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PEER VICTIMIZATION AND DELINQUENCY: A LONGITUDINAL ANALYSIS OF  
THEIR RELATIONSHIPS

BY

NICHOLAS A. ADAMS

Bachelor of Arts in Criminal Justice and Sociology, Old Dominion University, 2008

Master of Arts in Applied Sociology, Old Dominion University, 2011

DISSERTATION

Submitted to the University of New Hampshire

In Partial Fulfillment of  
the Requirements for the Degree of

Doctor of Philosophy

in

Sociology

May, 2020

This dissertation was examined and approved in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Sociology by:

Dissertation Director, David Finkelhor, Professor of Sociology

Heather Turner, Professor of Sociology

Cesar Rebellon, Professor of Sociology

Lisa Jones, Research Associate Professor of Psychology

Katie Edwards, Associate Professor of Psychology, University of  
Nebraska-Lincoln

On January 24, 2020

Approval signatures are on file with the University of New Hampshire Graduate School.

## DEDICATION

To Mom and Dad, Karen Polonko, Alli, and Lucky

## ACKNOWLEDGEMENTS

I would like to start off by thanking my first sociological mentor and great friend, Karen Polonko, aka Dr. P. If you had not believed in me and pushed me in Sociology of Child Welfare, then I would not be here today. I am so grateful for everything you did to help and support me, all the opportunities you gave me, and all the long hours that we spent working together. You truly were an inspiration for me, and you are sorely missed. I am so glad to be able to tell you that I finally did it, I got my PhD, and I am going to carry on our work to help children.

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## ABSTRACT

### PEER VICTIMIZATION AND DELINQUENCY: A LONGITUDINAL ANALYSIS OF THEIR RELATIONSHIPS

by

Nicholas A. Adams

University of New Hampshire, May, 2020

The correlation between peer victimization and delinquency has long been established in the sociological and criminological literatures. However, the research to this point has focused on one or the other as an outcome. This study addresses this gap in the literature by teasing out a causal relationship between them. By using 3 waves of the Developmental Victimization Survey, peer victimization and delinquency are treated as both predictors and outcomes for each other. In doing so, this study finds evidence to support a causal relationship between experiencing peer victimization at wave 1 and later delinquent behavior at wave 3. It also finds evidence of partial mediation through wave 2 depression. This study does not find evidence of a direct relationship between delinquency at wave 1 and later peer victimization at wave 3 after controlling for wave 3 anger. While adding new insight into the relationship between peer victimization and delinquency, this study provides a jumping off point for further analysis of these multifaceted relationships.

## 1. INTRODUCTION

Child adversity has long been a matter of great importance and interest to parents, public officials, researchers and service providers alike. Most research from the past 50 years has focused on traditional forms of child maltreatment (usually perpetrated by someone 5 years or older, and usually known to the child) such as physical abuse (hitting, kicking, beating, etc.), sexual abuse (exposing, fondling, oral, vaginal, and anal intercourse, etc.), and neglect (supervisory and emotional) since they present obvious threats to child safety and well-being. However, peer victimization (being hit, physically hurt, picked on, or verbally abused by a peer or sibling) and delinquency (including violent, nonviolent, and substance use) occur during important formative years in a child's or adolescent's life and can also negatively influence one's life chances and experiences. Perlus et al. (2014) find a declining trend in bullying and victimization among children and adolescents, however, 10 percent of children reported being victims of bullying and peer victimization in the past couple months as of 2010. Therefore, peer victimization remains a serious issue for a relatively large number of children and adolescents in the United States.

A considerable amount of research has found associations between peer victimization and delinquency. However, the current body of research has largely ignored causal relationships between these two phenomena. It is important to understand whether peer victimization and delinquency are both strong predictors of each other, or whether one acts as a stronger predictor for the other. In order to accomplish this, this study implements a longitudinal approach to investigate these relationships. Understanding this relationship will help inform prevention and intervention strategies and the best timing for these strategies. By determining whether one is a

stronger predictor for the other, the already-scant resources for helping children navigate these issues can be used more effectively by focusing on the most influential factor. For instance, it may make more sense to implement cognitive behavioral therapy in situations dealing with issues of anger and aggression, while it may make more sense to implement bullying prevention in situations dealing with peer victimization. Understanding any potential mediating factors in this relationship will further help clarify the resources needed to address peer victimization and delinquency on a macro- and micro-level. Children have the right to a life free of violence and as a society, we must take responsibility to not only educate but protect them in order to raise better-adjusted contributors in future generations.

In order to provide more insight into the processes involved in these relationships this study explores several different potential pathways. First, this study examines the direct relationship between experiencing peer victimization during childhood and later delinquency while controlling for prior delinquency. Second, this study examines the direct relationship between early delinquency and later peer victimization while controlling for prior peer victimization. By controlling for prior experiences of delinquency and peer victimization this study brings us closer to establishing patterns of causation among these two main relationships. Third, this study examines the potential mediating effects that negative mental health may have on these relationships. Since mental health is associated with both peer victimization and delinquency, there is reason to believe that it may act as a mediator for these relationships. By determining potential mediating variables, this study contributes to the literature by providing more evidence for causation among these relationships. In turn, this study aims to inform prevention and intervention strategies by determining key variables and times when interventions may be implemented most effectively. This study uses the stress process framework and routine

activities theory to help guide and understand these relationships. The stress process framework adds strength to this study by informing the statistical methods used to help understand these indirect effects. The stress process is especially useful when looking at the relationship between experiencing peer victimization at time 1 and delinquent behavior at time 3 because it focusses on mediation, which describes the first main relationship in this study. Routine activities theory helps to understand the second main relationship in the study – the relationship between delinquent behavior at time 1 and peer victimization at time 3. Children who participate in delinquent behavior may be more likely to find themselves in situations in which they are victimized.

With the heavy emphasis that the present body of literature has on both peer victimization and delinquency, it is imperative to come closer to determining causality so that resources may be used in the most advantageous ways to help prevent peer victimization and delinquency or at the very least reduce their negative impacts. This project adds to the existing literature in several ways: (1) Using three waves of a nationally representative sample of youth these analyses provide a more precise evaluation of the nature of the relationships between peer victimization and delinquency. (2) Investigating the mediating roles of negative mental health outcomes maximizes understanding of any underlying factors in the relationship between peer victimization and delinquency. Since negative mental health outcomes are associated with both peer victimization and delinquency, there is good reason to think that experiencing negative mental health could mediate or intervene in the relationship between peer victimization and delinquency. (3) Applying the stress process model as one of the theoretical frameworks for this project increases knowledge of delinquency as an outcome in addition to more traditional outcomes such as mental health.

