (b = .319, $p.$ < .001, β = .184) are factors positively associated with USWP. The R^2 value of .127 indicates that 12.7% of the variation in the observed variable of USWP is explained by the model capturing the aforementioned factors.

Study 1, Model 1, Peer Property Delinquency (Wave 3) Equation

Next, a direct positive effect is found for the relationship between USWP (Wave 2) and peer property delinquency (Wave 3) (b =.108, $p.$ < .001, β = .206). Additionally, the results show that being male (b = .317, $p.$ < .001, β = .189), having low self-control (b = .235, $p.$ < .001, β = .189), previous gang membership (b = .361, p < .05, β = .111), and prior property delinquency at Wave 1 (b = .152, $p.$ < .001, β = .167) are factors positively associated with peer property delinquency. Furthermore, identifying as White (b = **-**.126, $p.$ < .05, β = **-**.075) and currently being a gang member (b = **-**.547, $p.$ < .05, β = **-**.118) are factors negatively associated with peer property delinquency. The R^2 value of .257 indicates that 25.7% of the variation in the latent factor of peer property delinquency is explained by the structural model.

Study 1, Model 1, Property Delinquency (Wave 4) Equation

The portion of the model capturing the effect of peer property delinquency (Wave 3) on individual property delinquency (Wave 4) revealed a significant direct path between these variables (b =.114, $p.$ < .001, β = .357). A second direct path between

parental knowledge and property delinquency is also established ($b = -.051$, $p. < .05$, $\beta = -.093$). The results further indicate that engagement in property delinquency at Wave 1 is associated with property delinquency at Wave 4 ($b = .041$, $p. < .05$, $\beta = .143$). The R^2 value of .323 indicates that 32.3% of the variation in the latent factor of individual delinquency is explained by the structural model.

Study 1, Model 1, Property Delinquency, Indirect Effects

As a part of the structural modeling process, the indirect relationship between parental knowledge (Wave 1) and peer property delinquency (Wave 3) via USWP (Wave 2) was examined and confirmed [($b = -.029$, $p. < .05$, $\beta = -.017$), 95% bootstrapped confidence interval = -0.056 to -0.008], whereby the findings indicate that approximately 58% of the total effect of parental knowledge on peer property delinquency is exhibited through USWP. Following the recommendations by Ditlevsen, Christensen, Lynch, Damsgaard, and Keiding (2005) to calculate the proportion of the effect being mediated by a variable(s), the indirect effect is divided by the total effect. The results show that the indirect relationship between USWP and individual property delinquency via peer property delinquency has the expected direction [($b = .012$, $p. < .001$, $\beta = .073$), 95% bootstrapped confidence interval = .007 to .018], with about 60% of the total effect of USWP on property delinquency operating through peer property delinquency. Finally, the most informative estimate of the model pertains to the indirect relationship between parental knowledge and property delinquency via both USWP and peer property delinquency. This was also supported by the model results ($b = -.003$, $p. < .05$, $\beta = -.006$), bootstrapped confidence interval = -.007 to -.001]. Moreover, the findings suggest that approximately 5.1% of the total effect of parental knowledge on property delinquency is

exerted through both USWP and peer property delinquency. Figure 5 shows the path

diagram for the property delinquency model.

Table 6. *Weighted Least Squares with Mean and Variance Adjusted Estimates of Unstandardized Coefficients, Standard Errors, and Standardized Coefficients for Property Delinquency Mediation Model*

<u>Model 1: Property Delinquency</u>
(N=1,616)

Predictor	<u>Unstructured Socializing With Peers (Wave 2)</u>	<u>Peer Property Delinquency (Wave 3)</u>	<u>Property Delinquency (Wave 4)</u>
Age	0.045	0.023	-0.030
	0.066	0.047	0.016
	0.018	0.017	-0.070
Male	-0.067	0.317***	0.039
	0.081	0.058	0.020
	-0.021	0.189	0.072
White	0.332***	-0.126*	0.010
	0.081	0.060	0.019
	0.104	-0.075	0.018
Single-Parent Household	0.196*	0.089	-0.040
	0.086	0.065	0.022
	0.058	0.050	-0.070
Great Program	-0.110	0.010	0.006
	0.082	0.059	0.018
	-0.034	0.006	0.011
Low Self-Control	0.383***	0.235***	0.012
	0.064	0.050	0.015
	0.161	0.189	0.030
Gang Membership Ever	0.652**	0.361*	0.157
	0.251	0.150	0.084
	0.105	0.111	0.150
Gang Membership Currently	-0.084	-0.547*	0.065
	0.328	0.228	0.144
	-0.009	-0.118	0.044
Property Delinquency (Wave 1)	0.319***	0.152***	0.041*
	0.055	0.033	0.017
	0.184	0.167	0.143
Parental Knowledge (Wave 1)	-0.271**	-0.021	-0.051*
	0.099	0.069	0.021
	-0.083	-0.012	-0.093
Unstructured Socializing With Peers (Wave 2)	---	0.108***	0.008
		0.019	0.008
		0.206	0.049
Peer Property Delinquency (Wave 3)	---	---	0.114***
			0.018
			0.357

Table 6. *Continued. Weighted Least Squares with Mean and Variance Adjusted Estimates of Unstandardized Coefficients, Standard Errors, and Standardized Coefficients for Property Delinquency Mediation Model*

Indirect Effects:			
Parental Knowledge → Unstructured Socializing With Peers → Peer Property Delinquency			-0.029* 0.012 -0.017 -0.056 to -0.008
Unstructured Socializing With Peers→ Peer Property Delinquency → Property Delinquency			0.012*** 0.003 0.073 0.007 to 0.018
Parental Knowledge → Unstructured Socializing With Peers → Peer Property Delinquency Property Delinquency			-0.003* 0.001 -0.006 -0.007 to -0.001
R²	0.127	0.257	0.323
Likelihood Ratio χ2 (df)			487.607***(150)
RMSEA			0.037
CFI			0.952
TLI			0.938

Notes: RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index. Estimates reported in columns in descending order: Row 1: Unstandardized coefficient; Row 2: Standard error; Row 3: Standardized coefficient; Row 4 of Indirect Effects = 95% bootstrapped confidence intervals
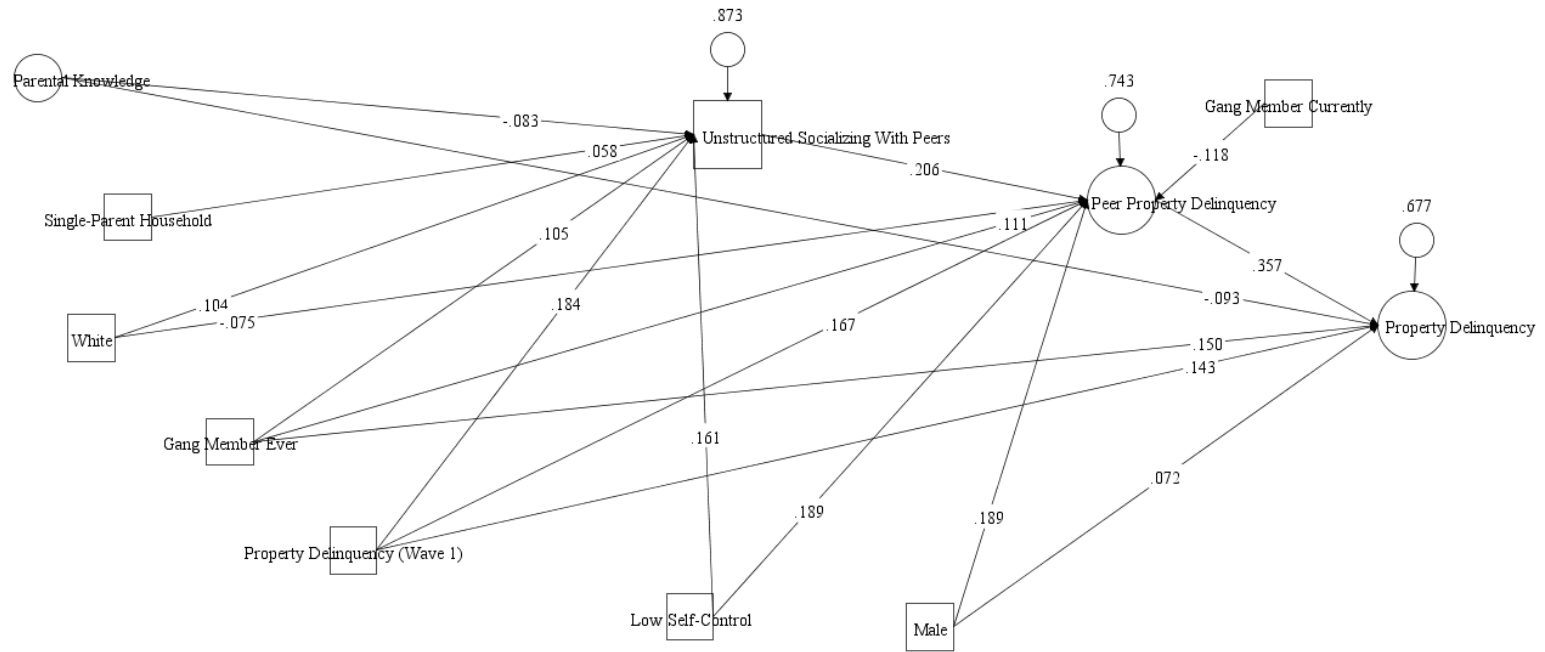*p <.05. **p <.01. ***p < .001.

Figure 5. Property Delinquency Mediation Model with Significant Pathways and Standardized Coefficients
(N = 1,616).

Study 1, Model 2, Violent Delinquency

The results reported in Table 7 pertain to the second model of the present study, assessing the influence of parental knowledge (Wave 1) on violent delinquency (Wave 4) via both USWP (Wave 2) and peer violent delinquency (Wave 3). The likelihood-ratio test of Model 2 (violent delinquency) (χ^2 of 397.862 *p.* < .001) indicates unacceptable model fit; however, the RMSEA of .040, along with the CFI (.933) and the TLI (.907), indicate acceptable model fit. This model captured one exogenous latent variable (parental knowledge), one endogenous observed variable (USWP), and two endogenous latent variables (peer violent delinquency and violent delinquency). In line with the approach adopted for the property delinquency model (Model 1), duplicate control variables were included.

Study 1, Model 2, USWP (Wave 2) Equation

The model estimate of the direct effect of parental knowledge (Wave 1) on USWP (Wave 2) was statistically significant and predicted a relationship in the expected direction, i.e., it demonstrated a direct negative effect of parental knowledge on USWP (*b* = -.308, *p.* < .001, β = **-**.095). The results also indicate that being White (*b* = .351, *p.* < .001, β = .109), living in a single-parent household (*b* = .183, *p.* < .05, β = .054), having lower self-control (*b* = .430, *p.* < .001, β = .181), prior gang membership (*b* = .612, *p.* < .01, β = .101), and greater engagement in violent delinquency at Wave 1 (*b* = .477, *p.* < .001, β = .188) are factors positively associated with USWP at Wave 2. The R^2 value of .143 indicates that 14.3% of the variation in the observed variable of USWP is explained by the model.

Study 1, Model 2, Peer Violent Delinquency (Wave 3) Equation

In addition, a direct, positive relationship is found between USWP (Wave 2) and peer violent delinquency (Wave 3) ($b = .100$, $p. < .001$, $\beta = .197$). Being male ($b = .367$, $p. < .001$, $\beta = .225$), having lower self-control ($b = .141$, $p. < .01$, $\beta = .118$), prior gang membership ($b = .286$, $p. < .05$, $\beta = .093$), and greater engagement in violent delinquency at Wave 1 ($b = .303$, $p. < .001$, $\beta = .237$) are also positively associated with peer violent delinquency. Conversely, being White ($b = -.131$, $p. < .05$, $\beta = -.080$) is negatively associated with peer violent delinquency. The R^2 value of .295 indicates that 29.5% of the variation in the latent factor of peer violent delinquency is explained by the structural model.

Study 1, Model 2, Violent Delinquency (Wave 4) Equation The model also predicted a direct, positive relationship between peer violent delinquency and violent delinquency, which was observed ($b = .075$, $p. < .001$, $\beta = .292$). The effects of other control variables failed to achieve statistical significance. The R^2 value of .245 indicates that 24.5% of the variation in the latent factor of violent delinquency is explained by the structural model.

