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Unraveling the Temporal Aspects of Victimization: The Reciprocal, Additive, and Cumulative Effects of Direct/Vicarious Victimization on Crime

Yeoju Park

UNRAVELING THE TEMPORAL ASPECTS OF VICTIMIZATION: THE
RECIPROCAL, ADDITIVE, AND CUMULATIVE EFFECTS OF
DIRECT/VICARIOUS VICTIMIZATION ON CRIME

by

Yeoju Park

Bachelor of Arts
Dong-Eui University, Busan, South Korea, 2006

Master of Science
Georgia State University, 2015

Submitted in Partial Fulfillment of the Requirements

For the Degree of Doctor of Philosophy in

Criminology and Criminal Justice

College of Arts and Science

University of South Carolina

2020

Accepted by:

Christi S. Metcalfe, Major Professor

Robert B. Brame, Committee Member

Deena Isom-Scott, Committee Member

Ronald Pitner, Committee Member

Cheryl L. Addy, Vice Provost and Dean of the Graduate School

www.manaraa.com

ACKNOWLEDGEMENTS

I would like to express my deep appreciation to the members of my dissertation committee for agreeing to serve on the committee and providing their guidance, feedback, and advice throughout this project. First, I would like to express my deepest gratitude to Dr. Christi Metcalfe, the Chair of this project, for her continued support, guidance with attention, and profound wisdom, and care through this long process. I am truly honored to have worked with her throughout the program since she led me to the right ways throughout the project as well as inspired me with great confidence for the research. I would also like to acknowledge and thank Dr. Robert Brame for providing his knowledge, comments, and insight on the methodological parts of the paper. I would like to extend my appreciation to Dr. Deena Isom-Scott for her detailed comments and suggestions on improving the theoretical parts and discussion of the paper as well as her words of encouragement. Lastly, I thank Dr. Ronald Pitner for serving as the external member and taking the time to provide guidance and useful advice throughout this process.

ABSTRACT

The current study aims to assess the continuous impact of direct/vicarious victimization on subsequent victimization and delinquency/crime across waves using an incorporated model of Agnew's general strain theory and the lifestyle/routine activities perspective. This study also aims to assess the additive and cumulative impact of dual victimization (i.e., exposure to direct and vicarious victimization) on offending. A cross-lagged model is conducted to examine the impacts of direct victimization, vicarious victimization, and delinquency/crime at an early point in time on these variables at later points in time using three waves from the Pathways to Desistance Study. Negative binomial regression models and fractional probit models are conducted to examine the influence of dual victimization and chronic/repeat dual victimization on delinquency/crime. Chronic/repeat dual victimization captures the number of prior waves of exposure to dual victimization. Results reveal that prior vicarious victimization is positively related to subsequent delinquency/crime, while the lagged impact of direct victimization on delinquency/crime is limited. There is a positive influence of dual victimization on delinquency/crime. A harmful effect of chronic dual victimization is also found, although this impact is less significant at four or more prior waves of exposure to dual victimization. While there is support for many of the propositions of GST, there are some inconsistencies regarding the propositions of lifestyle/routine activities perspective. The findings suggest the need for further assessments of the temporal patterns of strain,

as well as further consideration of the contemporaneous versus lagged effects of

victimization and crime/delinquency.

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CHAPTER 1

INTRODUCTION

Victimization research reveals that a great number of juveniles experience criminal victimization during their childhood and adolescence (e.g., Becker & Kerig, 2011; Copeland, Keeler, Angold, & Costello, 2007). It is also noted that criminal victimization is diverse, both in the ways it is experienced (i.e., direct and vicarious victimization) and its context (e.g., within a family, school, and community). These adverse events include physical violence and child maltreatment (Dixon Howie, & Franzcp, 2005; Ruchkin, Schwab-stone, Koposov, Vermeiren, & Steiner 2002; Wood, Foy, Layne, Pynoos, & James, 2002), witnessing violence at home or in the community (Graham-Bermann, Castor, Miller, & Howell, 2012; Hawke, Ford, Kaminer, & Burke, 2009; Moretti et al., 2006), and peer bullying (Park & Metcalfe, 2020).

More importantly, the changing nature of criminal victimization bears significance. The stability of victimization (i.e., the cumulative effect) and co-occurrence of different forms of victimization (i.e., the additive effect) are often detected in the real lives of juveniles. Stated differently, chronic/repeat victimization and dual victimization (i.e., experiencing both direct and vicarious victimization) seem to be common among juveniles, rather than just experiencing a single form of criminal victimization at one point in time (e.g., Capaldi, Kim, & Pears, 2009; Kilpatrick et al., 2000). For example, approximately 40 percent of youths reported recurrent violence exposure over the three years (Margolin et al., 2009). Also, about 50 percent of juveniles reported an overlap in

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the types of victimization (Finkelhor, Shattuck, Turner, Ormrod, & Hamby, 2011). The opportunities for suffering the cumulative and additive impacts of victimization are even greater among juveniles involved in the juvenile justice system, indicating an overlap between victimization and delinquency (e.g., Ford, Cruise, Grasso, & Holloway, 2018).

Studies show that an individual's risk of future offending is related to their prior victimization (Agnew, Brezina, Wright, & Cullen, 2002). Victimized individuals often take some form of "corrective action" in response (Agnew, 1992). Deviant behavior is one method of "corrective action" that is often used among strained juveniles with negative emotionality and low constraint, because delinquency can help these individuals alleviate their strain and negative emotions, especially when they lack legitimate ways of corrective action (Agnew, 1992, p. 60; Agnew & White, 1992). The association between victimization and offending can be stronger when direct and vicarious victimization occurs simultaneously (Lin, Cochran, & Mieczkowski, 2011), and when victimization repeatedly occurs over time (Ousey, Wilcox, & Brummel, 2008). A more significant link between past victimization and subsequent delinquency is expected among juveniles who are exposed to two or more types of victimization that are persistent across time (Slocum, Simpson, & Smith, 2005).

Studies also show that an individual's risk of future victimization is related to their prior participation in risky/deviant lifestyles (Cohen & Felson, 1979; Peterson, Taylor, & Esbensen, 2004). As individuals become involved in risky/deviant lifestyles, potential victims become closer to offenders. The physical proximity between potential victims and offenders can make these potential victims an attractive target and facilitate a criminal incident (Tillyer, Fisher, & Wilcox, 2011). The likelihood of being victimized

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will be much higher for juveniles who are involved in unstructured/unsupervised social activities, such as gang activities (Osgood, Wilson, O'Malley, Bachman, & Johnston, 1996).

This intersection between victimization and delinquency, often termed the victim-offender overlap, has been explained by several criminological theories. As alluded to above, Agnew's general strain theory (GST) has been employed to account for the positive effect of past victimization on future offending. Alternatively, lifestyle/routine activities theory posits the reverse causal pathway by focusing on the impact of past offending on future victimization and the similarities between victims and offenders (Hindelang, Gottfredson, & Garofalo, 1978).

1.1 Statement of the Problem

Although prior research has found evidence that supports the propositions of GST and lifestyle/routine activities theories in relation to the victimization-offending link, there are several notable limitations and areas for expansion in the current literature. First, regarding the reciprocal relationship between victimization and offending, an integrated model is required that can simultaneously capture the influence of victimization on offending and the impact of offending on future victimization.[1] Studies using GST's framework offer some support for the impact of victimization on delinquent coping (e.g., Baron, 2009). However, this model has often not been able to describe the likelihood of victimization derived from past deviant behavior. Similarly, most studies of the lifestyle/routine activities perspective have been confined to explaining the initiation

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[1] A reciprocal relationship describes variables that are the same on both sides or have similar impacts to each other.

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of criminal victimization as a result of involvement in risky lifestyles, as opposed to the alternative (e.g., Cohen & Cantor, 1981). Therefore, empirical applications of GST and lifestyle/routine activities theory, respectively, have mostly been limited to explaining one direction of the victimization and offending pathway, rather than depicting both causal pathways (except for Iratzoqui, 2018).

Second, and related to the previous point, is the argument that the reciprocal relationship between victimization and delinquency is still ambiguous. Many prior studies rely on a model in which victimization and delinquency are measured at two different points of time. Specifically, scholars recognize the impact of victimization at time 1 on delinquency at time 2, and delinquency at time 1 on victimization at time 2. Despite the supportive evidence for GST and the lifestyle/routine activities perspective, these models often fail to unravel whether the likelihood of being victimized results from prior involvement in risky/deviant lifestyles that stemmed initially from prior exposure to violence. Data from more than two time points would be required to consider this possibility. To date, limited research has employed a continuous and prospective model by exploring victimization and delinquency at more than two time points (e.g., Iratzoqui, 2018; Schreck et al., 2006).

Third, prior victimization studies do not typically account for the influence of both direct and vicarious victimization when considering reciprocal relationships. Agnew (2002) suggests that both forms of victimization influence subsequent offending, but they are also interrelated with each other. Experiencing one type of criminal victimization increases the chances of experiencing and responding to the other form of victimization, resulting in a greater risk of delinquency (e.g., Finkelhor, Ormrod, & Turner, 2007c).

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Even though Agnew (2002) did not suggest that the effect of direct victimization would be stronger than that of vicarious victimization or vice-versa, prior studies in this area have typically focused on which type of victimization is more likely to result in delinquency (e.g., Agnew & White, 1992; Lee & Kim, 2018; Reid, 2011). Alternatively, an examination of how direct and vicarious victimization interplay with each other to influence criminal coping can provide a better understanding of the nexus between victimization and offending.

Fourth, despite the increasing knowledge regarding the dynamic nature of victimization, little attention has been given to those exposed to violence across time and in multiple forms (e.g., Agnew & White, 1992; Lee & Kim, 2018; Reid, 2011; except for Eitle & Turner, 2002; Spohn & Wood, 2014). Specifically, two dimensions of victimization, its stability and co-occurrence, have been explored in prior research but typically as separate elements. Findings from these studies indicate that past victimization is positively and significantly related to subsequent victimization, and one type of victimization experience can increase one's victimization experiences across different types and contexts (e.g., Finkelhor et al., 2007c).

However, individuals who face both dimensions of victimization simultaneously (i.e., direct and vicarious) have received relatively little attention, though they often use delinquent means of coping. Research on this subject is critical because the compounded harmful effect is expected when the cumulative and additive effect become intertwined, which can amplify the response in comparison to a single effect. Thus, dual victimization— the additive effect—and repeated dual victimization—the cumulative effect—should be considered in explaining the impact of victimization on deviant coping.

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Considering the limitations described, there is a need for research that further elaborates the victimization–offending relationship in terms of its reciprocal, dual, and repetitive nature. Focusing on its reciprocal nature, an integrated model of two theoretical perspectives—GST and lifestyle/routine activities—can be used to explore the continuous impact of direct/vicarious victimization on subsequent direct/vicarious victimization, as well as risky/deviant lifestyles that may offer opportunities for further victimization. Within this model, both the direct and indirect effects of direct/vicarious victimization on delinquency can be examined. By including more than two time points, this model can also identify the possible link between delinquency and direct/vicarious victimization at a later point. Moreover, the dual and repetitive nature of victimization (or the additive and cumulative effect) should be considered further since more juveniles tend to encounter these situations in their everyday lives. In this context, a model that can explore the effect of dual victimization and repeated dual victimization on subsequent offending seems warranted.

1.2 Purpose and Significance of the Study

The purpose of the current study is two-fold. First, this study aims to extend the theoretical and empirical literature by integrating GST and the lifestyle/routine activities perspective to depict the non-recursive relationship between victimization and delinquency.[2] An integration of these theories can help explain the complicated link between direct victimization, vicarious victimization, and delinquent coping. More specifically, the continuous and prospective model used by Iratzoqui (2018) and Schreck

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[2] A non-recursive relationship demonstrates a bidirectional association between two variables, while a recursive relationship demonstrates a unidirectional association (see Ousey, Wilcox, & Fisher, 2011).

et al. (2006) will be employed. As an additional component to these studies, though, the interplay between direct and vicarious victimization will be considered.

Second, this study aims to test the compounded effect of victimization by considering situations in which the additive and cumulative effect become interwoven. Using data from a high-risk sample of delinquent juveniles (Pathways to Desistance study), these two dimensions of victimization will be concurrently considered to account for the impact of dual victimization on later offending, as well as the consequences of a history of dual victimization. The latter considers the temporal aspects of victimization. Individuals who have experienced chronic dual victimization may be more inclined to use criminal coping (e.g., Slocum et al., 2005).

Focusing on the reciprocal effects between victimization and offending, this study will (1) examine whether individuals who report direct and/or vicarious victimization at one point in time have an increased likelihood of committing crimes at a subsequent point in time (direct effects), (2) examine whether individuals who report direct (or vicarious) victimization at one point in time have an increased likelihood of committing crimes via vicarious (or direct) victimization at a subsequent point in time (indirect effects), and (3) examine whether the likelihood of direct/vicarious victimization derives from prior delinquent behaviors, as well as past direct and/or vicarious victimization (reciprocal effects). Turning to the additive and cumulative effects of victimization, this study will (1) determine whether experiencing dual victimization (i.e., experiencing both direct and vicarious victimization) is relevant to a later increase in delinquency, and (2) examine whether the temporal aspects of this victimization (i.e., the repetition of dual victimization over time) are also relevant to an increase in later delinquency.

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The results of the current study will be useful as a means of extending the theoretical perspectives of contemporary criminology. Although research using the theoretical frameworks of GST and lifestyles/routine activities has generally been supportive of the distinct causal pathways noted, the application of an incorporated model can better explore the total relationship between victimization and delinquency. This study can also be useful in understanding how different types of criminal victimization are interrelated with each other to affect risky/deviant lifestyles, and how this affects the likelihood of subsequent victimization. In addition, a comprehensive look at dual victimization, and its repetition over time, can improve our knowledge of the effects of chronic strains. Beyond the separate attention of the additive and cumulative effect of victimization, the compounded effect–the combination of these two effects–can be explored, which can vary depending on the stability and chances of the comorbidity of victimization.

This study focuses on a high-risk sample from the Pathways to Desistance data who have a high prevalence for both direct and vicarious victimization experiences and who have been involved in past criminal and delinquent behaviors. The use of a high-risk sample will assure that the variables of interest have variability across respondents, with many samples having low prevalence of victimization and offending. In this sense, this study can offer an improved explanation of the complex relationships between victimization and delinquency, including between-individual differences and within-individual changes.

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1.3 Dissertation Overview

The dissertation comprises six chapters, including the introduction. Chapter 2 will discuss the theoretical background and frameworks of GST and lifestyles/routine activities theories. Chapter 3 will include a discussion of empirical studies focused on the association between victimization and delinquency. Chapter 4 will present research questions based on the theoretical propositions noted and describe the sample and dataset that will be used to examine these research questions. This discussion also includes an explanation of the analytical procedures that will be used to answer the research questions. Chapter 5 will describe the results and the major research findings of the various analyses. In Chapter 6, a review of the main findings, and a discussion regarding the significance of the findings will be presented. This discussion will also include the limitations of the study and suggestions for future research.

CHAPTER 2

THEORETICAL FRAMEWORK

This chapter provides a discussion of the extant literature and theoretical foundation employed to answer the research questions. Agnew (1992) introduced general strain theory (GST) to explain how strain, which may derive from negative relationships with other people or from stressful life events, increases an individual's risk of engaging in delinquent behavior. Lifestyle/routine activities theories proffer an equally possible but divergent perspective of the victim-offender overlap by explaining how offending increases an individual's risk of being victimized. The current study attempts to explore a combined model using these two theoretical perspectives in order to examine the reciprocal relationship between victimization and delinquent behaviors and to better understand the nature of victimization. First, there is a discussion of the origins of GST, which includes an explanation of anomie as described by Durkheim (1951 [1897]) and the early strain theories developed by Merton (1938), Cohen (1955), and Cloward and Ohlin (1960). This discussion is followed by an overview of general strain theory, as well as the developmental and temporal aspects of strain, which will be considered, in part, in this dissertation. Next, a discussion of the various forms of victimization recognized by GST are presented. Particular attention is paid to direct and vicarious victimization, as well as dual victimization, since they are the focus of the current study. Finally, the causal impact of delinquency on subsequent victimization suggested by lifestyle/routine activities theories is discussed.

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2.1 The Impact of Victimization on Offending Using General Strain Theory

2.1.1 The Origins of General Strain Theory

2.1.1.1 Durkheim's Anomie Theory. Durkheim (1951[1897]) explained that human beings continue to look for satisfaction as a means of fulfilling unlimited desires and needs, such that once their current needs are fulfilled, people consistently pursue additional needs to obtain greater satisfaction. To Durkheim (1951[1897]), people need to be controlled by restrictions external to them (i.e., society) due to a lack of an internalized system to control unlimited desire. That is, unattainable desires and impulses of human beings for greater satisfaction are ultimately controlled and restricted by the larger society through rules and regulations.

Based on his observations of the social upheaval caused by the Industrial Revolution in European countries and the influx of capitalism, Durkheim (1951[1897]) noticed that a breakdown in social regulation transforms individuals' behaviors. A society facing rapid social upheaval and social changes confuses people and makes them uncertain of which rules and regulations they must follow. He used the French term "anomie," which refers to a state of normlessness and the failure of society to regulate or restrain goals and to provide suitable norms to follow these goals. During frequent and dramatic social changes (whether positive or negative), norms for proper behaviors break down and no longer hold the force to control individuals' behavior. As a result, the lack of social regulation, or anomie, frees individuals from social norms, promoting higher rates of deviant behaviors, such as suicide.

2.1.1.2 Merton's Anomie/Strain Theory. Merton (1938, 1968) adopted Durkheim's (1951[1897]) concept of anomie and revised it to form the basis of his own

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sociological explanation to account for how society and social structure contribute to deviant behavior. Diverging somewhat from Durkheim's (1951[1897]) original concept and perspective, Merton (1968) described anomie as "a breakdown in the cultural structure, occurring particularly when there is an acute disjunction between cultural norms and goals and the socially structured capacities of members of the group to act in accord with them" (p.216). Based on this revised concept of anomie, Merton's classic strain theory (1938, 1968) is constructed to explain how deviant behaviors are chosen as a form of adaptation to strain when there exists a disjunction between goals and means.

Merton (1959, 1964, 1968) introduced two major foundations of any social system: social structure and culture.[3] To Merton (1938), maintaining an equilibrium between structural means (e.g., employment and education) and cultural goals (e.g., monetary success) is the ideal for an integrated society. Under a harmonious dimension of the social structure and the cultural structure, members of a society are expected to maintain the equilibrium and receive satisfaction. By contrast, cultural and structural imbalances lead to deviant adaptations in the non-organized society or anomic society (Merton, 1938, 1968). A disjunction between these two components can be found when access to the culturally approved means is unequally distributed in society, while the culturally defined goals are generally accepted by the majority of the members. Also, a discrepancy can be created when the cultural means often exclude people with low

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[3] The social structure refers to "the organized set of social relationships in which members of the society or group are variously implicated," and the cultural structure refers to "an organized set of normative values governing behavior which is common to members of a designated society or group" (Merton, 1968, p. 216). Two subcategories were defined under the element of cultural structure: ends (culturally defined and accepted goals and values) and means (culturally approved ways to achieve these goals and values).

socioeconomic status, whereas the cultural goals are normally defined by people with high socioeconomic status. Thus, educational and economic inequality expedites the use of innovative and illegitimate methods to reach desired goals by producing strains or pressures to individuals in the lowest strata of society (Merton, 1938, 1968).

Durkheim (1951[1897]) focused only on macro-level differences across societies, but Merton (1968) proposed that individuals respond to strain in a number of ways. He identified five individual adaptations to strain, each of which is based on acceptance or rejection of the goal of economic success and the means used to achieve personal goals: conformity, innovation, ritualism, retreatism, and rebellion. First, conformists - the most common response to strain – adapt culturally accepted goals and conventional means to succeed (e.g., obtaining a legitimate job in order to secure wealth). Second, innovators are the group most likely to use crime in order to achieve their goals. This group maintains the goal of success but takes advantage of illegitimate means to attain it. Third, ritualists follow socially acceptable means to achieve economic success, but they do not hold strong goals. Fourth, retreatists reject both the goal of society and the need to follow socially approved means of achieving success, even when their goals are blocked (e.g., vagrants, psychotics, alcoholics, and drug addicts). Fifth, rebels reject the system entirely and seek to replace it with a new social order (e.g., political, spiritual, or violent values; Anderson, 1999).

2.1.1.3 Cohen's Delinquent Subculture Theory. Cohen (1955) presented an alternative strain argument, criticizing Merton's theory (1938, 1968) for two reasons: 1) the assumption that deviant behaviors are primarily utilitarian and 2) the ignorance of the complex anomic process (e.g., the process of interaction among individuals). To rectify

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these issues, Cohen (1955) suggested that the delinquent subculture and social structural sources of strain need to be considered to account for deviant behaviors committed by the lower class, especially male delinquents.

Deviant behaviors derived from social status are recognized as a collective response by working-class juveniles, rather than an individual response to strain (Cohen, 1955). Lower-class juveniles face status problems and frustrations as a result of being evaluated based on middle-class standards (e.g., manners, honesty, stake in conformity, and responsibility). Contrary to middle-class youths who are taught and supported by middle-class parents, most lower-class individuals are neither prepared for nor educated in the middle-class standards, which dominates within the educational institution.

An intensive feeling of frustration and deprivation of lower-class youths can create delinquent subcultures of which characteristics include hedonism, group autonomy, malicious orientation, negativistic attitudes, non-utilitarianism, and versatility in terms of offenses (Cohen, 1955). Their delinquent behaviors and gang affiliations are considered a way to respond to strains and a means of maintaining their status in the delinquent subculture and pursuing a reputation for toughness.

2.1.1.4 Cloward and Ohlin's (1960) Theory of Different Opportunity and Delinquent Subculture. Building on Merton's (1938, 1968) and Cohen's (1955) concepts, Cloward and Ohlin (1960) introduced an alternative version of strain theory exploring the association between community dynamics and strain. Like Merton (1938, 1968), strains can result from the discrepancy between cultural goals and structural means. The deviant adaptation, however, can vary by individuals' level of opportunity and social location within society. The intervening role of differential opportunity

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systems is emphasized in their articulation. Deviant behaviors are committed by individuals who learn and obtain favorable perspectives toward crime, rather than being directly derived from limited access or opportunities to legitimate means.

Cloward and Ohlin (1960) described that the lower class tend to disproportionately face both conditions: a lack of resources and a violent subculture. Their interaction with other individuals who are in the same condition and who respect the subculture encourages the use of illegitimate ways to achieve cultural goals. In this sense, the formation of deviant subcultures is a means to justify divergent behaviors and to reduce guilty or other feelings associated with the violation of social norms.

2.1.2 Agnew's General Strain Theory

2.1.2.1 Overview of GST. Agnew (1983, 1985, 1992) modified the concepts in earlier strain theories and introduced a revised version of strain theory. To Agnew (1984), earlier strain theories have a narrow scope in explaining delinquency due to the limited sources of strain they emphasize. Achieving monetary success and middle-class status is neither the foremost nor the only predictor of juveniles engaging in criminal behaviors. These explanations may be more relevant in the case of adult crimes than young children and adolescents (Agnew, 1984; Burton & Cullen, 1992; Elliott, Huizinga, & Ageton, 1985; Hirschi, 1969; Kornhauser, 1978). Also, middle- and upper-class youths may commit crimes, a fact that cannot be explained within Merton's (1938) theoretical framework (Broidy, 2001). Furthermore, earlier strain theories failed to delineate the relationship between strain and delinquency (Agnew, 1983), or the reason why delinquent activities are more likely to be committed by strained individuals with negative emotionality/low constraint than individuals without such conditions. These

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limitations lead to a new direction for strain theory with micro-level analyses (Agnew, 1983).

Agnew (1992) refers to strain as negative or adverse relations with other people, especially "relationships in which the individual is not treated as he or she wants to be treated" (p.48). Agnew (1983, 1984, 1985, 1992) expanded the sources of strain after taking into consideration juveniles' lifestyles to explain how a wide range of stressful life situations matter for juveniles. Agnew (1992) identified three types of strains: 1) failure to achieve positively valued goals (e.g., as finding education/employment inaccessible), 2) removal of positively valued stimuli (e.g., the death of family members), and 3) presentation of negative stimuli (e.g., criminal victimization, witnessing violence).

GST (Agnew, 1985, 1992) includes social-psychological dimensions (e.g., negative affective states) to delineate the underlying mechanisms that lead from strain to delinquent adaptations. It is necessary to consider the mediating role that negative affective states play in the link between strain and delinquency because, in itself, the direct effect of strain on delinquency is insufficient to explain the relationship. Each type of strain increases individuals' experience of negative emotions (e.g., anger, frustration, depression, resentment, fear, helplessness, and anxiety), which can lead to a corrective action (i.e., delinquency) as a means of alleviating the impact of strain, escaping aversive events and situations, or seeking revenge when there is an inability to legally remove a situation (Agnew, 1992). That is, negative emotions mediate the association between strain and delinquency.

Agnew (2006a) differentiated "situational-based negative emotions" from "trait-based negative emotions." The former refers to an unhappy or unpleasant emotion that is

evoked in certain situations as a response to strains, and the latter refers to a negative emotion that describes an individual's general tendency of certain emotions. Trait-based negative emotions – anger in particular - can foster situational-based negative emotions that provoke criminal coping (Capowich, Mazerolle, & Piquero, 2001; Ganem, 2011; Mazerolle, & Piquero, 1997; Mazerolle, Piquero, & Capowich, 2003; Moon, Morash, McCluskey, & Hwang, 2009). In this sense, criminal coping is most attractive to individuals with a history of direct/indirect stressful life events in helping them alleviate strain and negative emotions.

Additionally, GST (Agnew, 1992, 2006a, 2013) clarifies the variation in the use of criminal coping among victims of crime with the same or similar strains by addressing several conditioning variables, which are adopted from previously developed criminological theories that focus on personal and social resources (e.g., Cohen & Felson, 1955; Gottfredson & Hirschi, 1990; Hirschi, 1969). The conditioning factors consist of a variety of internal (e.g., negative emotionality/low constraint, intelligence, problem-solving skill, self-efficacy, and self-esteem) and external (e.g., social supports, peer groups) factors. Low social supports, negative personality traits (e.g., negative emotionality/low constraints, low self-control), and interactions with delinquent peers are identified as potential risk factors that can enhance criminal coping when individuals face direct and/or vicarious strain (Agnew, 2006b, 2013; Agnew et al., 2002). By contrast, maintaining or redeveloping prosocial coping resources can reduce the likelihood of delinquency even when strain is present.

2.1.2.2 Developmental and Temporal Aspects of GST. As Agnew's (1992) initial statement describes, individuals with strain can differ from those without such

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strains in terms of their criminal coping. In addition to the between-individual difference explanation, a developmental framework of GST is applicable in explaining within-individual variation in offending (Agnew, 1997; Slocum, 2010). Agnew (1997) agrees with Moffitt's (1993) description of adolescence-limited offenders in that the frequency of using delinquent coping is much higher for juveniles than adults. As children enter into adolescence, they have an increased chance of exposure to the public sphere and attention from others (Agnew, 2006b). Juveniles also have a high chance of participating in social activities and groups unsupervised by adults. Overall, these features can lead to a high chance of experiencing various strains, which, coupled with a lack of legitimate methods of coping, provokes negative emotions and promotes deviant behaviors.

Although the majority of adolescents desist from offending as they enter into adulthood, the strains experienced by individuals may alter offending pathways in the transition to adulthood (Agnew, 1997). Specifically, stability in crime and deviance could be partially due to negative personality traits developed in early childhood (Agnew, 1997). Having an aggressive personality increases, directly and indirectly, the likelihood of offending (Barroso et al., 2008; Francis, 2014). Individuals with a high level of aggression tend to experience a number of negative life events, interpret strains as aversive, and respond to aversive situations with deviant behavior (Farmer et al., 2015; see also, Blitz & Lee, 2015).

Within-individual changes in offending can be influenced by the conditions of strains, including their amount, duration, frequency, recency, and centrality to the core goals, needs, values, activities, and identities of the individual (Agnew, 2001). Aversive situations with a greater magnitude can have a greater impact on delinquent coping, as

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well as foster an angry emotional response (Agnew, 1985, 1989, 1992). Delinquent behaviors are expected from individuals with recent experiences of negative events, rather than ones that occurred long ago (Eitle, 2010; Zweig, Yahner, & Rossman, 2012). Also, strains that occur over a longer period of time or occur with a higher frequency are more consequential to deviant behaviors because of a high level of dissatisfaction and negative affective states (Agnew, 1992). It is argued that chronic or persistent strains, which threaten individuals' personally valued activities and identities, can contribute to persistent offending during mid-adolescence and young adulthood (Avison & Turner, 1988; Coggan, Bennet, Hooper, & Dickinson, 2003; Slocum et al., 2005).

2.1.3 Victimization in General Strain Theory

2.1.3.1 Direct Victimization and Vicarious Victimization. GST is one of the crime theories which accounts for the victimization-delinquency link, in that it describes three categories of victimization – personal criminal victimization, vicarious victimization, and anticipated victimization[4] (Agnew, 2001). Despite being distinct forms of strain, it is proposed that each of these forms of strain are closely interrelated to prompt delinquency as a method of corrective action (Agnew, 2002). The introduction of criminal victimization is acknowledged as a critical predictor of delinquency, because it often involves enormous emotional, mental, and psychological strain, especially when the victimization threatens the core goals or values of the victim (Botchkovar & Broidy, 2010; Cheung & Cheung, 2010; Hollist, Hughes, & Schaible, 2009). Moreover, criminal victimization meets all four characteristics of strain (discussed below), making it likely to

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[4] The term *anticipated strain* refers to an individual's perception that his or her current strains and stressful conditions will continue into the future, or new strain will be expected (Baron, 2009; Froggio, 2007; Zavala & Sphon, 2013).

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promote criminal coping over legitimate coping strategies (Agnew, 2001, 2002; Kort-Butler, 2010).

2.1.3.2 Direct Victimization and Vicarious Victimization as A Source of Strain.

Strain. The most common form of victimization that has received attention is the direct experience of criminal victimization or physical violence, in particular (Agnew, 1992). Indirect or vicarious victimization is also important to recognize (Agnew, 2002). The term *vicarious strain* refers to witnessing or hearing about criminal situations experienced or committed against other people through interactions with them or the media (Kort-Bulter, 2010).

An independent and combined method of experiencing criminal victimization meets all four characteristics of strain that can lead to criminal coping (Agnew, 2001, 2002). The first condition is that criminal victimization is perceived as unjust, a fact that elicits negative emotions (Agnew, 2002; Agnew et al., 2002; Hoskin, 2013). Most criminal victimization is caused by the voluntary and intentional behavior of others, not those of victims (Agnew & Brezina, 1997; Baron, 2009; Ousey, Wilcox, & Schreck, 2015). Victims of crime tend to use corrective actions, since they have been affected by harm and a violation of social norms caused by undeserved experiences.

Second, criminal victimization produces a strain that is high in magnitude, since it can be repeated across time and/or in multiple forms. Such experiences can modify personality traits and levels of social support (Agnew, 2002) and transform the perceived costs of criminal versus noncriminal coping (Radliff, Wang, & Swearer, 2016), resulting in delinquent coping. It is possible that individuals may falsely assume reduced costs (e.g., injury, stigmatization) and increased benefits (e.g., reducing or eliminating the

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source of strain) of delinquent behaviors. The misperception caused by direct/vicarious victimization can lead victims to an increase in delinquency by underestimating their prosocial ability to handle victimization experiences in a noncriminal manner (Busch, Laninga-Wijnen, van Yperen, Schrijvers, & De Leeuw, 2015; see also McCarty, Teie, McCutchen, & Geller, 2016).