The stress process model (Pearlin et al. 1981) provides the theoretical framework to examine the first main relationship – the relationship between experiencing peer victimization at time 1 and delinquent behavior at time 3. The stress process framework has proven to be very useful when analyzing the relationship between experiencing childhood adversity and later negative mental health outcomes (for a review see Foster and Brooks-Gunn 2009). This study extends the stress process literature by exploring peer victimization as a stressor and delinquency as an outcome, and by exploring negative mental health outcomes as mediating factors.

Routine activities theory (Cohen and Felson 1979) provides the theoretical framework for the second main relationship – the relationship between delinquent behavior at time 1 and experiencing peer victimization at time 3. This theory has been used to guide research in the criminal justice field on many issues from trends in crime rates (Cohen and Felson 1979), to effectiveness of neighborhood crime watch programs (Louderback and Roy 2018), to cyber crime (Hsieh and Wang 2018; Leukfeldt and Yar 2016; Williams 2016), to delinquency (Roth 2016), to bullying (Cho, Wooldredge, and Park 2016). As such, it is an appropriate theory for researching this relationship.

A more detailed discussion of the measures used in this study can be found later in the methods section (Tables 4.1). The following section will review literature relevant to the study.

The first section will address the bivariate association between peer victimization and delinquency. The second will address the prior research on causal relationships between peer victimization and delinquency, specifically directional relationships between these phenomena. The third section will address the relationship between peer victimization and negative mental health outcomes. The fourth section will address the relationship between delinquency and

negative mental health outcomes. The fifth and final section of the literature review will address the theoretical framework, specifically, the stress process.



## 2. LITERATURE REVIEW

### *Association between Peer Victimization and Delinquency*

Research consistently finds a correlation between peer victimization and delinquency. When using cross-sectional data, multiple studies find associations between peer victimization and delinquency. Barker et al. (2008) find that bullies and bully-victims had the greatest counts of mid-adolescent delinquency. Cooley et al. (2015) found that peer victimization was associated with increased rule breaking. Perren and Hornung (2005) found that being a bully-victim or a victim was associated with violent delinquency. Sigfusdottir et al. (2010) found that being bullied increased the likelihood of delinquent behavior. They also found that this association was partially mediated by anger. However, their analysis used cross-sectional data and is unable to determine causality. Van Berkel et al. (2018) find that sibling victimization is associated with increases in mental health problems and delinquency. And Zhu et al. (2016) find that peer victimization is associated with increased problem behavior. While there is more than enough evidence to support the association between peer victimization and delinquency it is important to begin exploring causality. Do both peer victimization and delinquency act as predictors for each other or is one a greater predictor for the other? This study addresses this issue by looking at both as predictors and outcomes. The following section reviews the research that has begun to tease out causality among these relationships.

### *Causal Relationships between Peer Victimization and Delinquency*

As shown above, there is ample evidence to support the association between peer victimization and delinquency. However, to my knowledge there is little research exploring the potential causal relationships between these two issues. One such study uses two waves of the

National Longitudinal Study of Adolescent to Adult Health (Add Health) to look at the relationship between delinquent behavior and later violent victimization (Chen, 2009). In their study Chen (2009) finds that delinquent behavior is associated with later violent victimization. Another study uses the Korean Children and Youth Panel Study to look at the relationship between deviant peer affiliation and bullying victimization (Hong et al. 2017). Hong et al. (2017) find that affiliating with delinquent peers is associated with an increased likelihood of later bully victimization (Hong et al. 2017). The third study uses data from the National Longitudinal Survey of Youth 1997 (NLSY97) to look at the relationship between experiencing bully victimization and delinquency Wong and Schonlau, 2013). Wong and Shonlau (2013) find that experiencing bully victimization is a significant predictor of later delinquent behavior. Lester, Cross, and Shaw (2012) also find that bully victimization was associated with an increased risk of delinquency. Hemphill et al. (2011) examined the longitudinal consequences of bullying and bully victimization in Australia and the U.S. They found that early bullying and victimization (4 years prior) did not predict current delinquent behavior. However, they did find that bullying behavior within the past year did predict several delinquent behaviors including theft, violent behavior, and binge drinking. They also found that bully victimization increased the likelihood of experiencing depressive symptoms. This study adds to the literature by addressing issues of causation that are lacking in the current research. By including measures of negative mental health, this study will address the potential for mediation. The following section reviews the research on negative mental health and peer victimization.

### *Mental Health Issues and Peer Victimization*

Negative mental health and behavioral outcomes have been found to influence the chances of experiencing peer victimization later in life. This section will review the literature on the relationship between negative mental health and behavioral outcomes and later victimization.

Prior research has examined the relationship between mental health and behavioral issues and subsequent victimization. Nishina et al. (2005) found that psychological maladjustment significantly predicted later peer victimization. Hodges and Perry (1999) discuss how personal factors, such as internalizing and externalizing behaviors may contribute to victimization. They cite prior research suggesting that internalizing behaviors such as crying easily, anxiousness, and being socially withdrawn can interfere with children's abilities to defend themselves against an attack or deter attacks from taking place. They discuss how interpersonal factors, such as a lack of friends and peer rejection (which could be a result of internalizing behaviors), may also contribute to victimization. They argue that "aggressive children probably prefer to attack peers who lack supportive and protective friends because they can do so without worrying about retaliation or ostracism from the victims' friends" (Hodges and Perry 1999:678). They also argue that children who are rejected by their peers may be more likely to be victims and that "Rejected children may be perceived as fair game by aggressive children, because the knowledge that a child is widely devalued by peers may legitimize subjecting the child to abuse" (Hodges and Perry 1999:678). They also cite prior research suggesting that externalizing behaviors, such as disruptiveness, aggression, dishonesty, and argumentativeness may irritate or provoke aggressors (Hodges and Perry 1999:677-678). In their study, Hodges and Perry (1999) found that Time 1 externalizing behaviors, internalizing behaviors, and peer rejection were positively correlated

with Time 2 peer victimization, and that the number of friends at Time 1 was negatively correlated with Time 2 peer victimization.