Study 1, Model 2, Violent Delinquency, Indirect Effects The model results also supported an indirect effect of parental knowledge on peer violent delinquency via USWP [($b = -.031$, $p. < .01$, $\beta = -.019$), 95% bootstrapped confidence interval = -.055 to -.011], whereby approximately 46.3% of the total effect of parental knowledge on peer violent delinquency is exerted through USWP. Further, the relationship between USWP and violent delinquency is mediated by peer violent delinquency [($b = .007$, $p. < .01$, $\beta = .057$), 95% bootstrapped confidence interval = .003 to .013], with 36.8% of the total

effect of USWP on violent delinquency operating through peer violent delinquency.

Lastly, the model results indicate that the relationship between parental knowledge and

violent delinquency is mediated by both USWP and peer violent delinquency [(b = -.002,

$p.$ < .05, β = -.005), bootstrapped confidence interval = -.005 to -.001] with approximately

4.3% of the total effect of parental knowledge on violent delinquency exerted via both

USWP and peer violent delinquency. Figure 6 displays the path diagram for the violent

delinquency model.

Table 7. *Weighted Least Squares with Mean and Variance Adjusted Estimates of Unstandardized Coefficients, Standard Errors, and Standardized Coefficients for Violent Delinquency Mediation Model*

Model 2: Violent Delinquency (N=1,610)   Endogenous Factors

Predictor	Unstructured Socializing With Peers (Wave 2)	Peer Violent Delinquency (Wave 3)	Violent Delinquency (Wave 4)
Age	0.077	0.013	-0.023
	0.064	0.051	0.017
	0.030	0.010	-0.070
Male	-0.070	0.367***	0.018
	0.083	0.062	0.017
	-0.022	0.225	0.042
White	0.351***	-0.131*	-0.019
	0.081	0.061	0.019
	0.109	-0.080	-0.046
Single-Parent Household	0.183*	0.077	-0.013
	0.086	0.067	0.019
	0.054	0.044	-0.029
Great Program	-0.119	0.039	0.001
	0.082	0.061	0.017
	-0.036	0.023	0.002
Low Self-Control	0.430***	0.141**	0.004
	0.065	0.050	0.014
	0.181	0.118	0.013
Gang Membership Ever	0.612**	0.286*	0.065
	0.232	0.133	0.092
	0.101	0.093	0.082
Gang Membership Currently	0.075	-0.067	0.098
	0.312	0.236	0.127
	0.009	-0.015	0.088
Violent Delinquency (Wave 1)	0.477***	0.303***	0.037
	0.076	0.051	0.025
	0.188	0.237	0.114
Parental Knowledge (Wave 1)	-0.308***	-0.036	-0.038
	0.095	0.071	0.021
	-0.095	-0.022	-0.090
Unstructured Socializing With Peers (Wave 2)	---	0.100***	0.012
		0.019	0.008
		0.197	0.091
Peer Violent Delinquency (Wave 3)	---	---	0.075***
			0.022
			0.292

Table 7 Continued. *Weighted Least Squares with Mean and Variance Adjusted Estimates of Unstandardized Coefficients, Standard Errors, and Standardized Coefficients for Violent Delinquency Mediation Model*

<u>Indirect Effects:</u>

Parental Knowledge → Unstructured Socializing With Peers→ Peer Violent Delinquency			-0.031**
			0.011
			-0.019
			-0.055 to -0.011
Unstructured Socializing With Peers → Peer Violent Delinquency → Violent Delinquency			0.007**
			0.003
			0.057
			0.003 to 0.013
Parental Knowledge → Unstructured Socializing With Peers→ Peer Violent Delinquency → Violent Delinquency			-0.002*
			0.001
			-0.005
			-0.005 to -0.001
R^2	0.143	0.295	0.245
Likelihood Ratio χ2 (df)			397.862*** (111)
RMSEA			0.040
CFI			0.933
TLI			0.907

Notes: RMSEA = root mean square error of approximation; CFI = comparative fit index, TLI = Tucker-Lewis index.
Estimates reported in columns in descending order:
Row 1: Unstandardized coefficient; Row 2: Standard error; Row 3: Standardized coefficient; Row 4 of Indirect Effects = 95% bootstrapped confidence intervals
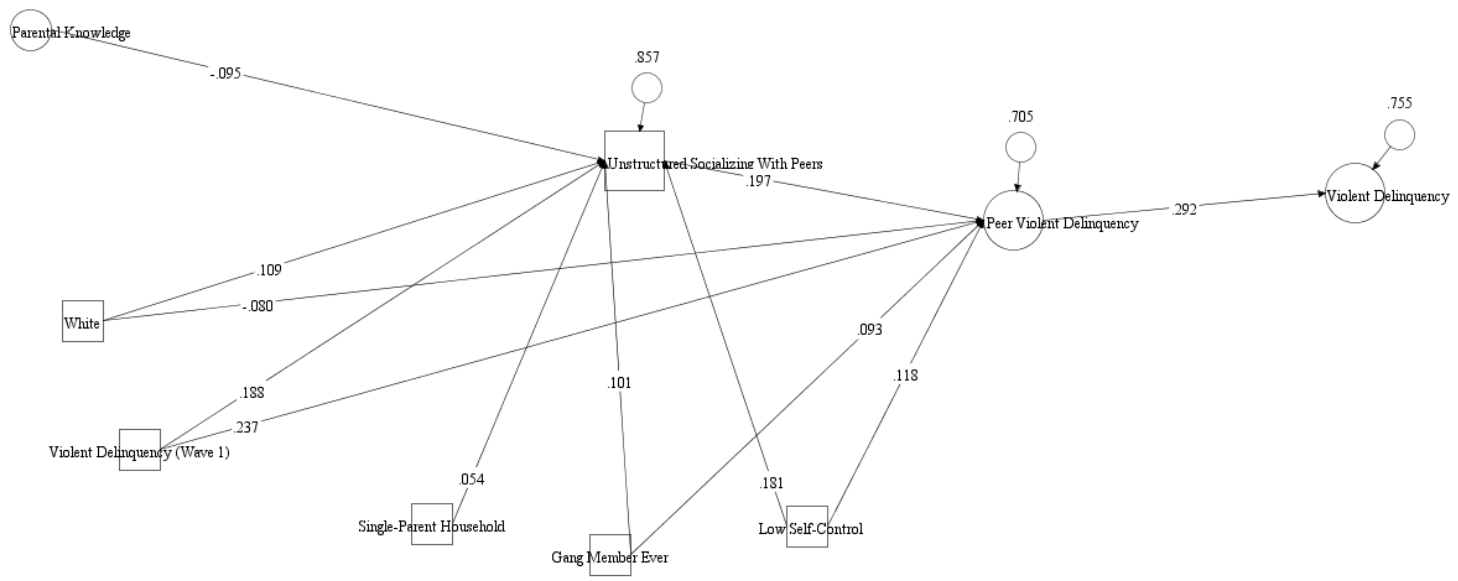*p <.05. **p <.01. ***p < .001.

Figure 6. Violent Delinquency Mediation Model with Significant Pathways and Standardized Coefficients (N = 1,610)

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Study 1, Model 3, Substance Use

The findings of Model 3, which assessed the influence of parental knowledge (Wave 1) on individual substance use (Wave 4) via both USWP (Wave 2) and peer substance use (Wave 3) are reported in Table 8. The fit indices, namely the likelihood-ratio test of Model 3 (χ^2 of 421.883, *p.* < .001) indicates unacceptable model fit; however, and the RMSEA of .042, along with the CFI (.961) and the TLI (.946) indicate acceptable model fit. This model incorporated one exogenous latent variable (parental knowledge), one endogenous observed variable (USWP), and two endogenous latent variables (peer substance use and substance use), while also including duplicate control variables from Models 1 and 2.

Study 1, Model 3, USWP (Wave 2) Equation

The model estimate of the direct effect of parental knowledge on USWP indicated the presence of a statistically significant and direct negative effect of parental knowledge on USWP (*b* = -.259, *p.* < .01, β = -.081). Moreover, being White (*b* = .326, *p.* < .001, β = .102), living in a single-parent household (*b* = .202, *p.* < .05, β = .059), having lower self-control (*b* = .385, *p.* < .001, β = .162), prior gang membership (*b* = .608, *p.* < .05, β = .096), and greater engagement in substance use at Wave 1 (*b* = .330, *p.* < .001, β = .172) were identified as factors positively associated with USWP. The R^2 value of .126 indicates that 12.6% of the variation in the observed variable of USWP is explained by the model.

Study 1, Model 3, Peer Substance Use (Wave 3) Equation

Next, the model revealed that USWP exerts a direct positive effect on peer substance use (*b* = .154, *p.* < .001, β = .246). Additionally, the results show that low self-

control ($b = .281$, $p. < .001$, $\beta = .190$), prior gang membership ($b = .393$, $p. < .01$, $\beta = .099$), and engagement in substance use at Wave 1 ($b = .330$, $p. < .001$, $\beta = .275$) are factors positively associated with peer substance use. The R^2 value of .293 indicates that 29.3% of the variation in the latent factor of peer substance use is explained by the structural model.

Study 1, Model 3, Substance Use (Wave 4) Equation

The model also revealed a direct positive relationship between peer substance use and individual substance use ($b = .136$, $p < .001$, $\beta = .430$). Further, the model shows that substance use at Wave 1 ($b = .081$, $p < .001$, $\beta = .213$) was positively associated with individual substance use at Wave 4, and additionally that males ($b = $ **-.045**, $p < .05$, $\beta = $ **-.071**) were less likely to engage in substance use than females. The R^2 value of .360 indicates that 36% of the variation in the latent factor of individual substance use is explained by the structural model.

Study 1, Model 3, Substance Use, Indirect Effects

Finally, the model results shown in Table 8 provide support for the indirect effect of parental knowledge on peer substance use via USWP [($b = $ **-.040**, $p < .01$, $\beta = $ **-.020**), 95% confidence interval = **-.073** to **-.012**], while suggesting that 28.6% of the total effect of parental knowledge on peer substance use operates through USWP. The results also show that USWP affects substance use indirectly through peer substance use [($b = .021$, $p < .001$, $\beta = .106$), 95% bootstrapped confidence interval = .014 to .029] with approximately 75% of the total effect of USWP on substance use operating through peer substance use. Finally, Model 3 results provide support for the indirect effect of parental knowledge on delinquency through both USWP and peer substance use ($b = $ **-.005**, $p < $

.05, β = **-**.009), bootstrapped confidence interval = -.010 to **-**.002], while indicating that

14.3% of the total effect of parental knowledge on substance use is exerted through both

USWP and peer substance use. Figure 7 displays the path diagram for the substance use

model.

Table 8. *Weighted Least Squares with Mean and Variance Adjusted Estimates of Unstandardized Coefficients, Standardized Errors, and Standardized Coefficients for Substance Use Mediation Model*

Model 3: Substance Use (N=1,604)

Endogenous Factors

Predictor	Unstructured Socializing With Peers (Wave 2)	Peer Substance Use (Wave 3)	Substance Use (Wave 4)
Age	0.024	0.038	-0.026
	0.065	0.054	0.018
	0.009	0.024	-0.052
Male	0.013	-0.104	-0.045*
	0.080	0.064	0.023
	0.004	-0.052	-0.071
White	0.326***	0.106	0.006
	0.082	0.068	0.024
	0.102	0.053	0.009
Single-Parent Household	0.202*	0.072	0.035
	0.088	0.073	0.025
	0.059	0.034	0.052
Great Program	-0.114	0.009	-0.002
	0.082	0.065	0.022
	-0.035	0.004	-0.004
Low Self-Control	0.385***	0.281***	0.034
	0.067	0.055	0.019
	0.162	0.190	0.071
Gang Membership Ever	0.608*	0.393**	-0.080
	0.249	0.152	0.081
	0.096	0.099	-0.063
Gang Membership Currently	0.151	-0.461	0.119
	0.330	0.265	0.110
	0.017	-0.081	0.065
Substance Use (Wave 1)	0.330***	0.330***	0.081***
	0.060	0.044	0.019
	0.172	0.275	0.213
Parental Knowledge (Wave 1)	-0.259**	-0.100	-0.014
	0.094	0.077	0.026
	-0.081	-0.050	-0.023
Unstructured Socializing With Peers (Wave 2)	---	0.154***	0.007
		0.020	0.009
		0.246	0.035
Peer Substance Use (Wave 3)	---	---	0.136***
			0.016
			0.430

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Table 8 Continued. *Weighted Least Squares with Mean and Variance Adjusted Estimates of Unstandardized Coefficients, Standard Errors, and Standardized Coefficients for Substance Use Mediation Model*

Indirect Effects:

Parental Knowledge → Unstructured Socializing With Peers → Peer Substance Use			-0.040**
			0.015
			-0.020
			-0.073 to -0.012
Unstructured Socializing With Peers → Peer Substance Use → Substance Use			0.021***
			0.004
			0.106
			0.014 to 0.029
Parental Knowledge → Unstructured Socializing With Peers → Peer Substance Use→ Substance Use			-0.005*
			0.002
			-0.009
			-0.010 to -0.002
R²	0.126	0.293	0.360
Likelihood Ratio χ2 (df)			421.883***(111)
RMSEA			0.042
CFI			0.961
TLI			0.946

Notes: RMSEA = root mean square error of approximation; CFI = comparative fit index, TLI = Tucker-Lewis index. Estimates reported in columns in descending order:
Row 1: Unstandardized coefficient; Row 2: Standard error; Row 3: Standardized coefficient; Row 4 of Indirect Effects = 95% bootstrapped confidence intervals
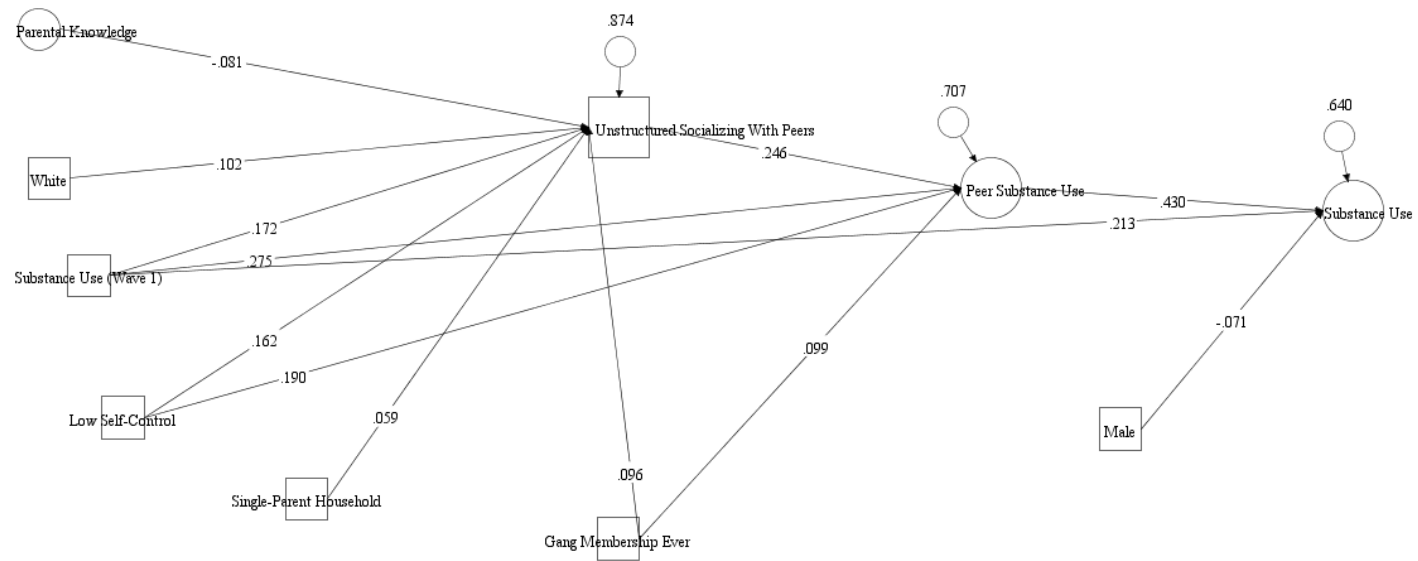*p <.05. **p <.01. ***p < .001.

Figure 7. Substance Use Mediation Model with Significant Pathways and Standardized Coefficients
(*N* = 1,604).

Study 2 (Reciprocal Effects)

Model 1, Property Delinquency

Table 9 reports the estimates for the reciprocal (cross lagged) relationships between USWP and property delinquency across three waves of data (Spring 1995/Wave 1, Fall 1995/Wave 2, and Fall 1996/Wave 3). The correlation matrix for the key variables used in the analysis of the current study is shown in Appendix B. In addition, demographics and other control variables are reported, along with model fit statistics. As recommended by Whittaker (2012), modification indices that would result in a large reduction in the χ^2, if theoretically justified, may be incorporated into a model in an iterative manner to improve fit. Thus, two indices were included into the property delinquency model. Specifically, whether the respondent had stolen something worth more than $50 at Wave 1 was allowed to correlate with this same item at Wave 2. Additionally, whether the respondent had purposely damaged or destroyed property that did not belong to him/her at Wave 1 was allowed to correlate with this same item at Wave 2. The χ^2 of Model 1, while remaining significant, was reduced from 890.580 (212) $p. < .001$ to 738.402 (210) $p. < .001$), and the RMSEA improved from .044 to .039, indicating close model fit. Similarly, the CFI improved from .897 to .920 and the TLI from .876 to .903, further confirming that model provided acceptable fit to the data. Along with several control variables assessed at Wave 1 and capturing information on whether the respondent had completed the GREAT program assessed at Wave 2, one observed variable (USWP) and one latent variable (property delinquency) were included in the model at Waves 1, 2, and 3.

Study 2, Model 1, Sequential Effects of USWP

        The model results pertaining to the sequential pathways between USWP and property delinquency are shown in Table 9, while Figure 8 depicts the path diagram. It can be seen that the subsequent influence of USWP from Wave 1 to Wave 2 and Wave 2 to Wave 3 is significant across all survey waves. Specifically, USWP at Wave 1 influences USWP at Wave 2 ($b = .409$, $p < .001$, $\beta = .410$) and USWP at Wave 2 influences USWP at Wave 3 ($b = .456$, $p < .001$, $\beta = .425$).

Study 2, Model 1, Sequential Effects of Property Delinquency

        Next, in assessing the sequential effect of property delinquency, significant associations were found across all waves; however, there is a slight downward trend in its effect. Specifically, property delinquency at Wave 1 influences property delinquency at Wave 2 ($b = .671$, $p < .001$, $\beta = .777$), which in turn influences property delinquency at Wave 3 ($b = .744$, $p < .001$, $\beta = .601$). Having established that each of these variables operates sequentially, the results providing support for the hypothesis that these variables influence one another in a reciprocal manner are discussed below.

Study 2, Model 1, Reciprocal Effects between USWP and Property Delinquency

        As can be seen from Table 9, property delinquency at Wave 1 influences USWP at Wave 2 ($b = 1.443$, $p < .001$, $\beta = .212$), and property delinquency at Wave 2 influences USWP at Wave 3 ($b = 1.110$, $p < .001$, $\beta = .131$). Contrary to Hypothesis 2, which predicted that USWP would be associated with property delinquency across all waves, no support was found for the association between USWP at Wave 1 and property offending at Wave 2.The model results however indicate that USWP at Wave 2 influences property

delinquency at Wave 3 ($b = .021$, $p < .001$, $\beta = .134$), providing partial support for what was hypothesized.

Study 2, Model 1, Controls

Effects of several control variables incorporated into the model also achieved statistical significance (see Table 9). For instance, older individuals ($b = .134$, $p < .05$, $\beta = .052$), being White ($b = .166$, $p < .05$, $\beta = .051$), living in a single-parent household ($b = .403$, $p < .001$, $\beta = .117$), having lower self-control ($b = .460$, $p < .001$, $\beta = .193$), having been in a gang ($b = .685$, $p < .001$, $\beta = .113$), and prior affiliation with peers who engage in property delinquency ($b = .302$, $p < .001$, $\beta = .135$) emerged as factors positively associated with USWP at Wave 1. In addition, model results indicated that low self-control ($b = .059$, $p < .001$, $\beta = .168$), prior gang membership ($b = .132$, $p < .001$, $\beta = .148$), current gang membership ($b = .135$, $p < .001$, $\beta = .109$), and engagement in peer property delinquency ($b = .171$, $p < .001$, $\beta = .522$) are positively associated with individual property delinquency at Wave 1. Finally, parental knowledge ($b = $ **-**$.021$, $p < .01$, $\beta = $ **-**$.067$) was negatively associated with individual property delinquency.

The R^2 values of .142 at Wave 1, .270 at Wave 2, and .237 at Wave 3 indicate respectively that 14.2%, 27.0%, and 23.7% of the variation in the observed variable of USWP is explained by the model. In addition, the R^2 value of .575 at Wave 1, .616 at Wave 2, and .436 at Wave 3 indicate in turn that 57.5%, 61.6%, and 43.6% of the variation in the latent factor of property delinquency is explained by the structural model.

Table 9. *Maximum Likelihood Estimation of Unstandardized Coefficients, Standard Errors, and Standardized Coefficients for Property Delinquency Reciprocal Effects Model*

Model 1: Property Delinquency (N=1,675)

Covariates	Unstructured Socializing With Peers (Wave 1)	Unstructured Socializing With Peers (Wave 2)	Unstructured Socializing With Peers (Wave 3)	Property Delinquency (Wave 1)	Property Delinquency (Wave 2)	Property Delinquency (Wave 3)
Age	0.134*			-0.003		
	0.062	---	---	0.008	---	---
	0.052			-0.007		
Male	-0.046			0.019		
	0.080	---	---	0.010	---	---
	-0.014			0.039		
White	0.166*			-0.008		
	0.079	---	---	0.010	---	---
	0.051			-0.016		
Single-Parent Household	0.403***			-0.018		
	0.083	---	---	0.011	---	---
	0.117			-0.035		
Great Program	-0.064			-0.015		
	0.079	---	---	0.010	---	---
	-0.019			-0.031		
Low Self-Control	0.460***			0.059***		
	0.064	---	---	0.009	---	---
	0.193			0.168		
Gang Membership Ever	0.685***			0.132***		
	0.197	---	---	0.026	---	---
	0.113			0.148		
Gang Membership Currently	0.141			0.135***		
	0.273	---	---	0.035	---	---
	0.017			0.109		
Parental Knowledge	-0.036			-0.021**		
	0.056	---	---	0.007	---	---
	-0.016			-0.067		
Peer Property Delinquency (Wave 1)	0.302***			0.171***		
	0.062	---	---	0.010	---	---
	0.135			0.522		

Table 9 Continued. *Maximum Likelihood Estimation of Unstandardized Coefficients, Standard Errors, and Standardized Coefficients for Property Delinquency Reciprocal Effects Model*

Unstructured Socializing With Peers (Wave 1)	---	0.409*** 0.025 0.410	---	---	0.003 0.003 0.023	---
Unstructured Socializing With Peers (Wave 2)	---	---	0.456*** 0.035 0.425	---	---	0.021*** 0.006 0.134
Unstructured Socializing With Peers (Wave 3)	---	---	---	---	---	---
Property Delinquency (Wave 1)	---	1.443*** 0.192 0.212	---	---	0.671*** 0.042 0.777	---
Property Delinquency (Wave 2)	---	---	1.110*** 0.314 0.131	---	---	0.744*** 0.072 0.601
Property Delinquency (Wave 3)	---	---	---	---	---	---
R^2	0.142	0.270	0.237	0.575	0.616	0.436
Likelihood Ratio χ2 (df)						738.402*** (210)
RMSEA						0.039
CFI						0.920
TLI						0.903

Notes: RMSEA = root mean square error of approximation; CFI = comparative fit index, TLI = Tucker-Lewis index. Estimates reported in columns in descending order: Row 1: Unstandardized coefficient, Row 2: Standard error of standardized coefficient, Row 3: Standardized coefficient. *p <.05. **p <.01. ***p < .001.