Third, criminal victimization is associated with low social control, which is more likely to result in crime (Agnew, 2002). Crimes committed by parents (e.g., child maltreatment) and that occur beyond the scope of parental monitoring and supervision (e.g., school bullying) can lack the element of social or parental control and hamper social bonds between children and parents (Augustyn, Thornberry, & Henry, 2019; Moon, Blurton, McCluskey, 2008; Moon, Morash, & McCluskey, 2012). The physical absence and lack of sufficient attention by parents may lessen individuals' attachment to mainstream society, as well as their parents, resulting in decreased social control (Daigle, Beaver, & Turner, 2010). As a result, victims may choose to assuage or eliminate their strain and negative emotions through criminal behavior rather than through legitimate means.

Fourth, criminal victimization committed by intimate groups creates pressure or incentive to engage in criminal coping (Agnew, 2001; Baron, 2009). Criminal victimization influences victims' beliefs about antisocial behavior, and these victims can develop favorable attitudes toward aggressive and antisocial behavior (e.g., the intergeneration cycle of maltreatment; Kim, 2009; Thornberry & Henry, 2013; the victim-offender overlap of school bullying; Connell, Morris, & Piquero, 2016). Consistent with social learning theory (Akers, 1998), frequent exposure to pressure by

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intimate groups, coupled with rewards for offending, can solidify individuals' perceptions of criminal coping as the most effective means of reducing their perceived magnitude of strain (Haynie, Petts, Maimon, & Piquero, 2009).

2.1.3.3 Relationship Between Direct and Vicarious Victimization. It is important to note that direct and vicarious victimization influence one another (Agnew, 2002). For one, individuals who experience direct victimization tend to respond to indirect exposure to violence by perceiving others' victimization as their own strain (Agnew, 2002). Two, individuals who have previously observed the criminal victimization of people close to them can respond to their own victimization in a much more aggressive manner (Agnew, 2002; Kort-Butler, 2010). Lastly, individuals who are concerned about future victimization may resort to illegitimate behavior (Jaggers et al., 2014). Ultimately, criminal coping is more likely in the above situations, as individuals want to avoid unpleasant situations based on what they have learned from their own and others' experiences.

According to Agnew's (2002) assertion, it is clear that direct and vicarious victimization are expected to be significantly and positively associated with each other. The relationship between the two forms of victimization can differ due to the variations in individuals' subjective evaluation of the objective strain (Agnew, 2002). By definition, objective strains are "events or conditions that are disliked by most members of a given group," while subjective strains are "events or conditions that are disliked by the people who are experiencing (have experienced) them" (Agnew, 2001, pp.320-321). Although most objective strains lead to a subjective strain, it is possible for individuals to react differently to the same objective strains, depending on the individuals' personality traits,

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available personal and social resources, and environmental conditions (Froggio & Agnew, 2007). Criminal victimization can have a greater harmful effect on victims when it is committed by intimate groups (e.g., family and peer groups) in comparison with those events committed by a stranger (e.g., nonfamily members) (Agnew, 2001; Haynie et al., 2009; Jang & Song, 2015).

Also, the impact of vicarious victimization depends on witnesses' relationships with the victims, including intimacy and physical proximity between witnesses and victims (Agnew, 2002; Agnew et al., 2002). Specifically, individuals are more likely to suffer from vicarious victimization that is perpetrated against the people with whom they spend the most time (e.g., family members and friends), members of the same social group (e.g., race, sex), and those in close physical proximity (e.g., home, school, and neighborhood) (Baron, 2009). Delinquent behaviors are expected when individuals experience negative emotions, which result from a crime conducted against their intimate groups (Agnew, 2002). Overall, despite the variations, exposure to direct (or vicarious) violence can contribute to the likelihood of using criminal coping based on past experiences of vicarious (or direct) victimization.

The presumed additive effects of direct victimization and vicarious victimization can be relevant to victims' inclination to use delinquent coping. The overlap among types of violence exposure within the family or in different contexts contributes to victims' behavioral problems beyond the separate stress factors (Lin et al., 2011). The additive effect of experiencing both forms of victimization (i.e., dual victimization) not only enhances the magnitude of the strain via personal judgment, but it can also modify personality traits and levels of social support, resulting in delinquent coping.

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2.1.3.4 Time Elements of Victimization Experiences. The impact of victimization on offending can be dynamic. The individual patterns of behavioral responses to victimization can remain constant across time or be altered over time due to changes in victimization experiences (Slocum, 2010). That is, the temporal aspects of victimization experiences matter to effectively measure the variable effects of victimization on delinquency, which include the magnitude, recency, duration, and clustering of the events (Agnew, 1992, 1997, 2001). As Agnew (1992) points out, victimization experiences may have a short-term effect on delinquency. Victimization can lead to a desire for corrective action as a means of behavioral coping, but its impact on delinquency can also be transient (Agnew & White, 1992). The contemporaneous effect found by several scholars supports the recency argument of GST (e.g., Brezina, 1996; Thornberry, Lizotte, Krohn, Farnworth, & Jang, 1994).

Rather than disappearing immediately, though, victimization can continuously and equally affect delinquent behaviors over time (Slocum et al., 2005; Park & Metcalfe, 2020). Scholars explored how the impact of victimization on delinquency fluctuates over the following years based on the duration of exposure to violence (Slocum et al., 2005; Park & Metcalfe, 2020) and the co-occurring of victimization (Slocum et al., 2005). Results show that the additive and cumulative exposure to violence (i.e., dual victimization and chronic/repeat victimization) are relevant to promote over-time stability in delinquency (see also Hoffman, 2010; Ousey et al., 2008). As a result of long-lasting and multiple criminal victimizations, individuals are more likely to perceive their objective victimization as subjective adversity (Lin & Mieczkowski, 2011; Moon & Morash, 2017). An increase in negative emotional states and a decrease in constraints

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(e.g., social supports) can produce a greater impact over time. Thus, the impact of victimization is not only persistent, but it can be accelerated over time.

2.2 The Impact of Offending on Victimization Using Lifestyle/Routine Activities Theories

2.2.1 The Origins of Lifestyle/Routine Activities Theories

The fundamental framework of classical theories, including lifestyle/routine activities theories, evolved during the 18th century by two philosophers, Beccaria (1996[1764]) and Bentham (1764). In his essay *On Crimes and Punishment*, Beccaria (1996[1764]) described his interests in the penal system. He pointed out the problems of the existing penal system, including judges' personal practices and inconsistent punishments. Both issues he found were relevant to the high chances of unjust and highly discretionary punishment practices. In the essay, Beccaria (1996[1764]) suggests four principles for a just legal system: (1) equality (equal treatment for all individuals under the law), (2) liberty (legal rights to be protected from abuses of the government), (3) humanitarianism (fair and proportional punishment), and (4) utilitarianism (aims to maximize happiness and pleasure for the greatest number of people). He argued for the importance of social laws and procedures that ensure the use of appropriate punishment for offenders, as opposed to the unjust and inconsistent way of sanctioning that was common during the pre-classical period. The justice system should take an official position to apply a clear and proportionate punishment defined by the laws to deter criminals. The degree of punishment needs to be determined by the magnitude of the harm caused by criminals. Overall, Beccaria's (1996[1764]) essay paved the way for the

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emphasis on equality within the legal system, as well as a deterrence-based approach to punishment.

Bentham (1764) extended Beccaria's (1996[1764]) argument by introducing utilitarianism among individuals, including criminals. In terms of the utility principle, he described that people recognize the fundamental role and consequences of happiness/pleasure and unhappiness/pain. Behaviors are considered as right and good if they produce or promote happiness and pleasure, whereas they are regarded as wrong or evil if they create or enhance unhappiness and pain. Individuals can use a hedonistic calculus to judge behaviors depending the amount or quality of happiness and unhappiness, following four criteria – intensity, duration, certainty, and nearness. As all individuals are self-interested, the pursuit of happiness and pleasure is naturally found in all human actions, including criminal behavior (Bentham, 1764). Thus, people make rational choices and can approve or disapprove of an action to maximize happiness and to minimize pain.

These two classical philosophers contributed to the development of multiple assumptions about the nature of human beings. More specifically, individuals were recognized as rational thinkers and self-interested actors, possessed a free will and capacity to make decisions based on hedonistic calculus, and used cost-benefit analysis in choosing a course of action. Based on these assumptions, rational choice theory describes that offenders are not different from nonoffenders in that they both use a rational thinking process or hedonistic calculus prior to the commission of a certain behavior. Their involvement in criminal behavior is the consequence of their decision that there is greater potential for positive outcomes (i.e., pleasure and reward) than negative outcomes (i.e.,

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costs and pains) (Clarke & Cornish, 1985; Clarke, 1995). This suggests that punishment is a necessary evil to prevent people from offending. Additionally, deterrence theory focuses on the idea that punishment can transform offenders. Criminals would be deterred when the perceived pain and costs outweigh the perceived rewards and benefits. In order to improve the effectiveness of punishment, the punishment is required to be certain, severe, and swift (Piquero & Paternoster, 1998).

2.2.2 Lifestyle/Routine Activities Theories

Lifestyle/routine activities theories are derived from the classical perspectives just described. Lifestyle theory attempts to explain how crime can be increased or decreased in terms of the routine activities of everyday life (Hindelang et al., 1978). The chances of exposure to situations that are conducive to crime are determined by an individual's daily activities. Lifestyle theory focuses on both demographic characteristics and structural constraints. The patterns in daily life can be similar among individuals who share the same demographic characteristics (e.g., age, race/ethnicity) or those who have a similar social/cultural background (e.g., juveniles, employment status). This suggests that people's preference for risky lifestyles (e.g., going out in the evening, staying in unsafe places with risky people) increases their vulnerability of being a victim of crime.

Cohen and Felson (1979) proffer a similar argument in their routine activities theory to explain victimization. Central to the theory, contemporary lifestyles and activities are relevant to the increase in criminal and deviant behaviors. The increase in time spent at social institutions (e.g., job, school) and participation in social activities (e.g., leisure), combined with a number of portable items and suitable personal possessions, increases the probability of crime and the risk of being victimized (Cohen &

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Felson, 1979). Cohen and Felson (1979) describe three elements for crime to occur, which are supposed to converge in time and place: 1) a motivated offender (e.g., the unemployed, juveniles), 2) a suitable target (e.g., individuals, property), and 3) an absence of capable guardians (e.g., police, neighbors) (Cohen & Felson, 1979; Felson & Eckert, 2010). Without an increase or change in the structural conditions, the crime rate and the odds of victimization are expected to increase due to the convergence of these factors.

2.2.3 Victimization in Lifestyle/Routine Activities Theories

The lifestyle/routine activities perspective is employed to describe the relationship between offending and victimization, suggesting that the risk of victimization can be increased through involvement in offending behavior in the routine activities of everyday life (Cohen & Felson, 1979). According to this framework, the positive association between criminal offending and subsequent victimization is dependent on the shared circumstances and the lifestyles between victims and offenders (Armstrong & Griffin, 2007; Jensen & Brownfield, 1986; Lauritsen, Sampson, & Laub, 1991). The convergence of time and place in daily activities increases contact between victims and offenders (Cohen & Felson, 1979; Jensen & Brownfield, 1986). An individual whose lifestyle maintains the physical/residential proximity with violent offenders, such as engaging in criminal and delinquent activities, using alcohol and drugs, hanging out at night, and residing in crime-ridden communities, will have a greater risk of being a victim (Cho, Wooldredge, & Park, 2016; Cohen & Felson, 1979; Schreck, Fisher, & Miller, 2004).

Also, the probability of future victimization can be enhanced by the amount of unstructured/unsupervised time spent with deviant peers (Osgood et al., 1996). The

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vulnerability of being a potential victim of other motivated offenders results from an individual's participation in social activities and delinquency, which occurs beyond the scope of parental supervision and monitoring (Sampson & Lauristen, 1990; Schreck, Stewart, & Osgood, 2008; Taylor, Freng, & Esbensen, 2008). Therefore, juvenile gang activities and school violence (e.g., peer bullying) increase the vulnerability for victimization, rather than diminishing the probability of being a victim (Miller & Decker, 2001; Taylor, Peterson, & Esbensen, 2007; Thornberry & Krohn, 2003).

2.3 Summary

Even though the two theoretical frameworks of GST and lifestyle/routine activities can help describe the association between victimization and delinquency, an integrated model is required to explore the totality of the relationship between victimization and delinquency. GST explains the initiation of delinquent behaviors as a result of direct/vicarious victimization experiences, while the lifestyle/routine activities perspective describes an increased risk of criminal victimization among individuals who participate in risky/deviant lifestyles. Despite the robust theoretical arguments stated, each perspective is limited in explaining only one direction of the two-way causal pathway. Iratzoqui (2018) and Schreck et al. (2006) propose that the two theoretical perspectives are very complimentary of each other so that the continuous reciprocal relationship between direct/vicarious victimization and delinquency can be delineated. This theoretical approach is taken in the current study.

CHAPTER 3

EMPIRICAL RESEARCH ON THE VICTIM-OFFENDING RELATIONSHIP

This chapter provides a discussion of the gaps within the existing literature focused on the relationship between victimization and offending. A substantial amount of research is examined to explore the following: (1) how direct and vicarious victimization increases the chances of delinquency, (2) how and to what extent dual victimization and repeat victimization are related to an increased likelihood of offending, (3) how engaging in risky/deviant behaviors increases the risk of victimization, and (4) whether a reciprocal effect should be anticipated between victimization and delinquency.

3.1 The Impact of Victimization on Offending

The majority of research on direct and vicarious victimization has discovered that an individual's history of criminal victimization is a significant predictor of various illegal activities (e.g., Agnew et al., 2002; Baron, 2009; Daigle et al., 2007; Manasse & Ganem, 2009; Ostrowsky & Messner, 2005; Lin et al., 2011). Consistent with Agnew (2001), experiences of criminal victimization are more likely to result in numerous negative outcomes than other types of strain (e.g., goal blockage) for juveniles, even when controlling for prior levels of delinquency (e.g., Broidy, 2001; Moon et al., 2009). Part of this response is due to limited access to non-criminal coping mechanisms (Agnew, 2002). Victimization experiences can provoke a contemporary effect for adolescents

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(Chen, Propp, de Lara, & Dorvo, 2011; Eitle & Eitle, 2016) and a long-term effect for young adults (Hay & Evans, 2006; Menard, Covey, & Franzese, 2015; Smith, Ireland, & Thornberry, 2005; Spano, Rivera, & Bolland, 2006), regardless of their level of criminal propensity (Jackson et al., 2013).

Specifically, physical/violent victimization can elicit violent crime, property crime, and status offenses, which either occur during early childhood (Baron, 2018; Watts & McNulty, 2013) or in adolescence (Brezina, 1998; Hollist et al., 2009). Similarly, an increased likelihood of criminal coping is found for individuals who experienced vicarious criminal victimizations of intimate groups (Agnew & White, 1992; Agnew et al., 2002; Ireland & Smith, 2009; Sigfusdottir et al., 2012), as well as those involving non-intimate groups (Eitle & Turner, 2002; Kirk & Hardy, 2014; Kort-Butler, 2010; Lee & Kim, 2018).

A growing body of research also suggests a robust association between victimization and substance abuse. Victims of crime show a heavy dependence on drugs, and a higher recidivism rate on drug-related crimes (Agnew & White, 1992; Baron, 2004; McGrath, Marcum, & Copes, 2012; Miller, Fagan, & Wright, 2014; Kilpatrick et al., 2000, 2003; Sullivan, Kung, & Farrell, 2004; Ullman, Reylea, Peter-Hagene, & Vasquez, 2013). A pattern of an early start in drug use is also found among victims of crimes (Carson et al., 2009; Ompad et al., 2005), even when compared to a subgroup of high-risk youths (Hamburguer, Leeb, & Swahn, 2008).

Together, prior studies offer some support for GST in that direct and vicarious victimization are posited to trigger internalized and externalized deviant behaviors. However, the evidence these studies offer is limited in a few ways. Most research uses

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cross-sectional data employing a static measure of victimization, rather than considering the dynamic dimensions of victimization (e.g., persistence and co-occurrence). Overlooking the temporal elements related to victimization experiences limits our understanding of the impact of criminal victimization on delinquent coping over time, which can vary depending on the consistency and chances of the comorbidity of victimization (i.e., dual victimization) (Agnew, 1992, 2001).

In addition, studies examining one type of experienced or vicarious victimization may be misleading (e.g., Hay et al., 2010; Watts & McNulty, 2013) because juveniles tend to be exposed to multiple types of victimization simultaneously in real-world contexts (Finkelhor et al., 2009). Furthermore, studies comparing two types of victimization reveal that experienced victimization often has a greater impact on deviant behaviors than that of vicarious victimization (e.g., Agnew & White, 1992; Lee & Kim, 2018; except for Eitle & Turner, 2002; Spohn & Wood, 2014). Taking into consideration the common co-occurrence of direct and vicarious victimization, this finding may provide less feasible contributions to policy and treatment programs. Stated differently, this literature does not fully consider the link between direct and vicarious victimization, which may jointly influence one's involvement in delinquent activity.

3.2 The Cumulative and Additive Impact of Victimization on Offending

3.2.1 Stability and Persistence in Victimization

Some research explores the dynamic dimensions of victimization in order to capture repeat victimization, as well as assess its cumulative impact on offending. In this context, some studies have focused solely on the stability of victimization over time. Most of these studies measured the risk of victimization at different time points (e.g.,

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victimization in the past year) or the chronicity of direct/vicarious victimization (e.g., lifetime victimization) and suggest a significant link between prior and subsequent criminal victimization (Lauristen & Quinet, 1995; Wittebrood & Nieuwbeerta, 2000). Using a national sample of adolescents, Finkelhor and colleagues (2007c) found persistent re-victimization across different types of victimization, including property crime, child maltreatment, and witnessing violence. Experiencing one type of criminal victimization makes a person highly vulnerable to re-victimization of the same and varying types.

Similalry, Ousey et al. (2008) suggests persistence in assault victimization over time, after considering time-varying exogenous measures (e.g., delinquent peer associations, school bonds, impulsivity/low self-control). The continuous experiences of criminal victimization can be an essential predictor in explaining the within-individual changes in criminal coping, since an individual's chance of criminal coping will vary depending on the duration of events. According to Agnew (1992, 2001), delinquent coping may be a more appealing means for individuals with stable and on-going risks of victimization than those with a one-time incident of victimization.

Moving to the connection with delinquency, longitudinal studies have assessed whether criminal victimization has a short-term or long-term effect on delinquency and how the continuity or discontinuity of victimization is related to delinquent behavior. Research has described that chronic and repeated victimization facilitates long-term negative consequences and chronic patterns of crime and violence due to the increased sensitivity to certain events/conditions (Eitle, 2010; Glassner & Cho, 2018). The persistence of violent victimization pushes individuals to overestimate the impact of

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current criminal victimization, resulting in experiencing negative emotions and psychological issues (English, Graham, Litrownik, Everson, & Bangdiwala, 2005; Thornberry et al., 2007). Consistent with GST's propositions (Agnew, 2002, 2006a), a higher risk of criminal coping is found among victims of chronic/repeat crimes. The greater the amount of childhood exposure to vicarious violence at home, the more likely the victim copes with delinquency and substance use among adolescents (Margolin et al., 2010) and adults (Hoffman, Phillips, Daigle, & Turner, 2017).

Only a few studies have considered variations in victimization by counting the duration of exposure to victimization as a means of measuring the enduring/transient effect of victimization and assessing its relationship with subsequent deviant behavior. Using data from the Women's Experience with Violence study (WEV), Slocum et al. (2005) found that long-lasting and accumulated violent victimization are significantly and positively associated with the risk of violent crime, nonviolent crime, and drug use. In a study on bullying victimization, Ousey and Wilcox (2007) created time-varying measures of peer bullying, maternal attachment, and association with delinquent peers to examine the effect of these factors on crime depending on levels of antisocial propensity. The results showed that an increase in the frequency of bullying victimization is related to an increase in offending over time, calling attention to within-individual changes in bullying experiences.

A more recent study by Park and Metcalfe (2020) also reveals the possible long-term effect of bullying victimization in their analysis of a nationally representative sample of South Korea. Extending the work of Slocum et al. (2005) and Ousey and Wilcox (2007), the duration of bullying victimization (the number of subsequent waves

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of exposure) is considered, as well as a time-varying risk factor index. The results revealed that the harmful effect of bullying victimization on general delinquency, substance use, bullying perpetration, and analogous behavior (marginally) continues to decrease, while its impact on violent and property crime remains constant over time. This finding implies that chronic strains may not have a continuing harmful impact in all situations.

While these studies have considered the temporal elements of strain, they have only focused on one type of direct victimization and have not considered vicarious victimization. As stated previously, these studies overlook the possible influence of vicarious victimization on direct victimization and vice versa. Also, much of this work is associational and cannot establish a causal link between victimization and offending or consider the reciprocal nature of this relationship. It is hard to tell whether or to what extent future direct/vicarious victimization is related to delinquent coping among victims, which is also a significant pathway.

Prior studies on the stability of victimization have employed several different methods to measure the variable. For example, the chronicity is captured with questions regarding their chronic or lifetime stressors (e.g., Eitle, 2010), when experiencing victimization is found at two or more different points of time (e.g., childhood and adolescence; Hoffman et al., 2017), or by consecutive waves in which the impact of victimization is continuously found (e.g., Park & Metcalfe, 2020; Slocum et al., 2005). The last approach can be a more accurate way to examine stability when compared to the two former ways. It is useful to examine the enduring effect of victimization, such that situations involving persistent victimization incidents can lead to a greater impact on

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victims in choosing delinquent coping compared to conditions with discontinued or intermittent incidents of victimization (see Park & Metcalfe, 2020 for discussion). Also, in both studies, criminal victimization is considered as a condition rather than an event, which is reasonable based on making a connection between the initiation of victimization and another event of criminal victimization (see Finkelhor et al., 2007b; Cyr et al., 2012). However, in order to examine the impact of versatility in criminal victimization over time on delinquent coping, a way to count criminal victimization as an event will be required (e.g., Avison & Turner, 1998; Mowen & Brent, 2016).

3.2.2 Dual Victimization/Co-occurrence of Victimization

Another dimension of victimization is the co-occurrence across different types of victimization. A substantial number of juveniles have reported their victimization experience across different types of victimization (Finkelhor, Ormrod, Turner, & Hamby, 2005; 2009; Widom, 1989). Also, exposure to violence in multiple places and across contexts is common, indicating the comorbidity of family and community violence (Margolin et al., 2010). For example, juveniles who are abused and neglected by parents have a greater risk of observing physical marital aggression (Jouriles, McDonald, Smith, Hayman, & Edward, 2008). The chance of exposure to violence at home is relevant to the higher likelihood of being abused by peers at school (Boney-McCory & Finkelhor, 1995; Finkelhor et al., 2005) and being a target of assault and property crime (Cyr et al., 2012). This literature suggests that risks of direct and vicarious victimization often coexist, and they are highly interrelated to one another (Finkelhor et al., 2005, 2009; Widom, 1989).

This concept is known as "dual victimization" (Lin et al., 2011), "multi-victimization" (Turner, Finkelhor, & Ormrod, 2010), or "poly-victimization" (Appel &

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Holden, 1998; Finkelhor, Ormrod, & Turner, 2007b; Wright, Fagan, & Pinchevsky, 2013). Lin et al. (2011) use dual victimization to mean that a person has at least one incident of direct and vicarious victimization. The terms multi-victimization or poly-victimization capture the specific numbers of victimizations (combining all types of victimization) during a specific period (e.g., experiencing four or more types of victimization a year; Finkelhor et al., 2007a, see also Finkelhor et al., 2009; Ford, Grasso, Hawke, & Chapman, 2013). A high prevalence of dual/poly-victimization was found among juveniles (Cuevas, Sabina, & Picard, 2010; Finkelhor et al., 2007b, 2007c, 2009).

Dual victimization is of particular concern among juveniles involved in the juvenile justice system due to the high prevalence of externalizing problems (Ford et al., 2013, 2018; Horn et al., 2018; Kerig, 2018; Turner et al., 2010). Dual victimization is characterized as the most dangerous and serious form of victimization (Turner et al., 2010), given that it facilitates criminal adaptations (Agnew, 2002) and persists over time (Finkelhor et al., 2007c). Specifically, criminal coping is more consequential for individuals with multiple types of victimization (Pinchevsky, Fagan, & Wright, 2014; Wright et al., 2013), with anger (Cudmore, Cuevas, & Sabina, 2017; Eitle & Eitle, 2016) and depression (Lin et al., 2011) serving as mediators of this relationship. A higher level of cumulative victimization (Margolin et al., 2010) and dual violent victimization (Lin et al., 2011) intensifies one's subsequent violent/property crime. Crooks and colleagues (2007) found that youth with dual victimization histories of three types of maltreatment have more than 11 times higher risk of involvement in violent crimes than those with no victimization history. Also, dual victims are more likely to experience severe psychological and trauma symptoms (Finkelhor et al., 2007b; O'Keefe, 1997) and depend

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on substances (Davis et al., 2019), and both conditions can promote criminal coping. Overall, dual victimization has detrimental effects that can place victims in a much more dangerous situation when compared to a solo victimization event.

Although the harmful role of poly-victimization has gained much attention recently, many prior studies do not really focus on dual victimization, or the experience of both direct and vicarious victimization (except for Lin et al., 2011; O'Keefe, 1997). Relying on Finkelhor et al.'s (2007a) definition of poly-victimization, researchers consider only the degree or number of exposures to multiple types of victimization. As a result, while the co-occurrence of different forms of child maltreatment (e.g., physical abuse, sexual abuse, and neglect) or the overlap of family-related violence (e.g., care maltreatment and parental violence) are explored, the co-occurring direct and vicarious forms of victimization have not been examined as much (e.g., Davis et al., 2019; Guerra, Ocaranza, & Weinberger, 2019).

In addition, less is known about both the additive and cumulative effects of violent victimization (except for Slocum et al., 2005). The impact of victimization is determined by fluctuations in the nature of victimization exposure, including frequency, duration, and magnitude (Agnew, 1992). Studies focused on stability in victimization suggest that victimized youths may be chronically exposed to the same and multiple kinds of violence (e.g., Finkelhor et al., 2007a; 2007c). When this continuity in victimization converges with the high comorbidity of experiencing both direct and vicarious victimization, the consequences may be more pronounced. It is reasonable to assume that the use of delinquent coping will be significantly higher for those who

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experience dual victimization, as well as those who experience repeated dual victimizations overtime.

Slocum et al. (2005) indicated a significant impact of victimization on delinquency when the additive and cumulative effects were jointly considered. As aforementioned, their analyses for the distinct effect of additive and cumulative effects reveal the increased risk of offending when victimization is repeated or in multiple types. The joint effect model (accumulation and duration in this study) also suggests that the risk of violent crime, property crime, and drug use significantly increases by the length of duration and degree of accumulation, supporting within-individual changes. However, this result is only applicable to adult females of violent victimization. Also, their analysis relied on monthly data for three years. More research is required in this area to examine the compounded effect beyond three years, especially using both males and females who have a high-risk of experiencing both serious offending and various forms of victimization.

3.3 The Impact of Offending on Victimization

Research on the victim-offender overlap recognizes the significant overlap in the situational and personal characteristics of offenders and victims. As Hindelang et al. (1978) contend, both victims and offenders share risky lifestyle activities, such as using illicit drugs, engaging in criminal activities, consuming alcohol, staying out at night, and participating in social events (Jennings, Higgings, Tewksbury, Gover, & Piquero, 2010). Similar demographic characteristics between offenders and victims were also found, including that most offenders and victims are young, males, lack employment, and are unmarried.

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Beyond these shared socio-demographic characteristics between offenders and victims, recent research explores the causal relationship to describe the risk of being a victim derived from criminal behaviors. Scholars espouse a target suitability interpretation of lifestyle/routine activities theories to understand victimization risk among juveniles. Individuals who participate in risky lifestyle activities make themselves and their belongings readily detected and accessible by motivated offenders, resulting in an increased chance of victimization (Cohen & Cantor, 1981; Jensen & Brownfield, 1986; Schreck & Fisher, 2004; Schreck et al., 2006).

In addition, risky lifestyles ensure the proximity between victims and offenders (Mustaine & Tewksbury, 1998; Tillyer, Fisher, & Wilcox, 2011; Osgood et al., 1996). Sharing similar routine activities enhances an individual's exposure to would-be offenders and the vulnerability of being victimized (Briddell & Osgood, 2006; Cross, Gottfredson, Wilson, Rorie, & Connell, 2009; Gottfredson & Soule, 2005; Haynie & Osgood, 2005; Osgood & Anderson, 2004). Criminal lifestyles, such as gang membership, are accompanied by an increased level of exposure to motivated offenders, as well as a decrease in physical distance to possible offenders. Thus, the risk of victimization of youths in gangs is much higher than in youths who are not in a gang (Peterson et al., 2004; Pyrooz, Turanovic, Decker, & Wu, 2016).

In a similar vein, juveniles who engage in deviant and risky behavior, status offenses, and drug-related offenses push themselves into further risky situations, where increased contact with potential offenders is likely (Mustaine & Tewksbury, 2000; Peterson et al., 2004; Ramos-Lira, Gonzalez-Foreteza, & Wagner, 2006; Zavala & Spohn, 2012). Consequently, activities with less parental guardianship and close

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proximity to peer groups increase the odds of violent victimization (Choi et al., 2016; Wilcox, Tillyer, & Fisher, 2009). Not only do risky behaviors introduce the initial victimization, but risky activities also amplify the probability of multiple types of victimization and re-victimization (Turanovic, Pratt, & Piquero, 2018).

3.4 The Reciprocal Relationship Between Victimization and Delinquency

A few studies have investigated the reciprocal effects between victimization and offending, which describes how new victimizations and crimes result from previous victimizations and crimes. This idea was supported by Lauristen and associates' earlier findings regarding the interchangeable roles of victims and offenders (Lauristen et al., 1991; Lauristen & Laub, 2007). Lauritsen et al. (1991) tested the impact of victimization and delinquency and vice versa using data from the first five waves of the National Youth Survey. As expected, their findings revealed that individuals with delinquent lifestyles (e.g., daily activities outside the home, having delinquent peers) had an increased risk of becoming a victim and victims have a higher probability of becoming offenders. This finding suggests that criminal victimization and offending are reciprocally related, net of the effects of prior and current delinquency, and a host of demographic variables (e.g., age, sex, SES, family condition). The role of victims and offenders can often be compatible due to the sharing of delinquent lifestyles (also see Wolfgang, 1958; Singer, 1981).

The reciprocal argument gained support by later studies that found a bi-directional relationship between victimization and delinquency. Consistent with Lauritsen et al. (1991), Wilcox et al. (2006) and Berg et al. (2012) found evidence that supports the reciprocal escalation hypothesis. Individuals who are victimized have a greater

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probability of engaging in future violent delinquency, and those who engage in risky behaviors like delinquency and substance use are more likely to suffer from victimization later (Begle et al., 2011; Chen, 2009; Schreck et al., 2006; Zhang, Welte, & Wieczorek, 2001). Specifically, Wilcox, May, and Roberts (2006), using data from three waves of the Rural Substance Abuse and Violence Project (RSVP), examined the effects of victimization, offending, risk perception and fear of crime at time 1 on those behaviors at time 3 through subsequent weapon carrying at time 2. Their SEM models reveal that victimization at time 1 had significant positive effects on time 3 victimization, offending, risk perception, and fear, while controlling for time 1 offending, risk, fear, and other background factors.

Ousey, Wilcox, and Fisher (2011) explored the reciprocal relationship using data from the RSVP. In their analysis, researchers controlled for the effects of time-stable sources of population heterogeneity and time-varying covariates (e.g., exposure to delinquent peers, self-control, prosocial ties), which are found to be relevant to both victimization and offending. Their results suggest that the likelihood of being a victim of violence or becoming a violent offender are related to the physical proximity of victims and offenders, as well as the past experience of being a victim or an offender. Though there may be variations by neighborhood structural factors (e.g., street culture; Berg et al., 2012), the impact of offending on victimization is greater than the impact of victimization on offending (Wilcox et al., 2006). Together, the above studies suggest that a non-recursive relationship exists between criminal victimization and delinquent behavior.