When looking at peer victimization as an outcome, Siegel et al. (2009) found that social anxiety at time 1 was related to an increase in the risk of experiencing peer victimization, in particular relational victimization, at time 2. They found that this relationship held true for both boys and girls. Social anxiety at time 1 was not related to overt or reputational peer victimization at time 2. As cited in Storch et al. (2005), prior research has shown that, “peer relations of socially anxious adolescents are problematic and characterized by a high degree of negativity” (2005:440). Compared to non-anxious youth, research has found that anxious youth report being disliked and teased more frequently, they report lower levels of acceptance, that negative peer interactions occur with greater frequency, and that they are perceived by peers as rejected or neglected (as cited in Storch et al. 2005). Storch et al. (2005) also posit that, “Socially anxious youth may be viewed by peers as being unlikely to retaliate against aggressors and thus vulnerable to peer torment” (440). They also state that, “socially anxious adolescents may be hesitant or unable to participate in social interactions, resulting in a smaller network of friends who may physically protect the youth” (Storch et al. 2005:440). However, in their own research, Storch et al. (2005) did not find evidence of a relationship between social anxiety and phobia and later overt or relational peer victimization. They note several limitations that could have affected their results including sample size, sampling frame, attrition, and length of time between time 1 data collection and time 2 data collection. The proposed study will address some of these issues by using a larger, nationally representative sample with three waves of data, rather than two.

In their review of the literature, Reijntjes et al. (2010) found that the association between internalizing problems (including depression, loneliness, anxiety, withdrawal, emotional

problems, somatic symptoms, and internalizing) and changes in later peer victimization was robust against publication bias. Reijntjes et al. (2010) state: “It thus appears that internalizing problems also maintain and solidify children’s standing as a victim of peer torment, as opposed to only being a consequence of peer victimization” (2010:250). Lehrer et al. (2006) found that depressive symptoms increased the odds of exposure to moderate to severe partner violence.

The link between negative mental health and externalizing and internalizing behaviors and peer victimization has been well established in the literature. The following section reviews the literature on the relationship between negative mental health and behavioral outcomes and delinquency.

#### *Mental Health Issues and Delinquency*

The link between mental health outcomes, such as anxiety, depression, and anger, and delinquent behaviors has been documented in the literature. However, findings vary and are inconsistent regarding the relationship between depression and delinquency. It should also be noted that much of the literature focusing on the relationship between mental health outcomes and delinquency employ Agnew’s (1992) general strain theory to guide their work. While general strain theory is an appropriate theory for this relationship, the proposed research will employ the stress process model (Pearlin et al. 1981) as its theoretical framework. This will be discussed in further detail in a later section. This section will focus on literature investigating the relationships between anger and delinquency, depression and delinquency, and anxiety and delinquency.

The relationship between anger and delinquency has been fairly well documented. Anger has been found to be related to violent delinquency and property-related delinquency (Bao, Haas, and Pi 2004), aggressive delinquency (Aseltine, Jr., Gore, and Gordon 2000), as well as

delinquency scales (Sigfusdottir, Farkas, and Silver 2004). While they employ a somewhat longitudinal approach, most of these studies are limited in so far as they rely on cross-sectional samples. One study (Aseltine, Jr. et al. 2000) used data from a three-wave panel study of high school youth. In this way, Aseltine, Jr. et al. (2000) were able to use a truer longitudinal approach.

The relationship between depression and subsequent delinquency is not as decisive as that of anger and subsequent delinquency. Some longitudinal studies find that depression significantly predicts delinquent behavior (Bao et al. 2004; Kofler et al. 2011) while other studies find that depression does not significantly predict delinquency (Sigfusdottir et al. 2004; Defoe, Farrington, and Loeber 2013). Similarly, the relationship between anxiety and subsequent delinquency is also inconclusive. Bao et al. (2004) found that anxiety significantly mediated the relationship between interpersonal strain and delinquency (minor offenses) while Aseltine, Jr. et al. (2000) found that anxiety had no effect on subsequent delinquency.

#### *Mental Health as a Mediator*

I have found only one study that addresses causality as well as mediation when examining the relationship between experiencing bullying and later delinquency (Cho and Galehan 2020). Cho and Galehan (2020) use 3 waves of the Korean Welfare Panel Study (KOEPS) to examine the relationship between experiencing two forms of childhood adversity at wave 1 (bullying victimization and child abuse) and delinquency at wave 3. Their measure for delinquency was composed of three items – stealing during the past year, beating severely during the past year, and robbing during the past year. These measures are more serious forms of delinquency and do not occur as frequently as other less severe forms of delinquency. As such their composite measure was a count of the number of different types of delinquency that

occurred in the past year (0 to 3). Their measure of negative emotions is a composite measure of anxiety and depression. They find that negative emotions at wave 2 fully mediates the effects of bullying victimization and child abuse at wave 1. Cho and Galehan (2020) help advance the literature on this relationship by exploring mediation through negative emotions. However, by combining the measures of anxiety and depression, they are unable to differentiate between their effects. It may be that one of these negative emotions is more influential in this relationship. Also, by restricting their delinquency measure to three more severe forms of delinquency, they are unable to speak to effects on a more encompassing measure of delinquency. This study addresses both issues. By including 3 individual measures of negative mental health (anger, anxiety, and depression) as potential mediators, as well as a more comprehensive measure of delinquency (count of 17 different items) this study helps provide a more detailed description of the relationships investigated in the prior research and helps establish causation for these two main relationships.

In summary, there is an extensive body of literature that suggests relationships between delinquency and peer victimization, as well as relationships between negative mental health outcomes and delinquency and peer victimization. While some of this research has approached these relationships longitudinally, much of the prior research on these relationships has been cross-sectional. Also, among the longitudinal research regarding the relationships between peer victimization and delinquency only one has looked at negative mental health outcomes (composite measure of anxiety and depression) as potential mediators. As such, this study contributes to the literature by treating individual negative mental health outcomes (anger, anxiety and depression) as potential mediators of these relationships.

The following two sections will briefly discuss the two main theoretical frameworks used in this study – the stress process and Routine Activities Theory. It will discuss how these theoretical frameworks have been applied to the study of childhood adversities and delinquency and how they will be applied to this study.

#### *Theoretical Framework 1: The Stress Process Model*

The stress process has recently begun being used to guide the study of childhood adversities. It serves as a useful theoretical framework when looking at how childhood family victimizations influence mental health and peer victimization outcomes. Turner (2010) discusses the literature on childhood adversity and the stress process. She argues that childhood adversity can have individual negative effects on mental health, as well as increase the likelihood of subsequent victimization. This process refers to stress proliferation. Turner (2010:208) states,

In discussing the process of stress proliferation, Pearlin et al. (2005) argue that exposure to trauma and major forms of adversity may exert their long-term effects, in part, because of the risk they pose for additional subsequent stressors that have their own health consequences. The process of stress proliferation highlights the importance of considering sequences of stress over time and the utility of longitudinal analysis.