White

Single-Parent Household

Age

Gang Membership Ever

Peer Property Delinquency (Wave 1)

Low Self-Control

Parental Knowledge   Gang Member Currently

.858

.730

.763

Unstructured Socializing (Wave 1) —.410— Unstructured Socializing (Wave 2) —.425— Unstructured Socializing (Wave 3)

.051
.117
.052
.113
.135
.193
.148
.522
.168
-.067   .109

.142
.132
.277

.425
.384
.564

.212
.131
.134

Property Delinquency (Wave 1) —.777— Property Delinquency (Wave 2) —.601— Property Delinquency (Wave 3)
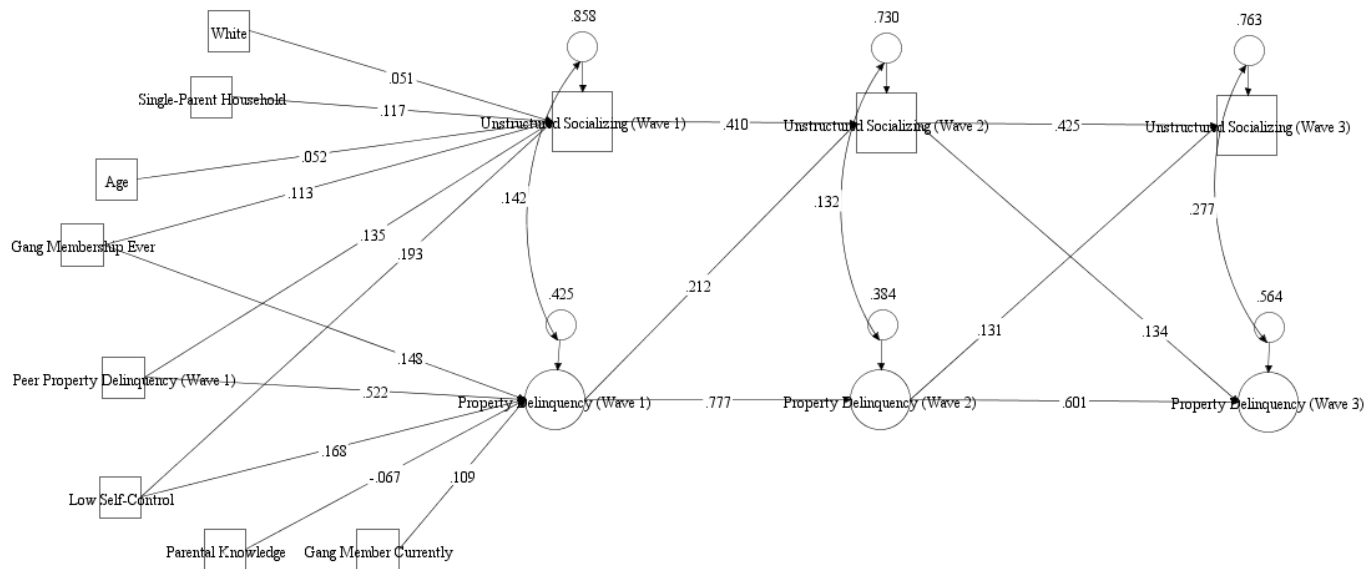
Figure 8. Property Delinquency Reciprocal Effects Model with Significant Pathways and Standardized Coefficients (N = 1,675).

Study 2, Model 2, Violent Delinquency

Table 10 reports the model estimates for the reciprocal relationship between USWP and violent delinquency across three waves and includes demographic and other control variables into the model. In order to improve model fit, five modification indices were included in an iterative manner into the violent delinquency model. First, at Wave 1, whether the respondent had attacked someone with a weapon was allowed to correlate with the item inquiring if the respondent had used a weapon or force to get money or things from people. These same items were allowed to correlate at Wave 2. Next, whether the respondent had hit someone with the intent to cause harm at Wave 1 was allowed to correlate with this same item at Wave 2. Additionally, whether the respondent had attacked someone with a weapon at Wave 1 was allowed to correlate with this same item at Wave 2. Last, at Wave 3, whether the respondent had attacked someone with a weapon was allowed to correlate with whether the respondent used a weapon or force to get money or things from people. While the χ^2 fit index of Model 2 remained significant, its value declined from 898.327 (146) $p. < .001$) to 450.024 (141) $p. < .001$), whereas the RMSEA improved from .056 to .036, indicating close model fit. In addition, both the CFI and the TLI improved, from .820 to .926, and from .771 to .903, respectively, each indicating acceptable model fit. Along with incorporating several control variables assessed at Wave 1 and capturing whether the respondent had completed the GREAT program assessed at Wave 2, the model included one observed variable (USWP) and one latent variable (violent delinquency) at Waves 1, 2, and 3.

Study 2, Model 2, Sequential Effects of USWP

The model results related to the sequential pathways between USWP and violent delinquency are reported in Table 10, and the path diagram of the violent delinquency model is shown in Figure 9, which indicate that USWP is significant across all waves. Particularly, USWP at Wave 1 influences USWP at Wave 2 ($b = .383$, $p < .001$, $\beta = .381$), and USWP at Wave 2 influences USWP at Wave 3 ($b = .426$, $p < .001$, $\beta = .396$).

Study 2, Model 2, Sequential Effects of Violent Delinquency

The sequential influence of violent delinquency is significant across all waves (see Table 10). Specifically, violent delinquency at Wave 1 influences violent delinquency at Wave 2 ($b = .720$, $p < .001$, $\beta = .758$), which in turn influences violent delinquency at Wave 3 ($b = .967$, $p < .001$, $\beta = .803$). Given that each of these variables has been shown to operate sequentially, the influence of these variables on one another in a reciprocal manner is discussed next.

Study 2, Model 2, Reciprocal Effects between USWP and Violent Delinquency

First, the results show that violent delinquency at Wave 1 influences USWP at Wave 2 ($b = 1.448$, $p < .001$, $\beta = .241$) and violent delinquency at Wave 2 influences USWP at Wave 3 ($b = 1.192$, $p < .001$, $\beta = .175$). No support was found for the influence of USWP at Wave 1 on violent delinquency at Wave 2, nor was any support found for the association between USWP at Wave 2 and violent delinquency at Wave 3. Given these findings, the results of the model run counter to Osgood et al.'s (1996) arguments, as well as Hypothesis 2. That is, the model indicates that violent delinquency predicts USWP, but USWP does not predict later violent delinquency.

Study 2, Model 2, Controls

Many control variables included in the model are positively associated with USWP at Wave 1, namely being older ($b = .146$, $p < .05$, $\beta = .057$), being White ($b = .179$, $p < .05$, $\beta = .055$), living in a single-parent household ($b = .398$, $p < .001$, $\beta = .116$), having low self-control ($b = .457$, $p < .001$, $\beta = .192$), prior gang membership ($b = .684$, $p < .001$, $\beta = .113$), and peer violent delinquency ($b = .321$, $p < .001$, $\beta = .135$). Additionally, the results revealed that males ($b = .044$, $p < .01$, $\beta = .082$), individuals with low self-control ($b = .058$, $p < .001$, $\beta = .146$), individuals who have ever been a gang member ($b = .156$, $p < .001$, $\beta = .155$), those who are currently in a gang ($b = .123$, $p < .001$, $\beta = .088$), and having violent peers ($b = .253$, $p < .001$, $\beta = .638$) are more likely to engage in violent delinquency at Wave 1. In addition, the results show that greater parental knowledge is negatively associated with violent delinquency ($b = -.021$, $p < .01$, $\beta = -.058$).

The R^2 values of .143 at Wave 1, .279 at Wave 2, and .245 at Wave 3 indicate correspondingly that 14.3%, 27.9%, and 24.5% of the variation in the observed variable of USWP is explained by the model. Further, the R^2 value of .741 at Wave 1, .583 at Wave 2, and .720 at Wave 3 respectively indicate that 74.1%, 58.3%, and 72% of the variation in the latent factor violent delinquency is explained by the structural model.

Table 10. *Maximum Likelihood Estimation of Unstandardized Coefficients, Standard Errors, and Standardized Coefficients for Violent Delinquency Reciprocal Effects Model*

Model 2: Violent Delinquency (N=1,670)

Covariates	Unstructured Socializing With Peers (Wave 1)	Unstructured Socializing With Peers (Wave 2)	Unstructured Socializing With Peers (Wave 3)	Violent Delinquency (Wave 1)	Violent Delinquency (Wave 2)	Violent Delinquency (Wave 3)
Age	0.146* 0.062 0.057	---	---	0.020 0.011 0.046	---	---
Male	-0.054 0.080 -0.017	---	---	0.044** 0.014 0.082	---	---
White	0.179* 0.079 0.055	---	---	0.020 0.014 0.036	---	---
Single-Parent Household	0.398*** 0.083 0.116	---	---	0.028 0.015 0.049	---	---
Great Program	-0.061 0.079 -0.018	---	---	-0.004 0.014 -0.007	---	---
Low Self-Control	0.457*** 0.063 0.192	---	---	0.058*** 0.011 0.146	---	---
Gang Membership Ever	0.684*** 0.196 0.113	---	---	0.156*** 0.035 0.155	---	---
Gang Membership Currently	0.143 0.272 0.017	---	---	0.123** 0.048 0.088	---	---
Parental Knowledge	-0.057 0.055 -0.026	---	---	-0.021* 0.010 -0.058	---	---
Peer Violent Delinquency (Wave 1)	0.321*** 0.064 0.135	---	---	0.253*** 0.015 0.638	---	---

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Table 10 Continued. *Maximum Likelihood Estimation of Unstandardized Coefficients, Standard Errors, and Standardized Coefficients for Violent Delinquency Reciprocal Effects Model*

Unstructured Socializing With Peers (Wave 1)	---	0.383*** 0.027 0.381	---	---	0.002 0.006 0.014	---
Unstructured Socializing With Peers (Wave 2)	---	---	0.426*** 0.038 0.396	---	---	0.019 0.011 0.098
Unstructured Socializing With Peers (Wave 3)	---	---	---	---	---	---
Violent Delinquency (Wave 1)	---	1.448*** 0.180 0.241	---	---	0.720*** 0.050 0.758	---
Violent Delinquency (Wave 2)	---	---	1.192*** 0.317 0.175	---	---	0.967*** 0.098 0.803
Violent Delinquency (Wave 3)	---	---	---	---	---	---
R^2	0.143	0.279	0.245	0.741	0.583	0.720
Likelihood Ratio χ2 (df)						450.024***(141)
RMSEA						0.036
CFI						0.926
TLI						0.903

Notes: RMSEA = root mean square error of approximation; CFI = comparative fit index, TLI = Tucker-Lewis index. Estimates reported in columns in descending order: Row 1: Unstandardized coefficient, Row 2: Standard error of standardized coefficient, Row 3: Standardized coefficient. *p <.05. **p <.01. ***p < .001.
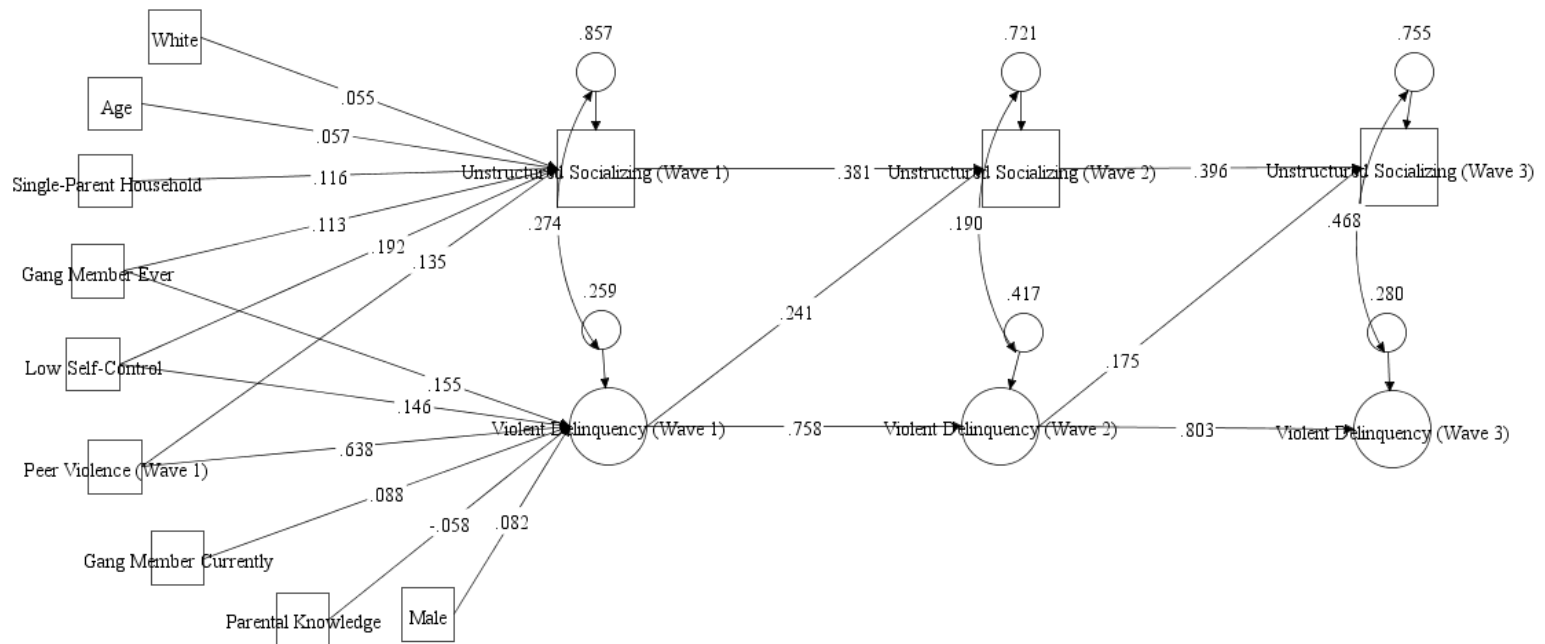
Figure 9. Violent Delinquency Reciprocal Effects Model with Significant Pathways, Standard Errors, and Standardized Coefficients (N = 1,670).