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Yet, an issue related to these prior studies should not be overlooked. Scholars employed two separate models: one analysis to examine the impact of time 1 victimization on time 2 delinquency, and another to describe the impact of time 1 delinquency on time 2 victimization (e.g., Ousey et al., 2011). Despite controlling for prior victimization and delinquency, there is a need to understand how victimization and delinquency are related to each other in a continuous setting. The theoretical perspective of GST and lifestyle/routine activities implies that prior victimization and delinquency are related to subsequent victimization and delinquency. It suggests that victimization and delinquency need to be measured at different points of time to explore whether the risk of victimization at a later point directly results from initial victimization experiences or indirectly derives from risky/deviant lifestyles as a means of coping with the initial victimization. The research exploring this reciprocal effect is scarce (except for Iratzoqui, 2018; Schreck et al., 2006).

In light of this limitation, the prospective approach presented by Schreck et al. (2006) and Iratzoqui (2018) would be a more accurate way to conduct a longitudinal analysis that intends to capture the continuous reciprocal relationship. Schreck et al. (2006) explored how low self-control, risky lifestyles, victimization, and delinquent behaviors are related to one another. Using panel data from the Gang Resistance Education Training program, the results of structural equation models (SEM) show that victimization at time 1 is positively and directly related to victimization at time 3, and indirectly affect victimization at time 3 through association with delinquent peers and involvement in delinquent behavior at time 2. A similar method was conducted by Iratzoqui (2018), who tested how child maltreatment from childhood leads to current

violent victimization through delinquent coping and negative emotions. As contrasted with several other studies, these two studies employed measurements collected at three different points that are reasonable to test the link between earlier and later events of victimization/delinquency.

Moreover, Schreck et al. (2006) found that preexisting pro-social attachments to parents and other pro-social individuals can fluctuate as a result of victimization, which, consequently, can change the odds of subsequent victimization and delinquency. After initial victimization, victims may move from risky lifestyles to prosocial ones to avoid perceived victimization, resulting in decreased interaction with potential offenders. Still, some victims with a certain personality trait (e.g., low self-control; Schreck et al., 2006) can, continuously or more frequently, become involved in unsupervised activities due to their withdrawal or weakened social bonds. The lack of effective guardianship and parental attachment can provoke further youths' involvement in highly risky/deviant behavior, which, in turn, elevates their probability of subsequent victimization (Averdijk, 2011; Iratzoqui, 2018).

However, one limitation found from the two previous studies is that both studies relied on a school-based sample. Although their sample consists of a nationally representative sample of juveniles, the original data tend to exclude high-risk juveniles partially due to skipping, truancy, or dropping out of school. The juveniles who were not included in the study may represent a higher likelihood of involvement in delinquent behaviors and victimization experiences. The exclusion of high-risk juveniles may lead to an issue in fully explaining between-individual differences due to low participation in delinquency among the sample (see Irazoqui, 2018 for discussion). Another limitation is

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that prior studies employed a more limited scope of victimization and delinquency.

Specifically, Schreck et al. (2006) included violent victimization and property

victimization, while Iratzoqui (2018) focused on child maltreatment. Neither studies have

considered the reciprocal nature of vicarious victimization in their prospective model.

Also, the measure of delinquent coping relies on minor deviant behaviors only, rather

than capturing serious offenses (e.g., violent and property crimes).

3.5 Summary

The theoretical frameworks of GST and lifestyle/routine activities, as well as

previous empirical findings, lend support for an integrated model that can explore the

totality of the relationship between victimization and delinquency. Although theoretical

frameworks of GST and lifestyles/routine activities have often been applied in prior

research to explain this link, two distinct models derived from each perspective cannot

fully explore the reciprocal association, such that they are restricted to explain one

pathway of the association between victimization and delinquency. That is, GST's

framework is not applicable to consider the impact of delinquency on victimization,

while lifestyle/routine activities perspective cannot explain the origin of deviant

behaviors as a result of victimization. The two theories can be seen as complementary to

each other. In this way, the combined model can address the overall and prospective

reciprocal relationship between victimization and delinquency.

From a theoretical standpoint, it is appropriate to consider the direct and vicarious

victimization link in analyses of the reciprocal relationship between victimization and

offending. The probability of direct victimization can be increased by individuals'

exposure to vicarious victimization and vice versa, since they share some common

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factors (e.g., family conditions, neighborhood factors; Finkelho et al.,2009; Turner, Finkelhor, Hamby, Shattuck, & Ormrod, 2011). A more sensitive reaction to current direct or vicarious victimization is expected due to an increased level of fear resulting from past victimization (Agnew, 2002). Moreover, risky/deviant lifestyles, such as drinking and illegal activities, affect individuals' cognitive dimensions (i.e., an increased perception of victimization) as well as emotional aspects (i.e., fear of being victimization) (Choi & Dulisse, 2019; Melde, 2009).

In addition, criminal coping can intensify by direct victimization via vicarious victimization and vice versa above and beyond any direct effects. It is possible that the impact of direct victimization on delinquency through vicarious victimization will be greater than the opposite pathway. Prior research suggests criminal coping is more consequential for those with direct exposure to violence than those with vicarious exposure (e.g., Francis, 2014; Heynie et al., 2009). Juveniles with past direct victimization are more likely to be involved in unsupervised risky lifestyles (e.g., child maltreatment and peer harassment on offending, drug use, and running away; Fagan, 2003; Reid, 2011), which provokes fear and sensitive reactions to subsequent exposure to violence. In turn, the impact of delinquent lifestyles on subsequent direct and vicarious victimization can vary. This argument has not been considered in empirical research since the introduction of the two theories.

CHAPTER 4
METHODS

This chapter provides a description of the research questions and an explanation of the Pathways to Desistance data, which is used to address the research questions. The measurements of the variables of interest are discussed, followed by a review of the analytic plan.

4.1 Research Questions

The current study applies general strain theory and the lifestyles/routine activities perspective to explore the non-recursive relationship between direct/vicarious victimization and delinquency/crime, as well as the impact of dual and repeat victimization. This study focuses on a high-risk sample from the Pathways to Desistance data, who have a high prevalence for both direct and vicarious victimization experiences and who have been involved in past criminal and delinquent behaviors. This study consists of two research goals that are designed to expand existing empirical research in the area. First, this study aims to explore the reciprocal relationship between direct/vicarious victimization and crime/delinquency in a longitudinal and prospective setting. In line with this goal, four research questions will be examined:

1. Is exposure to direct/vicarious victimization experiences at an earlier point in time related to an increase in crime/delinquency at a subsequent point in time?

2. Is exposure to direct (vicarious) victimization experiences at an earlier point in time related to an increase in crime/delinquency at a subsequent point in time via

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vicarious (direct) victimization?

3. Is involvement in crime/delinquency at an early point in time related to an increase in direct/vicarious victimization at a subsequent point in time? If so, does the harmful effect of criminal/delinquent behaviors on subsequent victimization vary by the types of victimization (direct vs. vicarious)?

These research questions extend existing knowledge about the victimization-delinquency relationship in several ways. They support a model that theoretically integrates GST with lifestyles/routine activities theory to consider reciprocal effects (e.g., Iratzoqui, 2018). These questions account for the continuous relationship between victimization and delinquency by assessing the relationship across three different time points (e.g., Schreck et al., 2006). Finally, distinct from prior studies, the research questions separate direct and vicarious victimization experiences to better understand how the two interplay with each other to affect delinquent coping (see Figure 4.1).
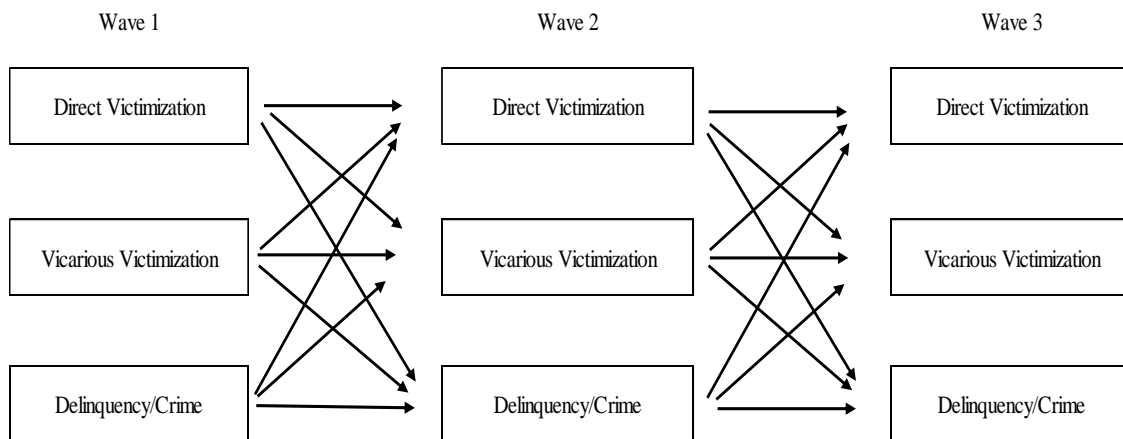
Figure 4.1 Estimated Model for Reciprocal Relationship.

The GST and lifestyle/routine activity theoretical model can contribute to discussions surrounding theoretical expansion in that the combination of these two theories can overcome the limitations of each to explain the reciprocal relationship between direct/vicarious victimization and offending. That is, the combined model consists of bidirectional assumptions of the causal pathways between the two events (i.e., victimization and delinquency/crime), which often occur in real-world settings. This model can also contribute to existing theoretical understandings regarding the relationship between direct victimization, vicarious victimization, and delinquency/crime. Agnew's (2002) explanation about the association between the two forms of victimization needs further development. Examining the reciprocal relationship between the two types of victimization and delinquency/crime can expand existing knowledge regarding the consequences of the inter-relationship between these two forms of victimization on delinquency, thereby contributing to GST's existing propositions.

Based on existing theory and prior research, individuals who previously experienced direct victimization are anticipated to have a higher rate of subsequent delinquency/crime as a means of coping with the aversive situation. Likewise, individuals who previously experienced vicarious victimization are anticipated to have a higher rate of subsequent delinquency/crime. Regarding the association between the two types of victimization experiences, individuals who previously experienced direct (or vicarious) victimization are expected to have a higher likelihood of experiencing vicarious (or direct) victimization, which, in turn, should increase the likelihood of subsequent offending. Also, individuals who previously participated in deviant/criminal activities are

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anticipated to have a higher likelihood of experiencing direct and vicarious victimization, respectively.

The second goal of this study is to examine how two temporal dimensions of victimization - stability and co-occurrence - are related to delinquent coping (see Figure 4.2). Even though repeat/chronic victimization and poly-victimization, respectively, have been examined in prior research, the collective temporal patterns of dual victimization, more specifically, have received limited attention. In accordance with this goal, the study focuses on two research questions:

1. Is dual victimization related to an increase in delinquency/crime?
2. Is the duration of exposure to dual victimization (i.e., experiencing dual victimization continuously across waves) related to an increase in delinquency/crime?
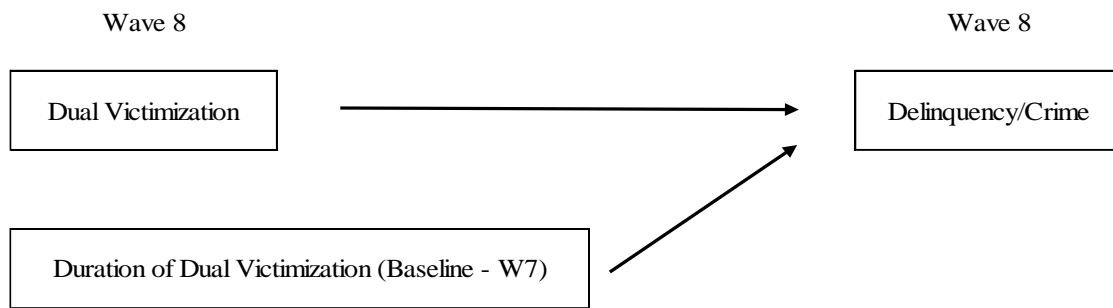
Figure 4.2 Estimated Model for Chronic Effects.

In exploring the answers to these questions, this study will consider within-individual changes and between-individual differences in dual victimization experiences across multiple waves. Based on existing theory and prior research, individuals who experience dual victimization as a life-course event are anticipated to have a higher rate

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of crime/delinquency as a means of coping with the aversive situation. Also in line with prior studies (e.g., Park & Metcalfe, 2020; Slocum et al., 2005), within-individual changes in dual victimization, and the consequences of chronic strain, are anticipated to increase delinquency/crime, especially among a group of high-risk juveniles transitioning into adulthood.

The analyses to explore the second study goal can serve to expand theoretical propositions regarding the temporal and developmental aspects of GST. Even though there are no assumptions regarding dual victimization in GST, dual victimization is expected to have a greater and/or a longer-term harmful effect on delinquency. In other words, dual victimization is expected to have an additive effect and cumulative effect on delinquency/crime.

4.2 Data and Sample

The current study utilizes data from the Pathways to Desistance study, made available through the Interuniversity Consortium for Political and Social Science Research (ICPSR). The Pathways to Desistance study is a multi-site panel study, with data collected in two locales— Maricopa County (Phoenix), Arizona, and Philadelphia County, Pennsylvania. Respondents of the study were classified as serious adolescent offenders, meaning they were between the ages of 14 to 17 when committing their first serious offense and ultimately were convicted of a serious crime. Among those enrolled, a baseline interview was conducted between November 2000 and January 2003. Follow-up interviews were then conducted with the respondents in the following 6, 12, 18, 24, 30, 36, 48, 60, 72, and 84 months. The original purpose of the study was to recognize desistance patterns among adolescent offenders as they transition into adulthood and to

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explore the impact of social context/developmental factors, as well as sanctions/interventions, on antisocial behaviors (see Mulvey et al. 2004 for more detail on the study).

For purposes of the first research goal, the study uses waves 1 through 3, with each of these waves having a six-month recall period. Some control variables are also taken from the baseline interview (explained further below). At the first three waves, most of the respondents are juveniles, aged 14 to 17 (the following number of respondents are in these age ranges at each wave: 962 in Wave 1, 776 in Wave 2, and 574 in Wave3) and are thus at the prime age for delinquent behaviors (Agnew, 2013; Defoe, Farrington, & Loeber, 2013). As Agnew (2006b) mentions, juveniles in those age ranges are more susceptible to direct victimization and vicarious victimization, since they are in an important transitory phase. Based on GST propositions, individuals at these age ranges within a more seriously delinquent sample would tend to cope with victimization through deviant behaviors, partially due to a lack of or limited legitimate ways of coping. Also, they have a higher risk of child maltreatment and peer bullying than those in young adulthood (Kim, Koh, & Leventhal, 2005). Overall, this suggests the need for focusing on adolescents in terms of their victimization and delinquent behaviors.

With regard to the second research goal, the study relies on the baseline interview and waves 1 to 8 in varying capacities. The impact of dual victimization experiences on delinquency is analyzed using Wave 8. However, to account for chronic or repeat dual victimization, the baseline interview and waves 1-7 are utilized to construct this measure. In order to extend existing knowledge from prior studies (e.g., Slocum et al., 2005), attention is given to try and maximize the duration of dual victimization experiences.

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However, it is noticed that several key variables of the current study are excluded at the later waves (Wave 9 and Wave 10), including school status and peer delinquency. Also, the retention rates for the last two waves are lower than previous waves (86.78% for Wave 9 and 83.53% for Wave 10), and the amount of offending and victimization reported is lower than earlier waves. In addition, all respondents in Waves 9 and 10 are 20 years old or older, which does not perfectly match the goals and theoretical framework of this study. For these reasons, these waves are excluded from the current study, leaving the baseline interview and eight subsequent waves (Wave 1 through Wave 8).

Among the 1,354 eligible participants at the baseline interview, 1,265 respondents (93.43%) agreed to participate and complete the survey at the first follow-up interview (Wave 1). An average retention rate of approximately 90% or above was found over the next six waves (Wave 2 through Wave 7), and about 89% retention rate for the following wave (Wave 8). Preliminary analyses are presented to consider potential issues resulting from missing data, including within-wave and whole-wave missing data. The within-wave missing data patterns are reported below in the analytic strategy sections of each study.

A whole-wave missing data analysis shows that a number of participants fail to complete the survey at each wave. A total of 966 respondents (71.34%) complete surveys from the baseline interview to the interview at wave 8. There are 76 different missing value patterns across waves. The most common patterns include missing one interview, including 34 respondents at Wave 3 (2.51%), 32 respondents at Wave 8 (2.36%), 24 respondents at Wave 1 and Wave 7, respectively (1.77%), 22 respondents at Wave 4 (1.62%), and 17 respondents at Wave 5 (1.26%). The rest of the missing data patterns

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include less than 1% of respondents. Given that there were no distinct patterns related to the missing waves, it can be assumed that these waves are missing at random (MAR; Schafer & Graham, 2002).

4.3 Measures

4.3.1 Key Variables of Interest for Study 1

Because of the reciprocal nature of this study, the variables of interest are treated interchangeably as independent and dependent variables and are therefore not classified as one or the other in this section. *Overall Crime/Delinquency* is a time-varying frequency score of 22 different illegal behaviors, including violent offenses, property offenses, and substance-related offenses (see Appendix A for details). Respondents are asked to report the number of times they were involved in these illegal behaviors over the recall period at Waves 1 to 3. As a count, this variable reflects the number of criminal acts in which the person engaged at each wave. As shown in Table 4.1, the variable ranges from 0 to 3250, with higher values indicating a greater number of deviant behaviors committed by the respondent.

Also, key to the research questions are the victimization experiences of the respondents during each recall period. Participants are asked to report on their experience with direct victimization and vicarious victimization, separately, over the past recall period. *Direct Victimization* is measured by asking participants about six related behaviors, including (1) being chased, (2) being beaten up, mugged, or seriously threatened by another person, (3) being raped, a victim of attempted rate, or sexually attacked, (4) being attacked with a weapon, (5) being shot at, and (6) being shot.

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Table 4.1 Descriptive Statistics of Key Variables by Wave for Study 1.

Variables	Wave 1		Wave 2		Wave 3		Min	Max
	Mean	SD	Mean	SD	Mean	SD	Min	Max
Delinquency/Crime (Frequency)	34.744	194.430	35.917	163.757	47.888	215.895	0	3250
Direct Victimization (Count)	.272	.686	.212	.603	.210	.604	0	6
Vicarious Victimization (Count)	1.176	1.471	1.099	1.468	.993	1.425	0	7
n (individuals)	1,265		1,262		1,229			

ABBREVIATIONS: SD = standard deviation; Min = minimum; Max = maximum.

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Vicarious Victimization is measured with seven related behaviors, including (1) observing someone else being chased and thought they could be seriously hurt, (2) observing someone else being beaten up, mugged, or seriously threatened, (3) observing someone else being raped, a victim of attempted rape, or sexually attacked, (4) observing someone else being attacked with a weapon, (5) observing someone else being shot at, (6) observing someone else being shot, and (7) observing someone else being killed as a result of violence. These two types of victimization experiences are measured as a count of the number of direct and vicarious victimization experiences. As a count, these variables reflect the number of exposures to each type of criminal victimization at each wave. *Direct Victimization* ranges from 0 to 6 and *Vicarious Victimization* ranges from 0 to 7 (see Table 4.1), with higher values indicating a greater number of either direct or vicarious exposures to criminal victimization by the respondent.

4.3.2 Key Variables of Interest for Study 2

The second study consists of two different measures of delinquency/crime as dependent variables, as shown in Table 4.2. Like the first study, *Overall Crime/Delinquency* is a time-varying frequency score of 22 different illegal behaviors, including violent offenses, property offenses, and substance-related offenses reported at Wave 8. Higher values indicate a greater number of deviant behaviors committed by the respondent. Second, the variety proportion of *Overall Crime/Delinquency* at Wave 8 is employed. This variable includes the same 22 illegal behaviors but is calculated as the number of acts committed in the recall period (ranging from 0 to 22) divided by the number of illegal behavior questions answered (i.e., 22). Higher values indicate a greater

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proportion of deviant behaviors committed by the respondent (with the final score

ranging from 0 to 1).

Table 4.2 Descriptive Statistics of Key Variables by Wave for Study 2 (n = 1,207).

Variables		Wave 8			
	Percentage	Mean	SD	Min	Max
Delinquency/Crime (Frequency)	-	61.292	214.769	0	2750
Delinquency/Crime (Proportion)	-	.060	.107	0	1
Dual Victimization (Dummy)	-	.104	.305	0	1
Chronic Dual Victimization					
0 Waves	25.52	-	-	0	1
1 Wave	38.61	-	-	0	1
2 Waves	20.22	-	-	0	1
3 Waves	8.95	-	-	0	1
4 Waves	3.81	-	-	0	1
5 Waves	1.49	-	-	0	1
6 or More Waves	.91	-	-	0	1

ABBREVIATIONS: SD = standard deviation; Min = minimum; Max = maximum.

The reporting of dual victimization experiences by the respondents serves as one

of the key independent variables for study 2. Dual victimization is captured based on

responses related to direct and vicarious victimization. Direct victimization and vicarious

victimization are measured by asking participants about victimization-related behaviors

experienced and witnessed by the respondent (as detailed above). These two variables are

first dummy coded to represent the experience of at least one form of direct and vicarious

victimization, respectively (1=yes, 0=never). Following the definition of Lin et al.

(2011), the measure of *Dual Victimization* relies on these two variables to designate

individuals who experienced at least one incident of direct victimization and vicarious

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victimization at each wave (coded 1). This method is different from research that follows Finkelhor et al.'s (2007a) definition of poly-victimization. In those studies, individuals who experienced more than four types of varying victimization experiences (direct, vicarious, or both) during the recall period are considered as poly-victims. Although their method is in accordance with the meaning of "poly," it fails to differentiate individuals directly exposed to violence from those indirectly exposed.

In order to capture the compounded effect of the two forms of victimization (i.e., the cumulative effect), respondents' *Dual Victimization* during earlier waves (baseline[5] through Wave 7) is counted to create a measure of *Chronic Dual Victimization*. This variable accounts for within-individual changes over time and identifies the number of prior waves in which respondents experienced *Dual Victimization,* ranging from 0-8. The values indicating 6 through 8 waves of dual victimization are truncated to 6, because few respondents experience dual victimization at 6 waves or more, resulting in a range of 0 to 6 (see Table 4.2).

Diverging from the two prior studies in this area (Park & Metcalfe, 2020; Slocum et al., 2005), the current research focuses on the existence of dual victimization over time, rather than the discontinued or intermittent incidents of victimization (see Park & Metcalfe, 2020 for discussion). Stated differently, regarding the extent of dual victimization, the recurrence of dual victimization across waves is given primary attention, instead of the duration of the enduring effect of victimization. For purposes of this goal, a distinct event of a dual victimization experience at each prior wave is counted

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[5] The respondents were asked whether they had *Direct Victimization* and *Vicarious Victimization* experiences during their life up to the point of the interview.

in numeric format (see Avison & Turner, 1998; Mowen & Brent, 2016 for a similar approach). Responses consist of seven mutually exclusive categories: never, once, twice, and continuing up to six times or more.

4.3.3 Time-Varying Control Variables

Several time-varying control variables are included that are theoretically related to GST and the lifestyles/routine activities perspectives (see Table 4.3). Agnew (2006b, 2013) recommended the use of an overall measure of personal characteristics and situational factors to adequately measure interconnected risk factors. His suggestion of an additive scale includes items "… such as low self-control, negative emotionality, low social control, belief favorable to crime, and association with criminal peers, including gang members" (Agnew, 2013, p. 662). Following the recommendation of Agnew (2006b, 2013) and prior studies (e.g., Craig, Cardwell, & Piquero, 2017; Thaxton & Agnew, 2018), a *Risk Factor Index* is created (see Table 4.3). This index combines thirteen factors into a single additive index: peer delinquency, family criminality, moral disengagement, perception of chances for success, future orientation, religious attendance, gang involvement, substance abuse, school status, employment status, marital/relationship status, low self-control, and personal rewards of crime (see Appendix A for details about these measures).

Five of these variables are already dummy coded: family criminality (1= having delinquent/criminal family members), gang involvement (1= gang activity), school status (1=not enrolled in school), employment status (1= unemployed), and marital/relationship status (1= unmarried or no romantic relationship). Aside for these five-dummy coded

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Table 4.3 Descriptive Statistics of Time Varying Control Variables by Wave.

	Wave 1		Wave 2		Wave 3		Wave 8			
Variables	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Min	Max
Age	16.553	1.150	17.048	1.154	17.519	1.143	21.018	1.151	14	23
Time on Streets	.520	.439	.571	.432	.662	.420	.714	.390	0	1
Emotional Intensity	2.801	.676	2.816	.683	2.849	.683	2.777	.676	1	4
Risk Factor Index	4.058	2.106	3.991	2.133	4.182	2.173	4.274	2.220	0	13
n (individuals)	1,265		1,262		1,229		1,207			

ABBRDVIATIONS: SD = standard deviation; Min = minimum; Max = maximum.

variables, all other variables are recoded on the upper quartile (the most extreme 25%) of these scales as 1 to represent a higher risk in each of the factors, and those observations on the other quartiles are coded as 0 (see Thaxton & Agnew, 2018). For the purpose of the index, perceptions of chances for success, religious attendance, future orientation, and low self-control are reverse coded initially. Each of these dummy variables are added together to form the index, with higher values representing greater risk factors for delinquency/crime. Appendix B provides the correlation matrix and descriptive statistics of the items in the index.

In addition to this index, *Age* is a time-variant factor, which captures the age in years of the respondents at each wave. *Time on Street* is measured by asking respondents to report the proportion of time spent on the streets during each recall period. Higher scores indicate more time spent on the streets. *Emotional Intensity* is another time-variant factor that captures the adolescents' ability to regulate emotions. This variable was originally created by the Pathways team and represents the mean of 9 items that are drawn from Walden et al.'s (1995) Children's Emotional Intensity Child Reports. According to Agnew (1992, 2001), emotional intensity is an intervening mechanism in explaining offending, which is expected to mediate the association between victimization and delinquency. This variable is measured by questions pertaining to control of feelings and knowledge of things that make them less mad, scared, sad, or upset. Higher scores indicate a greater ability to regulate emotions.

4.3.4 Time-Invariant Control Variables

The current study also considers several control variables that are found to be related to victimization and/or delinquency based on the theory and research guiding this

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study but either do not vary or are not adequately captured at each wave. All of these variables are taken from the baseline interview (see Table 4.4). Sex is dummy coded, representing 1 for *Male*. Race/ethnicity is also a relevant control variable, since some racial groups, such as Blacks, have an increased risk of violent victimization and delinquency (Agnew, 1999; Jang & Johnson, 2003). In the original measure of race, there are four racial/ethnic categories: *White*, *Black*, *Hispanic*, and *Other*. Separate dummy variables are created for each race/ethnic category, and *White* is used as the reference category. *Family Socioeconomic Status* (SES) is measured by asking the level of educational attainment of the respondent's biological parents. The six choices available include graduate school (1), college education (2), two-year college (3), high school diploma (4), some high school (5), and grade school or less (6). Two distinct measures for each biological parent are combined into a single mean index by the Pathways team. Higher values suggest lower levels of educational attainment or socioeconomic status.

Table 4.4 Descriptive Statistics for Time-Invariant Control Variables (n = 1,354).

Variables	Percentage	Mean	SD	Min	Max
Male	86.41	-	-	0	1
Race/ethnicity					
White	20.24	-	-	0	1
Black	41.43	-	-	0	1
Hispanic	33.53	-	-	0	1
Other	4.80	-	-	0	1
Family Structure (1= both biological parents)	14.70	-	-	0	1
Family Socioeconomic Status (SES)	-	4.303	.946	0	6
Parental Warmth	-	3.058	.693	1	4
Parental Monitoring	-	2.731	.716	1	4
Neighborhood Conditions	-	2.347	.723	1	4

ABBRDVIATIONS: SD = standard deviation; Min = minimum; Max = maximum.

Family Structure is a dummy variable, coded 1 to represent that the respondent grew up with both biological parents. *Parental Warmth* is measured by asking nine questions regarding feelings of warmth from the mother and father, separately. The variable is measured by asking respondents how often their mother and father, respectively, show their affection toward respondents, such as acting supportive, telling the respondents they love them, and listening carefully to respondents' points (see Appendix A for details). The answers were originally combined by the Pathways team to create two variables - mother warmth and father warmth. For purposes of the study, these two variables are then combined into a single mean index (alpha = .618), with higher values suggesting more parental warmth. *Parental Monitoring* is measured by asking nine questions regarding the level of monitoring of the primary caregiver. The answers were combined by the Pathways team into a single mean index, with higher values suggesting higher levels of parental monitoring. The variable of *Neighborhood Conditions* is measured by asking 21 items about the physical disorder (e.g., cigarettes on the street, graffities, or tags) and social disorder of the neighborhood (e.g., people using needles or syringes to take drugs, people smoke marijuana/cocaine). In this preconstructed index, higher scores indicate a greater degree of disorder within the community. Variance inflation factors (VIF) suggest none of the present measures suffer from multicollinearity (not shown). Appendix C provides the correlation matrices for studies 1 and 2.

4.4 Analytic Strategy

4.4.1 Study 1: Reciprocal Relationship Between Victimization and Delinquency/Crime

In study 1, path analysis is used to examine the set of research questions that aims to explore the non-recursive relationship between direct/vicarious victimization and delinquency captured at three different waves. Path analysis is preferred to standard regression as a means of accounting for the longitudinal and prospective scope of the reciprocal relationships, including the impact of delinquency at an earlier wave on direct/vicarious victimization at a later wave (e.g., Iratzoqui, 2018). While direct victimization may increase one's chance of vicarious victimization, vicarious victimization may also affect the risk of direct victimization (Agnew, 2002). Exposure to both forms of victimization can enhance the likelihood of criminal coping, as well as later victimization (e.g., Lin et al., 2011). Additionally, by using path analysis, the multiple pathways between direct/vicarious victimization and delinquency are explored by estimating direct, indirect, and total effects simultaneously within a single model. By exploring lagged specifications, issues related to causal ordering are also considered.

The data analyses are based on the estimation of a cross-lagged model, which is designed to test for reciprocal effects. The cross-lagged model is suitable to examine the longitudinal relationship between variables that are associated with each other across time (Bui, Ellickson, & Bell, 2000; Matsueda & Anderson, 1998). As shown in Figure 4.1, the cross-lagged model includes three key measures: direct victimization, vicarious victimization, and delinquency/crime (each from Wave 1 through Wave 3). By using this cross-lagged model, the current study analyzes the impact of the Time 1 measures (i.e., direct victimization, vicarious victimization, delinquency/crime) on their Time 2 and 3

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counterparts, while simultaneously estimating the effect of the other covariates. In this model, direct victimization, vicarious victimization, and delinquency/crime at Time 1 are assumed to have a lagged (positive) effect on those counterparts at Time 2. Likewise, direct victimization, vicarious victimization, and delinquency/crime at Time 2 are assumed to have a lagged (positive) effect on their counterparts at Time 3. Accordingly, direct victimization, vicarious victimization, and delinquency/crime at times 1 and 2 are included in each equation to control for the relative stability of each variable on itself.

Although cross-lagged models have been widely used by researchers to examine longitudinal relationships, there are some issues with cross-lagged models that should be noted. First, cross-lagged correlations are not only affected by the magnitudes of the cross-variable causal paths (i.e., the impacts of direct/vicarious victimization on delinquency/crime, and vice versa) but also the presence of stabilities of each variable (e.g., the impact of direct victimization at Time 1 on direct victimization at Time 2) and the simultaneous correlation of the variables. In this way, the correlations among certain lagged variables, such as delinquency/crime at Time 1 and vicarious victimization at Time 2, could be greater than the correlation between vicarious victimization at Time 1 and delinquency/crime at Time 2, for instance, if the stability of vicarious victimization is larger than the stability of delinquency/crime (Markus, 1979).