Turner (2010) argues that there is reason to suspect that childhood adversities could lead to subsequent victimization in and out of the home. Stressful family situations and life events may increase the likelihood of experiencing traditional forms of child maltreatment as well as extra-familial victimization. These stressors (such as the loss of a job, divorce, physical or mental illness, death in the family, etc.) may lead to harsh and inconsistent discipline as well as less effective parental supervision (for a more detailed discussion see Turner 2010).

Turner (2010) provides a good model for this research. In her research she used the first two waves of the DVS to take a closer look at the effects of victimization on child well-being. She found that lifetime adversities (including forms of victimization) substantially increased



negative mental health symptoms. Turner (2010) also found that the different types of victimization also contributed independently to increases in negative mental health symptoms. She also found that after controlling for symptoms at time 1, the measure of lifetime adversities (not including forms of victimization) no longer predicted increases in negative mental health symptoms at time 2. She argues that while lifetime adversities significantly predicted negative mental health symptoms at time 1, “it was the subsequent victimization occurring between the two time points that was most related to deteriorations in mental health” (Turner 2010:219). This study does not expressly look at the process of stress proliferation, but it is somewhat helpful in illustrating the process of mediation.

This study adds to the literature on childhood adversity and the stress process by applying it to different forms of childhood adversity, specifically peer victimization and delinquency. The concept of peer victimization as a stressor is more in line with conventional stressors in the stress process such as child abuse. However, delinquency is not usually looked at using the stress process. Therefore, this study adds to the stress process literature by treating peer victimization as a stressor and delinquent behavior as an outcome. The next section briefly discusses Routine Activities Theory and how it is used to inform the second main relationship in this study.

#### *Theoretical Framework2: Routine Activities Theory*

Routine Activities Theory (RAT), first formulated by Cohen and Felson (1979), has been successfully used in the criminal justice literature to help explain many different relationships and phenomena. The three main tenets of RAT are that crime requires, “an *offender* with both criminal inclinations and the ability to carry out those inclinations, a person or object providing an *suitable target* for the offender, and *absence of guardians* capable of preventing violations” (Cohen and Felson 1979:590). When applied to delinquency and peer victimization, RAT posits

that engaging in delinquent behavior places one in contact with motivated offenders -delinquent peers as well as retaliation motivated persons. Also, by involving oneself in delinquent behavior that person places themselves in situations that lack guardianship. Previous studies that use RAT to examine bullying, have yielded mixed results regarding the third tenet – absence of guardians (Cho et al. 2016).

The current study applies RAT to the relationship between delinquent behavior at time 1 and experiencing peer victimization at time 3. While measures for the absence of guardians is not available for each wave of the DVS, I argue that participating in delinquent behavior is more likely to occur in situations with an absence of supervision (Demuth and Brown 2004). Even though measures for all three tenets of RAT are not available in the data, the RAT framework is still useful in guiding this research. This study hypothesizes that involvement in delinquent behavior will increase one's risk of later peer victimization as involvement in such behavior places one in situations that are more likely to result in peer victimization due to the nature of these behaviors and the other participants.

In order to examine these two main relationships this study uses all three waves of the DVS to determine if peer victimization experienced at time 1 is a significant predictor of delinquency at time 3 and if delinquency at time 1 is a significant predictor of peer victimization at time 3. This study also adds to the literature by exploring whether these relationships are mediated by negative mental health outcomes. Relationships which are partially mediated by a third variable will show a decrease in the direct effect when controlling for the third variable. If there is complete mediation, then the direct effect will cease to exist after controlling for the third variable. A more detailed discussion of these relationships and how this study examines them is

found in Chapter 4. Turner's (2010) research suggests that these relationships will at least be partly mediated by negative mental health outcomes.

The following chapter discusses the main research questions addressed in this study.

### 3. MAIN RESEARCH QUESTIONS

This study aims to help determine if causal relationships exist between peer victimization and delinquency and whether one is a stronger predictor for the other. The first relationship examined in this study is the direct relationship between experiencing peer victimization during childhood (wave 1) and later delinquent behavior (wave 3). This study also examines potential mediating effects caused by negative mental health outcomes at wave 2, specifically anger, depression, and anxiety. The second main relationship examined in this study is the direct relationship between delinquent behavior in childhood (wave 1) and subsequent experiences of peer victimization (wave 3). Anger, depression, and anxiety at wave 2 are also examined as potential mediating variables of this relationship. The main research questions addressed in this study are:

1. Does experiencing peer victimization at wave 1 increase one's likelihood for delinquent behavior at wave 3?
2. Is the relationship between experiencing peer victimization at wave 1 and delinquent behavior in wave 3 mediated by mental health issues at wave 2, specifically anger, depression, and anxiety?
  - a. Does anger at wave 2 mediate this relationship, and does it influence this relationship in a different way than depression or anxiety?
  - b. Does depression at wave 2 mediate this relationship, and does it influence this relationship in a different way than anger or anxiety?
  - c. Does anxiety at wave 2 mediate this relationship, and does it influence this relationship in a different way than anger or depression?

3. Does delinquent behavior at wave 1 increase the likelihood of experiencing peer victimization at wave 3?
4. Is the relationship between delinquent behavior at wave 1 and experiencing peer victimization at wave 2 mediated by mental health issues at wave 2, specifically anger, depression, and anxiety?
  - a. Does anger at wave 2 mediate this relationship, and does it influence this relationship in a different way than depression or anxiety?
  - b. Does depression at wave 2 mediate this relationship, and does it influence this relationship in a different way than anger or anxiety?
  - c. Does anxiety at wave 2 mediate this relationship, and does it influence this relationship in a different way than anger or depression?

Figures 3.1 and 3.2 illustrate the main relationships examined in this study. Figure 3.1 illustrates the main direct relationship between wave 1 peer victimization and wave 3 delinquency as well as the potential relationship mediated by negative mental health outcomes. Figure 3.2 illustrates the main direct relationship between wave 1 delinquency and wave 3 peer victimization as well as the potential relationship mediated by negative mental health outcomes. The following chapter discusses the data used in this study as well as the variables and their composition. The statistical techniques used in this study are also discussed.