Study 2, Model 3, Substance Use

Table 11 reports the estimates for the reciprocal relationship between USWP and substance use across the three waves of data. In addition, like Models 1 and 2, the table includes the demographic and other control variables. Two modification indices were adopted in an iterative fashion to improve model fit. Specifically, at Wave 1, whether the respondent had ever used marijuana was allowed to correlate with this same item at Wave 2, and whether the respondent had ever used alcohol was allowed to correlate with this same item at Wave 2. By incorporating these modification indices into the model, the χ^2, although significant, was reduced from 1102.758 (146) *p.* < .001) to 624.067 (144) *p.* < .001), while the RMSEA improved from .063 to .045, indicating close model fit. As the CFI improved from .860 to .930 and the TLI improved from .822 to .909, acceptable model fit was confirmed. Along with adopting several control variables assessed at Wave 1 and capturing whether the respondent had completed the GREAT program assessed at Wave 2, the model incorporated one observed variable (USWP) and one latent variable (substance use) at Wave 1, 2, and 3.

Study 2, Model 3, Sequential Effects of USWP

The results pertaining to the sequential pathways between USWP and substance use reported in Table 11 and depicted in Figure 10 indicate that USWP is significant across all waves. Specifically, USWP at Wave 1 influences USWP at Wave 2 (*b* = .405, *p* < .001, β = .406) and USWP at Wave 2 influences USWP at Wave 3 (*b* = .436, *p* < .001, β = .407).

Study 2, Model 3, Sequential Effects of Substance Use

Additionally, the sequential influence of substance use is significant across all waves and as anticipated exhibits a slight downward trend. That is, substance use at Wave 1 influences substance use at Wave 2 ($b = .804$, $p < .001$, $\beta = .802$), which in turn influences substance use at Wave 3 ($b = .843$, $p < .001$, $\beta = .718$). Given that each of these variables operates sequentially, the results providing support for the hypothesis that these variables influence one another in a reciprocal manner are presented next.

Study 2, Model 3, Reciprocal Effects between USWP and Substance Use

The model results indicate that substance use at Wave 1 influences USWP at Wave 2 ($b = 1.279$, $p < .001$, $\beta = .216$) and substance use at Wave 2 influences USWP at Wave 3 ($b = 1.015$, $p < .001$, $\beta = .160$). Further, USWP at Wave 2 influences substance use at Wave 3 ($b = .025$, $p < .001$, $\beta = .127$), offering partial support for Hypothesis 2 that USWP and substance use will be reciprocally related over time as well as illustrating partial support for Osgood and colleagues' (1996) theory.

Study 2, Model 3, Controls

The model also indicated that the following control variables were significant predictors of USWP at Wave 1: being White ($b = .183$, $p < .05$, $\beta = .056$), living in a single-parent household ($b = .396$, $p < .001$, $\beta = .114$), lower self-control ($b = .447$, $p < .001$, $\beta = .186$), prior gang membership ($b = .677$, $p < .001$, $\beta = .111$), and having peers who engage in substance use ($b = .342$, $p < .001$, $\beta = .178$). The results further revealed that age ($b = .034$, $p < .001$, $\beta = .078$), lower self-control ($b = .060$, $p < .001$, $\beta = .149$), previous gang membership ($b = .097$, $p < .001$, $\beta = .094$), and peer substance use ($b = $

.233, $p < .001$, $\beta = .688$) are factors positively associated with individual substance use at Wave 1.

The R^2 values of .158 at Wave 1, .276 at Wave 2, and .243 at Wave 3 correspond to 15.8%, 27.6%, and 24.3% of the variation in the observed variable of USWP explained by the model. Further, the R^2 value of .696 at Wave 1, .668 at Wave 2, and .605 at Wave 3 indicate, in turn, that 69.6%, 66.8%, and 60.5% of the variation in the latent factor of substance use is explained by the structural model.

Table 11. *Maximum Likelihood Estimation of Unstandardized Coefficients, Standard Errors, and Standardized Coefficients for Substance Use Reciprocal Effects Model*

Model 3: Substance Use (N=1,665)

Covariates	Unstructured Socializing With Peers (Wave 1)	Unstructured Socializing With Peers (Wave 2)	Unstructured Socializing With Peers (Wave 3)	Substance Use (Wave 1)	Substance Use (Wave 2)	Substance Use (Wave 3)
Age	0.109			0.034***		
	0.062	---	---	0.009	---	---
	0.042			0.078		
Male	0.015			-0.020		
	0.079	---	---	0.011	---	---
	0.005			-0.036		
White	0.183*			-0.003		
	0.079	---	---	0.011	---	---
	0.056			-0.006		
Single-Parent Household	0.396***			-0.005		
	0.083	---	---	0.011	---	---
	0.114			-0.009		
Great Program	-0.073			-0.012		
	0.079	---	---	0.011	---	---
	-0.022			-0.022		
Low Self-Control	0.447***			0.060***		
	0.063	---	---	0.009	---	---
	0.186			0.149		
Gang Membership Ever	0.677***			0.097***		
	0.198	---	---	0.028	---	---
	0.111			0.094		
Gang Membership Currently	0.034			0.032		
	0.274	---	---	0.038	---	---
	0.004			0.022		
Parental Knowledge	-0.026			-0.014		
	0.056	---	---	0.008	---	---
	-0.012			-0.037		
Peer Substance Use (Wave 1)	0.342***			0.223***		
	0.053	---	---	0.009	---	---
	0.178			0.688		

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Table 11 Continued. *Maximum Likelihood Estimation of Unstandardized Coefficients, Standard Errors, and Standardized Coefficients for Substance Use Reciprocal Effects Model*

Unstructured Socializing With Peers (Wave 1)	---	0.405*** 0.025 0.406	---	---	0.007 0.004 0.040	---
Unstructured Socializing With Peers (Wave 2)	---	---	0.436*** 0.036 0.407	---	---	0.025*** 0.007 0.127
Unstructured Socializing With Peers (Wave 3)	---	---	---	---	---	---
Substance Use (Wave 1)	---	1.279*** 0.162 0.216	---	---	0.804*** 0.035 0.802	---
Substance Use (Wave 2)	---	---	1.015*** 0.243 0.160	---	---	0.843*** 0.057 0.718
Substance Use (Wave 3)	---	---	---	---	---	---
R^2	0.158	0.276	0.243	0.696	0.668	0.605
Likelihood Ratio χ2 (df)						624.067***(144)
RMSEA						0.045
CFI						0.930
TLI						0.909

Notes: RMSEA = root mean square error of approximation; CFI = comparative fit index, TLI = Tucker-Lewis index. Estimates reported in columns in descending order: Row 1: Unstandardized coefficient, Row 2: Standard error of standardized coefficient, Row 3: Standardized coefficient. *p <.05. **p <.01. ***p < .001.
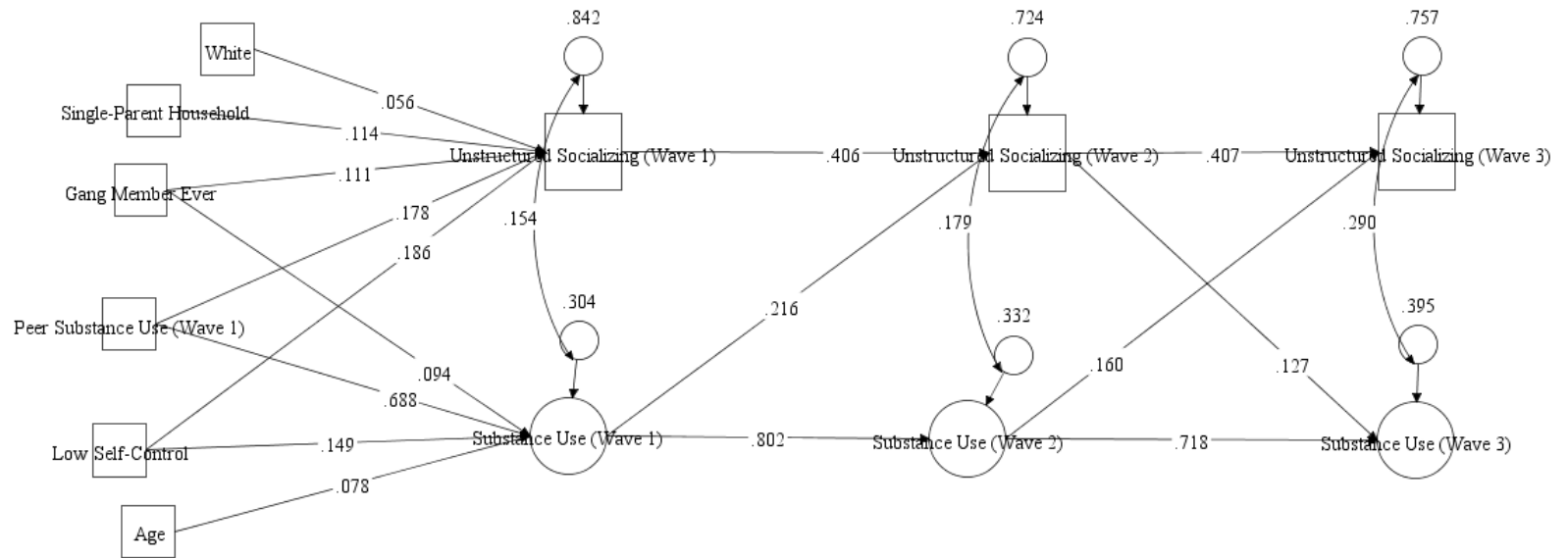
Figure 10. Substance Use Reciprocal Effects Model with Significant Pathways, Standard Errors, and Standardized Coefficients (N = 1,665)

Study 3 (Nonlinear Effects)

The model estimates related to the relationship between USWP (Wave 1) and

property delinquency (Model 1), violent delinquency (Model 2), and substance use

(Model 3), which are each measured at Wave 2, are reported in Table 12. Results for all

of the models are interpreted in terms of incidence rate ratios (IRRs). A statistically

significant IRR above 1.00 indicates a positive effect on the frequency of each measure

of antisocial behavior, and a statistically significant IRR below 1.00 indicates a negative

effect on the frequency of each measure of antisocial behavior. Table 12 reports the

results for whether USWP (Wave 1/Spring 1995) and antisocial behavior (Wave 2/Fall

1995) are nonlinear and additionally the results of many control variables across multiple

waves of data.

Study 3, Model 1, Property Delinquency Equation

As can be seen in Table 12, USWP is positively associated with property

delinquency (IRR = 1.32, $p < .001$). Additionally, although the association between

USWP and property delinquency is positive, the squared term for USWP is statistically

significant, and the IIR is less than 1.00 (IRR = .97, $p < .01$), indicating a decelerating

effect. Thus, contrary to Hypothesis 3 and past research by Gage et al. (2005), the

positive effect of USWP on property delinquency tends to become weaker rather than

accelerate at higher amounts of USWP.

Study 3, Model 1, Controls

Model 1 of Table 12 also provides results of analyses testing the influence of a

wide range of covariates on property delinquency. Specifically, males are more likely

than females to engage in property delinquency (IRR = 1.26, $p < .05$), as are individuals

with lower self-control (IRR = 1.38, $p < .001$), and those with friends who engage in property delinquency (IRR = 1.19, $p < .01$). In addition, individuals that engaged in more property delinquency at Wave 1 (IRR = 1.56, $p < .001$) are more likely to engage in property delinquency at Wave 2. Conversely, individuals who have completed the GREAT program are less likely to engage in property delinquency (IRR = .80, $p < .01$).

Study 3, Model 2, Violent Delinquency Equation

As shown in Model 2 of Table 12, USWP is positively associated with violent delinquency (IRR = 1.16, $p < .05$). Further, the IRR of 1.16 in Model 2 shows that the occurrence of violent delinquency increases by 16% for each unit increase in USWP. Additionally, the squared term for USWP was not statistically significant, lending no support for nonlinearity in the relationship between USWP and violent delinquency and that of Hypothesis 2 of the current study which predicted that the relationship between USWP and violent delinquency will be nonlinear in an accelerating manner.