Second, cross-lagged models cannot account for contemporaneous reciprocal effects. For example, direct victimization and vicarious victimization at Time 3 can result in delinquency/crime at Time 3. Likewise, delinquency/crime at Time 3 can increase the chances of exposure to direct/vicarious victimization at Time 3. The cross-lagged model does not explore the association between direct/vicarious victimization and

delinquency/crime at the same point in time. To avoid this issue, some prior studies (e.g., Barnes, Golden, Mancini, Boutwell, Beaver, & Diamond, 2014; Brezina, 1999) employ a contemporaneous model that is specialized to analyze the concurrent/contemporaneous reciprocal effects. Contrary to the cross-lagged model, a contemporaneous model includes causal paths between variables at the same point in time, as well as the lagged effects of each variable on itself. Some prior studies suggest that the concurrent impact is much greater and more significant than the lagged effect (e.g., Agnew, 1991; Agnew & White, 1992; Lauristen et al., 1991; Thornberry, Lizotte, Krohn, Farnworth, & Jang, 1994). Based on some prior findings, it is argued that accounting for the contemporaneous effect is more critical than the lagged impact to understand the reciprocal relationship between victimization and offending.

Despite this last issue, the theoretical justification and research purposes of the current study necessitate a model specifying cross-lagged effects. Building on an incorporated model of GST and the lifestyle/routine activity perspective, the primary goal of this study is to explore the impact of direct and vicarious victimization experiences at Time 1 on delinquent/criminal behaviors at Time 2, which, in turn, can affect the likelihood of being a victim at Time 3. In this instance, the lagged effects are noteworthy and relevant for assessing the causal paths of interest as a means of appropriately establishing time ordering. Also, the cross-contemporaneous model is demanding and restrictive in its estimations due to certain exclusion restrictions of this model. In particular, delinquency/crime at Time 1 could not directly affect vicarious victimization at Time 2, for instance, except through vicarious victimization at Time 1.

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Based on the goals of the study, structural equation modeling (SEM) with full information maximum likelihood (FIML) estimation is utilized. The SEM approach is useful in understanding relational data in multivariate systems. The regression coefficients of the SEM model are explored based on the relationship between the key variables of interest across waves. More specifically, *Direct Victimization* at Wave 1 is linked to *Direct Victimization*, *Vicarious Victimization*, and *Delinquency/Crime* at waves 2 and 3 to assess direct and indirect pathways leading from *Direct Victimization*. Similarly, *Vicarious Victimization* and *Delinquency/Crime* at Wave 1 are linked to the three outcome variables at waves 2 and 3, respectively. These directional parameters enable tests related to whether and what extent an early event or condition has a stable and/or cross-lagged influence on the variables of interest at a later point in time.

The SEM model includes covariances between error terms, which is equal to the correlation times the product of the variables' standard deviations. The covariances in error terms in this study are measured between *Direct Victimization, Vicarious Victimization,* and *Delinquency/Crime* at waves 2 and 3, separately. Also, the model includes covariances between all exogenous variables within and across waves. More specifically, the covariances are measured between *Direct Victimization, Vicarious Victimization,* and *Delinquency/Crime* at Wave 1, between the key variables at Wave 1 and the control variables, and between the control variables across waves.

The model consists of four time-variant control variables, including *Age*, *Time on Street*, *Emotional Intensity*, and the *Risk Factor Index* that are taken from waves 2 and 3, respectively. These control variables are linked to the key variables of interest at the same wave, such that the lagged effects are not explored. Initially, the lagged effects of the

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time-invariant control variables are considered (e.g., the impact of the *Risk Factor Index* at Wave 2 on *Direct Victimization* at Wave 3). Yet, a preliminary analysis reveals that conditions and circumstances at the earlier wave are unrelated or less related to victimization experiences and offending at the subsequent wave. Modification indices also reveal that using the time-invariant variables from the same wave improve model fit. Therefore, these variables are not lagged, partially because adolescents are more affected by the current circumstances than prior ones (see Agnew & White, 2002; Brezina, 1999).

As recommended by Markus (1979), unstandardized estimates are presented "because correlations and standardized regression coefficient values are affected by changes in variances across populations" (p. 49) and the lagged effects of each of the endogenous variables (direct victimization, vicarious victimization, and delinquency/crime) are included in the models. Through the use of FIML, the missing values on the predictors can be easily handled, though missing data analyses to justify this approach are presented first below. Two alternative methods are also considered to deal with missing values in the responses and are presented as supplementary analyses in Chapter 5, including listwise deletion and mean imputation. Generally, the SEM model can provide consistent estimates under the assumption that the endogenous variables are continuous and normally distributed. Therefore, the frequency score of *Delinquency/Crime* and the counts of *Direct Victimization* and *Vicarious Victimization* are log-transformed to more closely meet these assumptions. Alternative methods to account for issues of non-normality are also considered in a series of sensitivity analyses.

4.4.2 Missing Variables for Study 1

A number of participants failed to complete the survey or skipped survey items. A total of 193 respondents missed interviews at Wave 1, Wave 2, and/or Wave 3. Scholars advise against imputing whole waves of missing data, since doing so does not increase model efficiency and can inflate the standard errors (Allison, 2001; Young & Johnson, 2015). As a result, these waves are dropped from the analysis and assumed to be missing at random (MAR) based on the missing data patterns presented above. This reduces the number of respondents to 1,161.

A within-wave missing data analysis is done for these 1,161 remaining respondents. A total of 984 of them (84.75%) have complete information for all independent and dependent variables. Regarding the key variables of interest, three respondents (.26%) did not provide their involvement in *Delinquency/Crime*, *Direct Victimization,* and *Vicarious Victimization* at Wave 1. One respondent did not provide their involvement in *Delinquency/Crime*, *Direct Victimization,* and *Vicarious Victimization* at Wave 2 and 3, respectively.

There are 26 different missing value patterns. The most common patterns include missing one variable, including the *Risk Factor Index* at Wave 1 (4.05%), *Parental Monitoring* (2.67%), the *Risk Factor Index* at Wave 3 (2.07%), the *Risk Factor Index* at Wave 2 (1.64 %), and *Family SES* (1.38%). The rest of the missing data patterns include less than 1% of respondents. A total of 5 respondents are dropped based on missing values for the key variables of interest (i.e., *Delinquency/Crime*, *Direct Victimization,* and *Vicarious Victimization*), which are considered as endogenous variables in the path model.

Among those without missing values on the key variables of interest (n = 1,156), a set of *t-tests* are conducted to compare the participants with at least one missing observation on any of the independent variables to those without missing values in terms of direct victimization, vicarious victimization, and delinquency/crime at each wave. As shown in Table 4.5, the results reveal that the two groups of participants are not statistically different from one another in terms of the outcomes. There are no patterns to the missingness. Accordingly, it is assumed that the missing data is missing completely at random (MCAR; Schafer & Graham, 2002) and FIML estimations are conducted.

Table 4.5 Results of T-tests Comparing Individuals with Missing Value(s) to Individuals Without Missing Value(s) for Study 1 (n = 1,156).

Dependent Variable	t-value	p-value
Direct Victimization at Wave 1	.125	.901
Direct Victimization at Wave 2	-.415	.679
Direct Victimization at Wave 3	.752	.453
Vicarious Victimization at Wave 1	.620	.536
Vicarious Victimization at Wave 2	.034	.973
Vicarious Victimization at Wave 3	-.427	.670
Delinquency/Crime at Wave 1	.513	.609
Delinquency/Crime at Wave 2	-.112	.911
Delinquency/Crime at Wave 3	-.079	.937

4.4.3 Study 2: Chronic Effects of Victimization on Delinquency/Crime

To address the second set of research questions, multivariate regression analyses are conducted to assess the relationship between dual victimization and delinquency/crime. The first model includes *Dual Victimization* to explore the additive association between victimization and delinquency/crime. Appropriate control variables are also included, with controls for prior *Delinquency/Crime* measured at Wave 7, *Age*,

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the *Risk Factor Index, Time on Streets,* and *Emotional Intensity* measured at Wave 8, and *Male, Race/Ethnicity, Family SES, Intact Family, Parental Warmth,* and *Parental Monitoring* taken from the baseline interview. The results capture between-individual differences, in terms of explaining the variation in delinquent coping between people who experienced dual victimization and those without such experience. In a second model, the *Chronic Dual Victimization* measure is added to explore the cumulative effect. The results for this variable show how the number of waves that include *Dual Victimization* prior to Wave 8 may be related to an increase in delinquency/crime at Wave 8. From this model, it is possible to determine whether and to what extent an individual's risk of offending can be affected by multiple life experiences of *Dual Victimization* during the adolescent and early adulthood years, a consideration of within-individual change.

As stated earlier, the dependent variable of this study consists of two different measures of delinquency/crime. The first set of analyses uses the frequency score of *Delinquency/Crime* at Wave 8. The offense frequency ranges between 0 and 2750, and it is positively skewed. Given that the estimators are affected by the outliers in a preliminary analysis (not shown), the frequency score is truncated to the 95th percentile (see Monahan & Piquero, 2009 for a similar approach). Offenses with a frequency of 360 or more are recoded as 360, and the updated distribution is shown in Figure 4.3. Likewise, *Delinquency/Crime* at Wave 7 – one of the control variables – is truncated to the 95th percentile to keep consistency. Offenses with a frequency of 368 or more are recoded as 368.

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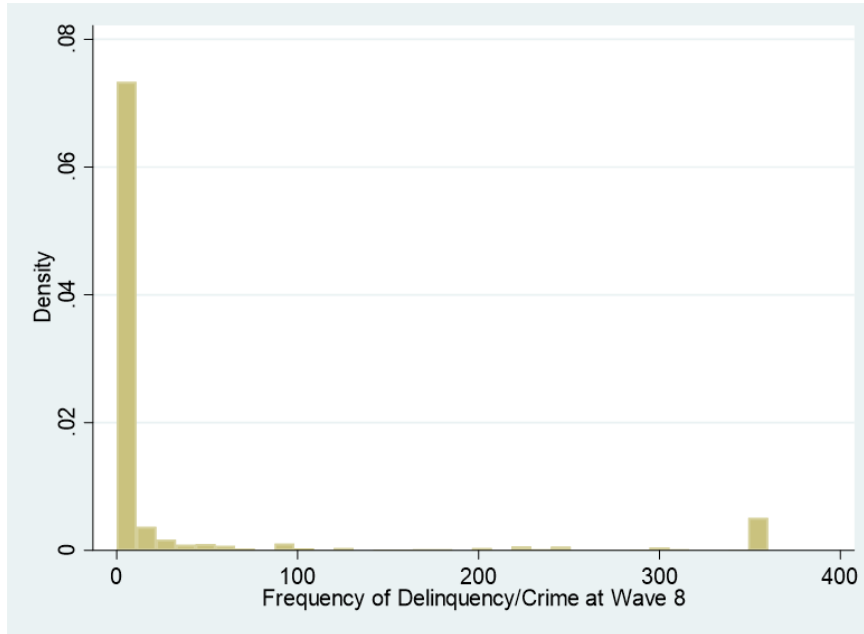
Figure 4.3 Distribution of the Frequency of Delinquency/Crime at Wave 8.

Because the outcome is a count, Poisson and negative binomial estimators are considered for the analysis. A number of tests are conducted to compare the two estimators, and the results indicate that the negative binomial regression model (NBRM) is preferred to the Poisson regression model (PRM). First, overdispersion is found in the Poisson distribution, but not the NBRM. The mean number of crimes reported is 38.658, with a variance of 96.377, such that the variance is substantially more than the mean. For this reason, the number of crimes observed is overpredicted or underpredicted by the Poisson distribution, while it is almost identical to the NBRM. As shown in Table 4.6, a Poisson distribution predicts that .16% of the cases will be zeros, while the observed zeros are 55.94%. The observed number of zeros (n = 672) is 253.55% of what is expected by the PRM (n = 2.64), suggesting that the PRM is not the optimal distribution (Cameron & Trivedi, 1998). The number of predicted zeros by the NBRM is 671

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(55.90%), which is closest to the observed proportion. Also, fewer people are predicted

by the Poisson estimator to have 1 to 3 more crimes than is observed, whereas more

people are predicted by the Poisson estimator to have 4 or more crimes than is observed.

Figure 4.4 demonstrates this discrepancy in the predicted versus observed proportions for

PRM, while Figure 4.5 shows the predicted and observed proportions are more closely

aligned for NBRM.

Table 4.6 Poisson and Negative Binomial Model Comparisons for Frequency of
Crime (n = 1,058).

Delinquency/Crime	Observed Proportion	Predicted PRM	Predicted NBRM
0	.5595	.0022	.5590
1	.0803	.0075	.0621
2	.0567	.0143	.0342
3	.0265	.0198	.0239
4	.0104	.0227	.0184
5	.0113	.0231	.0150
6	.0076	.0222	.0127
7	.0095	.0210	.0110
8	.0066	.0203	.0097
9	.0028	.0204	.0086
10	.0085	.0211	.0078
11	.0038	.0223	.0071
12	.0057	.0238	.0065
13	.0028	.0252	.0060
14	.0000	.0265	.0056
15	.0047	.0274	.0052
16	.0019	.0281	.0049
17	.0009	.0285	.0046
18	.0000	.0285	.0043
19	.0000	.0282	.0041
20	.0095	.0276	.0039
21	.0028	.0268	.0037
22	.0009	.0258	.0035
23	.0000	.0246	.0034
24	.0009	.0233	.0032
25	.0038	.0219	.0031
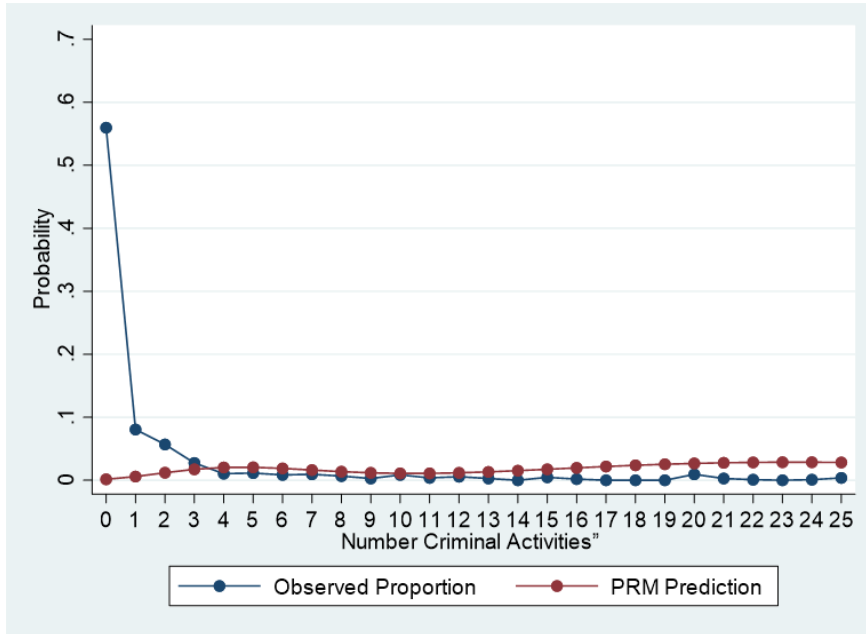
Figure 4.4 Observed Proportion vs. Poisson Regression Model Prediction for Frequency of Crime.
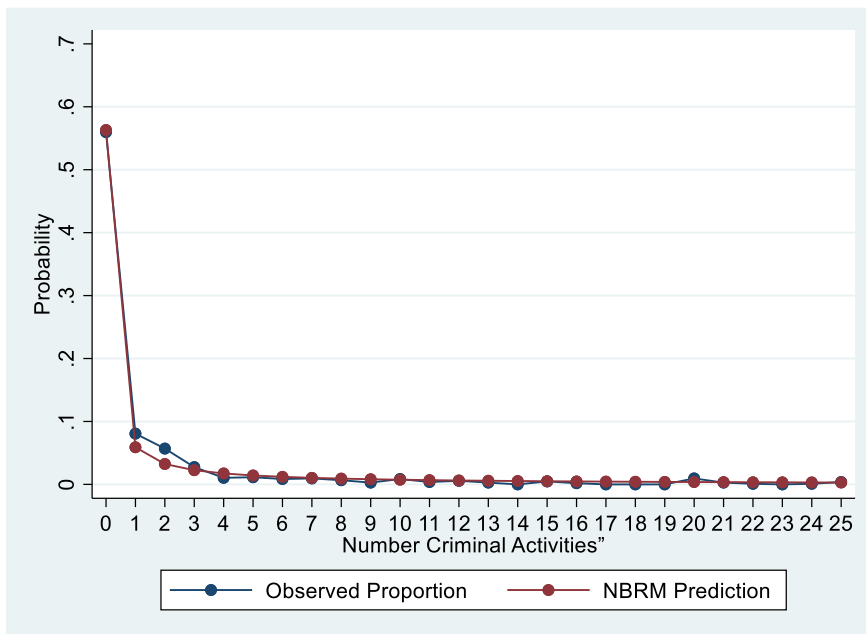
Figure 4.5 Observed Proportion vs. Negative Binomial Regression Model Prediction for Frequency of Crime.

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Second, the results of the model fit statistics indicate a stronger preference for the NBRM over the PRM.[6] In Table 4.7, the values of Akaike's Information Criterion (AIC) in the NBRM are lower than those in the PRM, and the difference is 92697.90 for the model only with *Dual Victimization* and 90231.75 for the model with *Dual Victimization* and *Chronic Dual Victimization*, suggesting a preference for the NBRM (Hilbe, 2009). Similarly, the values of the Bayesian Information Criterion (BIC) in the NBRM are lower than those in the PRM for both models, also suggesting a strong preference for the NBRM (Reftery, 1996). The likelihood ratio chi-square test (i.e., G^2) shows a value of 92699.89 for the first model and 90233.75 for the second model, indicating a preference for the NBRM due to overdispersion.

Table 4.7 Poisson and Negative Binomial Model Comparisons for Models Predicting Frequency of Crime (n = 1,058).

Model	Obs	ll(null)	ll(model)	df	AIC	BIC
PRM (Dual Victimization)	1058	-74013.550	-49216.390	16	98464.790	98544.210
NBRM (Dual Victimization)	1058	-2931.751	-2866.445	17	5766.890	5851.281
PRM (Dual & Chronic Dual Victimization)	1058	-74013.550	-47977.340	22	95998.690	96107.900
NBRM (Dual & Chronic Dual Victimization)	1058	-2931.751	-2860.468	23	5766.936	5881.111

The second set of analyses uses the proportion of total *Delinquency/Crime* at Wave 8, and the distribution of the variable is shown in Figure 4.6. Fractional Response

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[6] These comparisons are done using listwise deletion models (n = 1,058).

Generalized Linear Models are considered for the analysis. The fractional estimator (e.g., Fractional Probit, Fractional Logit) is an appropriate estimator when the dependent variable of interest is a proportion, and the values range between 0 and 1 (Papke & Wooldridge, 1996; Wooldridge, 2011), indicating that the logistic/probit estimators can produce imprecise outcomes for this model. The fractional estimator can be more accurate than a beta distribution for this study because the latter ignores the response values of 0 and 1. The Zero One Inflated Beta Model is also considered, since the dependent variable of this study includes values of 0. However, it is not an optimal model, in this circumstance, due to the lack of 1s in the dependent variable. Accordingly, the Fractional Probit Model is selected after comparing it to the Fractional Logit Model.
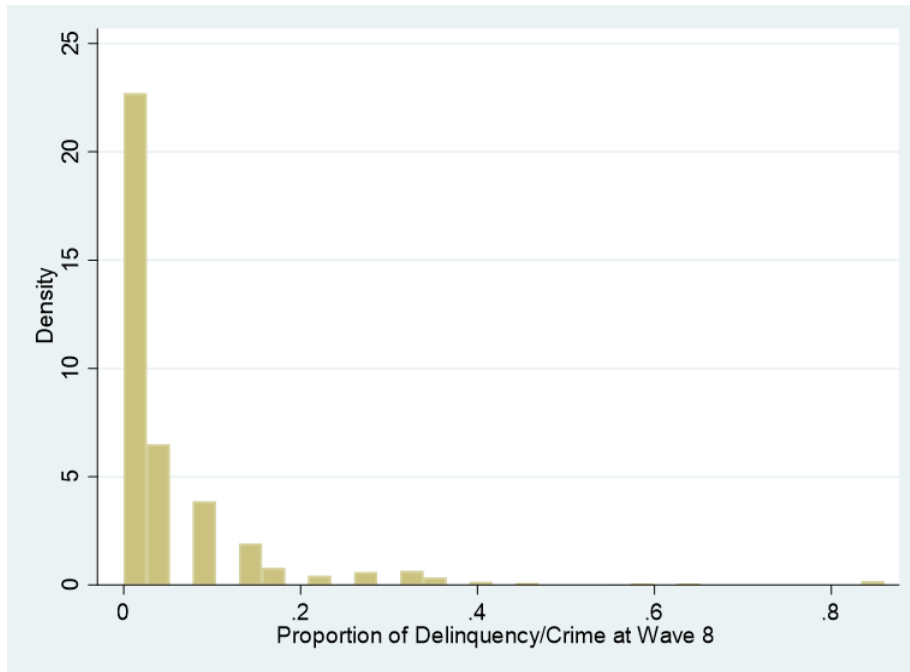
Figure 4.6 Distribution of the Proportion of Delinquency/Crime at Wave 8.

As shown in Table 4.8, the values of Akaike's Information Criterion (AIC) and Bayesian Information Criterion (BIC) of the first model using the probit estimator (AIC: .439.228, BIC: 518.655) are smaller than those of the logit estimator (AIC: .440.226, BIC: 519.652).[7] Similarly, the AIC and BIC values of the second model using the probit estimator (AIC: .449.451, BIC: 558.662) are smaller than those of the logit estimator (AIC: 450.219, BIC: 559.430), even though the differences are negligible. The likelihood ratio chi-square test (i.e., G^2) shows a value of 1.00 for the first model and .77 for the second model, indicating a preference for the Fractional Probit Model.

Table 4.8 Probit and Logit Model Comparisons for Models Predicting the Proportion of Crime (n = 1,058).

Model	Obs	ll(null)	ll(model)	df	AIC	BIC
Probit (Dual Victimization)	1058	-235.374	-203.611	16	439.228	518.655
Logit (Dual Victimization)	1058	-235.374	-204.113	16	440.226	519.652
Probit (Dual & Chronic Dual Victimization)	1058	-235.374	-202.726	22	449.451	558.662
Logit (Dual & Chronic Dual Victimization)	1058	-235.374	-203.109	22	450.219	559.430

Robust standard errors are set by default in the Fractional Probit estimator. Robust standard errors can be more reliable because robust standard errors can relax the assumption regarding heteroskedasticity, which states that errors are both independent and identically distributed. More importantly, the "Fractional regression is a model of the mean of the dependent variable y conditional on covariates x" (Fracreg - Fractional response regression (n.d.), p.4). This means that the Fractional Probit estimator is a quasi-

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[7] These comparisons are done using listwise deletion models (n = 1,058).

likelihood estimation, which relies on the conditional mean (µx). The dependent variable ranges between 0 and 1 and the conditional mean (µx) is then ensured to be ranged between 0 and 1 by using a probit estimator. For this reason, there is no "need to know the true distribution of the entire model to obtain consistent parameter estimates" (Fracreg - Fractional response regression (n.d.), p.4).

4.4.4 Missing Variables for Study 2

A number of participants failed to complete the survey or skipped survey items. A total of 147 respondents missed the interview at Wave 8. As previously mentioned, scholars advise against imputing whole waves of missing data, since doing so does not increase model efficiency and can inflate the standard errors (Allison, 2001; Young & Johnson, 2015). As a result, these respondents are dropped from the analysis and assumed to be missing at random (MAR) based on the whole-wave missing data patterns presented above. This reduces the number of respondents to 1,207.

A within-wave missing data analysis is done for these 1,207 remaining respondents. A total of 1,058 of them (87.66%) have complete information for all independent and dependent variables. Six respondents (.50%) do not provide their involvement in *Delinquency/Crime* at Wave 8 - the dependent variable of interest. There are 3 missing observations (.25%) for *Dual Victimization* and 37 missing observations (3.07%) for the *Risk Factor Index*, with 0% through 4.23% missingness in the other control variables. *Chronic Dual Victimization* has no missing observations, because the measure counts dual victimization for each wave that this information is reported. Stated differently, individuals who are missing waves of data are assumed to have no experience of direct and vicarious victimization at those waves. An alternative approach to the

construction of this variable is considered in the supplementary analyses reported in Chapter 5.

There are 23 different missing value patterns. The most common patterns include missing one variable, including *Delinquency/Crime* at Wave 7 (3.48%), *Parental Monitoring* (2.82%), the *Risk Factor Index* (1.91%), and *Parental Education* (1.33%). The rest of the missing data patterns include less than 1% of respondents. A total of six respondents are dropped due to missing data on the dependent variable - *Delinquency/Crime* at Wave 8.

Among those without missing values on the dependent variable (n = 1,201), a *t-test* is conducted to compare the participants with at least one missing observation on any of the independent variables and those without missing values on the independent variables in relation to reports of delinquency/crime. The results reveal that the two groups of participants are not statistically different from one another in terms of the frequency score of offending ($t = -.194$, $p > .05$) and proportion of offending ($t = .924$, $p > .05$). Accordingly, it is assumed that the missing data is missing completely at random (MCAR; Schafer & Graham, 2002).

Even still, multiple imputation (MI) is applied to deal with missing values among respondents who completed interviews at Wave 8. This is one of several procedures to generate missing values based on other available information in the data (Rubin, 1987). Since the missing values are created based on information from non-missing observations, multiple imputation reduces biases and adjusts uncertainty that may be caused by missing information. This simulation-based approach improves validity more

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so than other ad hoc approaches to missing data (McCleary, 2002). Therefore, it is argued that this technique can yield unbiased estimates (Rubin, 1996).

Missing values for each missing data point are replaced with substituted values to create an analytic sample (Schafer, 1997). The original data is used to create missing values through the use of ten imputations. This process results in an analytic sample of 1,201. It should be noted that imputing missing values on the dependent variables can increase the standard errors, while it does not increase the efficiency of the model (Allison, 2001; Young & Johnson, 2015). Thus, missing data on the independent variables and control variables are imputed but not the dependent variable, and the result of the models using multiple imputation are reported.

Two alternative methods are also considered to deal with missing values in the responses and are presented as supplementary analyses in Chapter 5. These methods include listwise deletion and mean imputation. Also, as previously noted, the multiple imputation approach using a different version of the *Chronic Dual Victimization* variable is conducted as a supplementary analysis.

CHAPTER 5

RESULTS

5.1 Study 1: Reciprocal Relationship Between Victimization and Delinquency/Crime

As noted, a path analysis is used to simultaneously model the direct and indirect effects between direct victimization, vicarious victimization, and delinquent/criminal behavior across three waves. Fit statistics for the overall model indicate the model fits the data well (Comparative Fit Indices - CFI = .985, Tucker-Lewis Indices - TLI = .921, Root Mean Square Error of Approximation - RMSEA = .037, Akaike's Information Criterion - AIC = 52921.813, Bayesian Information Criterion - BIC = 54437.629).[8] For CFI and TLI, a value of .90 or above indicates a good fit (Hu & Bentler, 1999). For RMSEA, a value that is close to 0 is optimal for purposes of good fit, and a value of .06 or below indicates a good fit (Brown & Cudeck, 1993). Both unstandardized and standardized regression coefficients are available. Unstandardized regression coefficients are preferred, in this case, because they are not affected by changes in variances across populations, while standardized coefficient values are influenced by such changes (Markus, 1979). Because of this nuance, all reported coefficients are unstandardized.

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[8] The chi-square statistic (χ^2 [24, N = 1,161] = 61.567, $p < .001$) does not suggest a good fit between the data and the model. However, Holye and Panter (1995) suggest that specific fit indices can be selected to report, rather than reporting multiple indices. As the three fit indexes (i.e., CFI, TLI, and RMSEA) present the same results regarding model fit, they are presented as evidence of sufficient model fit. Chi-square values are also heavily impacted by sample size, which could explain its significance.

The direct and indirect effects of *Direct Victimization* at Wave 1 on *Direct Victimization, Vicarious Victimization,* and *Delinquency/Crime* at later waves are reported in Tables 5.1 and 5.2, as well as Figure 5.1. *Direct Victimization* at Wave 1 has direct effects on *Direct Victimization* at Wave 2 ($b = .127$, $p < .001$) and *Direct Victimization* at Wave 3 ($b = .074$, $p < .01$). Also, *Direct victimization* at Wave 1 is indirectly linked to *Direct victimization* at Wave 3 ($b = .028$, $p < .001$), mainly through its effect on *Direct Victimization* at Wave 2 ($b = .028$, $p < .001$). Individuals who are exposed to direct victimization at an earlier point in time tend to experience direct victimization at a later point in time, indicating a stability in direct victimization. *Direct Victimization* at Wave 1 does not directly or indirectly influence *Vicarious Victimization* or *Delinquency/Crime* at the later waves.

Table 5.1 Direct Effects of Path Model Examining the Longitudinal Impact of Direct Victimization on Direct Victimization, Vicarious Victimization, and Delinquency/Crime Using FIML (n = 1,156).

Path	b	SE
Direct Victimization at W1 → Direct Victimization at W2	.127***	.027
Direct Victimization at W1 → Vicarious Victimization at W2	-.013	.050
Direct Victimization at W1 → Delinquency/Crime at W2	.203	.129
Direct Victimization at W1 → Direct Victimization at W3	.074**	.027
Direct Victimization at W1 → Vicarious Victimization at W3	.049	.048
Direct Victimization at W1 → Delinquency/Crime at W3	.150	.139
Direct Victimization at W2 → Direct Victimization at W3	.219***	.032
Direct Victimization at W2 → Vicarious Victimization at W3	.007	.056
Direct Victimization at W2 → Delinquency/Crime at W3	.024	.162

ABBRDVIATIONS: b = unstandardized coefficient; SD = standard deviation.

NOTES: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$. The model includes the time-variant and time-variant control variables noted.

Table 5.2 Indirect and Total Effects of Path Model Examining the Longitudinal Impact of Direct Victimization on Direct Victimization, Vicarious Victimization, and Delinquency/Crime Using FIML (n = 1,156).

Path	Indirect b	Total b
Direct Victimization at W1 → Direct Victimization at W2 → Direct Victimization at W3	.028***	
Direct Victimization at W1 → Vicarious Victimization at W2 → Direct Victimization at W3	-.009[a]	
Direct Victimization at W1 → Delinquency/Crime at W2 → Direct Victimization at W3	-.002[b]	
Direct Victimization at W1 → Direct Victimization at W3	.028***	.102***
Direct Victimization at W1 → Direct Victimization at W2 → Vicarious Victimization at W3	.009	
Direct Victimization at W1 → Vicarious Victimization at W2 → Vicarious Victimization at W3	-.003	
Direct Victimization at W1 → Delinquency/Crime at W2 → Vicarious Victimization at W3	.003	
Direct Victimization at W1 → Vicarious Victimization at W3	.008	.058
Direct Victimization at W1 → Direct Victimization at W2 → Delinquency/Crime at W3	.003	
Direct Victimization at W1 → Vicarious Victimization at W2 → Delinquency/Crime at W3	-.002	
Direct Victimization at W1 → Delinquency/Crime at W2 → Delinquency/Crime at W3	.047	
Direct Victimization at W1 → Delinquency/Crime at W3	.048	.197

ABBREVIATION: b = unstandardized coefficient.

NOTES: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed test). The model includes the time-variant and time-variant control variables noted; [a] The coefficient was multiplied by 100 to obtain a non-zero value; [b] The coefficient was multiplied by 10 to obtain a non-zero value.