Figure 3.1: Model of Theoretical Relationship Between Wave 1 Peer Victimization and Wave 3 Delinquency

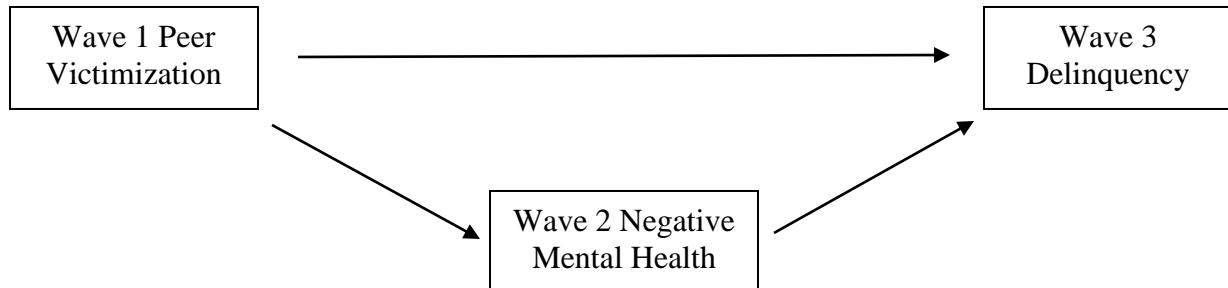
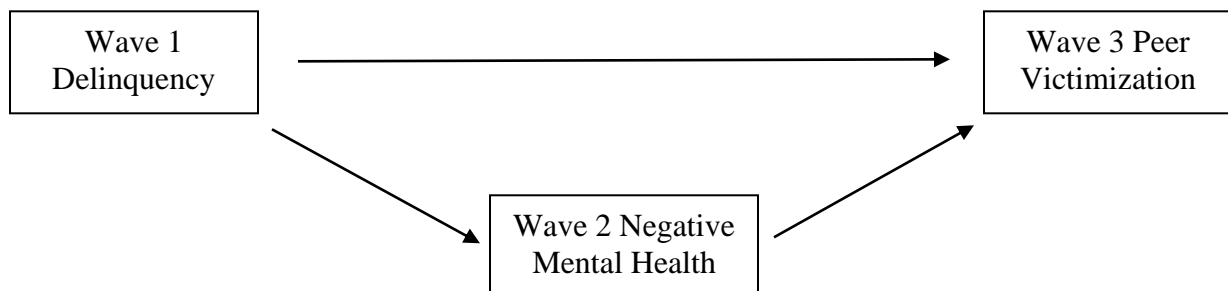


Figure 3.2: Model of Theoretical Relationship Between Wave 1 Delinquency and Wave 3 Peer Victimization



## 4. METHODS

### *Description of Data and Variables*

Data for the analyses were obtained from the Developmental Victimization Survey (DVS), which is a nationally representative sample of children and adolescents in the U.S. The DVS is longitudinal in design and consists of three waves of data. Wave 1 data collection took place from December 2002 to February 2003. It included 2,030 children and adolescents aged 2 to 17 (Finkelhor et al. 2005). Of the original 2,030 children and adolescents that participated in wave 1, 1,467 of them participated in wave 2 and 1,115 participated in wave 3. Nine hundred and eighty-nine children and adolescents participated in all three waves. Due to the age restriction for the delinquency measure, only 652 of the 989 respondents who participated in all three waves were included in this study.

The un-weighted wave 1 sample (N=2,030) is 50.3% male, 76.35% white non-Hispanic, 10.44% black non-Hispanic, 6.9% other non-Hispanic, 5.07% Hispanic, and 1.23% refused to give their race. The un-weighted sample for this analysis (N=652) is 48.47% male, 81.13% white non-Hispanic, 10.12% black non-Hispanic, 3.53% other non-Hispanic, and 5.21% Hispanic. Regarding the gender and racial makeup of the study sample, the percentages of each category remained relatively the same as the full sample. The sample also did not significantly change regarding participants who reported experiencing at least one form of peer/sibling victimization (at least one experience in module c), or at least one item on the delinquency scale. (For further description of the DVS and its measures see Finkelhor et al. 2005)

Table 4.1 presents the main variables of interest from each wave of the DVS. Many of the variables have the same measurement in each wave. Therefore, the composition for variables

with the same measurement in all three waves will only be detailed in the Wave 1 section of the table. Similarly, variables found in both waves two and three with the same measurement, but not in wave one, will only be described in detail in the Wave 2 section.



**Table 4.1. Main variables of interest from the DVS**

<b>Variables</b>	<b>Composition</b>
<i>Wave 1 Independent variables</i>	
Module C – Peer victimization (past year)	<p>Sum of six different types of peer victimization. In the past year:</p> <p>1 – a group of kids or a gang hit, jumped or attacked you (your child).</p> <p>2 – a kid, even if it was a brother or sister, hit you (your child).</p> <p>3 – a kid tried to hurt your (your kid's) private parts on purpose by hitting or kicking you (your child) there.</p> <p>4 – a kid picked on you (your child) by chasing you (him/her), grabbing you (him/her), or making you (him/her) do something you (he/she) did not want to do.</p> <p>5 – you (your child) got scared or felt really bad because other kids were calling you (him/her) names, saying mean things to you (him/her), or saying they didn't want you (him/her) around.</p> <p>6 – a boyfriend or girlfriend or anyone you went on a date with slapped or hurt you. (Only asked of kids 10 and older)</p>
<p>Delinquency score (ages 6-17)</p> <p>Cronbach's alpha coefficient .80</p>	<p>Sum of 17 delinquency items. In the last year did you (your child):</p> <p>1 – On purpose break, damage or destroy something that belonged to someone else?</p> <p>2 – Hit, slap or shove other kids or get into a physical fight with them?</p> <p>3 – Hit, slap or shove a parent or other grown-up?</p> <p>4 – Take anything at school from other kids or a teacher that did not belong to them?</p> <p>5 – Take money at home that did not belong to them like from their mother's purse or a parent's dresser?</p> <p>6 – Steal or try to steal a bicycle, skateboard, or something from a car?</p> <p>7 – Take something from a store without paying for it?</p> <p>8 – Cheat on school tests?</p> <p>9 – Skip school without an excuse?</p> <p>10 – Write things or spray paint on walls or sidewalks or cars, where they were not supposed to do that?</p> <p>11 – Become loud, or rowdy in a public place so that people complained about it or they got into trouble?</p> <p>12 – Carry a weapon with them?</p> <p>13 – Avoid paying for things such as movies, bus or subway rides, or food?</p> <p>14 – Consume any alcohol?</p> <p>15 – Smoke or chew tobacco?</p> <p>16 – Smoke marijuana?</p>