Study 3, Model 2, Controls

Model 2 of Table 12 provides support for the effect of a limited number of covariates on violent delinquency and indicate a notable covariate is statistically significant in the positive direction. Particularly, individuals who have engaged in violent delinquency at Wave 1 are more likely to engage in violent delinquency at Wave 2 (IRR = 1.99, $p < .001$).

Study 3, Model 3, Substance Use Equation

As displayed in Model 3 of Table 12, USWP is positively associated with substance use (IRR = 1.23, $p < .01$). Further, the IRR of 1.23 in Model 3 shows that the occurrence of substance use increases by 23% for each unit increase in USWP. The

results reported here are similar to those seen with the property delinquency model (Model 1), which emerged regarding the squared term of USWP in the relationship of USWP on substance use. Specifically, while the association between USWP and substance use is increasing, the statistically significant squared term in the effect of USWP on substance use that is less than one (IRR $= .98$, $p < .05$) indicates a decelerating effect, lending support for Hypothesis 3 and prior research (Meldrum & Leimberg, 2018).

Study 3, Model 3, Controls

Model 3 also examines the influence of the covariates on substance use, and the results reported in Table 12 indicate that a few of these variables attained statistical significance in the positive direction. It can be seen that individuals with lower self-control are more likely to engage in substance use (IRR $= 1.27$, $p < .01$), peer substance use is positively associated with individual substance use (IRR $= 1.14$, $p < .05$), and substance use at Wave 1 is positively associated with substance use at Wave 2 (IRR $= 1.97$, $p < .001$).

Table 12. *Negative Binomial and Poisson Regressions of Unstructured Socializing on Property Delinquency, Violent Delinquency, and Substance Use*

Predictors	Model 1 Property Delinquency (Wave 2) (N= 1,404)		Model 2 Violent Delinquency (Wave 2) (N= 1,303)		Model 3 Substance Use (Wave 2) (N= 1,361)	
	IRR	SE	IRR	SE	IRR	SE
Unstructured Socializing (Wave 1)	1.32***	0.10	1.16*	0.08	1.23**	0.09
Unstructured Socializing^2 (Wave 1)	0.97**	0.01	0.98	0.01	0.98*	0.01
Covariates						
Age	1.03	0.07	0.94	0.07	1.11	0.08
Male	1.26*	0.12	1.18	0.11	0.87	0.08
White	0.84	0.08	0.94	0.09	0.88	0.08
Single-Parent Household	0.89	0.09	1.06	0.10	0.94	0.09
Great Program (Wave 2)	0.80**	0.07	0.91	0.08	0.97	0.09
Low Self-Control	1.38***	0.11	1.11	0.09	1.27**	0.10
Gang Membership Ever	1.15	0.19	1.12	0.21	1.18	0.20
Gang Membership Currently	0.84	0.19	0.85	0.21	0.85	0.20
Parental Knowledge	0.92	0.06	0.91	0.09	0.92	0.06
Peer Property Delinquency	1.19**	0.08	---	---	---	---
Peer Violent Delinquency	---	---	0.92	0.07	---	---
Peer Substance Use	---	---	---	---	1.14*	0.07
Property Delinquency (Wave 1)	1.56***	0.07	---	---	---	---
Violent Delinquency (Wave 1)	---	---	1.99***	0.13	---	---
Substance Use (Wave 1)	---	---	---	---	1.97***	0.11
Pseudo R^2	0.16		0.14		0.18	

Notes: IRR = Incidence Rate Ratio; SE = Standard Error; * p < .05; ** p < .01; *** p < .001
Negative binomial regression was used to estimate the property delinquency and substance use models while poisson regression was used to estimate the violent delinquency model.

VI.   DISCUSSION

Study 1 (Multiple Mediation)

In the present study, Osgood and colleagues' (1996) routine activity theory of general deviance served as the theoretical foundation for examining the interrelationships between parental knowledge, USWP, peer delinquency/substance use, and delinquency/substance use. Although some prior research on multiple mediating mechanisms in the context of USWP exists (Hoeben & Weerman, 2016), the present analyses advance our understanding of these processes by demonstrating that both USWP and peer delinquency/substance use mediate the relationship between parental knowledge and delinquency/substance use. In this section, the theoretical and practical implications of the findings will be discussed, along with the study limitations and recommendations for future research, before closing with concluding remarks.

Consistent with the results obtained in prior research, this study revealed that a lack of parental knowledge is positively associated with USWP (Bernburg & Thorlindsson, 2007; Osgood & Anderson, 2004; Walters, 2018). Similarly, assertions made by other researchers have found that lack of parental monitoring is associated with USWP (Janssen et al., 2014; Janssen et al., 2016). Additionally, findings reported by other authors indicate that USWP influences peer delinquency (Hoeben & Weerman, 2016; Svensson & Oberwittler, 2010) and substance use (Thorlindsson & Bernburg, 2006), while also suggesting that peer delinquency/substance use influences individual delinquency/substance use (for a review, see Hoeben et al., 2016). The current study not only adds to this emerging body of research establishing that each of these relationships operate alone, but also supports findings related to simple mediation models (i.e., one

mediating variable) in this context (Walters, 2018). Considering that Hoeben and

Weerman (2016) examined processes stemming from USWP, like peer delinquency, the

current study advances our understanding of these processes by providing evidence that

both USWP and peer delinquency/substance use mediate the relationship between

parental knowledge and delinquency/substance use in a sequential manner.

From a theoretical standpoint, this finding implies that the routine activity theory

of general deviance may need to be modified to explain a more complex set of

relationships. Specifically, results obtained in the present study indicate that USWP is not

the sole situational cause of deviant behavior as Osgood et al. (1996) postulated. In this

relationship, USWP is a mediator between the more distal factor of parental knowledge

and the end result of involvement in delinquency. Moreover, the results showed that a

lack of parental knowledge leads to greater USWP, which leads to peer delinquency and

then influences individual delinquency. Given this, USWP provides the context for a

wide variety of delinquent behaviors and exposure to delinquent peers, as previously

observed by Hoeben and Weerman (2016).

From a policy standpoint, these findings imply that parents should remain

apprised of their children's whereabouts when they socialize with friends in unstructured

and unsupervised situations to promote a positive parent to child relationship and reduce

the opportunities available for future delinquency. An ample body of evidence indicates

that after school programs, despite aiming to limit unsupervised routine activities, are

relatively ineffective at reducing delinquency (Cross, Gottfredson, Wilson, Rorie, &

Connell, 2009). Hence, individuals in charge of such programs should provide parents

with information about the importance of having knowledge of their children's

whereabouts. Consistent with the results reported by Walters (2018), the current study's findings suggest that parental knowledge does not influence delinquency directly, but rather indirectly through USWP. This information, coupled with the observation that parental knowledge indirectly influences peer delinquency through USWP, further highlights the importance of parental oversight in understanding factors that may contribute to greater USWP, which then result in associating with delinquent peers.

Study Limitations and Future Research

With these implications in mind, it is important to discuss the limitations of the present study, as this provides directions for future research. One of the main limitations stems from the reliance on the GREAT dataset and the large amount of attrition. Almost half of the participants from Wave 3 (46%) had dropped out from the study. While attrition is a common issue in longitudinal studies (Jeličić et al., 2009; Hansen et al., 1990), the use of methods that could alleviate the effects of missing data, such as full information maximum likelihood (FIML) employed in the current study, was proven beneficial. Schlomer, Bauman, and Card (2010) found that the use of FIML provided acceptable estimates of regression coefficient and standard errors across data meeting the missing completely at random (MCAR) and missing at random (MAR) assumptions. FIML has also been found to perform well with samples containing moderate percentages of missing data (e.g., 25%) that meet the not missing at random (NMAR) assumptions (Buhi, Goodson, & Neilands, 2008). Authors of future studies in this domain should thus attempt to replicate the findings yielded by the present investigation using datasets less affected by attrition to provide a more definitive answer to the research questions proposed in this examination.

A second limitation pertains to the fact that the data used in the present study is neither recent (1995-1999) nor nationally representative. While this is certainly a notable limitation, Scheuerman, Grosholz, and Thaxton (2018), Thaxton and Agnew (2018), and Walters (2019) utilized this same dataset in their analyses, demonstrating that the findings produced still hold merit today. Given this shortcoming, the aim of future research should be to replicate the results of this study by conducting surveys involving more recent and representative samples of adolescents to verify if the findings reported here are still applicable.

Next, a single-item measure of USWP measured in an hourly format, which has been used in previous research (Higgins & Jennings, 2010; Meldrum & Leimberg, 2018; Osgood & Anderson, 2004), has its benefits, such as providing a more exact measure of USWP than evenings out per week (see Gage et al., 2005). Yet, it is possible that USWP is a more complex process and relying on a single item to measure the construct does not reveal specific days of the week or times of the day when this activity occurs. Specifically, it is impossible to discern whether adolescents are spending all of the reported time in USWP over the weekend, or whether this time is spread out over multiple days of the week (e.g., Mon-Fri). To address this potential issue, it would be beneficial to replicate studies of other scholars, such as Hoeben and Weerman (2016), using space-time budget data which can provide a more fine-grained measure of when adolescents are spending time in USWP. The use of space-time budget data could also be beneficial to better understand whether the number of friends could alter the amount and type of USWP and delinquency. Specifically, greater amounts of time available in USWP and larger friendship networks would likely result in parties where substance use would

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prominently occur. Comparatively, Tillyer and Tillyer (2015) found in their examination

of co-offending and robbery that the likelihood of arrest significantly increased with

greater numbers of offenders. Taking into account these assertions, the number of friends

present during USWP could alter the type of USWP which occurs (e.g., riding around in

a car for fun, unsupervised parties) and subsequent deviant behavior.

Multiple measures of USWP may be necessary to provide a rigorous assessment

of the USWP−delinquency relationship. For instance, Weerman, Bernasco, Bruinsma,

and Pauwels (2015) found that time spent with peers was only independently related to

delinquency when two or more risk-inducing conditions were included, such as just

socializing, being in public, and being unsupervised. Moreover, the authors found that the

potential for delinquency was the greatest when all three of these conditions were met.

Hence, having a construct such as that used in the GREAT data, which captures two of

these criteria, is important to ensure item validity.

An additional limitation of this study stems from the potential for respondents to

project their own delinquency onto that of their friends (i.e., projection effects). The

traditional measure of peer delinquency often relies on respondents reporting the

behavior of their peers, which may result in ascribing their own delinquent behavior to

their friends (Davies & Kandel, 1981; Gottfredson & Hirschi, 1987, 1990; Jussim &

Osgood, 1989; Wilcox & Udry, 1986). To overcome this potential source of bias,

Coleman (1961), Reiss and Rhodes (1964) and Kandel (1978) have adopted alternative

measures requiring respondents to identify their peers, which can then be used to directly

obtain measures of peer behavior. This method is known as the "direct method" or the

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"social network method" (Aseltine, 1995; Baerveldt, Van Duijn, Vermeij, & Van Hemert, 2004; Haynie, 2001, 2002; Haynie & Osgood, 2005; Weerman & Smeenk, 2005).

Results yielded by prior empirical research indicate that the effect size of indirect measures (i.e., traditional measures wherein respondents are asked of their friends' delinquent acts) of peer behavior on respondent delinquency are substantially higher than the effect size of direct peer measures (i.e., measures which ask respondents friends' directly about their behavior) (Weerman & Smeenk, 2005). Similar results have been obtained in examinations comparing the effects of low self-control and delinquent peers on respondent delinquency (Meldrum et al., 2009). Given such findings, traditional measures of peer behavior may be overestimating effect sizes between peer and respondent delinquency. Future research would benefit from the use of data captured by the 'direct method' to elucidate if the use of direct peer delinquency measures yields a stronger effect size of USWP (on peer delinquency directly and on one's own delinquency indirectly via peer delinquency) relative to that obtained via the traditional measure of peer delinquency adopted in this study.

Next, an important issue to consider is the amount of time adolescents spend with peers engaging in unstructured socializing in digital space. For instance, Lenhart, Ling, Campbell & Purcell (2010) report that 72% of all U.S. adolescents between the ages of 12 and 17 text-message or instant-message one another. The authors further noted that in 2006 only 27% of adolescents reported text-messaging others on a daily basis, which suggests mobile messaging is on the rise. In addition, Meldrum and Clark (2013) found that virtual time spent engaging in USWP was associated with delinquency and substance use. These findings suggest that USWP may not be as spontaneous and opportunistic as

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claimed by Osgood and colleagues (1996). Specifically, the use of mobile media devices may be a mechanism for adolescents to plan deviant behavior while avoiding the supervision of authority figures. Given the notions above, accompanied with the results of the present study, which found that lack of sufficient parental knowledge leads to more USWP, parents should consider more strictly monitoring adolescents use of mobile devices.