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Wave 1   Wave 2   Wave 3

Direct Victimization → Direct Victimization → .2186*** → Direct Victimization

Direct Victimization

Vicarious Victimization → .2568*** → Vicarious Victimization

Delinquency/Crime → .2326*** → Delinquency/Crime

.1274***
.0742**
-.0134
.0493
.2025
.1495
.0069
.0070
.0151
-.0011
.1830*
.0244

NOTES: †p < .10; *p < .05; **p < .01; ***p < .001; Unstandardized coefficients are reported.

Figure 5.1 Effects of Direct Victimization at Wave 1 on Direct Victimization, Vicarious Victimization, and Delinquency/Crime at Waves 2 and 3.

Tables 5.3 and 5.4, as well as Figure 5.2, show that *Vicarious Victimization* at

Wave 1 is both directly and indirectly linked to *Direct Victimization, Vicarious*

Victimization, and *Delinquency/Crime* at Wave 3. *Vicarious Victimization* at Wave 1 has

positive and direct effects on *Direct Victimization* at Wave 2 ($b = .052$, $p < .01$),

Vicarious Victimization at Wave 2 ($b = .308$, $p < .001$), *Delinquency/Crim*e at Wave 2 (b

$= .355$, $p < .001$), and *Vicarious Victimization* at Wave 3 ($b = .141$, $p < .001$).

Table 5.3 Direct Effects of Path Model Examining the Longitudinal Impact of
Vicarious Victimization on Direct Victimization, Vicarious Victimization, and
Delinquency/Crime Using FIML (n = 1,156).

Path	b	SE
Vicarious Victimization at W1 → Direct Victimization at W2	.052**	.017
Vicarious Victimization at W1 → Vicarious Victimization at W2	.308***	.032
Vicarious Victimization at W1 → Delinquency/Crime at W2	.355***	.082
Vicarious Victimization at W1 → Direct Victimization at W3	.026	.018
Vicarious Victimization at W1 → Vicarious Victimization at W3	.141***	.032
Vicarious Victimization at W1 → Delinquency/Crime at W3	-.081	.091
Vicarious Victimization at W2 → Direct Victimization at W3	.007	.018
Vicarious Victimization at W2 → Vicarious Victimization at W3	.257***	.031
Vicarious Victimization at W2 → Delinquency/Crime at W3	.183*	.089

ABBREVIATIONS: b = unstandardized coefficient; SD = standard deviation.
NOTES: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$. The model includes the time-variant and time-variant control variables noted.

Vicarious Victimization at Wave 1 is indirectly associated with *Direct*

Victimization at Wave 3 ($b = .013$, $p < .05$), *Vicarious Victimization* at Wave 3 ($b = .088$,

$p < .001$), and *Delinquency/Crime* at Wave 3 ($b = .140$, $p < .001$). Early exposure to

vicarious victimization at Wave 1 increases the likelihood of experiencing direct

victimization at Wave 3 mainly by increasing direct victimization in Wave 2 ($b = .011$, p

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< .01). Similarly, early exposure to vicarious victimization at Wave 1 increases the likelihood of experiencing vicarious victimization at Wave 3 mainly by increasing vicarious victimization in Wave 2 ($b = .079$, $p < .001$). Also, criminal coping in Wave 3 is enhanced by exposure to vicarious victimization in Wave 1 mainly through increasing delinquency/crime at Wave 2 ($b = .083$, $p < .001$) and vicarious victimization at Wave 2 ($b = .056$, $p < .05$).

Table 5.4 Indirect and Total Effects of Path Model Examining the Longitudinal Impact of Vicarious Victimization on Direct Victimization, Vicarious Victimization, and Delinquency/Crime Using FIML (n = 1,156).

Path	Indirect b	Total b
Vicarious Victimization at W 1 → Direct Victimization at W 2 → Direct Victimization at W3	.011**	
Vicarious Victimization at W1 → Vicarious Victimization at W2 → Direct Victimization at W3	.002	
Vicarious Victimization at W1 → Delinquency/Crime at W2 → Direct Victimization at W3	-.004[a]	
Vicarious Victimization at W1 → Direct Victimization at W3	.013*	.039*
Vicarious Victimization at W1 → Direct Victimization at W2 → Vicarious Victimization at W3	.004	
Vicarious Victimization at W1 → Vicarious Victimization at W2 → Vicarious Victimization at W3	.079***	
Vicarious Victimization at W1 → Delinquency/Crime at W2 → Vicarious Victimization at W3	.005	
Vicarious Victimization at W1 → Vicarious Victimization at W3	.088***	.229***
Vicarious Victimization at W1 → Direct Victimization at W2 → Delinquency/Crime at W3	.001	
Vicarious Victimization at W1 → Vicarious Victimization at W2 → Delinquency/Crime at W3	.056*	
Vicarious Victimization at W1 → Delinquency/Crime at W2 → Delinquency/Crime at W3	.083***	
Vicarious Victimization at W1 → Delinquency/Crime at W3	.140***	.059

ABBREVIATION: b = unstandardized coefficient.

NOTES: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed test). The model includes the time-variant and time-variant control variables noted; [a] The coefficient was multiplied by 10 to obtain a non-zero value.

Wave 1   Wave 2   Wave 3
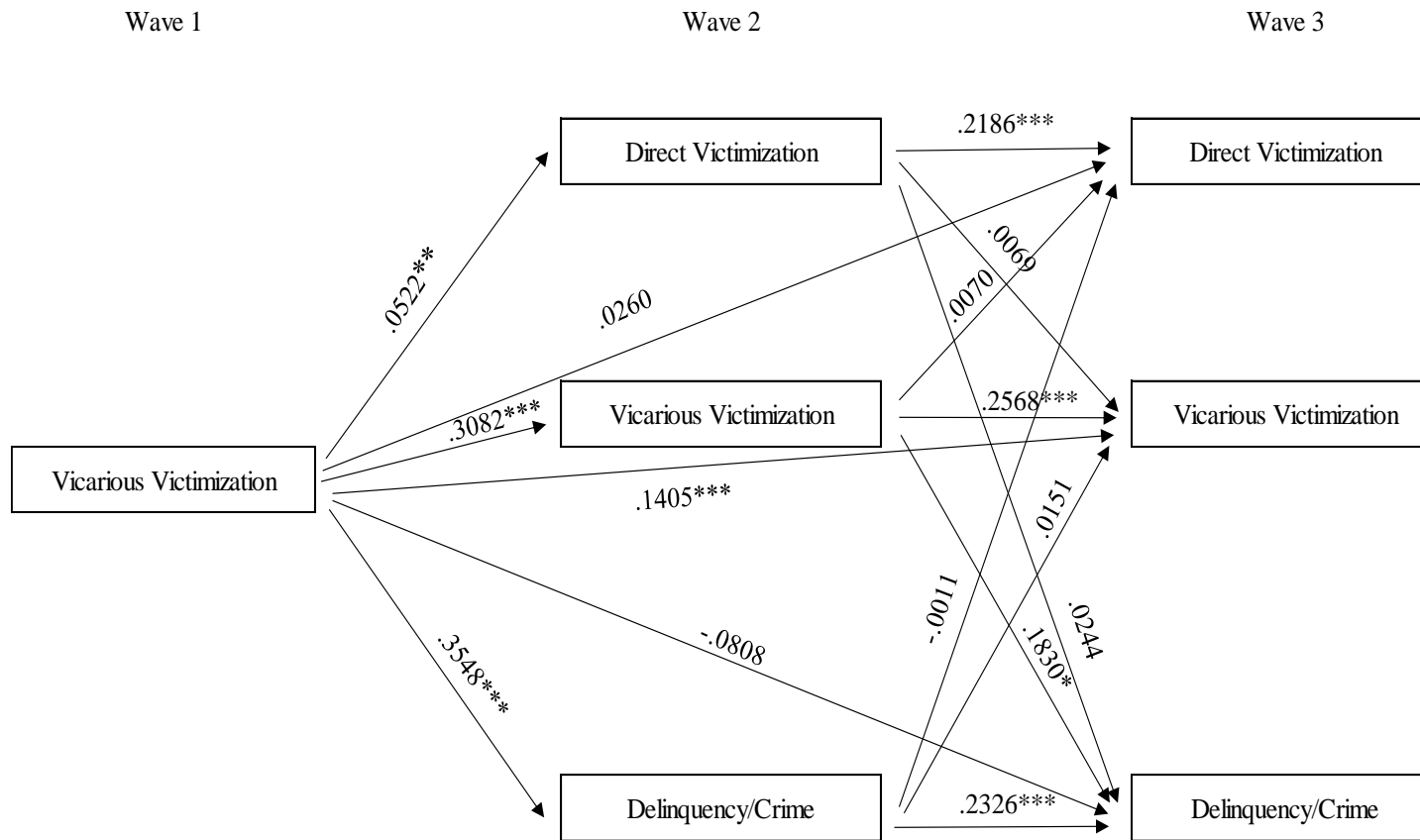
NOTES: †p < .10; *p < .05; **p < .01; ***p < .001; Unstandardized coefficients are reported.

Figure 5.2 Effects of Vicarious Victimization at Wave 1 on Direct Victimization, Vicarious Victimization, and Delinquency/Crime at waves 2 and 3.

Direct and indirect relationships between *Delinquency/Crime* at Wave 1 and subsequent victimization and deviant coping are shown in Tables 5.5 and 5.6, as well as Figure 5.3. In terms of the direct effects, *Delinquency/Crime* at Wave 1 has a positive impact on *Delinquency/Crime* at Wave 2 ($b = .250$, $p < .001$) and *Delinquency/Crime* at Wave 3 ($b = .209$, $p < .001$). However, the direct effects of *Delinquency/Crime* at Wave 1 on *Direct Victimization* and *Vicarious Victimization* at later waves are statistically nonsignificant. Turning to the indirect effects, *Delinquency/Crime* at Wave 1 is significantly associated with an increase in *Delinquency/Crime* at Wave 3 ($b = .061$, $p < .001$), mainly by increasing *Delinquency/Crime* at Wave 2 ($b = .058$, $p < .001$), demonstrating a stability in offending across waves.

Table 5.5 Direct Effects of Path Model Examining the Longitudinal Impact of Delinquency/Crime on Direct Victimization, Vicarious Victimization, and Delinquency/Crime Using FIML (n = 1,156).

Path	b	SE
Delinquency/Crime at W1 → Direct Victimization at W2	.010	.006
Delinquency/Crime at W1 → Vicarious Victimization at W2	.013	.012
Delinquency/Crime at W1 → Delinquency/Crime at W2	.250***	.030
Delinquency/Crime at W1 → Direct Victimization at W3	-.002	.006
Delinquency/Crime at W1 → Vicarious Victimization at W3	-.008	.011
Delinquency/Crime at W1 → Delinquency/Crime at W3	.209***	.033
Delinquency/Crime at W2 → Direct Victimization at W3	-.001	.007
Delinquency/Crime at W2 → Vicarious Victimization at W3	.015	.012
Delinquency/Crime at W2 → Delinquency/Crime at W3	.233***	.034

ABBREVIATIONS: b = unstandardized coefficient; SD = standard deviation.
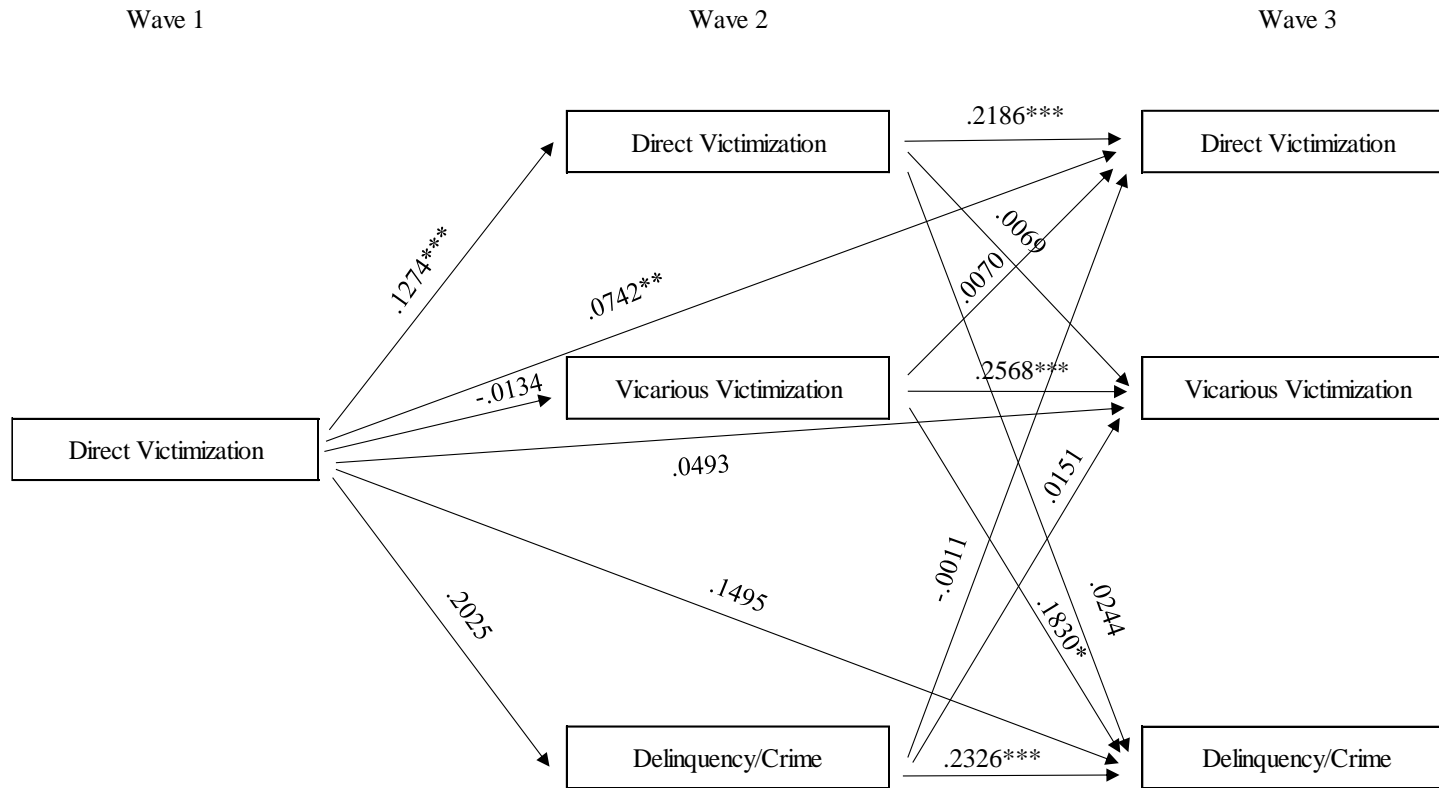
NOTES: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$. The model includes the time-variant and time-variant control variables noted.

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Table 5.6 Indirect and Total Effects of Path Model Examining the Longitudinal Impact of Delinquency/Crime on Direct Victimization, Vicarious Victimization, and Delinquency/Crime Using FIML (n = 1,156).

Path	Indirect b	Total b
Delinquency/Crime at W1 → Direct Victimization at W2 → Direct Victimization at W3	.002	
Delinquency/Crime at W1 → Vicarious Victimization at W2 → Direct Victimization at W3	.009[a]	
Delinquency/Crime at W1 → Delinquency/Crime at W2 → Direct Victimization at W3	-.003[b]	
Delinquency/Crime at W1 → Direct Victimization at W3	.002	.004[b]
Delinquency/Crime at W1 → Direct Victimization at W2 → Vicarious Victimization at W3	.001	
Delinquency/Crime at W1 → Vicarious Victimization at W2 → Vicarious Victimization at W3	.003	
Delinquency/Crime at W1 → Delinquency/Crime at W2 → Vicarious Victimization at W3	.004	
Delinquency/Crime at W1 → Vicarious Victimization at W3	.008†	.001[b]
Delinquency/Crime at W1 → Direct Victimization at W2 → Delinquency/Crime at W3	.002[b]	
Delinquency/Crime at W1 → Vicarious Victimization at W2 → Delinquency/Crime at W3	.002	
Delinquency/Crime at W1 → Delinquency/Crime at W2 → Delinquency/Crime at W3	.058***	
Delinquency/Crime at W1 → Delinquency/Crime at W3	.061***	.269***

ABBREVIATION: b = unstandardized coefficient.

NOTES: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed test). The model includes the time-variant and time-variant control variables noted; [a] The coefficient was multiplied by 100 to obtain a non-zero value; [b] The coefficient was multiplied by 10 to obtain a non-zero value.

Wave 1   Wave 2   Wave 3

Direct Victimization   .2186***   Direct Victimization

.0097

-.0019

.0125

Vicarious Victimization   .2568***   Vicarious Victimization

Delinquency/Crime

-.0075

.0069

.0070

.0151

-.0011

.0244

.1830*

.2499***

.2087***

Delinquency/Crime   .2326***   Delinquency/Crime
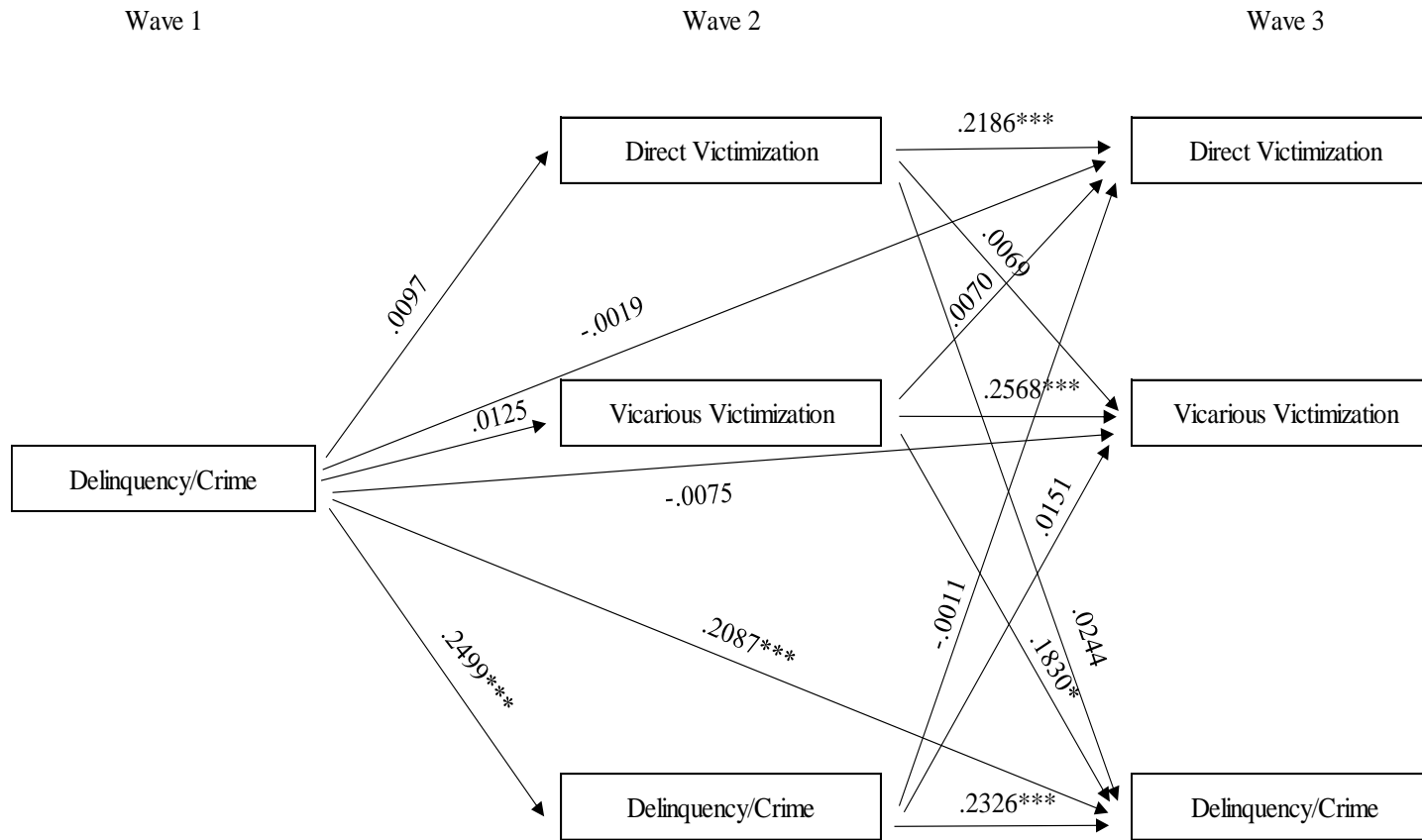
NOTES: †p < .10; *p < .05; **p < .01; ***p < .001; Unstandardized coefficients are reported.

Figure 5.3 Effects of Delinquency/Crime at Wave 1 on Direct Victimization, Vicarious Victimization, and Delinquency/Crime at Waves 2 and 3.

Supporting prior research on persistence in victimization, the results of the path model show that prior direct victimization experiences increase the subsequent chance of exposure to direct victimization (total effect: $b = .102$, $p < .001$). Also, prior vicarious victimization experiences increase the subsequent chance of exposure to direct victimization (total effect: $b = .039$, $p < .05$) and vicarious victimization (total effect: $b = .229$, $p < .001$). In a similar vein, stability in deviant/criminal behavior across waves is found (total effect: $b = .269$, $p < .001$). However, prior direct victimization experiences do not significantly influence, either directly or indirectly, subsequent vicarious victimization and criminal coping. Similarly, prior deviant/criminal behaviors do not have significant impacts on subsequent chances of being a victim or committing a crime, either directly or indirectly.

Some of the control variables have consistent relationships with the endogenous variables across waves. To be specific, the *Risk Factor Index* at waves 2 and 3 is positively and significantly related to *Direct Victimization, Vicarious Victimization*, and *Delinquency/Crime* at waves 2 and 3. *Time on Street* at waves 2 and 3 is also positively and significantly associated with *Direct Victimization* and *Delinquency/Crime* at both waves, but not with *Vicarious Victimization*. Offending is significantly higher for males at waves 2 and 3 compared to females, while the risk of direct/vicarious victimization does not vary by sex and race/ethnicity.

Individuals with lower SES have an increased risk of direct victimization (at Wave 3), vicarious victimization (at Wave 3), and deviant/criminal behaviors (at Wave 2), but the associations are not consistent across waves. As assumed, poor neighborhood conditions are positively and significantly related to vicarious victimization (at Wave 2

and Wave 3) and delinquency/crime (at Wave 3), whereas a high level of parental monitoring is negatively associated with victimization (at Wave 2) and delinquency/crime (at Wave 2). An unanticipated finding is that the risk of vicarious victimization (at Wave 2) can increase as the level of parental warmth increases.

The results of this analysis partially support the first research question related to whether exposure to direct/vicarious victimization experiences at an earlier point in time is related to an increase in crime/delinquency at a subsequent point in time. While direct victimization does not increase the likelihood of subsequent offending, vicarious victimization yields a significant and positive impact on future offending. Deviant/criminal behavior can be the result of an increase in subsequent exposure to vicarious victimization after the initial experience or subsequent participation in deviant behaviors as a result of the initial exposure to vicarious victimization.

The second research question is not supported, which is concerned with the mediating role of direct victimization and vicarious victimization in the association between direct/vicarious victimization experiences at an earlier point in time and crime/delinquency at a subsequent point in time. The impact of *Direct Victimization* at Wave 1 on *Delinquency/Crime* at Wave 3 through experiences of *Vicarious Victimization* at Wave 2 is negative and nonsignificant ($b = -.002$, $p > .10$). The impact of *Vicarious Victimization* at Wave 1 on *Delinquency/Crime* at Wave 3 through experiences of *Direct Victimization* at Wave 2 is positive but nonsignificant as well ($b = .001$, $p > .10$). From this, the mediating role of direct victimization and vicarious victimization are not found.

The last research question is also not supported, which concerns the positive effect of crime/delinquency at an early point in time on direct/vicarious victimization at a

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subsequent point in time. Inconsistent with the lifestyle/routine activity perspective, prior deviant behaviors are not significantly associated with an increase in subsequent direct/vicarious criminal victimization after controlling for prior deviant behaviors. These cross-lagged impacts are not found

5.1.1 Supplementary Analyses for Study 1

Two alternative methods are applied to deal with the missing data. In the first model, a listwise deletion strategy is adopted to deal with missing values in responses. Respondents are excluded from the analysis if they are missing at least one of the outcome variables, independent variables, and/or control variables. The second model uses a mean imputation approach. The missing observations are replaced with the mean of the non-missing observations for that variable after dropping incomplete surveys at waves 1 to 3.

The results of the path model using the listwise deletion strategy are presented in Appendix D. The significance of the key variables of interest are similar to the main model. Direct victimization at an early point in time is positively and significantly related to direct victimization at a later point in time. Vicarious victimization at an early point in time is positively and significantly related to direct victimization and vicarious victimization at a later point in time. Likewise, delinquency/crime at an early point in time is positively and significantly related to delinquency/crime at a later point in time. These findings reveal the persistent pattern in criminal victimization and offending, respectively, across the waves.

The results partially support the first research hypothesis, providing evidence for vicarious victimization only. A significant and positive association is found between prior

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vicarious victimization and future delinquency/crime, but not between prior direct victimization and future offending. As expected, direct and vicarious victimization are directly/indirectly linked to each other, but there is no consistent pattern (i.e., positive and significant impact) in the association. Also, the expected mediating roles of direct victimization in the association between vicarious victimization and delinquency/crime is not found. Likewise, exposure to vicarious victimization does not intervene in the relationship between direct victimization and delinquency/crime. Prior participation in delinquency/crime increases the subsequent likelihood of offending, but not subsequent risk of being a victim of crime. Accordingly, these supplementary analyses are consistent with the main models presented.

5.1.2 Sensitivity Analyses for Study 1

As a precaution, the main model is re-analyzed with bootstrapped standard errors using 50 replications. The bootstrapped standard errors are obtained from multiple samples that are randomly and repeatedly drawn with replacement from the original sample. Using this resampling procedure, better inferences can be made about an estimate within a population. Although bootstrapped standard errors based on 5,000 replications are typically conducted in prior research, there is not a fixed number of replications to accurately perform the process. Instead, it is important to find a rational number of replications, which can make the process work efficiently and can produce reliable estimates (Gould & Pitblado, n.d.). Accordingly, bootstrapped standard errors using 50 replications allowed for the best chances of convergence in the main model.

In this study, bootstrapped standard errors are used to ensure the assumption of normality of the key variables of interests, even after the log-transformed versions of

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direct/vicarious victimization and delinquency/crime are used. The results regarding the key variables of interest are substantively similar to those reported. The magnitude and significance of the longitudinal relationship among *Direct Victimization, Vicarious Victimization*, and *Delinquency/Crime* are comparable to those reported in Tables 5.1 to 5.6.

Also, the main model is re-analyzed using a generalized structural equation model (GSEM). In doing so, the frequency scores of *Delinquency/Crime* at waves 1 to 3 are used. The offense frequency at Wave 1 ranges between 0 and 3250 and is positively skewed. Given that the estimators are affected by the outliers in a preliminary analysis (not shown), the frequency score is truncated to the 95th percentile. Offenses with a frequency of 135 or more are recoded as 135. Likewise, delinquency/crime at waves 2 and 3 are truncated to the 95th percentile. The upper range is 153 for *Delinquency/Crime* at Wave 2, and it is 201 for *Delinquency/Crime* at Wave 3. The count scores of *Direct Victimization* (range between 0 and 6) and *Vicarious Victimization* (range between 0 and 7) are employed.

The GSEM using a negative binomial regression estimator (n = 1,083; AIC = 18286.74; BIC = 18760.55) shows similar results to the main model reported. *Direct Victimization* at Wave 1 is directly linked to *Direct Victimization* at Wave 2 ($b = .308$, $p < .05$). *Vicarious Victimization* at Wave 1 is directly linked to *Direct Victimization* at Wave 2 ($b = .248$, $p < .001$), *Vicarious Victimization* at Wave 2 ($b = .298$, $p < .001$), *Vicarious Victimization* at Wave 3 ($b = .126$, $p < .001$), and *Delinquency/Crime* at Wave 2 ($b = .216$, $p < .001$). *Vicarious Victimization* at Wave 1 also has a marginally significant impact on *Direct Victimization* at Wave 3 ($b = .113$, $p < .10$).

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Delinquency/Crime at Wave 1 is directly linked to *Delinquency/Crime* at Wave 2 (b = .003, $p < .05$) and *Delinquency/Crime* at Wave 3 (b = .005, $p < .001$). Supporting prior studies, results show consistent patterns in victimization and offending, respectively, across waves. Exposure to vicarious victimization is significantly and positively associated with later offending, but the opposite causal relationship is not found. Also, the impact of prior direct victimization on subsequent offending is statistically nonsignificant, and vice versa. Consistent to the main model, neither direct victimization nor vicarious victimization mediates the impact of vicarious (direct) victimization on offending.

In addition to these two specifications, an alternative version of the cross-lagged model is analyzed. Distinct from the main model, the effects of the endogenous variables (i.e., *Direct Victimization*, *Vicarious Victimization*, and *Delinquency/Crime*) are constrained on themselves to represent the average effect overtime, such that the relationship of each of these endogenous variables on itself is fixed to the average effect across the waves.

While the cross-lagged panel model enables identification of the non-recursive causality, it can provide biased estimates due to unobserved confounders. Also, the likelihood of autocorrelation between the disturbances of the lagged endogenous variables can be an issue with repeated measures data, which is caused by stable unobserved confounders (Sturgis, Smith, Berrington, & Hu, 2004). The model can minimize such conceivable issues by having all covariance paths constrained between the disturbance terms of the endogenous variables to zero (Brunton-Smith, 2011). This version of the model shows similar results as those found in the main model (CFI = .976,

TLI = .900, RMSEA = .042, AIC = 52938.016, BIC = 54423.516). Direct effects are found for *Direct Victimization, Vicarious Victimization,* and *Delinquency/Crime* at Wave 1 on their counterparts at later waves, respectively. The indirect relationships and total impacts are also matched to those in the main model.

In contrast with the main model, though, *Delinquency/Crime* at Wave 1 has a direct and marginal impact on *Vicarious Victimization* at Wave 2 ($b = .019$, $p < .10$), and an indirect effect on *Vicarious Victimization* at Wave 3 ($b = .008$, $p < .05$), mainly through its impact on *Vicarious Victimization* at Wave 2 ($b = .004$, $p < .10$). This finding supports the research hypothesis, which predicts that prior involvement in delinquency/crime will increase the subsequent risk of vicarious victimization. Consistent with the main model, the relationship between *Direct Victimization* at Wave 1 and *Delinquency/Crime* at Wave 3 is not mediated by *Vicarious Victimization* at Wave 2. Also, *Direct Victimization* at Wave 2 does not serve a mediating role in the association between *Vicarious Victimization* at Wave 1 and *Delinquency/Crime* at Wave 3. The hypothesis regarding the mediating mechanism is not supported.

Lastly, a final series of analyses is conducted to consider the contemporaneous relationship between victimization and offending. As stated above, a preliminary analysis indicates that the within-wave control variables are more consequential than the lagged control variables. Also, some prior studies suggest that the concurrent impact is more crucial in comparison with the lagged effects (e.g., Barnes et al., 2014; Brezina, 1999).

The last set of analyses is intended to see whether the immediate effect is more crucial than the lagged effects in terms of criminal coping. A series of negative binomial regressions at each wave are conducted. These models include the frequency score of

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Delinquency/Crime at waves 1 to 3, which is truncated to the 95th percentile. The count scores of *Direct Victimization* (range between 0 and 6) and *Vicarious Victimization* (range between 0 and 7) are also employed. The results reveal significant concurrent/immediate associations between the variables across waves. That is, a positive and significant association is found between direct victimization, vicarious victimization, and delinquency/crime at all waves assessed. Also, the risk factor index is positively and significantly related to direct/vicarious victimization and offending. These findings are consistent with the main model. Further discussion regarding the relevance of the concurrent impact over the lagged effects is provided in Chapter 6.