	17 – Take any other drugs (that were not prescribed medication)?
Gender	Coded “1” for Female “0” for Male
Race	Four categories: White non-Hispanic, Black non-Hispanic, Other non-Hispanic, Hispanic. Dichotomous variables used for each category.
Age	Ranges from 6 to 17. Mean of 12.23 and standard deviation of 3.42.
SES	Composite score derived by converting household income and parental education to z-scores, adding them, and converting the sums to a combined z-score. Ranges from -2.88 to 1.81 with a mean of 0.18.
Family Composition	3 categories: Both parents, mixed family (parent and stepparent), single parent or other.
<i>Wave 2 Independent Variables</i>	
Anger score - Standardized	Composite z-score of anger scales for children and youth. (Modified from original DVS anger scales to exclude measures that were too similar to measures in the delinquency scale)
Child anger score (ages 2-9) Cronbach’s alpha coefficient .77	Sum of 4 “anger” questions. In the last month, how often has your child: 1 – Had temper tantrums? 2 – Been too aggressive? 3 – Become very angry over a little thing? 4 – Yelled at family?
Youth anger score (ages 10-17) Cronbach’s alpha coefficient .87	Sum of 8 “anger” questions. In the last month, how often have you been: 1 – Arguing too much? 2 – Wanting to yell and break things? 3 – Getting mad and can’t calm down? 4 – Wanting to yell at people? 5 – Wanting to hurt other people? 6 – Feeling mean? 7 – Feeling like you hate people? 8 – Feeling mad?
Anxiety score - Standardized	Composite z-score of anxiety scales for children and youth.
Child anxiety score (ages 2-9) Cronbach’s alpha coefficient .70	Sum of 9 “anxiety” questions. In the last month, how often has your child: 1 – Been easily scared? 2 – Been worried that bad things would happen in the future? 3 – Been afraid of the dark? 4 – Been afraid to be alone? 5 – Cried at night because they were frightened? 6 – Been frightened of men? 7 – Worried about other people’s safety?

	<p>8 – Been afraid that they would be killed by someone?</p> <p>9 – Been frightened by things that didn't used to scare them?</p>
<p>Youth anxiety score (ages 10-17)</p> <p>Cronbach's alpha coefficient .76</p>	<p>Sum of 7 "anxiety" questions. In the last month, how often have you been:</p> <p>1 – Feeling afraid something bad might happen?</p> <p>2 – Getting scared all of a sudden and don't know why?</p> <p>3 – Feeling nervous or jumpy inside?</p> <p>4 – Feeling afraid?</p> <p>5 – Afraid of the dark?</p> <p>6 – Worrying about things?</p> <p>7 – Feeling afraid someone will kill you?</p>
<p>Depression score - Standardized</p>	<p>Composite z-score of depression scales for children and youth.</p>
<p>Child depression score (ages 2-9) Cronbach's alpha coefficient .76</p>	<p>Sum of 9 "depression" questions. In the last month, how often has your child:</p> <p>1 – Looked sad?</p> <p>2 – Blamed themselves for things that weren't their fault?</p> <p>3 – NOT been laughing or NOT been happy like other children?</p> <p>4 – Cried for no obvious reason?</p> <p>5 – Called them bad?</p> <p>6 – Said that nobody like them?</p> <p>7 – Said they wanted to die or be killed?</p> <p>8 – Acted sad or depressed?</p> <p>9 – NOT played because they were depressed?</p>
<p>Youth depression score (ages 10-17) Cronbach's alpha coefficient .80</p>	<p>Sum of 9 "depression" questions. In the last month, how often have you been:</p> <p>1 – Feeling lonely?</p> <p>2 – Feeling sad or unhappy?</p> <p>3 – Crying?</p> <p>4 – Wanting to hurt yourself?</p> <p>5 – Washing yourself because you feel dirty on the inside?</p> <p>6 – Feeling stupid or bad?</p> <p>7 – Feeling like you did something wrong?</p> <p>8 – Feeling like nobody likes you?</p> <p>9 – Wanting to kill yourself?</p>
<i>Wave 3 Dependent Variables</i>	
<p>Peer Victimization</p>	<p>See Module C under Wave 1 for a description of the measures.</p>
<p>Delinquency score</p> <p>Cronbach's alpha coefficient .77</p>	<p>Sum of 19 delinquency items. In the last year did your child:</p> <p>1 – On purpose break, damage or destroy something that belonged to someone else?</p> <p>2 – Hit, slap or shove other kids or get into a physical fight with them?</p> <p>3 – Hit, slap or shove a parent or other grown-up?</p>

	<p>4 – Take anything at school from other kids or a teacher that did not belong to them?</p> <p>5 – Take money at home that did not belong to them like from their mother’s purse or a parent’s dresser?</p> <p>6 – Steal or try to steal a bicycle, skateboard, or something from a car?</p> <p>7 – Take something from a store without paying for it?</p> <p>8 – Cheat on school tests?</p> <p>9 – Skip school without an excuse?</p> <p>10 – Write things or spray paint on walls or sidewalks or cars, where they were not supposed to do that?</p> <p>11 – Become loud, or rowdy in a public place so that people complained about it or they got into trouble?</p> <p>12 – Carry a weapon with them?</p> <p>13 – Avoid paying for things such as movies, bus or subway rides, or food?</p> <p>14 – Consume any alcohol?</p> <p>15 – Smoke or chew tobacco?</p> <p>16 – Smoke marijuana?</p> <p>17 – Take any other drugs (that were not prescribed medication)?</p> <p>18 – Use or threaten to use a weapon to get something from someone?</p> <p>19 – Hurt someone badly enough to need bandages or care from a doctor?</p>
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### *Analysis Techniques*

This study uses negative binomial regression to analyze the relationships between peer victimization and delinquency. Since the two main outcome variables are count variables negative binomial regression is the most appropriate statistical procedure to use. OLS regressions were also run to test for robustness of findings. These analyses are not included in the results of this study. In order to test for mediation, regression analyses were run for each variation of the main relationships in question. For example, if the effect of peer victimization at wave 1 on delinquency at wave 3 decreased after controlling for wave 2 anger, then further analyses were run to determine if wave 1 peer victimization predicts wave 2 anger. If wave 1 peer victimization does predict wave 2 anger, after controlling for wave 1 anger, then there is evidence of mediation. It is important to control for wave 1 anger in this case to make sure peer victimization at wave 1 is additionally contributing to wave 2 anger. In this case a Sobel test was used when there was evidence of mediation. While the Sobel test is considered a more conservative test of mediation, I believe it adds robustness to the findings and is worth the potential error of not finding evidence of mediation when there is mediation

The following two chapters present the findings of this study. Chapter 5 presents the findings of the analyses looking at the relationship between wave 1 peer victimization and wave 3 delinquency and whether this relationship is mediated by negative mental health outcomes. Chapter 6 presents the findings of the analyses looking at the relationship between wave 1 delinquency and wave 3 peer victimization and whether this relationship is mediated by negative mental health outcomes.