A final limitation in the present study is common method bias (CMB), which may increase the strength in relationships among variables stemming from using self-report data to measure each of the variables in an analysis (Conway & Lance, 2010). Conway and Lance (2010) claim that CMB may be less problematic when 1) construct validity is present, 2) when there is a lack of overlap between study items, and 3) the author proactively considered CMB. In this regard, concerns over CMB might be tempered as it pertains to the current study. First, the primary measures of this dissertation have been used in previous research, which suggests construct validity is present. Second, with the exception of the variables examining former and current gang membership, which a pearson correlation test ($r = .64$) revealed moderately strong correlation between the items, the other measures appear to not overlap (without doing formal statistical testing). Third, as advocated by Podsakoff, MacKenzie, Lee, and Podsakoff (2003) study design techniques may proactively consider CMB such as "protecting respondent anonymity" (p. 888). Given the confidential design of the GREAT questionnaire (Esbensen et al., 2011), such methods helped to reduce the possibility of CMB.

Concluding Remarks

Continued attention to these underlying processes is needed to develop a more rigorous understanding of why USWP is such a strong predictor of delinquency (Osgood et al., 1996). For example, future research would benefit from a more thorough examination in the type of parenting factors that are most likely to reduce USWP. Research has probed how various parenting factors such as greater child disclosure (Stattin & Kerr, 2000) and children who have a positive relationship with their parents (Kerr and Stattin, 2000) exhibit less delinquency. Additionally, research by Janssen and colleagues (2014) found that adolescents who perceive greater parental monitoring, greater parental limit setting, and those who report a more positive relationship with their parents tend to spend less time in USWP. Considering the limitations of Janssen et al. (2014) who were only able to examine a four day time span per week of adolescent activities like USWP, further research is warranted to ascertain a more definitive answer as to what type of parenting factors are most likely to reduce USWP and what days of the week USWP is most likely to occur. Additionally, given the assertion that no parent wants their child to grow up as a delinquent, continued research on common settings that are conductive to antisocial behavior among adolescents; such as USWP, should be at the forefront of social science research. Findings yielded by such studies would ensure that the health and safety of children continues to improve, leading to a safer environment for all of society.

Study 2 (Reciprocal Effects)

Prior research investigating Osgood and colleagues' (1996) routine activity theory of general deviance indicates that USWP is a robust predictor of delinquency (for a

review, see Hoeben et al., 2016). Empirical evidence also indicates that delinquency leads to USWP (Taylor et al., 2007; Vasquez & Zimmerman, 2014). The current study advances our understanding of these associations by demonstrating that the relationship between USWP and property delinquency and that between USWP and substance use influence one another over time; however, this association does not emerge instantly. As Osgood et al. (1996) contended that the USWP-delinquency relationship is one-directional, assessing the degree to which USWP is reciprocally related to a variety of antisocial behaviors is necessary in order to establish a robust understanding of theoretical arguments put forth by these authors. Several main findings emerged from the models developed as a part of this study and are elaborated on below. Additionally, as it pertains to each of these results, the theoretical implications for Osgood and colleagues' (1996) routine activity theory of general deviance will be provided. Within this section, the practical implications of the study will also be discussed, along with the study limitations, thus providing suggestions for future research, before concluding with some final remarks.

The first finding of this study is that USWP remains relatively stable over time. For instance, in Model 1 which examined USWP and property delinquency, the standardized estimates of USWP from Wave 1 to Wave 2 was .410 and from Wave 2 to Wave 3 was .425, showing only a slight increase. The standardized estimates of property delinquency from Wave 1 to Wave 2 of .777 and Wave 2 to Wave 3 of .601; however, demonstrate a slight decline. Second, this study found that USWP is a predictor of property delinquency over time; albeit not instantly. Specifically, USWP measured at Wave 1 did not influence property delinquency at Wave 2; however, USWP measured at

Wave 2 (Fall 1995) predicted property delinquency at Wave 3 (Fall 1996). Additionally, property delinquency at Wave 1 significantly and positively predicted property delinquency at Wave 2, and the same findings emerged at Wave 3. Given, Osgood et al. (1996) argued that unstructured activities that carry no agenda are conducive to deviance. The findings yielded by the present study only partially support this assertion. Particularly, property delinquency was a significant and consistent predictor of later USWP across all three waves that were subjected to analyses in the present study. Therefore, it is apparent that both USWP and property delinquency mutually influence one another in a cross-lagged manner, but only at later time points (Wave 2 and 3). In other words, these associations are reciprocal, indicating that Osgood and colleagues' (1996) routine activity theory of general deviance should be extended to account for these complexities.

The second finding of this study examining the stability of USWP over time (Model 2), reported by the standardized estimates from Wave 1 to Wave 2 of .381 and from Wave 2 to Wave 3 of .396 demonstrate USWP remains relatively stable over time. Additionally, the standardized violent delinquency estimates from Wave 1 to Wave 2 of .758 and Wave 2 to Wave 3 of .803 offer support that violent delinquency only slightly increases over time. The next finding which offered some evidence of the reciprocal influence of USWP and violent delinquency over time is partially consistent with those captured by the property delinquency model. Like the property delinquency model, violent delinquency was found to be a positive predictor of later USWP across all survey waves, Specifically, the standardized estimate found from Wave 1 to Wave 2 was .381 and Wave 2 to Wave 3 was .396. Unlike the property delinquency model (Model 1);

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however, USWP did not predict later violent delinquency across any of the waves. Though inconsistent with the postulates of Osgood et al.'s (1996) theory, this finding is consistent with the results reported by other authors indicating that delinquents may spend greater time in USWP (Taylor et al., 2007; Vásquez & Zimmerman, 2014). Hence, in order for Osgood et al.'s (1996) theory, to retain its empirical validity, , which states USWP leads to delinquency, an extension is needed to better explain why delinquency contributes to greater USWP.

The third main finding pertains to the relationship between USWP and substance use over time (Model 3), which was very similar to findings yielded by the property delinquency model. Indeed, not only does USWP remain relatively stable over time, as the standardized estimates of USWP from Wave 1 to Wave 2 of .406 and from Wave 2 to Wave 3 of .407 offer support, substance use only slightly declines overtime which is supported by the standardized estimates from Wave 1 to Wave 2 of .802 and Wave 2 to Wave 3 of .718. In addition, substance use was found to be a consistent predictor of later USWP. Further, and similar to the results of the property delinquency model, a cross-lagged relationship was found between USWP and substance use at Waves 2 and 3. Particularly, USWP at Wave 2 (Fall 1995) predicted substance use at Wave 3 (Fall 1996) and substance use at Wave 2 (Fall 1995) predicted USWP at Wave 3 (Fall 1996). The finding that USWP leads to substance use is in accordance with Osgood et al.'s (1996) theory claiming USWP leads to substance use. Additionally, the finding that substance use predicted USWP supports prior research suggesting that drug-related delinquency (e.g., drug use and drug sales) is associated with spending more time with peers (Vásquez & Zimmerman, 2014).

Study Limitations and Future Research

While utilizing longitudinal survey data of adolescents residing in the U.S. is one of the strengths of the present study, along with using a measure of USWP that taps into all three components of the construct (e.g., unstructured and unsupervised, time with peers), and controlling for a wide variety of variables, the limitations noted earlier should be considered when interpreting the findings reported here. The main issue stems from attrition, which was addressed through FIML. As mentioned, FIML is well-suited to handle missing data, especially if it meets MCAR and MAR assumptions (Schlomer et al., 2010), and to a lesser extent MNAR data (Buhi et al., 2008). Authors of future research should therefore seek to replicate the findings of this study by conducting analyses on more recent samples of adolescents for whom more complete data are available.

An additional limitation worth noting is the rarity of antisocial behavior among the general population of adolescents and the design of the GREAT survey. Focusing on a general sample of adolescents means that engagement in serious delinquency, particularly violence, will be quite low, which can make it difficult to detect associations between such types of delinquency and predictor variables. In addition, nonuniformity exists between the waves of the current study with regard to asking respondents about their previous delinquency. For example, the Fall of 1996 (Wave 3) questionnaire asked respondents to indicate how many delinquent acts they had committed in the past 6 months. The preceding survey was administered in Fall of 1995 (Wave 2), which would suggest a 12-month reference point. Given these considerations, issues may exist as to whether some responses were missing due to lack of reference to a full year between

survey distributions. Inquiring by respondent's delinquency within the past six months is also evident in the later waves of the GREAT data, particularly, Fall 1997, 1998, and 1999. Lacking reference of a full range between time points (i.e., asking respondents about their delinquency in the past 12 months) may have resulted in low variability, which could explain the pattern of findings wherein USWP failed to predict later involvement in violent delinquency. Considering the rare nature of antisocial behavior and loss of responses from attrition of the GREAT data, which likely was a result stemming from delinquents who dropped out of the survey, statistical power was lost, which could help explain the pattern of findings of the present study. Given this, future research should use larger samples and seek to achieve greater retention in order to ensure sufficient statistical power and reduce any potential bias in study findings.

As postulated by Osgood et al. (1996) and confirmed by extensive research (Hoeben et al., 2016), USWP predicts a wide range of antisocial behaviors. Hence, it is important to elucidate why USWP was not a predictor of substance use as well as other types of delinquent behavior like property delinquency at Wave 1 and violent delinquency across all survey waves. Prior research could provide a much-needed perspective on this issue. For example, without capturing the degree to which authority figures were present when adolescents aged 9 to 12 years socialized with their friends, Wong (2005) found that the duration of time spent with peers often increases with age. Similarly, Higgins and Jennings (2010) found that USWP increases from age 12 to 16. Other researchers have found that older individuals (those aged 18 to 26 years) are likely to spend time in USWP but this decreases as individuals get older (Osgood et al., 1996).

Considering the findings yielded by the aforementioned studies, at Wave 1 of the GREAT survey, adolescents in the present study would be less likely to spend time in USWP compared to later waves that were conducted when they were older. Although adolescence appears to be the time when USWP is likely to have the greatest effect on delinquency (Higgins & Jennings, 2010), it would be beneficial to probe further into the degree to which USWP has its greatest impact in other age brackets, such as early adulthood. Prior studies have demonstrated that time spent with peers increases as the child ages (Higgins & Jennings, 2010; Wong, 2005), and this trend extends into early adulthood (Osgood et al., 1996). Thus, in future research, it would be beneficial to examine the entire period of early adolescence to adulthood. Such an investigation would help elucidate the age(s) at which USWP has the largest effect on delinquency. Based on the findings yielded by the aforementioned studies, it would seem that 9 to 18-year-olds are most prone to delinquency if allowed to spend time in USWP; however, further research is still needed. Such a study would be useful to better understand why USWP leads to anti-social behavior, but only at certain time points.

Additionally, Study 1 found that USWP indirectly influences delinquency through peer delinquency, (see also, Hoeben and Weerman, 2016). Thus, it is possible that peer delinquency may be a more immediate predictor of delinquency than USWP. Given this consideration, future research could provide a more definitive answer as to why USWP did not predict delinquency from all Waves of the GREAT data. Specifically, a reciprocal examination of USWP, peer delinquency, and individual delinquency would be useful to not only better understand the multifaceted ways in which USWP leads to delinquency, but would also help to provide a more definitive answer as to why USWP was not a

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predictor of delinquency across all waves of the current study. Therefore, it is possible that USWP is running through peer delinquency to then lead to delinquency; however, further examination is still warranted.

From a policy standpoint, these findings suggest that individuals who are already involved in delinquency should be more closely monitored. Vasquez and Zimmerman (2014) found that delinquents spend more time with their peers than is average for adolescents. Thus, it is likely that adolescent offenders may spend more time in unstructured and unsupervised situations with peers than those not already involved in delinquency. Further, offender release efforts that incorporate family management and parent effectiveness training can be beneficial for younger adolescents, increasing the likelihood that they would reenter society as law abiding citizens (Altschuler & Brash, 2004) and perhaps be less likely to increase involvement in USWP.

Concluding Remarks

In sum, the findings yielded by the current examination suggest that, although Osgood and colleagues' (1996) routine activity theory of general deviance and its' arguments concerning the USWP−delinquency relationship are partially supported, it cannot fully elucidate why delinquents may end up spending more time in USWP in the future. Continued research efforts should thus be dedicated to this issue, with potential revisions to Osgood et al.'s (1996) theory that could explain why involvement in delinquency might cause an increase in USWP.