5.2 Study 2: Chronic Effects of Victimization on Delinquency/Crime

Table 5.7 presents the results of the negative binomial regression analyses using multiple imputation. The coefficients demonstrate an increase in the frequency of *Delinquency/Crime* at Wave 8 for a one-unit increase in *Dual Victimization*, *Chronic Dual Victimization*, and the control variables. An Incidence Rate Ratio (IRR) with a value greater than 1 demonstrates an increased rate of *Delinquency/Crime* for every one-unit increase in *Dual Victimization*, *Chronic Dual Victimization,* and the control variables. An IRR with a value smaller than 1 indicates a decreased rate of *Delinquency/Crime* for every one-unit increase in all independent variables.

Model 1 explores the additive influence of victimization by analyzing the relationship between *Dual Victimization* and *Delinquency/Crime*, along with the control variables. The results demonstrate that exposure to *Dual Victimization* is significantly related to an increase in the log count of the number of offenses committed by a factor of 1.274 in comparison to those without such an experience, while holding all other

variables in the model constant. Stated differently, individuals who are exposed to *Dual*

Victimization experiences are expected have an incidence rate of offending that is 3.575

times greater than those who do not experience *Dual Victimization* (IRR = 3.575, *b* =

1.274, *p* < .001).

Table 5.7 Negative Binomial Regression Analysis Examining the Additive and
Cumulative Effect of Victimization on Delinquency/Crime Using Multiple Imputation
(n = 1,201).

	Model 1		Model 2	
	IRR	*b*(SE)	IRR	*b*(SE)
Dual Victimization	3.575	1.274(.292)***	3.142	1.145(.299)***
Chronic Dual Victimization				
1 Wave	-	-	2.054	.720(.262)**
2 Waves	-	-	2.517	.923(.302)**
3 Waves	-	-	1.527	.423(.375)
4 Waves	-	-	4.276	1.453(.509)**
5 Waves	-	-	2.550	.936(.746)
6 or More Waves	-	-	3.225	1.171(1.045)
Control Variables				
Age	1.064	.062(.088)	1.047	.046(.092)
Risk Factor Index	1.232	.209(.047)***	1.225	.203(.048)***
Time on Street	1.960	.673(.299)*	2.234	.804(.301)**
Emotional Intensity	.946	-.056(.131)	.882	-.125(.132)
Delinquency/Crime (W7)	1.005	.005(.001)***	1.005	.005(.001)***
Male	3.688	1.305(.296)***	3.717	1.313(.296)***
Black	1.011	.011(.277)	.998	-.002(.283)
Hispanic	1.003	.003(.277)	.931	-.071(.282)
Other	.861	-.150(.480)	.598	-.514(.514)
Family SES	1.096	.092(.103)	1.145	.135(.103)
Intact Family	1.088	.084(.276)	1.280	.247(.284)
Parental Warmth	.973	-.027(.154)	.991	-.009(154)

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Parental Monitoring	.839	-.176(.136)	1.012	.012(.147)
Neighborhood Conditions	1.149	.139(.142)	1.116	.110(.145)
Intercept	.330	-1.109(2.092)	.144	-1.941(2.101)

ABBREVIATIONS: IRR = incidence rate ratio; b = unstandardized coefficient; SE = standard error.

NOTES: †*p* < .10; **p* < .05; ***p* < .01; ****p* < .001 (two-tailed).

REFERENCE GROUPS: No experiences of chronic dual victimization; White.

Among the control variables, the *Risk Factor Index*, *Time on Street*, *Delinquency/Crime* at Wave 7, and *Male* are significant predictors of offending. More specifically, a one-unit increase in the *Risk Factor Index* is related to a 23.2% increase in *Delinquency/Crime*, while holding all other variables in the model constant (IRR = 1.232, *b* = .209, *p* < .001). For every one-unit increase in *Time on Street*, the likelihood of *Delinquency/Crime* increases by 96% (IRR = 1.960, *b* = .673, *p* < .05). The incident rate of *Delinquency/Crime* at Wave 8 is expected to increase by a factor of 1.005 for every-one-unit increase in *Delinquency/Crime* at Wave 7 (IRR = 1.005, *b* = .005, *p* < .001). Males are expected to have a rate of offending that is 3.688 times greater than females (IRR = 3.688, *b* = 1.305, *p* < .001).

In Model 2, *Chronic Dual Victimization* is added to assess the cumulative effect of dual victimization, recognizing the impact of within-individual changes in victimization. Like the first model, Model 2 indicates that *Dual Victimization* is positively and significantly associated with offending (IRR = 3.142, *b* = 1.145, *p* < .001). That is, individuals who are exposed to *Dual Victimization* are expected to have an incident rate of offending that is 3.142 times greater than those who do not have such an experience, while holding all other variables in the model constant.

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As expected, *Chronic Dual Victimization* is positively associated with an increase in offending, but there are differences in the impact depending on the number of waves the respondent experienced dual victimization. Individuals with one past exposure to *Chronic Dual Victimization* are expected to have an incident rate of *Delinquency/Crime* that is 2.054 times greater than those who have not experienced *Dual Victimization* prior to Wave 8 (IRR = 2.054, b = .720, p < .01). The incident rate of *Delinquency/Crime* is also greater for individuals with two prior experiences of *Chronic Dual Victimization* (IRR = 2.517, b = .923, p < .01) and four prior experiences of *Chronic Dual Victimization* (IRR = 4.276, b = 1.453, p < .01) when compared to those who do not have such experiences. Unexpectedly, the experience of *Dual Victimization* in three, five, and six or more of the prior waves did not have a significant impact on offending.

Like the first model, every one-unit increase in the *Risk Factor Index* is related to a 22.5% increase in *Delinquency/Crime* (IRR = 1.225, b = .203, p < .001). Increases in *Time on Street* (IRR = 2.234, b = .804, p < .01) and *Delinquency/Crime* at Wave 7 (IRR = 1.005, b = .005, p < .001) are also related to *Delinquency/Crime* at Wave 8. Males are expected to have an incident rate of offending that is 3.717 times greater compared to females (IRR = 3.717, b = 1.313, p < .001).

Table 5.8 presents the results of the Fractional Probit Regression Analyses using multiple imputation. The coefficients reveal the increased proportion of *Delinquency/Crime* for a one-unit increase in *Dual Victimization*, *Chronic Dual Victimization,* and the control variables. Model 1 shows a positive association between *Dual Victimization* and *Delinquency/Crime*. Exposure to *Dual Victimization* increases the

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chances of offending by a factor of .651, and the impact is statistically significant (b = .651, $p < .001$).

Among the control variables, a one unit increase in the *Risk Factor Index* (b = .092, $p < .001$), *Time on Street* (b = .127, $p < .05$), and *Delinquency/Crime* at Wave 7 (b = 1.763, $p < .001$) is significantly associated with an increase in *Delinquency/Crime*. Males have a greater chance of offending than females (b = .182, $p < .05$), while Blacks have a lower chance of offending than Whites (b = -.119, $p < .05$). The rest of the control variables do not significantly influence offending.

Table 5.8 Fractional Probit Regression Analysis Examining the Additive and Cumulative Effect of Victimization on Delinquency/Crime Using Multiple Imputation ($n = 1,201$).

	Model 1		Model 2	
	b	SE	b	SE
Dual Victimization	.651***	.056	.633***	.055
Chronic Dual Victimization				
1 Wave	-	-	.099†	.060
2 Waves	-	-	.223**	.068
3 Waves	-	-	.103	.086
4 Waves	-	-	.219*	.110
5 Waves	-	-	.446**	.145
6 or More Waves	-	-	.121	.167
Control Variables				
Age	-.006	.018	-.008	.018
Risk Factor Index	.092***	.011	.089***	.011
Time on Street	.127*	.054	.126*	.054
Emotional Intensity	-.023	.032	-.021	.032
Delinquency/Crime (W7)	1.763***	.206	1.619***	.211
Male	.182*	.081	.158*	.080
Black	-.119*	.060	-.093	.060

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Hispanic	-.036	.064	-.029	.064
Other	-.016	.093	-.030	.091
Family SES	.012	.026	.020	.025
Intact Family	-.041	.060	-.025	.059
Parental Warmth	.003	.030	.007	.030
Parental Monitoring	-.041	.032	-.033	.032
Neighborhood Conditions	.004	.031	-.015	.031
Intercept	-2.243***	.444	-2.337***	.449

ABBREVIATIONS: b = unstandardized coefficient; SE = standard error.

NOTES: †*p* < .10; **p* < .05; ***p* < .01; ****p* < .001 (two-tailed).

REFERENCE GROUPS: No experiences of chronic dual victimization; White.

In Model 2, the association between *Dual Victimization* and offending is positive and statistically significant (*b* = .633, *p* < .001). Similar to the NBRM, *Chronic Dual Victimization* yields a positive influence on *Delinquency/Crime*, but there is variation in the impact depending on the number of waves of exposure. Two prior experiences (*b* = .223, *p* < .01), four prior experiences (*b* = .219, *p* < .05), and five prior experiences (*b* = .446, *p* < .01) of *Chronic Dual Victimization* have a significant and positive impact on later offending, while one prior experience has a marginal effect (*b* = .099, *p* < .10). Individuals who have three and six or more experiences of *Chronic Dual Victimization* are not significantly different in terms of offending from those who have not been exposed to repeat dual victimization.

Like the first model, the *Risk Factor Index* (*b* = .089, *p* < .001), *Time on Street* (*b* = .126, *p* < .05), and *Delinquency/Crime* at Wave 7 (*b* = 1.619, *p* < .001) are significant predictors of *Delinquency/Crime* at Wave 8. Males have a higher chance of offending

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compared to females ($b = .158$, $p < .01$). Blacks are no longer different from Whites in terms of offending ($b = -.093$, $p > .10$).

Overall, the results of the NBRM are analogous to those of the Fractional Probit model regarding the collective temporal patterns of dual victimization. The results across the two models suggest evidence that supports the first research hypothesis, which predicts that dual victimization is related to an increase in delinquency/crime. Exposure to direct and vicarious victimization experiences is a significant predictor of criminal coping, demonstrative of an additive influence of dual victimization on offending. In other words, deviant/criminal behaviors are often used as a means of coping with the aversive situation for individuals with dual victimization experiences in comparison to those without such experiences. This finding is consistent with underlying propositions of GST and prior studies (e.g., Lin et al., 2011) that explore the between-individual variations regarding involvement in offending.

The results across the two models also support the second research hypothesis, which predicts that the duration of exposure to dual victimization is related to an increase in delinquency/crime. Individuals who experience dual victimization as a life-course event tend to have an increased chance of criminal coping at a subsequent point in time in comparison to those without such experiences. This finding is consistent with GST's temporal/developmental explanation (i.e., within-individual changes) and prior studies on this subject (e.g., Park & Metcalfe, 2020; Slocum et al., 2005). It is noted that the cumulative influence of victimization on offending is nonlinear and varies by the number of reported waves with dual victimization experiences.

5.2.1 Supplementary Analyses for Study 2

Two alternative methods are applied to deal with the missing data, like the first study. In the first model, a listwise deletion strategy is used to deal with missing values in responses. Respondents are excluded from the analysis if they are missing at least one of the outcome variables, independent variables, and/or control variables. The second model uses mean imputation. The missing observations are replaced with the mean of the non-missing observations for that variable after dropping incomplete surveys at Wave 8.

A final model employs the multiple imputation approach for missing observations but includes an alternative version of *Chronic Dual Victimization*. This version of the *Chronic Dual Victimization* variable is created such that individuals who do not have all eight waves (i.e., the baseline interview through Wave 7) of dual victimization information are considered as missing rather than assuming a missing wave represents a lack of a victimization experience at that wave. As shown in Table 5.9, there are 247 missing observations (20.57%) for this variable, because individuals are missing at least one of the direct and/or vicarious victimization experience measures prior to Wave 8, while 954 non-missing observations are detected.

Table 5.9 Distribution of Chronic Dual Victimization.

# of Waves	Version #1	Version #2
0	308	246
1	466	378
2	244	191
3	108	81
4	46	33
5	18	16
6 or More	11	9
Total	1,201	954

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The three models in Table E1 (see Appendix E) employ negative binomial regression using the three alternative methods referenced. Despite the variations in the values of coefficients across models, the significance of key variables of interest is substantively similar to the main model, indicating a consistent pattern. In line with Model 2 in Table 5.7, these models reveal that *Dual Victimization* is positively and significantly related to an increase in offending. The models using listwise deletion and mean imputation show that one, two, and four prior waves experiencing *Chronic Dual Victimization* are significantly associated with future offending compared to no experiences. However, the model with the alternative measure of *Chronic Dual Victimization* reveals that four prior experiences is the only significant predictor of offending, while two prior experiences has a marginal impact. Consistent with the main model, the likelihood of offending is also increased by the *Risk Factor Index*, *Time on Street*, *Delinquency/Crime* at Wave 7, and *Male*.

The models in Table E2 (see Appendix E) employed the Fractional Probit Model using the three alternative methods. The results across the three models are almost identical to Model 2 in Table 5.8. *Dual Victimization* and *Chronic Dual Victimization* (two, four, and five prior experiences) are significant predictors of offending. Also, a consistent pattern is found in the impact of the *Risk Factor Index*, *Time on Street*, *Delinquency/Crime* at Wave 7, and *Male.* Accordingly, these supplementary analyses are consistent with the main models presented.

5.2.2 Sensitivity Analyses for Study 2

In order to establish causality, a lagged model was initially considered. The model included the independent and time-varying control variables specific to Wave 7 (i.e.,

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Dual Victimization, *Risk Factor Index*, *Emotional Intensity*, and *Times on Street*) and the time-invariant control variables taken from the baseline interview (e.g., *Male*, *Family SES*, and *Parental Monitoring*). *Chronic Dual Victimization* counts the number of waves of exposure to dual victimization prior to Wave 7 (i.e., the baseline interview through Wave 6). The results of the NBRM and the Fractional Probit Model reveal that the victimization events and circumstances at Wave 7 are unrelated or less related to offending at the subsequent wave. More specifically, the main analyses and supplementary analyses show that prior *Dual Victimization* experiences (at Wave 7) are not significantly related to offending (*Delinquency/Crime* at Wave 8), even with the positive correlation between the two variables. Similarly, control variables at Wave 7, such as the *Risk Factor Index* and *Time on Street*, are not relevant to *Delinquency/Crime* at Wave 8. The nonsignificant lagged effects can possibly be explained by the time between the two surveys. Given that respondents are interviewed a year from the previous survey (and more than a year for some respondents), they may have been less affected by the events that happened in the prior year. They are more influenced by the contemporaneous events and conditions (see Agnew & White, 2002; Brezina, 1999).

Also, as a precaution, all models are re-analyzed using a frequency score of *Delinquency/Crime* at Wave 7 and 8 that is truncated to the 99th percentile, as opposed to the 95th percentile (not shown). Offenses with a frequency of 995 and more are recoded as 995 for *Delinquency/Crime* at Wave 7. Offenses with a frequency of 1130 and more are recoded as 1130 for *Delinquency/Crime* at Wave 8. The results regarding the key variables of interest are substantively similar to those reported. The magnitude and

significance of *Dual Victimization* and *Chronic Dual Victimization* across models are comparable to those in Tables 5.7 and Table E1.

While all other control variables are the same as the main analyses, a marginally significant impact of *Family SES* (b= .185, $p < .10$) and a significant negative impact of *Parental Monitoring* ($b = -.272$, $p < .05$) on offending are detected in the first model *(Dual Victimization* only) using multiple imputation. In the model included *Chronic Dual Victimization*, *Family SES* (b= .210, $p < .05$) remains significant, while *Parental Monitoring* ($b = -.032$, $p > .10$) becomes nonsignificant. The consistent pattern of *Family SES* is also found when using listwise deletion ($b = .196$, $p < .10$), mean imputation ($b = .226$, $p < .05$), and multiple imputation with the alternative measure of *Chronic Dual Victimization* ($b = .192$, $p < .10$).

CHAPTER 6

DISCUSSION AND CONCLUSION

This dissertation explored several temporal aspects of criminal victimization experiences to understand the longitudinal relationship between criminal victimization and deviant/criminal behaviors. In the first study, the incorporated model, which was built on general strain and risky lifestyle theories, suggested that criminal victimization can be linked to increases in deviant behavior, and deviant behavior can be expected to increase subsequent criminal victimization. The combined model reconciled these two theoretical perspectives as a means of exploring the continuous and reciprocal relationship between criminal victimization and offending across time. Thus, exposure to direct and vicarious victimization at an early point in time was posited to directly and indirectly influence offending behaviors at a later point in time. Also, prior participation in delinquent/criminal activity was posited to directly and indirectly impact subsequent experiences of victimization. In addition, an association between direct victimization and vicarious victimization was expected.

The second study focused on the additive and cumulative effects of criminal victimization on delinquent/criminal behavior, considering both between-individual differences in criminal behavior based on exposure to dual victimization and the consequences of within-individual changes in dual victimization over time. Specially, exposure to both direct and vicarious victimization (i.e., dual victimization) was expected

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to influence criminal coping strategies. Also, chronic/repeat exposure to dual victimization was assumed to influence future offending.

6.1 Summary of Key Findings

Five key conclusions emerged from the study's findings. First, the results of the path model considering the reciprocal relationship between victimization and offending over time revealed that prior vicarious victimization was a significant predictor of future offending. Individuals who previously experienced vicarious criminal victimization had an increased likelihood of future criminal coping compared to those without such experience (e.g., Lin et al., 2011; Menard et al., 2015; Vogel & Keith, 2015). However, prior exposure to direct victimization did not have a significant lagged effect on subsequent offending. That is, individuals who experienced direct victimization were not different from those without such experience in terms of criminal coping at the subsequent waves. This finding partially supported GST's proposition that criminal victimization can be one of the significant strains that can yield a harmful impact by promoting delinquency/crime (Agnew, 2001). Still, this finding came into conflict with prior studies that suggest between-individual differences in offending based on prior direct victimization experiences (e.g., Ousey et al., 2015; Watts & McNulty, 2013). It should be recognized that more respondents in this study experienced vicarious victimization than direct victimization. That is, adolescents have more chances of observing and hearing other's victimization experiences. It also needs to be noted that the Pathways data consists of rather severe forms of victimization, making a difference in their impact. That is, exposure to vicarious victimization, such as homicide, rape, and violent physical attacks with weapons, may have a more significant harmful effect on

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offending due to the overlap in the severity of and the frequency of criminal victimization. As Agnew (1997) noted, juveniles are a unique social group, which are susceptible to external factors, including criminal behaviors committed toward others. As a result, criminal coping was more related to vicarious victimization as a means of coping.

Second, the current study did not find evidence to support a positive relationship between previous participation in delinquent/criminal activity and subsequent experiences of victimization. Contrary to the lifestyle/routine activity perspective, neither direct victimization nor vicarious victimization at Wave 3 was influenced by involvement in deviant/criminal activities at Wave 2 or Wave 1. The probability of being a victim of crime in later waves was not amplified for individuals who engaged in risky behaviors with less parental guardianship and proximity to motivated offenders in prior waves, which conflicted with some prior findings in the literature (e.g., Choi, Cronin, & Correia, 2016; Turanovic et al., 2018).

Third, the expected mediating role of direct victimization and indirect victimization was not found for the relationship between direct/vicarious victimization and delinquency/crime. However, the likelihood of direct victimization was significantly increased by previous exposure to vicarious victimization. This finding partially supported Agnew's (1992, 2002) theory, which predicted a positive and significant effect of one form of criminal victimization on the other form of criminal victimization. Still, this interrelationship between the two forms of victimization did not translate into offending at later waves, as was theoretically expected.

It seems that the subjective evaluation of individuals functions only for the impact of vicarious victimization on direct victimization. That is to say, prior vicarious victimization can affect individuals' subjective perception and interpretation of subsequent direct victimization, which leads them to (re)interpret direct victimization with regard to magnitude and impact. A similar process was not found for direct victimization with its impact on vicarious victimization. It follows that individuals with prior direct victimization experience are disturbed emotionally, mentally, or psychologically by vicarious victimization.

The lack of an effect of delinquency/crime on victimization, as well as the lack of a mediating impact of direct and vicarious victimization, could be due to the timeframe between waves. As found in the sensitivity analysis, deviant/criminal coping was more influenced by victimization experiences that occurred at the same wave than those that occurred in the previous waves. Even though the two interviews were six months apart, the immediate effects of criminal victimization were more consequential than the lagged ones. In accordance with Agnew's (1992) recency arguments, the harmful impacts of criminal victimization may be more immediate and short-term, with less of an effect after a certain period of time.

Fourth, a significant additive effect of dual victimization was found. Exposure to direct and vicarious victimization simultaneously was significantly and positively related to delinquency/crime. This relationship was observed even when controlling for a host of variables, including age, risk factors, emotional intensity, race/ethnicity, time on the street, family structure, parental warmth, family SES, and neighborhood conditions. This finding supported GST's proposition (Agnew, 1992, 2001), which suggested that

exposure to direct and vicarious victimization simultaneously was a strain that is greater in magnitude and can promote deviant/criminal behaviors as a means of coping. This result was also consistent with Lin et al. (2011) who found that individuals who experienced both direct and vicarious victimization had an increased likelihood of offending in comparison to those without such experiences. It appears that this form of strain should not be overlooked in research that considers GST's propositions, since it places individuals at a higher risk for offending (see Finkelhor et al., 2009).

Fifth, the results revealed a significant cumulative impact of dual victimization on offending, which supported GST from a developmental standpoint (Agnew, 1997; Slocum, 2010). It was noted that individuals with chronic/repeat dual victimization showed an increased likelihood of offending after controlling for the impact of current dual victimization experiences. The results indicated that individuals who experienced dual victimization in the past were at greater risk of offending. This finding was consistent with prior GST research, which found that victimization experiences of a long duration and clustered in time are strains that can enhance individuals' involvement in delinquent activity (Slocum, 2010).

Consistent with Slocum et al. (2005), the impact of chronic/repeat dual victimization was neither linear nor consistent. In particular, individuals who have five and six or more experiences of chronic dual victimization were not at greater risk of offending across models using the frequency score and variety proportion of delinquency/crime. It could be because there were fewer people in these categories, which could have contributed to bias in the estimator. If this is the case, future research

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using alternative samples with greater victimization experiences across multiple waves is required to assess the full cumulative impact of dual victimization on offending.

The variation in the impact of dual victimization could also be because victims of crime experienced a varying degree of negative emotions. For some individuals, anger and depression may be more relevant to promote deviant/criminal behaviors as a means of coping than fear and hopelessness, or vice versa (e.g., Ganem, 2011; Iratzoqui, 2018). Also, victims of crime might have come to internalize their feelings. The repetition of or chronic exposure to aversive events could make victims lethargic, resulting in low intentions or inability to cope with their strains and negative emotions. As Park and Metcalfe (2020) found, the impact of criminal victimization on delinquency can decay over time, even when the aversive situation/events maintain or increase in the magnitude.

6.2 Implications for Theoretical Development

This study contributed to the theoretical literature on the victimization-offending association by integrating propositions from two complementary theoretical arguments to consider the relationship between victimization and offending over time. The integrated model served as a compelling approach to explaining the continuous association between victimization and offending and the bidirectional relationship between victimization and delinquency. The integration enabled the study to overcome the limitations of each theoretical perspective (i.e., GST and lifestyle/routine activity perspective in this dissertation). Like most criminological theories, there were certain assumptions and hypotheses within each theory that restricted a more comprehensive review of the victim-offender overlap. Propositions of GST and lifestyle/routine activity theory assume unidirectional causal pathways on their own. With an integration, this study provided

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more expansive explanatory power to predict the continuous association between victimization and crime beyond the propositions of each theory on its own (Elliot, Ageton, & Cantor, 1979).

The integrated approach is also desirable to accumulate existing empirical studies into a coherent and comprehensive framework (Bernard & Ritti,1990). Prior studies recognized the significant overlap in the situational and personal characteristics of offenders and victims (Hindelgang et al., 1978; Jennings et al., 2010). The interchanging roles of victims and offenders were also found, suggesting that they share some common factors (Lovegrove & Cornell, 2014; Turner et al., 2011). For this reason, the isolated predictions and documentation for the distinct theoretical models can lead to misinterpretation of deviant/criminal behaviors. Instead, a better understanding can be accomplished by testing and reviewing available research on offending across the theoretical models. Iratzoqui (2018) employed this incorporated model to explain the impact of child maltreatment on violent victimization through negative emotions and deviant behavior. Also, Schreck et al. (2006) explored a similar model in their longitudinal study that focused on direct victimization. This study contributed to these efforts to assess the value of an incorporated theoretical model in explaining the victimization-offending relationship.

The model can further the arguments of the lifestyle/routine activities perspective. Even though this theory proposes that convergence in time is needed for a crime to occur, the perspective does not recognize explicit time elements of criminal victimization (e.g., elements like recency and duration). For this reason, most prior research may not consider whether deviant/risky lifestyles have a lagged versus contemporaneous effect on

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criminal victimization. Irazoqui (2018) and Schreck et al. (2006) found a positive impact of deviant/criminal lifestyles at an earlier point in time on the risk of victimization at a later point in time. The nonsignificant lagged effect in the present study conflicts with these findings. This conflict may be due to the characteristics of the high-risk sample and/or the serious forms of criminal victimization they were asked. Distinct from the two prior studies, the contemporaneous impact of a deviant/criminal lifestyle on victimization was also considered in the current study and found to be more consequential. Also, variation in the lagged impact of victimization was discovered depending on the types of criminal victimization. Criminal coping was found to occur based on current direct/vicarious victimization experiences and previous exposure to vicarious victimization. Overall, the findings suggest that the lifestyle/routine activities perspective can broaden its explanation and propositions by further considering the temporal aspects of events and types of criminal victimization.

The current study's approach furthered the theoretical development of GST as well. Although Agnew (2002) described a positive association between direct and vicarious victimization, hypotheses regarding the interrelationship between the two forms of victimization as they relate to delinquency were not provided. Also, this relationship was mostly overlooked in prior research, with direct and vicarious victimization often not considered separately. Unfortunately, the study provided minimal support for their interrelationship over consecutive waves but did uncover strong associations between the two forms of victimization within waves. From this, GST can be more applicable to explain the association between direct victimization and vicarious victimization when they have concurrently occurred. Their recent exposure to direct/vicarious victimization

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can affect individuals' perceptions and interpretations that the increase criminal behaviors, as opposed to past exposures. To account for these more immediate effects, future research can consider a concurrent model of the relationships explored to broaden the understanding of the link between direct victimization, vicarious victimization, and delinquency/crime.

The findings of the study also provided additional evidence of the effects of dual victimization, a concept that has recently gained attention in victimization research. The temporal predictions of GST were applied to this specific type of victimization. The results confirmed that dual victimization is a form of strain that can lead to criminal coping, with some evidence that chronic dual victimization can have this effect as well. Unfortunately, GST does not explicitly recognize a concept of dual victimization and provide research hypotheses with regard to the impact of dual victimization on offending. Following Lin et al. (2011), this study suggested a way to test dual victimization and chronic dual victimization to assess the temporal explanation of GST, thereby contributing to GST's theoretical arguments regarding strains that can lead to criminal coping.

This study served to show how the temporal arguments and a developmental perspective of GST (Agnew, 1992, 1997, 2006b) needs to be applied to account for both between-individual variations and within-individual changes over time. A higher risk of offending was found for individuals with dual victimization and chronic/repeat victimizations, demonstrating the complicated conditions of criminal victimization over time. Future research can reanalyze and expand these models to account for the variation in the duration of effects (e.g., either short-term or long-term) of chronic dual

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victimization on diverse types of crime (e.g., Park & Metcalfe, 2020; Slocum et al., 2005).

6.3 Implications for Policy and Practice

The results of the current study have implications for delinquency and victimization prevention programs. These programs should recognize risk factors for criminal victimization and delinquency over time. Specifically, the stability found in direct and vicarious victimization over the waves was particularly noteworthy, as well as the stability in deviant/criminal behaviors. These findings suggest that juveniles' future behaviors and conditions are significantly influenced by their past behaviors and conditions. It is important to identify individuals' past criminal victimization experiences and involvement in deviant behavior to reduce their future perpetrations and subsequent victimization. Some characteristics (e.g., low self-control; Schreck et al., 2006) or environmental factors (e.g., living on the street; Baron, 2004) contribute to a higher risk of participating in crime and being victimized over consecutive time periods. The knowledge of their past life can be used to transform their circumstances and minimize the risk factors that are conducive to adverse conditions in the future.

The finding of a significant harmful impact of vicarious victimization on offending could also inform parental training programs and parental skills programs. These programs can include skills to prevent abusive family interactions and adverse environments that can be a source of vicarious victimization. The programs can serve to educate parents in ways to improve communication skills and help children deal with their exposure to violence within and outside the home (Agnew, 1999; Anderson, 1990; Piquero et al., 2016).

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This finding is also relevant for school authorities. Programs in schools that are designed to detect and reduce school violence by promoting prosocial behaviors and enhancing unfavorable perspectives toward delinquency can be helpful (Bradshaw, 2015; McCarty et al., 2016). A reduction in school violence can be achieved through anti-bullying programs, which aim to raise children's empathy and condemnation of bullying, and teach intervention skills for bystanders (e.g., reporting bullying to adults/school authorities, showing emotional supporting to victims, and stopping perpetrators) (Garandeau, Vartio, Poskiparta, & Salmivalli, 2017; Jenson, Brisson, Bender, & Williford, 2013).

Moreover, dual victimization was found to have a significant concurrent impact on offending. Some of these programs previously referenced can be used to promote legitimate ways of coping that can help juveniles with recent dual victimization experiences. In addition, providers of the programs can develop a comprehensive perspective toward dealing with dual victimization and intervening as a means of reducing long-term negative consequences of dual victimization. The harmful impact of chronic patterns of dual victimization on offending varies depending on the number of previous experiences of dual victimization. This implies that the patterns of crime and violence can vary by the combination of the additive and cumulative effects of victimization (see also Agnew, 1997; Caspi, Bem, & Elder, 1989; Sampson & Laub, 2003).

Policymakers need to consider high-risk juveniles who may be exposed to both direct and vicarious victimization experiences as a life-course event. Even though this group has a greater risk of delinquency, some chronic/repeat victims are not involved in

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deviant lifestyles, as uncovered in the second study. According to prior research on school bullying, chronic/repeat bullying victimization can result in self-destructive acts (e.g., substance abuse, suicide thoughts and attempts) and status offenses (e.g., truancy, dropping school) rather than violent crimes (Connolly, 2017; Hay et al., 2010). Along with these studies, it follows that chronic victims have a higher risk of externalized and internalized deviant behavior. Accordingly, approaches are required to help high-risk juveniles by teaching legal or conventional alternatives to deal with strains. For example, cognitive-behavioral therapy programs for chronic victims of crime are required to set a long-term goal in pursuit of teaching cognitive skills, such as reducing the subjective interpretation of strain and neutralizing the level of strain (see also Landenberger & Lipsey, 2005; Wilson, Bouffard, & MacKenzie, 2005). The programs can also proffer several skills that are specialized to develop personal characteristics, challenge criminal beliefs and attitudes, and (re)establish social attachment, which is relevant to reduce criminal propensity (Agnew, 1997).

6.4 Limitations and Directions for Future Research

While the current study provides valuable insights into the relationship between victimization and delinquency/crime, there were several limitations that should be noted. First, this study did not consider the mediating role of negative emotions, as stated in GST. Unfortunately, the Pathways to Desistance data did not provide adequate and multiple indicators for the various forms of negative emotions. Also, given the complexity of the model, focus was placed on the mediating roles of victimization and delinquency.