## 5. FINDINGS I – Predicting Wave 3 Delinquency

In this chapter I review the findings regarding wave 3 delinquency. This chapter is broken into 3 sections, one section for each mental health outcome (anger, depression, anxiety) I explored as potential mediators of the relationship between experiencing peer victimization and later delinquency. For each section I begin by discussing the results of a negative binomial regression showing the relationship between experiencing peer victimization and later delinquent behavior. After this I discuss the results of a second negative binomial regression in which I include each negative mental health outcome at wave 2. If there is evidence of potential mediation, then the results of two further regressions are discussed. In examining these I aim to address the first two research questions which I reiterate here:

1. Does experiencing peer victimization at wave 1 increase one's likelihood for delinquent behavior at wave 3?
2. Is the relationship between experiencing peer victimization at wave 1 and deviant behavior at wave 3 mediated by mental health issues?
  - a. Does anger mediate this relationship, and does it influence this relationship in a different way than depression or anxiety?
  - b. Does depression mediate this relationship, and does it influence this relationship in a different way than anger or anxiety?
  - c. Does anxiety mediate this relationship, and does it influence this relationship in a different way than anger or depression?

### *Anger as a Potential Mediator*

Table 5.1 shows results from two negative binomial regressions predicting wave 3 delinquency. Results from Table 5.1 show that wave 1 peer victimization is a significant predictor of wave 3 delinquency, even when controlling for wave 1 delinquency. This suggests a direct relationship between wave 1 peer victimization and wave 3 delinquency. If a respondent's number of peer victimizations at wave 1 was to increase by one unit, the difference in the logs of expected counts of delinquent acts at wave 3 would increase by 0.15 unit, while holding all other variables constant. Delinquency at wave 1 is also a significant predictor of wave 3 delinquency. If a respondent's number of delinquent acts at wave 1 increases by one unit, the difference in the logs of expected counts of delinquent acts at wave 3 would increase by 0.15 unit, while holding all other variables constant. Being in a mixed/stepfamily is also a significant predictor of wave 3 delinquency. In the current study, the difference in the logs of expected counts of delinquent acts at wave 3 is expected to be 0.35 unit higher for a child in a mixed/stepfamily compared to a child in an intact family, while holding all other variables constant.

As can be seen in the second analysis in Table 5.1, wave 1 peer victimization remains a significant predictor even when controlling for wave 2 anger. However, there is a decrease in the coefficient and the test statistic after controlling for wave 2 anger. In the second model, if a respondent's number of peer victimizations at wave 1 was to increase by one unit, the difference in the logs of expected counts of delinquent acts at wave 3 would increase by 0.11 unit (as compared to 0.15 unit increase in model 1), while holding all other variables constant. Wave 2 anger is also a significant predictor of wave 3 delinquency. If a respondent's anger scale score at wave 2 increases by one unit, the difference in the logs of expected counts of delinquent acts at wave 3 would increase by 0.34 unit, while holding all other variables constant. This suggests that

there may be some partial mediation through wave 2 anger. Wave 1 delinquency and being part of a mixed/stepfamily also remain significant predictors of wave 3 delinquency when controlling for wave 2 anger.

In order to determine if the effect of peer victimization at wave 1 was partially mediated through wave 2 anger another regression was run to predict wave 2 anger. The results from this OLS regression are found in Table 5.2. Results from this regression suggest that peer victimization at wave 1 does not significantly predict one's anger score at wave 2 when controlling for one's anger score at wave 1. Since wave 1 peer victimization did not significantly predict wave 2 anger, this leads me to believe that the relationship between wave 1 peer victimization and wave 3 delinquency is not mediated by wave 2 anger. A Sobel test was also run to test for potential mediation through wave 2 anger and did not find any support for mediation.

The following section presents the results of the same main relationship with depression at wave 2 as a potential mediator.



Table 5.1: Negative Binomial Regressions Predicting Wave 3 Delinquency with Wave 2 Anger as Mediator

IVs	M1 Coefficients	M1 z	M2 Coefficients	M2 z
Delinquency W1	<b>.15***</b>	6.15	<b>.11***</b>	5.07
Peer Vic W1	<b>.15***</b>	3.37	<b>.11*</b>	2.50
Anger Score W2	---	---	<b>.34***</b>	7.57
Female	-.16	-1.70	<b>-.20*</b>	-2.26
Age	<b>.14***</b>	8.22	<b>.14***</b>	8.66
Black non-His	-.02	-0.29	-.08	-1.03
Other non-His	-.03	-0.29	-.05	-0.63
Hispanic	.00	0.00	-.03	-0.66
SES W1	.02	0.32	.03	0.61
Single Parent/Other	.20	1.50	.18	1.40
Mixed Family	<b>.35*</b>	2.47	<b>.34*</b>	2.46
Constant	<b>-1.67***</b>	-6.79	<b>-1.58***</b>	-6.65
N=652; LRTA prob>=chi2 = 0.000		N=652; LRTA prob>=chi2 = 0.000		

Table 5.2: OLS Regression of Wave 1 Peer Victimization Predicting Wave 2 Anger

OLS Predicting Wave 2 Anger		
IVs	Coef	t
Peer Vic W1	.04	1.09
Anger W1	<b>.57***</b>	14.32
Female	.03	0.54
Age	.01	1.48
Black non-His	.02	0.41
Other non-His	.10	1.68
Hispanic	.04	1.18
SES W1	-.01	-0.22
Single Parent/Other	-.02	-0.22
Mixed Family	-.05	-0.45
Constant	-.27	-1.89
N=649; Adjusted R-squared=0.2782		

Results of Sobel Test for Mediation: p= 0.28

### *Depression as a Potential Mediator*

Table 5.3 displays the results from two negative binomial regressions predicting wave 3 delinquency. In this set of analyses wave 2 depression is being explored as a potential third variable. As can be seen in the first analysis, peer victimization at wave 1 is a significant predictor of wave 3 delinquency, even when controlling for wave 1 delinquency. If a respondent's number of peer victimizations at wave 1 was to increase by one unit, the difference in the logs of expected counts of delinquent acts at wave 3 would increase by 0.15 unit, while holding all other variables constant. Delinquency at wave 1 is also a significant predictor of wave 3 delinquency. If a respondent's number of delinquent acts at wave 1 increases by one unit, the difference in the logs of expected counts of delinquent acts at wave 3 would increase by 0.15 unit, while holding all other variables constant. Being in a mixed/stepfamily is also a significant predictor of wave 3 delinquency. In the current study, the difference in the logs of expected counts of delinquent acts at wave 3 is expected to be 0.35 unit higher for a child in a mixed/stepfamily compared to a child in an intact family, while holding all other variables constant.