Study 3 (Nonlinear Effects)

The current study adds to the emerging body of research examining Osgood and colleagues' (1996) theory of USWP by assessing the extent to which USWP influences a

variety of antisocial behaviors in a nonlinear manner. Although the nonlinearity aspect has received some attention (Gage et al., 2005; Meldrum & Leimburg, 2018), the current study advances our understanding of these processes by demonstrating that the relationship between USWP and both property delinquency and substance use is nonlinear. In the following paragraphs, the findings obtained as a part of this study are outlined, along with their theoretical and practical implications. Thereafter, the key study limitations are delineated, along with directions for future research. The section ends with and concluding remarks.

While controlling for a wide variety of covariates, such as self-control, parental knowledge, peer delinquency, and prior delinquency among others, this study has yielded findings consistent with those reported by other authors suggesting that USWP is associated with property delinquency (Bernburg & Thorlindsson, 2001) and violent delinquency (Gage et al., 2005; Maimon & Browning, 2010). Similarly, the link between USWP and substance use established in this work supports the conclusions reached in past research on this topic (Barnes et al., 2007; Green & Banerjee, 2009; Hawdon, 1996; Meldrum & Leimburg, 2018; Miller, 2013). These findings add to the emerging literature indicating that USWP is a robust predictor of a wide variety of delinquent acts (for a review, see Hoeben et al., 2016).

Next, the relationship between USWP and property delinquency, and that between USWP and substance use, was found to be nonlinear in a decelerating manner. These findings mirror those reported by Meldrum and Leimberg (2018), who examined a sample of adolescents establishing that while the effect of USWP on the frequency of drinking, marijuana use, and a variety index of substances including cigarette, e-cigarette,

drinking, and marijuana use is positive, the effect is a decelerating one. However, Gage et al. (2005) offered evidence that the relationship between USWP and deviance may be nonlinear in an accelerating manner. Specifically, whereas children who spent two to four evenings out with friends per week were only slightly more likely to engage in occasional or frequent involvement in problem behaviors compared to students that rarely go out with friends, students who reported spending five to seven evenings out per week were significantly more likely to engage in problem behaviors.

Given that the relationship between USWP and property delinquency/substance use is nonlinear in a decelerating manner, it is reasonable to assume that a tipping point may exist, whereby adolescents do not desire to be involved in delinquency or substance use all of the time. In addition, only so much drug use can occur before parents become aware of such behavior among their children. Given these assertions, adolescents involved in USWP may be spending time doing other things rather than continuing to use drugs. Future research should continue to probe this finding by examining other forms of illicit behaviors that have been associated with USWP, such as vandalism (Hoeben & Weerman, 2016).

As a further point, the relationship between USWP and violent delinquency was supported in this study, albeit without any evidence of its nonlinearity. Given that Osgood and colleagues (1996) state "being accompanied by friends reduces the danger in challenging a rival to a fight" (p. 639), it is plausible that individuals spending greater amounts of time in USWP may actually be those who are most shielded from violent delinquency, due to the protection offered from fellow group members. This notion has been supported in the gang literature, wherein being part of a gang protects members

from general violent victimization but not serious violent victimization (Taylor et al., 2007). Therefore, it would be beneficial to explore whether this association holds across other samples involving adolescents or individuals entering early adulthood, which would help develop a firmer understanding of whether these associations are nonlinear.

Considering results yielded by the model indicated that the relationship between USWP and property delinquency is decelerating, this counters Hypothesis 3 postulating an accelerating association. With attention to this assertion, it is logical that property delinquency would require more effort by the offender to carry out than consuming an alcoholic beverage, lighting up a cigarette, or using marijuana (Meldrum & Leimburg, 2018). Despite the findings in the reciprocal examination of USWP and antisocial behavior (Study 2) of this dissertation, which found that although USWP does lead to delinquency, this may not occur instantly. Osgood et al.'s (1996) theory, nonetheless, continues to provide a valid explanation as to why spending time in unsupervised and unstructured settings with friends is so conducive to adolescent deviance.

Study Limitations and Future Research

Despite the strengths of the current study, namely the use of a longitudinal sample necessary to determine proper causal ordering, a measure of USWP that taps into all three elements of the construct, and a wide variety of control variables, it also has limitations which merit discussion. First, the data is not as recent as one would like (1995-1999). Still, several authors have conducted recent studies utilizing the same dataset (Scheuerman et al., 2018; Thaxton & Agnew, 2018; Walters, 2019), suggesting that the findings yielded still have merit. Next, although USWP was captured via a single questionnaire item, which prompted respondents to report the number of hours they

spend in USWP during an average week, (see also Higgins & Jennings, 2010; Meldrum

& Leimburg, 2018; Osgood & Anderson, 2004), the reliability of this item cannot be

assessed. Clearly, it would be more informative to measure USWP by asking respondents

to indicate the specific number of hours and specific times of day they typically engage in

USWP, as is common when gathering space-time budget data (Hoeben & Weerman,

2016). Considering that respondents may be spending all of their time in USWP over the

weekend or spending a couple hours after school during the week in USWP, having this

information would be useful for future research to distinguish more fine-grained time

points at which USWP is taking place. Parents would also benefit from such a study in

order to better understand when their children need to be more closely monitored to

prevent delinquency.

Past research conducted by Gage et al. (2005) found that the relationship between

USWP and delinquency may be nonlinear in an accelerating manner. Comparatively,

other research by Meldrum and Leimburg (2018) found that the relationship between

USWP and substance use may be nonlinear albeit decelerating, which was also confirmed

by the results of the current study for the property delinquency and substance use models.

Considering the rapidly expanding use of media devices, like smart phones among

adolescents (Lenhart et al., 2010), this could be a possible explanation as to why the

results of this study offered evidence of decelerating associations. Specifically, the use of

media devices allows greater planning to occur than what typically would happen during

the timeframe of Osgood and colleagues (1996) study. Therefore, adolescents may be

planning deviant activities in unsupervised and unstructured time spent with friends

through means of virtual communication.

Although a common approach in dealing with missing data (Kang, 2013), an additional study limitation worth noting is the use of listwise deletion. Considering the initially large sample size offered by the GREAT data of almost 3,000 respondents, which would offer sufficient power for the present analysis, this was reduced by more than half through the use of listwise deletion. Further, preliminary analysis of the data revealed that it does not meet the assumptions of MCAR necessary for listwise deletion, thus, parameter bias may be present (Kang, 2013). Future studies should consider the use of software packages which can assess nonlinearity with strategies to regain missing data like FIML or multiple imputation. Such a study would be useful to determine if the results offered in the present analysis sill hold across alternative strategies for dealing with attrition and missing data.

Concluding Remarks

In conclusion, the current study adds to the USWP literature by demonstrating that the relationship between USWP and property delinquency/substance use is nonlinear. This study also highlights the need for a better understanding of the USWP/delinquency relationship, with the ultimate aim of reducing delinquency. Specifically, although the current study advances our understanding of the nonlinear effects of USWP on delinquency/substance use, the varied ways this relationship may be nonlinear with respect to males or females and gang or non-gang members remains unexplored. By gaining a more comprehensive explanation of the varied ways USWP influences delinquency, a more robust understanding of Osgood and colleagues' (1996) theory of USWP can be found.

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APPENDICES

Appendix A. Weighted Least Squares With Mean and Variance Adjusted Estimates of Correlations for Mediation Measurement Models

Model 1 Property Delinquency (N = 1,616)	Parental Knowledge (Wave 1)	Unstructured Socializing With Peers (Wave 2)	Peer Property Delinquency (Wave 3)	Property Delinquency (Wave 4)
Parental Knowledge (Wave 1)	1.000***	---	---	---
Unstructured Socializing With Peers (Wave 2)	-0.083**	1.000***	0.312***	0.246***
Peer Property Delinquency (Wave 3)	-0.029	---	1.000***	---
Property Delinquency (Wave 4)	-0.108**	---	0.473***	1.000***

Model 2 Violent Delinquency (N = 1,610)	Parental Knowledge (Wave 1)	Unstructured Socializing With Peers (Wave 2)	Peer Violent Delinquency (Wave 3)	Violent Delinquency (Wave 4)
Parental Knowledge (Wave 1)	1.000***	---	---	---
Unstructured Socializing With Peers (Wave 2)	-0.095***	1.000***	0.320***	0.249***
Peer Violent Delinquency (Wave 3)	-0.041	---	1.000***	---
Violent Delinquency (Wave 4)	-0.110**	---	0.418***	1.000***

Model 3 Substance Use (N = 1,604)	Parental Knowledge (Wave 1)	Unstructured Socializing With Peers (Wave 2)	Peer Substance Use (Wave 3)	Substance Use (Wave 4)
Parental Knowledge (Wave 1)	1.000***	---	---	---
Unstructured Socializing With Peers (Wave 2)	-0.081**	1.000***	0.380***	0.268***
Peer Substance Use (Wave 3)	-0.070	---	1.000***	---
Substance Use (Wave 4)	-0.056	---	0.548***	1.000***

Notes: *p <.05. **p <.01. ***p < .001.

Appendix B. Weighted Least Squares With Mean and Variance Adjusted Estimates of Correlations for Reciprocal Effects Measurement Models

Model 1 Property Delinquency (N = 1,671)	Unstructured Socializing With Peers (Wave 1)	Unstructured Socializing With Peers (Wave 2)	Unstructured Socializing With Peers (Wave 3)	Property Delinquency (Wave 1)	Property Delinquency (Wave 2)	Property Delinquency (Wave 3)
Unstructured Socializing With Peers (Wave 1)	1.00***	0.434***	---	---	---	0.102***
Unstructured Socializing With Peers (Wave 2)	---	1.00***	---	---	---	0.235***
Unstructured Socializing With Peers (Wave 3)	0.156***	0.360***	1.00***	---	---	0.292***
Property Delinquency (Wave 1)	0.135***	0.221***	0.060***	1.00***	---	0.067***
Property Delinquency (Wave 2)	0.077**	0.163***	0.011	0.437***	1.00***	0.074*
Property Delinquency (Wave 3)	---	---	---	---	---	1.00***

Model 1 Violent Delinquency (N = 1,667)	Unstructured Socializing With Peers (Wave 1)	Unstructured Socializing With Peers (Wave 2)	Unstructured Socializing With Peers (Wave 3)	Violent Delinquency (Wave 1)	Violent Delinquency (Wave 2)	Violent Delinquency (Wave 3)
Unstructured Socializing With Peers (Wave 1)	1.00***	---	---	---	---	---
Unstructured Socializing With Peers (Wave 2)	0.435***	1.00***	0.365***	---	---	---
Unstructured Socializing With Peers (Wave 3)	0.158***	---	1.00***	---	---	---
Violent Delinquency (Wave 1)	0.155***	0.162***	0.043***	1.00***	---	---
Violent Delinquency (Wave 2)	0.108***	0.199***	0.018	0.315***	1.00***	---
Violent Delinquency (Wave 3)	0.115***	0.250***	0.182***	0.121***	0.322***	1.00***

Model 3 Substance Use (N = 1,665)	Unstructured Socializing With Peers (Wave 1)	Unstructured Socializing With Peers (Wave 2)	Unstructured Socializing With Peers (Wave 3)	Substance Use (Wave 1)	Substance Use (Wave 2)	Substance Use (Wave 3)
Unstructured Socializing With Peers (Wave 1)	1.00***	0.443***	---	0.208***	---	0.126***
Unstructured Socializing With Peers (Wave 2)	---	1.00***	---	0.187***	---	0.253***
Unstructured Socializing With Peers (Wave 3)	0.159***	0.364***	1.00***	0.044	---	0.245***
Substance Use (Wave 1)	---	---	---	1.00***	---	---
Substance Use (Wave 2)	0.129***	0.202***	0.037	0.665***	1.00***	0.403***
Substance Use (Wave 3)	---	---	---	0.277***	---	1.00***

Notes: *p <.05. **p <.01. ***p < .001.

VITA

ROBERT JOSEPH. LEE ARCHER

2007 – 2012	Bachelor of Arts, Criminal Justice Florida Atlantic University Boca Raton, Florida
2012 – 2014	Masters of Science, Criminology and Criminal Justice Florida Atlantic University Boca Raton, Florida
2015 – 2020	Ph.D., International Crime and Justice Florida International University Miami, Florida

SELECTED PUBLICATIONS AND PRESENTATIONS

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"Sexual Assault Victimization, Fear of Crime, and Self-Protective Behaviors: A Test of General Strain Theory," presented at the annual meeting of the *American Society of Criminology* (Philadelphia, 2017).

"Examining the Relationship Between Fear of Crime, Self-Protective Behaviors, and Situational Crime Prevention among College Students," presented at the annual meeting of the *Academy of Criminal Justice Sciences* (Orlando, 2014).