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According to Iratzoqui (2018), depression, fear, and hopelessness were directly and indirectly associated with the impact of child maltreatment on risk behaviors and subsequent violent victimization. Many prior studies suggested that anger was a significant mediator in the link between various forms of strain and different types of delinquency (Agnew et al., 2002; Bao, Hass, & Pi, 2004; Broidy, 2001; Jang & Johnson. 2003; Patchin & Hinduja, 2011; Rebellon, Manasse, Gundy, & Cohn, 2012). Depression and anxiety were also found to have a mediating role in the victimization-offending link (Jang & Rhodes, 2012; Jang & Song, 2015). From this research, it is assumed that individuals' responses to initial victimization experiences can vary by the types and magnitude of the negative affective states experienced. Future research should focus greater attention on the mediating role of negative emotions within the reciprocal relationship between victimization and offending. Also, the concurrent experiences of negative emotions need to be considered, given that experiencing two or more types of negative emotions simultaneously can lead to variations in the type and frequency of deviant behavior (e.g., Ganem, 2011).

Second, the current study did not find gender differences. The dataset included mostly male adolescents at the baseline interview (86.40%) and this imbalance in the gender ratio is maintained throughout the waves. Future research can broaden the understanding of the reciprocal association between victimization and offending by focusing on differences between males and females. According to Broidy and Agnew (1997), gender differences can derive from the different types and magnitudes of strain, negative affective states, and coping mechanisms (i.e., personal characteristics and external supports). Prior research also found significant differences between males and

females in the types of victimization (e.g., Hay, 2003), and the type and level of negative emotions (e.g., Kaufman, 2009; Ostrowsky & Messner, 2005; Sigfusdottir, Asgeirsdottir, Gudjonsson, & Sigurdsson, 2008).

Despite these gender differences, relatively few studies have examined gender differences in relation to vicarious victimization and subsequent delinquency. One such study was conducted by Lee and Kim (2018), drawing upon a sample from NSA. They found no gender gap in the impact of experienced and vicarious victimization on robbery, assault, and gang fights. However, their nationally representative sample was collected approximately three decades ago. From GST's standpoint, males may respond differently to vicarious victimization than females (Broidy & Agnew, 1997; Mazerolle, 1998). Ultimately, the above findings suggest a need for additional research regarding the mechanisms behind the types of criminal victimization, victims' negative affective states, and delinquent coping that can vary by gender.

Third, the current study did not focus on racial/ethnic differences, even though GST is applicable for describing the variations in delinquent and criminal coping among different racial and ethnic groups. Even though four distinct racial/ethnic groups were considered as a control variable, a significantly lower likelihood of offending for Blacks than Whites was found only in a few models. However, the significant differences disappeared when chronic/repeat dual victimization was added to the model. The Racialized General Strain Theory (RGST) describes that minorities are at greater risk of criminal victimization and strain, which increases delinquent and criminal coping (Agnew, 1999, 2006b; Kaufman, Rebellon, Thaxton, & Agnew, 2008). In comparison to Whites, criminal victimization is more relevant to interpersonal aggression and property

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offending for Blacks and Hispanics (e.g., Jennings, Piquero, Gover, & Pérez, 2009; Piquero & Sealock, 2010; Spohn & Wood, 2014).

In addition, there are differences in negative emotions by racial/ethnic background. For instance, Blacks' strains are associated with severe offenses via aggression and anger (Agnew, 1999; Jang & Johnson, 2003) and via depression (Peck, 2013). It is also noted that minorities receive a reduced level of social support from teachers and others in the school system (Agnew, 2006b), and are also affected by detrimental environmental factors in their neighborhood (Agnew, 1999; Anderson, 1990, 1994). These factors are crucial not only because they can directly increase the chances of becoming a victim and an offender, but they also can be tied to criminal propensity (Agnew, 2006).

However, a recent study by Isom-Scott and Grosholz (2019) suggested a more complicated perception of the differences between Whites and Blacks in terms of offending, revealing mixed support for the RGST. Specifically, Blacks and Whites did not experience different types of strains, but they had variation in the magnitude of direct and vicarious victimization. Also, no difference was found in the conditioning factors. That is, the same direction and magnitude of an effect for delinquent peers and family attachments was detected for Blacks and Whites. One difference was identified regarding negative emotions. Although Blacks and Whites experienced both anger and depression, the cumulative impact of strain on negative emotions was greater for Blacks than for Whites. Regarding these mixed findings, it is clear that further studies are needed to examine differences that may exist among racial/ethnic groups, including the

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types/magnitude of strains, negative affective states, personal resources, and external supports.

An intersectional perspective needs to be used to account for the association between victimization and offending. The term intersectionality, coined by Crenshaw (1989), describes that individuals have multiple layers of characteristics that constitute one's identity, such as gender, race/ethnicity, and class. Intersectionality incorporates social, personal, and physical dimensions to account for their interactions rather than considering its discrete relations. Thus, intersectionality helps us to understand the impact of these coexistent identities as well as the interrelationship between characteristics on victimization and offending (Potter, 2008, 2015). This perspective can be utilized in several ways. For example, Crenshaw (1989, 1991) applied this concept to account for how gender and race/ethnicity overlap and give rise to a unique forms of discrimination. Potter (2008) used the same approach to account for how interacting identities of gender and race/ethnicity are related to women's exposure to violence and criminal victimization. More recently, Isom-Scott (2018) considered the interactions between race/ethnicity and gender to account for the impact of direct and vicarious victimization on negative emotions and criminal coping. Based on a review of this research, future studies should be extended to explore more fully the differences across age, race, sexual orientation, and SES.

Fourth, the current study did not assess the conditioning role of criminal propensity, although multiple conditioning factors were combined into one composite risk index, following Agnew's (2006) recommendation. To date, little research has examined the effect of this composite index as a moderator of the victimization-

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delinquency relationship. Empirical evidence regarding this "total risk" approach is mixed, although several studies indicate that using a composite measure of multiple conditioning factors helps explain the variance in the victimization-delinquency relationship (Baron, 2018; Mazerolle & Maahs, 2000; Lin & Mieczkowski, 2011; Moon & Morash, 2017; Park & Metcalfe, 2020; Thaxton & Agnew, 2018; Willits, 2019). Other studies do not find support for this approach in detecting interaction effects (Craig et al., 2017; Jang & Song, 2015; Ousey et al., 2015).

A handful of studies also employed the total risk approach to understanding criminal victimization, in particular. For example, Baron (2018) concluded that the impact of emotional neglect, physical abuse, physical neglect, sexual abuse, and vicarious victimization on violent offenses were more prevalent among those with a high level of criminal propensity. Similarly, Park and Metcalfe (2020) found a greater impact of bullying victimization on offending for juveniles with a high level of criminal propensity. According to Craig et al. (2017), although criminal propensity had a positive and significant impact on delinquency, the magnitude of the coefficient did not vary according to the individual's level of criminal propensity. Instead, both experiencing victimization and witnessing victimization produced robust direct effects on subsequent offending. Future studies are needed to consider the validity of the total risk approach in the relationship between victimization and offending.

Fifth, there is a critical concern that the missing at random (MAR) assumption may not be correct. In the current study, missing observations were assumed to be randomly distributed based on the results of t-tests that compared the groups with non-missing values to those with missing observations on the independent and control

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variables. However, the MAR assumption is not fully guaranteed, even with t-tests, due to possible correlations with undefined covariates. If missing values are not random, the nonrandom exclusion of dependent variables may lead to a biased estimation, while the missing observations on the independent variables lowers the efficiency (Allison, 2001; Berk & Ray, 1982; Wooldredge, 1998). As the efficiency of the model is affected by the sample size, the coefficient estimation and the standard error can be ensured through several techniques to account missing observations on the independent variables, such as multiple imputation and mean imputation strategies, as used in this study. Future research can apply a statistical procedure to reduce biases related to missing data, such as a bounding approach. This method can be more accurate than the point estimation, because it demonstrates the lower and upper boundaries of estimates for the two extreme cases - where all missing cases are related to the variables and where all missing cases are not associated with them (e.g., Manski, 1995; Brame, Turner, Paternoster, & Bushway, 2012).

Sixth, causal inference needs to be carefully drawn from the present study because it relies on observational data. All analyses used the predetermined and collected variables by the Pathways team. Even though the correlation and time order between the variables were determined, the causal association between victimization and offending still can be affected by unobserved confounders. This issue can be resolved in an experimental or quasi-experimental design (Jennings, Fridell, Lynch, Jetelina, & Gonzalez, 2017; Shadish, Cook, & Campbell, 2002). These research designs can be employed in future research considering the victim-offender overlap.

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Seventh, the nature of the sample restricts the study in some ways. The Pathways sample does not represent the general juvenile population, since it consists of serious adolescent offenders. This characteristic of the sample restricts the range of the dependent variable, which can attenuate the effect of the independent variables. Therefore, the results presented may not be generalizable to the typical juvenile population. Some researchers may also argue that general strain theory and the lifestyle/routine activity perspective, as general theories of crime, are more applicable to explaining crime among general samples than high-risk samples. In an alternative viewpoint, as general theories, these theories should apply to all populations and samples. A key contribution of this study was its attempt to explore the propositions of the two theories to explain serious adolescent offending for those at greater risk for both criminal victimization and offending.

Lastly, a suggestion for future research with cross-lagged panel models needs to be stated. The current study does not control for unobserved time-invariant confounders using fixed-effect methods, which is a benefit that can be exploited by using panel data to examine cross-lagged effects (Allison, Williams, & Moral-Benito, 2017). The problem is that inserting fixed effects can introduce an incidental parameters problem. Incidental parameter bias can yield ambiguous and inconsistent estimates in the estimation of a dynamic panel model.

The fixed-effect model with maximum-likelihood estimation introduced by Allison et al. (2017) can resolve the issue of an incidental parameters problem even when the normality assumptions are violated (Moral-Benito, 2013). This model is equivalent to the random-effect model in that it allows for unrestricted correlations between the

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individual specific effects and the time-varying predictors. What this means is that unobserved time-invariant confounders are treated as strictly exogenous, which are allowed to freely correlate with all future independent and dependent variables when their effects change over time. This approach could be adapted in future research considering the cross-lagged effects of victimization on crime/delinquency.

6.5 Conclusion

It appears that exposure to direct and vicarious victimization is an important risk factor that is conducive to delinquency/crime, as well as subsequent criminal victimization. Findings in the current study partially support the research questions regarding the association between victimization and offending. The impact of prior vicarious victimization on subsequent delinquency/crime was found, while an effect of direct victimization was not found. The results do not support the causal impact of deviant behaviors on subsequent victimization suggested by the lifestyle/routine activity perspective. Also, the expected mediating roles of direct/vicarious victimization were not found in the link between direct/vicarious victimization and offending. Overall, the findings suggested that contemporaneous effects mattered more when considering the victim-offender overlap. Regarding the temporal and developmental explanations of GST, experiencing criminal victimization had a harmful effect on deviant/criminal behaviors when direct victimization and vicarious victimization experiences co-occurred and accumulated over time. More theoretical development and research is needed to examine the incorporated model and explain the continuous non-recursive link between criminal victimization and offending.

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APPENDIX A

ITEMS INCLUDED IN MEASURES

Table A Items Included in Measures.

Variable	Items
Delinquency/Crime (Cronbach's α: .84 - .88)	(1) Destroyed/damaged property during the recall period
	(2) Set fire to house/building/car/vacant lot during the recall period
	(3) Entered building to steal during the recall period
	(4) Shoplifted during the recall period
	(5) Bought/received/sold stolen property during the recall period
	(6) Used checks/credit cards illegally during the recall period
	(7) Stolen car/motorcycle during the recall period
	(8) Sold marijuana during the recall period
	(9) Sold other illegal drugs during the recall period
	(10) Carjacked someone during the recall period
	(11) Drove drunk or high during the recall period
	(12) Paid to have sexual relations during the recall period
	(13) Forced someone to have sex during the recall period
	(14) Killed someone during the recall period
	(15) Shot someone (where bullet hit) during the recall period
	(16) Shot at someone (pulled trigger) during the recall period

(17) Robbery with weapon during the recall period

(18) Robbery no weapon during the recall period

(19) Beaten up somebody badly needed doctor during the recall period

(20) Been in fight during the recall period

(21) Fight part of gang during the recall period

(22) Carried a gun during the recall period

Direct Victimization	(1) Being chased where you thought you might be seriously hurt during the recall period
(Cronbach's α: .51 - .62) [a]	(2) Being beaten up, mugged, or seriously threatened by another person during the recall period
	(3) Being raped, had someone attempt to rate you or been sexually attacked in some other way during the recall period
	(4) Being attacked with a weapon, like a knife, box cutter, or bat during the recall period
	(5) Being shot at during the recall period
	(6) Being shot and hit during the recall period
Vicarious Victimization	(1) Being seen anyone get chased where you thought they could be seriously hurt during the recall period
(Cronbach's α: .71 - .78) [a]	(2) Being seen anyone else get beaten up, mugged, or seriously threatened by another person during the recall period
	(3) Being seen someone else being raped, had someone attempt to rate you or been sexually attacked during the recall period
	(4) Being seen someone else get attacked with a weapon, like a knife, box cutter, bat, chained, or broken bottle during the recall period

(5) Being seen someone else get shot at during the recall period

(6) Being seen someone else get shot and hit during the recall period

(7) Being seen someone else get killed as a result of violence, like being shot, stabbed, or beaten to death during the recall period

Peer Delinquency (Cronbach's α: .88 - .92) [a]	(1) Number of friends have purposely damaged/destroyed property that did not belong to them during the recall period (2) Number of friends have hit/threatened to hit someone during the recall period (3) Number of friends have sold drugs during the recall period (4) Number of friends have gotten drunk once in a while during the recall period (5) Number of friends have carried a knife during the recall period (6) Number of friends have carried a gun during the recall period (7) Number of friends have owned a gun during the recall period (8) Number of friends have gotten into a physical fight during the recall period (9) Number of friends have been hurt in a fight during the recall period (10) Number of friends have stolen something worth more than $100 during the recall period (11) Number of friends have taken a motor vehicle or stolen a car during the recall period (12) Number of friends have gone in or tried to go into a building to steal something during the recall period
Moral Thinking (Cronbach's α: .88 - .92) [a]	(1) It is alright to protect your friends. (2) Slapping and shoving someone is just a way of joking. (3) Damaging some property is no big deal when you consider that others are beating people up. (4) A kid in a gang should not be blamed for the trouble the gang causes.

(5) Kids are living under bad conditions they cannot be blamed for behaving aggressively.

(6) It is okay to tell small lies because they don't really do any harm.

(7) Some people deserve to be treated like animals.

(8) If kids fight and misbehave in school it is their teacher's fault.

(9) It is alright to beat someone who bad mouths your family.

(10) To hit obnoxious classmates is just giving them 'a lesson.'

(11) Stealing some money is not too serious compared to those who steal a lot of money.

(12) A kid who suggests breaking rules should not be blamed if other kids go ahead and do it.

(13) If kids are not disciplined, they should not be blamed for misbehaving.

(14) Children do not mind being teased because it shows interest in them.

(15) It is okay to treat badly somebody who behaved like a 'worm' or a 'low life.'

(16) If people are careless where they leave their things it is their own fault it they get stolen.

(17) It is alright to fight when your group's honor is threatened.

(18) Taking someone's bicycle without their permission is just 'borrowing it.'

(19) It is okay to insult a classmate because beating him/her is worse.

(20) If a group decides together to do something harmful it is unfair to blame any kids in the group for it.

(21) Kids cannot be blamed for using bad words when all their friends do it.

(22) Teasing someone does not really hurt them.

(23) Someone who is obnoxious does not deserve to be treated like a human being.

(24) Kids who get mistreated usually do things that deserve it.

(26) It is not a bad thing to 'get high' once in a while.

(27) Compared to the illegal things people do, taking some things from a store without paying for them is not very serious.

(28) It is unfair to blame a child who had a small part in the harm caused by a gang.

(29) Kids cannot be blamed for misbehaving if their friends pressured them to do it.

(30) Insults among children do not hurt anyone.

(31) Some people have to be treated roughly because they lack feelings that can be hurt.

(32) Children are not at fault for misbehaving if their parents force them too much.

Perception of Chances of Success (Cronbach's α: .67 - .75)	(1) How important to have a good job or career
	(2) How important to graduate from college
	(3) How important to earn a good living
	(4) How important to provide a good home for your family
	(5) How important to have a good marriage
	(6) How important to have a good relationship with your children
	(7) How important to stay out of trouble with the law
Substance Abuse (Cronbach's α: .51 - .71)	(1) Number of times been drunk on alcohol during the recall period
	(2) Number of times used marijuana/hashish during the recall period
	(3) Number of times used sedative/tranquilizers during the recall period
	(4) Number of times used stimulants/amphetamines during the recall period
	(5) Number of times used cocaine during the recall period
	(6) Number of times used opiates during the recall period
	(7) Number of times used ecstasy during the recall period

(8) Number of times used hallucinogens during the recall period

(9) Number of times used inhalants during the recall period

(10) Number of times used amyl nitrate/odorizers/rush during the recall period

(11) Number of times smoked cigarettes during the recall period

Future Oriented Inventory (Cronbach's α: .68 - .73) [a]	(1) I will keep working at difficult, boring tasks if I know they will help me get ahead later.
	(2) I think about how things might be in the future.
	(3) I make lists of things to do.
	(4) Before making a decision, I weigh the good vs. the bad.
	(5) I will give up my happiness now so that I can get what I want in the future.
	(6) I would rather save my money for a rainy day than spend it now on something fun.
	(7) I can see my life 10 years from now.
	(8) I usually think about the consequences before I do something.
Personal Rewards of Crime (Cronbach's α: .88 - .91) [a]	(1) How much 'thrill' or 'rush' is it to do any of the following things? - Fighting, Robbery with gun, Stabbing someone, Breaking into a store or home, Stealing clothes from a store, Vandalism, and Auto theft
Employment Status	(1) Total weeks worked in recall period across all facility jobs
School Attendance	(1) Enrolled school during the recall period
Gang Involvement	(1) Still a member of gang from the last interview
Family Criminality	(1) Anyone in family involved in criminal activity during recall period

Religious Attendance [b] (1) How often did you attend church, synagogue, or other religious activities during recall period

Marital/relationship status (1) Currently have a bf/gf/husband/wife

Parental Warmth
(Cronbach's α: .62 at baseline)

(1) How often did your mother help you do something that was important?

(2) How often did your mother let you know she really cares about you?

(3) How often did your mother listen carefully to your point of view?

(4) How often did your mother act supportive and understanding toward you?

(5) How often did your mother act loving or affectionate towards you?

(6) How often did your mother have a good laugh with you about something that was funny?

(7) How often did your mother let you know that she appreciates you, your ideas, or the things you do?

(8) How often did your mother tell you she loves you?

(9) How often did your mother understand the way you feel about things?

Parental Monitoring
(Cronbach's α: .54 at baseline)

(1) How much does your primary caregiver know who you spend time with?

(2) How much does your primary caregiver know how you spend your free time?

(3) How much does your primary caregiver know how you spend your money?

(4) How much does your primary caregiver know about where you go right after school or work is over for the day?

(5) How much does your primary caregiver know about where you go at night?

(6) How often do you have a set time to be home on school or work nights?

(7) How often do you have a set time to be home on weekend nights?

(8) How often does your primary caregiver know what time you will be home when you've gone out?

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(9) If your primary caregiver is not at home, how often do you leave a note, call, or communicate with her/him in some way about where you are going?

Neighborhood Conditions (Cronbach's α: .94 at baseline) [a]

(1) How often do cigarettes on the street or in the gutters occur within your neighborhood?

(2) How often does garbage in the streets or on the sidewalk occur within your neighborhood?

(3) How often do empty beer bottles on the streets or sidewalks occur within your neighborhood?

(4) How often do boarded up windows on buildings occur within your neighborhood?

(5) How often does graffiti or tags occur within your neighborhood?

(6) How often does graffiti painted over occur within your neighborhood?

(7) How often does gang graffiti occur within your neighborhood?

(8) How often do abandoned cars occur within your neighborhood?

(9) How often do empty lots with garbage occur within your neighborhood?

(10) How often do condoms on sidewalk occur within your neighborhood?

(11) How often do needles or syringes occur within your neighborhood?

(12) How often does political messages in graffiti occur within your neighborhood?

(13) How often does gangs (or other teen groups) hang out within your neighborhood?

(14) How often do adults hang out on the street within your neighborhood?

(15) How often do people drink beer, wine, or liquor within your neighborhood?

(16) How often do people get drunk or passed out within your neighborhood?

(17) How often do adults fight or argue loudly within your neighborhood?

(18) How often do prostitute on the streets within your neighborhood?

(19) How often do people smoke marijuana within your neighborhood?

(20) How often do people smoke crack within your neighborhood?

(21) How often do people use needles or syringes to take drugs within your neighborhood?

NOTES: [a] This measure is preconstructed by the Pathways team; [b] Answers are coded using the 5 point Likers sale: (1) Never, (2) Several times a year, (3) Once or twice per month, (4) Once a week, and (5) Several times per week.

APPENDIX B

DESCRIPTION AND CORRELATION OF MEASURES OF THE RISK FACTOR INDEX

Table B1 Descriptive Statistics of Measures of the Risk Factor Index by Wave.

	Wave 1		Wave 2		Wave 3		Wave 8			
Variables	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Min	Max
Peer Delinquency	1.963	.875	1.830	.835	1.777	.813	1.694	.782	1	5
Family Criminality (1= having criminal family)	.226	.418	.183	.387	.166	.372	.160	.366	0	1
Moral Thinking	1.571	.364	1.528	.357	1.497	.372	1.410	.347	1	3
Perception of Chances of Success	4.473	.532	4.477	.557	4.508	.533	4.563	.495	1	5
School Status (1 = not enrolling school)	.109	.311	.205	.404	.325	.469	.744	.485	0	1
Substance Abuse	16.687	7.696	17.134	7.949	17.466	7.560	19.033	7.766	0	99
Gang Involvement (1= gang activity)	.129	.336	.114	.318	.103	.305	.066	.265	0	1
Employment Status (1= unemployed)	.695	.461	.622	.485	.593	.491	.410	.498	0	1
Relationship Status (1= no relationship)	.524	.500	.532	.499	.492	.500	.389	.483	0	1
Low Self-Control	2.955	.843	3.068	.838	3.085	.863	3.199	.835	1	5
Future Orientation Inventory	2.480	.584	2.523	.564	2.570	.568	2.692	.551	1	4
Religious Attendance	2.061	1.325	1.977	1.290	1.882	1.286	1.844	1.211	1	5
Personal Rewards of Crime	2.274	2.491	2.153	2.404	1.993	2.363	2.204	1.514	0	10
n (individuals)	1,265		1,262		1,229		1,207			

ABBREVIATIONS: SD = standard deviation; Min = minimum; Max = maximum.

Table B2 Bivariate Correlation Matrix of Measures for Risk Factor Index at Wave 1.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	1							
(2)	.207***	1						
(3)	.381***	.148***	1					
(4)	-.182***	-.036	-.279***	1				
(5)	.003	-.043	-.020	.001	1			
(6)	.316***	.142***	.197***	-.065**	.120**	1		
(7)	.257***	.147***	.223***	-.142***	.040	.110***	1	
(8)	.076***	.024	.056**	-.057**	-.189***	-.223***	.025	1
(9)	-.099***	-.009	.001	-.079***	-.136***	-.165***	-.025	.141***
(10)	-.339***	-.159***	-.423***	.158***	-.015	-.255***	-.185***	-.039
(11)	-.116***	-.026	-.250***	.308***	-.017	-.135***	-.132***	-.037
(12)	.020	.054*	-.033	.138***	-.085***	-.067	.114***	.023
(13)	.302***	.155***	.375***	-.172***	-.001	.232***	.242***	.005

Table B2 Bivariate Correlation Matrix of Measures for Risk Factor Index at Wave 1 (continued).

	(9)	(10)	(11)	(12)	(13)
(1)					
(2)					
(3)					
(4)					
(5)					
(6)					
(7)					
(8)					
(9)	1				
(10)	.051	1			
(11)	-.072**	.211***	1		
(12)	-.009	.047	.086***	1	
(13)	.020	-.368***	-.262***	-.018	1

NOTES: *$p < .10$; **$p < .05$; ***$p < .01$ (two-tailed).

NOTES: (1) Peer Delinquency, (2) Family Criminality, (3) Moral Thinking, (4) Perception of Chances of Success, (5) School Status, (6) Substance Abuse, (7) Gang Involvement, (8) Employment Status, (9) Relationship Status, (10) Low Self-control, (11) Future Oriented Inventory, (12) Religious Attendance, and (13) Personal Rewards of Crime.

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Table B3 Bivariate Correlation Matrix of Measures for Risk Factor Index at Wave 2.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	1							
(2)	.158***	1						
(3)	.340***	.088***	1					
(4)	-.113***	-.003	-.244***	1				
(5)	-.054*	-.032	-.013	-.051*	1			
(6)	.337***	.092***	.228***	-.078***	.150***	1		
(7)	.225***	.140***	.189***	-.097***	.015	.108***	1	
(8)	.045	.024	.040	-.088***	-.202***	-.129***	.060**	1
(9)	-.019	-.067	.018	-.122***	-.069**	-.086***	-.043	.204***
(10)	-.391***	-.145***	-.480***	.129***	.008	-.298***	-.183***	-.005
(11)	-.164***	-.062**	-.201***	.337***	-.011	-.092***	-.098***	-.066**
(12)	.011	.052*	-.067**	.124***	-.078***	-.078***	.018	.062**
(13)	.288***	.139***	.337***	-.110***	.011	.188***	.237***	.020

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Table B3 Bivariate Correlation Matrix of Measures for Risk Factor Index at Wave 2 (continued).

	(9)	(10)	(11)	(12)	(13)
(1)					
(2)					
(3)					
(4)					
(5)					
(6)					
(7)					
(8)					
(9)	1				
(10)	.082***	1			
(11)	-.086***	.222***	1		
(12)	-.018	.012	.113***	1	
(13)	.081***	-.371***	-.225***	.000	1

NOTES: *$p < .10$; **$p < .05$; ***$p < .01$; (two-tailed).

NOTES: (1) Peer Delinquency, (2) Family Criminality, (3) Moral Thinking, (4) Perception of Chances of Success, (5) School Status, (6) Substance Abuse, (7) Gang Involvement, (8) Employment Status, (9) Relationship Status, (10) Low Self-control, (11) Future Oriented Inventory, (12) Religious Attendance, and (13) Personal Rewards of Crime.

Table B4 Bivariate Correlation Matrix of Measures for Risk Factor Index at Wave 3.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	1							
(2)	.210***	1						
(3)	.278***	.034	1					
(4)	-.127***	-.051*	-.248***	1				
(5)	.012	.026	-.002	-.089***	1			
(6)	.345***	.090***	.249***	-.126***	.153***	1		
(7)	.177***	.136***	.208***	-.089***	.026	.070**	1	
(8)	.037	.065**	.028	-.077***	-.168***	-.153***	.107***	1
(9)	-.069**	-.021	.001	-.114***	-.097***	-.122***	.018	.186***
(10)	-.342***	-.051*	-.483***	.182***	-.028	-.273***	-.170***	-.052*
(11)	-.123***	-.048*	-.201***	.309***	-.001	-.133***	-.125***	-.083***
(12)	-.013	.026	-.100***	.164***	-.078***	-.128***	.029	.095***
(13)	.273***	.066**	.363***	-.143***	.000	.211***	.183***	.037

Table B4 Bivariate Correlation Matrix of Measures for Risk Factor Index at Wave 3 (continued).

	(9)	(10)	(11)	(12)	(13)
(1)					
(2)					
(3)					
(4)					
(5)					
(6)					
(7)					
(8)					
(9)	1				
(10)	.092***	1			
(11)	-.102***	.261***	1		
(12)	.006	.076***	.134***	1	
(13)	.045	-.370***	-.233***	-.041	1

NOTES: *$p < .10$; **$p < .05$; ***$p < .01$ (two-tailed).

NOTES: (1) Peer Delinquency, (2) Family Criminality, (3) Moral Thinking, (4) Perception of Chances of Success, (5) School Status, (6) Substance Abuse, (7) Gang Involvement, (8) Employment Status, (9) Relationship Status, (10) Low Self-control, (11) Future Oriented Inventory, (12) Religious Attendance, and (13) Personal Rewards of Crime.

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Table B5 Bivariate Correlation Matrix of Measures for Risk Factor Index at Wave 8.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	1							
(2)	.224***	1						
(3)	.309***	.099***	1					
(4)	-.094***	-.011	-.154***	1				
(5)	-.034	-.012	.029	-.143***	1			
(6)	.351***	.133***	.244***	-.089***	.067**	1		
(7)	.154***	.102***	.227***	-.033	-.065**	.074**	1	
(8)	.117***	.045	.138***	-.094***	-.078***	-.085***	.137***	1
(9)	.029	-.018	.095***	-.098***	-.073**	-.124***	.013	.244***
(10)	-.363***	-.100***	-.487***	.146***	-.026	-.305***	-.170***	-.097***
(11)	-.139***	-.019	-.223***	.307***	-.043	-.144***	-.059**	-.045
(12)	.027	.026	-.044	.122***	-.128***	-.116***	-.071**	.119***
(13)	.210***	.082***	.321***	-.060**	-.009	.165***	.168***	.015

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Table B5 Bivariate Correlation Matrix of Measures for Risk Factor Index at Wave 8 (continued).

	(9)	(10)	(11)	(12)	(13)
(1)					
(2)					
(3)					
(4)					
(5)					
(6)					
(7)					
(8)					
(9)	1				
(10)	.023	1			
(11)	-.009	.312***	1		
(12)	.027	.044	.129***	1	
(13)	.033	-.321***	-.160***	-.046	1

NOTES: *$p < .10$; **$p < .05$; ***$p < .01$ (two-tailed).

NOTES: (1) Peer Delinquency, (2) Family Criminality, (3) Moral Thinking, (4) Perception of Chances of Success, (5) School Status, (6) Substance Abuse, (7) Gang Involvement, (8) Employment Status, (9) Relationship Status, (10) Low Self-control, (11) Future Oriented Inventory, (12) Religious Attendance, and (13) Personal Rewards of Crime.

APPENDIX C

BIVARIATE CORRELATION MATRIX OF MEASURES

Table C1 Bivariate Correlation Matrix of Measures at Wave 1.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	1							
(2)	.207***	1						
(3)	.231***	.472***	1					
(4)	.040	-.010	.022	1				
(5)	-.077***	-.094***	-.070**	.075***	1			
(6)	.037	.063**	-.001	-.086***	-.020	1		
(7)	.142***	.205***	.035**	-.016	-.240***	-.133***	1	
(8)	-.043	-.105***	-.068**	-.048*	.155***	-.165***	-.168***	1
(9)	-.026	-.072	-.104***	-.223**	.127***	.256***	-.256***	.195***
(10)	.011	-.011	-.017	-.016	-.011	-.091***	.050*	.052*
(11)	-.026	.046	.070**	.027	.012	-.202***	.138***	.110***
(12)	.012	.032	.075***	.044	-.011	-.027	.114***	-.002
(13)	-.002	.017	.011	-.020	-.064**	.111***	.035	-.063**
(14)	.043	.034	.125**	.034	.054*	-.175***	.098***	.059**

Table C1 Bivariate Correlation Matrix of Measures at Wave 1 (continued).

	(9)	(10)	(11)	(12)	(13)	(14)
(1)						
(2)						
(3)						
(4)						
(5)						
(6)						
(7)						
(8)						
(9)	1					
(10)	-.022	1				
(11)	-.077***	.012	1			
(12)	-.053*	.264***	.034	1		
(13)	.025	.024	.019	-.019	1	
(14)	-.146***	.147***	.000	.063**	-.045	1

NOTES: *p < .10; **p < .05; ***p < .01 (two-tailed).

NOTES: (1) Delinquency/Crime (frequency), (2) Direct Victimization, (3) Vicarious Victimization, (4) Age, (5) Emotional Intensity, (6) Time on Street, (7) Risk Factor Index, (8) Parental Warmth, (9) Parental Monitoring, (10) Family SES, (11) Male, (12) Race/Ethnicity, (13) Family Structure, and (14) Neighborhood Conditions.

Table C2 Bivariate Correlation Matrix of Measures at Wave 2.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	1							
(2)	.232***	1						
(3)	.284***	.435***	1					
(4)	.023	.016	.031	1				
(5)	-.055*	-.056**	-.017	.070**	1			
(6)	-.003	.067**	-.029	-.027	-.045	1		
(7)	.021***	.257***	.248**	-.012	-.187***	-.142***	1	
(8)	.022	-.077***	.027	-.035	.187***	-.114***	-.133***	1
(9)	-.099***	-.067**	-.139***	-.226***	.059**	.158***	-.228***	.195***
(10)	.009	-.005	-.044	-.045	-.042	-.062**	.066**	.052*
(11)	.044	.038	.074***	.017	.015	-.186***	.113***	.110***
(12)	-.001	.016	-.008	.035	-.027	-.027	.086***	-.002
(13)	-.043	.007	-.015	-.012	-.064**	.102***	.046	-.063**
(14)	.046*	.046	.170***	.039	.003	-.124***	.083***	.059**

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Table C2 Bivariate Correlation Matrix of Measures at Wave 2 (continued).

	(9)	(10)	(11)	(12)	(13)	(14)
(1)						
(2)						
(3)						
(4)						
(5)						
(6)						
(7)						
(8)						
(9)	1					
(10)	-.022	1				
(11)	-.077***	.012	1			
(12)	-.053*	.264***	.034	1		
(13)	.025	.024	.019	-.019	1	
(14)	-.146***	.147***	.000	.063**	-.045	1

NOTES: *p < .10; **p < .05; ***p < .01 (two-tailed).

NOTES: (1) Delinquency/Crime (frequency), (2) Direct Victimization, (3) Vicarious Victimization, (4) Age, (5) Emotional Intensity, (6) Time on Street, (7) Risk Factor Index, (8) Parental Warmth, (9) Parental Monitoring, (10) Family SES, (11) Male, (12) Race/Ethnicity, (13) Family Structure, and (14) Neighborhood Conditions.

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Table C3 Bivariate Correlation Matrix of Measures at Wave 3.

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	1							
(2)	.239***	1						
(3)	.294***	.444***	1					
(4)	.041	.062**	.074***	1				
(5)	.072**	-.011	-.001	.038	1			
(6)	.025	.056*	-.053*	.045	-.011	1		
(7)	.197***	.211***	.246***	.021	-.194***	-.154***	1	
(8)	-.007	-.022	.004	-.033	.137***	-.088***	-.140***	1
(9)	-.059**	-.089***	-.122***	-.215***	.093***	.075**	-.214***	.195***
(10)	.016	.070**	.018	-.037	-.019	-.052*	.105***	.052*
(11)	.062**	.047	.079***	.018	.003	-.150***	.130***	.110***
(12)	-.031	.012	.001	.033	-.040	-.049*	.093***	-.002
(13)	-.010	.017	-.021	-.004	-.056**	-.097***	-.012	-.063**
(14)	.073**	.041	.150***	.023	.023	-.080***	.084***	.059**

Table C3 Bivariate Correlation Matrix of Measures at Wave 3 (continued).

	(9)	(10)	(11)	(12)	(13)	(14)
(1)						
(2)						
(3)						
(4)						
(5)						
(6)						
(7)						
(8)						
(9)	1					
(10)	-.022	1				
(11)	-.077***	.012	1			
(12)	-.053*	.264***	.034	1		
(13)	.025	.024	.019	-.019	1	
(14)	-.146***	.147***	.000	.063**	-.045	1

NOTES: *p* < .10; **p* < .05; ***p* < .01 (two-tailed).

NOTES: (1) Delinquency/Crime (frequency), (2) Direct Victimization, (3) Vicarious Victimization, (4) Age, (5) Emotional Intensity, (6) Time on Street, (7) Risk Factor Index, (8) Parental Warmth, (9) Parental Monitoring, (10) Family SES, (11) Male, (12) Race/Ethnicity, (13) Family Structure, and (14) Neighborhood Conditions.

Table C4 Bivariate Correlation Matrix of Measures at Wave 8 (frequency).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	1							
(2)	.315***	1						
(3)	.038	-.028	1					
(4)	-.035	-.032	-.026	1				
(5)	.417	-.079***	-.061**	.015	1			
(6)	.241***	.250***	-.017	-.149***	-.300***	1		
(7)	-.054*	-.001	-.055*	.142***	-.099***	-.115***	1	
(8)	-.071**	-.050*	-.230***	.106***	.145***	-.208***	.195***	1
(9)	.014	-.028	-.042	-.067**	-.089***	.090***	.052*	-.022
(10)	.104***	.087***	.015	.070**	-.264***	.191***	.110***	-.077***
(11)	-.011	.020	.061**	.020	-.059**	.035	-.002	-.053*
(12)	-.031	-.052*	-.023	-.036	.042	-.004	-.063**	.025
(13)	.063**	.090***	.025	-.076***	-.103***	.179***	.059**	-.146***

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Table C4 Bivariate Correlation Matrix of Measures at Wave 8 (frequency; continued).

	(9)	(10)	(11)	(12)	(13)
(1)					
(2)					
(3)					
(4)					
(5)					
(6)					
(7)					
(8)					
(9)	1				
(10)	.012	1			
(11)	.264***	.034	1		
(12)	.024	.019	-.019	1	
(13)	.147***	.000	.063**	-.045	1

NOTES: *p < .10; **p < .05; ***p < .01 (two-tailed).

NOTES: (1) Delinquency/Crime (frequency), (2) Dual Victimization, (3) Age, (4) Emotional Intensity, (5) Time on Street, (6) Risk Factor Index, (7) Parental Warmth, (8) Parental Monitoring, (9) Family SES, (10) Male, (11) Race/Ethnicity, (12) Family Structure, and (13) Neighborhood Conditions.

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Table C5 Bivariate Correlation Matrix of Measures at Wave 8 (proportion).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	1							
(2)	.503***	1						
(3)	-.028	-.028	1					
(4)	-.060**	-.032	-.026	1				
(5)	-.097***	-.079***	-.061**	.015	1			
(6)	.423***	.250***	-.017	-.149***	-.300***	1		
(7)	-.058**	-.001	-.055*	.142***	-.099***	-.115***	1	
(8)	-.101***	-.050*	-.230***	.106***	.145***	-.208***	.195***	1
(9)	.008	-.028	-.042	-.067**	-.089***	.090***	.052*	-.022
(10)	.129***	.087***	.015	.070**	-.264***	.191***	.110***	-.077***
(11)	.021	.020	.061**	.020	-.059**	.035	-.002	-.053*
(12)	-.023	-.052*	-.023	-.036	.042	-.004	-.063**	.025
(13)	.077***	.090***	.025	-.076***	-.103***	.179***	.059**	-.146***

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Table C5 Bivariate Correlation Matrix of Measures at Wave 8 (proportion; continued).

	(9)	(10)	(11)	(12)	(13)
(1)					
(2)					
(3)					
(4)					
(5)					
(6)					
(7)					
(8)					
(9)	1				
(10)	.012	1			
(11)	.264***	.034	1		
(12)	.024	.019	-.019	1	
(13)	.147***	.000	.063**	-.045	1

NOTES: *p < .10; **p < .05; ***p < .01 (two-tailed).

NOTES: (1) Delinquency/Crime (proportion), (2) Dual Victimization, (3) Age, (4) Emotional Intensity, (5) Time on Street, (6) Risk Factor Index, (7) Parental Warmth, (8) Parental Monitoring, (9) Family SES, (10) Male, (11) Race/Ethnicity, (12) Family Structure, and (13) Neighborhood Conditions.

APPENDIX D

SUPPLEMENTARY ANALYSES FOR STUDY 1

Table D1 Direct Effects of Path Model Examining the Longitudinal Impact of Direct Victimization on Direct Victimization, Vicarious Victimization, and Delinquency/Crime Using Listwise Deletion (n = 1,031).

Path	b	SE
Direct Victimization at W1 → Direct Victimization at W2	.102***	.029
Direct Victimization at W1 → Vicarious Victimization at W2	-.036	.054
Direct Victimization at W1 → Delinquency/Crime at W2	.213	.141
Direct Victimization at W1 → Direct Victimization at W3	.082**	.029
Direct Victimization at W1 → Vicarious Victimization at W3	.039	.052
Direct Victimization at W1 → Delinquency/Crime at W3	.080	.151
Direct Victimization at W2 → Direct Victimization at W3	.199***	.033
Direct Victimization at W2 → Vicarious Victimization at W3	.070	.060
Direct Victimization at W2 → Delinquency/Crime at W3	.020	.172

NOTES: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed test). Unstandardized coefficients presented. Model fit statistics: RMSEA = .041; CFI = .982; TLI = .905; SRMR = .011; CD = .563. The model includes the time-variant and time-variant control variables noted.

ABBREVIATIONS: b = unstandardized coefficient; RMSEA = root mean squared error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; CD = coefficient of determination.

Table D2 Indirect and Total Effects of Path Model Examining the Longitudinal Impact of Direct Victimization on Direct Victimization, Vicarious Victimization, and Delinquency/Crime Using Listwise Deletion (n = 1,031).

Path	Indirect b	Total b
Direct Victimization at W1 → Direct Victimization at W2 → Direct Victimization at W3	.022**	
Direct Victimization at W1 → Vicarious Victimization at W2 → Direct Victimization at W3	-.003[a]	
Direct Victimization at W1 → Delinquency/Crime at W2 → Direct Victimization at W3	-.001	
Direct Victimization at W1 → Direct Victimization at W3	.020**	.102***
Direct Victimization at W1 → Direct Victimization at W2 → Vicarious Victimization at W3	.008	
Direct Victimization at W1 → Vicarious Victimization at W2 → Vicarious Victimization at W3	-.010	
Direct Victimization at W1 → Delinquency/Crime at W2 → Vicarious Victimization at W3	.002	
Direct Victimization at W1 → Vicarious Victimization at W3	-.001[a]	.054
Direct Victimization at W1 → Direct Victimization at W2 → Delinquency/Crime at W3	.002	
Direct Victimization at W1 → Vicarious Victimization at W2 → Delinquency/Crime at W3	-.007	
Direct Victimization at W1 → Delinquency/Crime at W2 → Delinquency/Crime at W3	.048	
Direct Victimization at W1 → Delinquency/Crime at W3	.044	.124

NOTES: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed test). Unstandardized coefficients presented. Model fit statistics: RMSEA = .041; CFI = .982; TLI = .905; SRMR = .011; CD = .563. The model includes the time-variant and time-variant control variables noted; [a] The coefficient was multiplied by 10 to obtain a non-zero value.

ABBREVIATIONS: b = unstandardized coefficient; RMSEA = root mean squared error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; CD = coefficient of determination.

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Table D3 Direct Effects of Path Model Examining the Longitudinal Impact of Vicarious Victimization on Direct Victimization, Vicarious Victimization, and Delinquency/Crime Using Listwise Deletion (n = 1,031).

Path	b	SE
Vicarious Victimization at W1 → Direct Victimization at W2	.055**	.018
Vicarious Victimization at W1 → Vicarious Victimization at W2	.314***	.033
Vicarious Victimization at W1 → Delinquency/Crime at W2	.354***	.087
Vicarious Victimization at W1 → Direct Victimization at W3	.034†	.019
Vicarious Victimization at W1 → Vicarious Victimization at W3	.148***	.033
Vicarious Victimization at W1 → Delinquency/Crime at W3	-.148	.097
Vicarious Victimization at W2 → Direct Victimization at W3	.008	.018
Vicarious Victimization at W2 → Vicarious Victimization at W3	.272***	.033
Vicarious Victimization at W2 → Delinquency/Crime at W3	.183†	.096

NOTES: †$p < .10$; *$p <. 05$; **$p <. 01$; ***$p < .001$ (two-tailed test). Unstandardized coefficients presented. Model fit statistics: RMSEA = .041; CFI = .982; TLI = .905; SRMR = .011; CD = .563. The model includes the time-variant and time-variant control variables noted.

ABBREVIATIONS: b = unstandardized coefficient; RMSEA = root mean squared error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; CD = coefficient of determination.

Table D4 Indirect and Total Effects of Path Model Examining the Longitudinal Impact of Vicarious Victimization on Direct Victimization, Vicarious Victimization, and Delinquency/Crime Using Listwise Deletion (n = 1,031).

Path	Indirect b	Total b
Vicarious Victimization at W 1 → Direct Victimization at W 2 → Direct Victimization at W3	.011**	
Vicarious Victimization at W1 → Vicarious Victimization at W2 → Direct Victimization at W3	.002	
Vicarious Victimization at W1 → Delinquency/Crime at W2 → Direct Victimization at W3	-.002	
Vicarious Victimization at W1 → Direct Victimization at W3	.011†	.046*
Vicarious Victimization at W1 → Direct Victimization at W2 → Vicarious Victimization at W3	.004	
Vicarious Victimization at W1 → Vicarious Victimization at W2 → Vicarious Victimization at W3	.085***	
Vicarious Victimization at W1 → Delinquency/Crime at W2 → Vicarious Victimization at W3	.003	
Vicarious Victimization at W1 → Vicarious Victimization at W3	.092***	.240***
Vicarious Victimization at W1 → Direct Victimization at W2 → Delinquency/Crime at W3	.001	
Vicarious Victimization at W1 → Vicarious Victimization at W2 → Delinquency/Crime at W3	.057†	
Vicarious Victimization at W1 → Delinquency/Crime at W2 → Delinquency/Crime at W3	.080**	
Vicarious Victimization at W1 → Delinquency/Crime at W3	.139***	-.009

NOTES: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed test). Unstandardized coefficients presented. Model fit statistics: RMSEA = .041; CFI = .982; TLI = .905; SRMR = .011; CD = .563. The model includes the time-variant and time-variant control variables noted.

ABBREVIATIONS: b = unstandardized coefficient; RMSEA = root mean squared error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; CD = coefficient of determination.

Table D5 Direct Effects of Path Model Examining the Longitudinal Impact of Delinquency/Crime on Direct Victimization, Vicarious Victimization, and Delinquency/Crime Using Listwise Deletion (n = 1,031).

Path	b	SE
Delinquency/Crime at W1 → Direct Victimization at W2	.011†	.007
Delinquency/Crime at W1 → Vicarious Victimization at W2	.019	.012
Delinquency/Crime at W1 → Delinquency/Crime at W2	.255***	.032
Delinquency/Crime at W1 → Direct Victimization at W3	.001	.007
Delinquency/Crime at W1 → Vicarious Victimization at W3	-.006	.012
Delinquency/Crime at W1 → Delinquency/Crime at W3	.238***	.035
Delinquency/Crime at W2 → Direct Victimization at W3	-.005	.007
Delinquency/Crime at W2 → Vicarious Victimization at W3	.010	.012
Delinquency/Crime at W2 → Delinquency/Crime at W3	.226***	.035

NOTES: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed test). Unstandardized coefficients presented. Model fit statistics: RMSEA = .041; CFI = .982; TLI = .905; SRMR = .011; CD = .563. The model includes the time-variant and time-variant control variables noted.

ABBREVIATIONS: b = unstandardized coefficient; RMSEA = root mean squared error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; CD = coefficient of determination.

Table D6 Indirect and Total Effects of Path Model Examining the Longitudinal Impact of Delinquency/Crime on Direct Victimization, Vicarious Victimization, and Delinquency/Crime Using Listwise Deletion (n = 1,031).

Path	Indirect b	Total b
Delinquency/Crime at W1 → Direct Victimization at W2 → Direct Victimization at W3	.002	
Delinquency/Crime at W1 → Vicarious Victimization at W2 → Direct Victimization at W3	.001[a]	
Delinquency/Crime at W1 → Delinquency/Crime at W2 → Direct Victimization at W3	-.001	
Delinquency/Crime at W1 → Direct Victimization at W3	.001	.002
Delinquency/Crime at W1 → Direct Victimization at W2 → Vicarious Victimization at W3	.001	
Delinquency/Crime at W1 → Vicarious Victimization at W2 → Vicarious Victimization at W3	.005	
Delinquency/Crime at W1 → Delinquency/Crime at W2 → Vicarious Victimization at W3	.002	
Delinquency/Crime at W1 → Vicarious Victimization at W3	.008†	.003
Delinquency/Crime at W1 → Direct Victimization at W2 → Delinquency/Crime at W3	.002[a]	
Delinquency/Crime at W1 → Vicarious Victimization at W2 → Delinquency/Crime at W3	.004	
Delinquency/Crime at W1 → Delinquency/Crime at W2 → Delinquency/Crime at W3	.057***	
Delinquency/Crime at W1 → Delinquency/Crime at W3	.060***	.298***

NOTES: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed test). Unstandardized coefficients presented. Model fit statistics: RMSEA = .041; CFI = .982; TLI = .905; SRMR = .011; CD = .563. The model includes the time-variant and time-variant control variables noted; [a] The coefficient was multiplied by 10 to obtain a non-zero value.

ABBREVIATIONS: b = unstandardized coefficient; RMSEA = root mean squared error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; CD = coefficient of determination.

Table D7 Direct Effects of Path Model Examining the Longitudinal Impact of Direct Victimization on Direct Victimization, Vicarious Victimization, and Delinquency/Crime Using Mean Imputation (n = 1,156).

Path	b	SE
Direct Victimization at W1 → Direct Victimization at W2	.127***	.027
Direct Victimization at W1 → Vicarious Victimization at W2	-.013	.050
Direct Victimization at W1 → Delinquency/Crime at W2	.202	.128
Direct Victimization at W1 → Direct Victimization at W3	.074**	.027
Direct Victimization at W1 → Vicarious Victimization at W3	.049	.048
Direct Victimization at W1 → Delinquency/Crime at W3	.145	.139
Direct Victimization at W2 → Direct Victimization at W3	.218***	.032
Direct Victimization at W2 → Vicarious Victimization at W3	.066	.056
Direct Victimization at W2 → Delinquency/Crime at W3	.021	.162

NOTES: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed test). Unstandardized coefficients presented. Model fit statistics: RMSEA = .035; CFI = .986; TLI = .927; SRMR = .010; CD = .548. The model includes the time-variant and time-variant control variables noted.

ABBREVIATIONS: b = unstandardized coefficient; RMSEA = root mean squared error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; CD = coefficient of determination.

Table D8 Indirect and Total Effects of Path Model Examining the Longitudinal Impact of Direct Victimization on Direct Victimization, Vicarious Victimization, and Delinquency/Crime Using Mean Imputation (n = 1,156).

Path	Indirect b	Total b
Direct Victimization at W1 → Direct Victimization at W2 → Direct Victimization at W3	.028***	
Direct Victimization at W1 → Vicarious Victimization at W2 → Direct Victimization at W3	-.001[a]	
Direct Victimization at W1 → Delinquency/Crime at W2 → Direct Victimization at W3	-.001a	
Direct Victimization at W1 → Direct Victimization at W3	.028***	.101***
Direct Victimization at W1 → Direct Victimization at W2 → Vicarious Victimization at W3	.008	
Direct Victimization at W1 → Vicarious Victimization at W2 → Vicarious Victimization at W3	-.003	
Direct Victimization at W1 → Delinquency/Crime at W2 → Vicarious Victimization at W3	.003	
Direct Victimization at W1 → Vicarious Victimization at W3	.008	.057
Direct Victimization at W1 → Direct Victimization at W2 → Delinquency/Crime at W3	.003	
Direct Victimization at W1 → Vicarious Victimization at W2 → Delinquency/Crime at W3	-.002	
Direct Victimization at W1 → Delinquency/Crime at W2 → Delinquency/Crime at W3	.047	
Direct Victimization at W1 → Delinquency/Crime at W3	.048	.193

NOTES: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed test). Unstandardized coefficients presented. Model fit statistics: RMSEA = .035; CFI = .986; TLI = .927; SRMR = .010; CD = .548. The model includes the time-variant and time-variant control variables noted; [a] The coefficient was multiplied by 10 to obtain a non-zero value.

ABBREVIATIONS: b = unstandardized coefficient; RMSEA = root mean squared error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; CD = coefficient of determination.

Table D9 Direct Effects of Path Model Examining the Longitudinal Impact of Vicarious Victimization on Direct Victimization, Vicarious Victimization, and Delinquency/Crime Using Mean Imputation (n = 1,156).

Path	b	SE
Vicarious Victimization at W1 → Direct Victimization at W2	.052**	.017
Vicarious Victimization at W1 → Vicarious Victimization at W2	.308***	.032
Vicarious Victimization at W1 → Delinquency/Crime at W2	.354***	.081
Vicarious Victimization at W1 → Direct Victimization at W3	.026	.018
Vicarious Victimization at W1 → Vicarious Victimization at W3	.141***	.032
Vicarious Victimization at W1 → Delinquency/Crime at W3	-.081	.091
Vicarious Victimization at W2 → Direct Victimization at W3	.007	.018
Vicarious Victimization at W2 → Vicarious Victimization at W3	.253***	.031
Vicarious Victimization at W2 → Delinquency/Crime at W3	.180*	.089

NOTES: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed test). Unstandardized coefficients presented. Model fit statistics: RMSEA = .035; CFI = .986; TLI = .927; SRMR = .010; CD = .548. The model includes the time-variant and time-variant control variables noted.

ABBREVIATIONS: b = unstandardized coefficient; RMSEA = root mean squared error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; CD = coefficient of determination.

Table D10 Indirect and Total Effects of Path Model Examining the Longitudinal Impact of Vicarious Victimization on Direct Victimization, Vicarious Victimization, and Delinquency/Crime Using Mean Imputation (n = 1,156).

Path	Indirect b	Total b
Vicarious Victimization at W 1 → Direct Victimization at W 2 → Direct Victimization at W3	.011**	
Vicarious Victimization at W1 → Vicarious Victimization at W2 → Direct Victimization at W3	.002	
Vicarious Victimization at W1 → Delinquency/Crime at W2 → Direct Victimization at W3	-.002[a]	
Vicarious Victimization at W1 → Direct Victimization at W3	.013*	.039*
Vicarious Victimization at W1 → Direct Victimization at W2 → Vicarious Victimization at W3	.003	
Vicarious Victimization at W1 → Vicarious Victimization at W2 → Vicarious Victimization at W3	.079***	
Vicarious Victimization at W1 → Delinquency/Crime at W2 → Vicarious Victimization at W3	.005	
Vicarious Victimization at W1 → Vicarious Victimization at W3	.088***	.228***
Vicarious Victimization at W1 → Direct Victimization at W2 → Delinquency/Crime at W3	.001	
Vicarious Victimization at W1 → Vicarious Victimization at W2 → Delinquency/Crime at W3	.055*	
Vicarious Victimization at W1 → Delinquency/Crime at W2 → Delinquency/Crime at W3	.083***	
Vicarious Victimization at W1 → Delinquency/Crime at W3	.139***	.058

NOTES: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed test). Unstandardized coefficients presented. Model fit statistics: RMSEA = .035; CFI = .986; TLI = .927; SRMR = .010; CD = .548. The model includes the time-variant and time-variant control variables noted; [a] The coefficient was multiplied by 10 to obtain a non-zero value.

ABBREVIATIONS: b = unstandardized coefficient; RMSEA = root mean squared error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; CD = coefficient of determination.

Table D11 Direct Effects of Path Model Examining the Longitudinal Impact of Delinquency/Crime on Direct Victimization, Vicarious Victimization, and Delinquency/Crime Using Mean Imputation (n = 1,156).

Path	b	SE
Delinquency/Crime at W1 → Direct Victimization at W2	.010	.006
Delinquency/Crime at W1 → Vicarious Victimization at W2	.012	.012
Delinquency/Crime at W1 → Delinquency/Crime at W2	.249***	.030
Delinquency/Crime at W1 → Direct Victimization at W3	-.001	.006
Delinquency/Crime at W1 → Vicarious Victimization at W3	-.007	.011
Delinquency/Crime at W1 → Delinquency/Crime at W3	.212***	.033
Delinquency/Crime at W2 → Direct Victimization at W3	-.001	.007
Delinquency/Crime at W2 → Vicarious Victimization at W3	.015	.012
Delinquency/Crime at W2 → Delinquency/Crime at W3	.234***	.034

NOTES: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed test). Unstandardized coefficients presented. Model fit statistics: RMSEA = .035; CFI = .986; TLI = .927; SRMR = .010; CD = .548. The model includes the time-variant and time-variant control variables noted.

ABBREVIATIONS: b = unstandardized coefficient; RMSEA = root mean squared error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; CD = coefficient of determination.

Table D12 Indirect and Total Effects of Path Model Examining the Longitudinal Impact of Delinquency/Crime on Direct Victimization, Vicarious Victimization, and Delinquency/Crime Using Mean Imputation (n = 1,156).

Path	Indirect b	Total b
Delinquency/Crime at W1 → Direct Victimization at W2 → Direct Victimization at W3	.002	
Delinquency/Crime at W1 → Vicarious Victimization at W2 → Direct Victimization at W3	.001[a]	
Delinquency/Crime at W1 → Delinquency/Crime at W2 → Direct Victimization at W3	-.001[a]	
Delinquency/Crime at W1 → Direct Victimization at W3	.002	.001
Delinquency/Crime at W1 → Direct Victimization at W2 → Vicarious Victimization at W3	.001	
Delinquency/Crime at W1 → Vicarious Victimization at W2 → Vicarious Victimization at W3	.003	
Delinquency/Crime at W1 → Delinquency/Crime at W2 → Vicarious Victimization at W3	.004	
Delinquency/Crime at W1 → Vicarious Victimization at W3	.008†	.001
Delinquency/Crime at W1 → Direct Victimization at W2 → Delinquency/Crime at W3	.002[a]	
Delinquency/Crime at W1 → Vicarious Victimization at W2 → Delinquency/Crime at W3	.002	
Delinquency/Crime at W1 → Delinquency/Crime at W2 → Delinquency/Crime at W3	.058***	
Delinquency/Crime at W1 → Delinquency/Crime at W3	.061***	.273***

NOTES: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed test). Unstandardized coefficients presented. Model fit statistics: RMSEA = .035; CFI = .986; TLI = .927; SRMR = .010; CD = .548. The model includes the time-variant and time-variant control variables noted; [a] The coefficient was multiplied by 10 to obtain a non-zero value.

ABBREVIATIONS: b = unstandardized coefficient; RMSEA = root mean squared error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; CD = coefficient of determination.

APPENDIX E

SUPPLEMENTARY ANALYSES FOR STUDY 2

Table E1 Negative Binomial Regression Analysis Examining the Additive and Cumulative Effect of Victimization on Delinquency/Crime Using Listwise Deletion, Mean Imputation, and The Alternative Chronic Dual Victimization.

	Listwise Deletion		Mean Imputation		MI (with Chronic Dual Victimization Version 2)	
	IRR	b(SE)	IRR	b(SE)	IRR	b(SE)
Dual Victimization	3.233	1.173(.322)***	3.245	1.177(.299)***	3.074	1.123(.303)***
Chronic Dual Victimization						
1 Experience	1.758	.564(.283)*	2.078	.731(.262)**	1.667	.511(.352)
2 Experiences	2.271	.820(.330)*	2.547	.935(.301)**	1.878	.630(.364)†
3 Experiences	1.329	.284(.399)	1.605	.473(.372)	1.106	.101(.436)
4 Experiences	4.745	1.557(.571)**	4.303	1.459(.508)**	3.117	1.137(.544)*
5 Experiences	2.123	.753(.837)	2.654	.976(.744)	1.369	.314(.824)
6 or More Experiences	3.429	1.232(1.065)	3.300	1.194(.956)	1.844	.612(.923)
Control Variables						
Age	1.057	.056(.098)	1.061	.059(.091)	1.051	.050(.093)
Risk Factor Index	1.242	.217(.052)***	1.242	.217(.048)***	1.228	.205(.049)***
Time on Street	2.112	.747(.322)*	2.311	.838(.300)**	2.151	.766(.307)*

	IRR	b(SE)	IRR	b(SE)	IRR	b(SE)
Emotional Intensity	.932	-.070(.147)	.879	-.129(.131)	.892	-.114(.134)
Delinquency/Crime (W7)	1.004	.004(.001)***	1.004	.004(.001)***	1.005	.005(.001)***
Male	3.310	1.197(.317)***	3.729	1.316(.296)***	3.770	1.327(.300)***
Black	.966	-.035(.305)	1.041	.041(.281)	.969	-.032(.288)
Hispanic	.875	-.133(.298)	.941	-.061(.283)	.941	-.061(.287)
Other	.493	-.706(.568)	.607	-.499(.511)	.797	-.227(.520)
Family SES	1.127	.119(.109)	1.150	.139(.103)	1.125	.118(.104)
Intact Family	1.263	.223(.300)	1.309	.270(.284)	1.250	.223(.295)
Parental Warmth	1.068	.066(.166)	1.003	.003(.155)	.998	-.002(.157)
Parental Monitoring	.957	-.044(.156)	1.023	.023(.146)	.935	-.067(.154)
Neighborhood Conditions	1.079	.076(.160)	1.102	.097(.143)	1.097	.093(.144)
Intercept	.142	-1.948(2.208)	.094	-2.367(2.072)	.215	-1.535(2.141)
n (individuals)		1,058		1,201		1,201

ABBREVIATIONS: IRR = incidence rate ratio; b = unstandardized coefficient; SE = standard error.

NOTES: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed).

REFERENCE GROUPS: No experiences of chronic dual victimization; White.

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Table E2 Fractional Probit Regression Analysis Examining the Additive and Cumulative Effect of Victimization on Delinquency/Crime Using Listwise Deletion, Mean Imputation, and The Alternative Chronic Dual Victimization.

	Listwise Deletion		Mean Imputation		MI (with Chronic Dual Victimization Version 2)	
	b	SE	b	SE	b	SE
Dual Victimization	.634***	.059	.654***	.056	.661***	.057
Chronic Dual Victimization						
1 Experience	.092	.064	.103†	.060	.028	.069
2 Experiences	.247**	.072	.226**	.068	.183**	.071
3 Experiences	.128	.091	.110	.087	-.003	.095
4 Experiences	.319**	.113	.234*	.107	.240†	.123
5 Experiences	.318*	.155	.496**	.159	.312*	.146
6 or More Experiences	.132	.166	.143	.142	-.052	.167
Control Variables						
Age	-.008	.019	-.008	.018	-.007	.018
Risk Factor Index	.091***	.011	.093***	.011	.088***	.011
Time on Street	.106†	.057	.115*	.054	.112*	.055
Emotional Intensity	-.021	.033	-.015	.032	-.019	032
Delinquency/Crime (W7)	1.429***	.220	1.510***	.218	1.624***	.217
Male	.164†	.084	.157†	.080	.163*	.080
Black	-.123*	.062	-.090	.060	-.097	.060

	b	SE	b	SE	b	SE
Hispanic	-.048	.066	-.029	.064	-.027	.064
Other	-.063	.100	-.035	.092	-.023	.094
Family SES	.023	.026	.025	.025	.020	.025
Intact Family	-.041	.062	-.026	.060	-.013	.060
Parental Warmth	.009	.032	.005	.030	-.003	.031
Parental Monitoring	-.040	.033	-.038	.032	-.030	.033
Neighborhood Conditions	-.012	.033	-.019	.031	-.006	.032
Intercept	-2.293***	.470	-2.333***	.448	-2.311***	.452
n (individuals)	1,058		1,201		1,201	

ABBREVIATIONS: b = unstandardized coefficient; SE = standard error.

NOTES: †*p* < .10; *p < .05; **p < .01; ***p < .001 (two-tailed).

REFERENCE GROUPS: No experiences of chronic dual victimization; White.