As can be seen in the second analysis in Table 5.3, wave 1 peer victimization remains a significant predictor even when controlling for wave 2 depression. However, there is a decrease in the size of the coefficient for wave 1 peer victimization as well as a decrease in the strength of wave 1 peer victimization as a predictor. In the second model, if a respondent's number of peer victimizations at wave 1 was to increase by one unit, the difference in the logs of expected counts of delinquent acts at wave 3 would increase by 0.13 unit (as compared to 0.15 unit increase in model 1), while holding all other variables constant. Wave 2 depression is also a significant predictor of wave 3 delinquency. If a respondent's depression scale score at wave 2

increases by one unit, the difference in the logs of expected counts of delinquent acts at wave 3 would increase by 0.12 unit, while holding all other variables constant. This suggests a potential partial mediating effect of wave 2 delinquency. Wave 1 delinquency and being part of a mixed/stepfamily also remain significant predictors of wave 3 delinquency when controlling for wave 2 depression.

In order to determine if wave 2 depression partially mediates the relationship between wave 1 peer victimization and wave 3 delinquency an OLS regression was run to determine if wave 1 peer victimization significantly predicts wave 2 depression. The results of this analysis are found in Table 5.4. As can be seen in Table 5.4, wave 1 peer victimization does significantly predict wave 2 depression, even when controlling for prior depression at wave 1. Wave 1 peer victimization is associated with an increase in the likelihood of experiencing depression at wave 2. Since wave 1 peer victimization was found to be a significant predictor of wave 2 depression, this suggests that wave 2 depression may in fact be partially mediating the relationship between wave 1 peer victimization and wave 3 delinquency. In order to determine if there was any mediation a Sobel test was also run. The results of the Sobel test ( $p=.03$ ) suggest that wave 2 depression does partially mediate the relationship between wave 1 peer victimization and wave 3 delinquency. Figure 5.1 illustrates the direct and indirect relationships between wave 1 peer victimization and wave 3 delinquency when controlling for wave 2 depression. As can be seen there are multiple paths by which peer victimization affects later delinquency.

The following section presents the results of the same main relationship with anxiety at wave 2 as a potential mediator.

Table 5.3: Negative Binomial Regressions Predicting Wave 3 Delinquency with Wave 2 Depression as Mediator

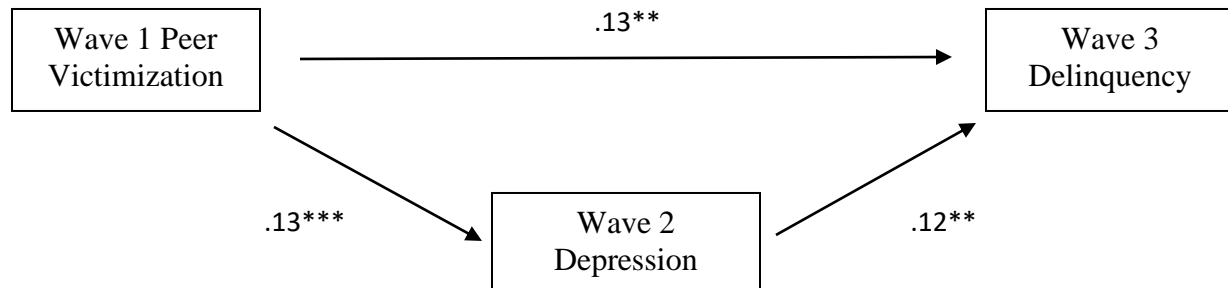
IVs	M1 Coefficients	M1 z	M2 Coefficients	M2 z
Delinquency W1	<b>.15***</b>	6.15	<b>.14***</b>	5.71
Peer Vic W1	<b>.15***</b>	3.37	<b>.13**</b>	2.81
Depression W2	---	---	<b>.12**</b>	2.60
Female	-.16	-1.70	<b>-.23*</b>	-2.42
Age	<b>.14***</b>	8.22	<b>.14***</b>	8.39
Black non-His	-.02	-0.29	-.01	-0.06
Other non-His	-.03	-0.29	-.03	-0.33
Hispanic	.00	0.00	-.01	-0.19
SES W1	.02	0.32	.01	0.28
Single Parent/Other	.20	1.50	.19	1.39
Mixed Family	<b>.35*</b>	2.47	<b>.34*</b>	2.41
Constant	<b>-1.7***</b>	-6.79	<b>-1.63***</b>	-6.65
N=652; LRTA prob>=chi2 = 0.000		N=652; LRTA prob>=chi2 = 0.000		

Table 5.4: OLS Regression of Wave 1 Peer Victimization Predicting Wave 2 Depression

OLS Predicting Wave 2 Depression		
IVs	Coef	t
Peer Vic W1	<b>.13***</b>	3.60
Depression W1	<b>.42***</b>	10.89
Female	<b>.33***</b>	4.61
Age	-.00	-0.25
Black non-His	<b>-.15*</b>	-2.30
Other non-His	.12	1.83
Hispanic	.02	0.48
SES W1	-.02	-0.47
Single Parent/Other	.07	0.64
Mixed Family	-.00	-0.02
Constant	-.26	-1.63
N=650; Adjusted R-squared=0.24		

Results of Sobel Test for Mediation: **p= 0.03**

Figure 5.1: Model of the Direct and Indirect Relationship between Wave 1 Peer Victimization and Wave 3 Delinquency with Depression as a Partial Mediator



#### *Anxiety as a Potential Mediator*

Table 5.5 displays the results from two negative binomial regressions predicting wave 3 delinquency. In this set of analyses wave 2 anxiety is being explored as a potential third variable. As can be seen in the first analysis, peer victimization at wave 1 is a significant predictor of wave 3 delinquency, even when controlling for wave 1 delinquency. If a respondent's number of peer victimizations at wave 1 was to increase by one unit, the difference in the logs of expected counts of delinquent acts at wave 3 would increase by 0.15 unit, while holding all other variables constant. Delinquency at wave 1 is also a significant predictor of wave 3 delinquency. If a respondent's number of delinquent acts at wave 1 increases by one unit, the difference in the logs of expected counts of delinquent acts at wave 3 would increase by 0.15 unit, while holding all other variables constant. Being in a mixed/stepfamily is also a significant predictor of wave 3 delinquency. In the current study, the difference in the logs of expected counts of delinquent acts at wave 3 is expected to be 0.35 unit higher for a child in a mixed/stepfamily compared to a child in an intact family, while holding all other variables constant.

As can be seen in the second analysis in Table 5.5, wave 1 peer victimization remains a significant predictor even when controlling for wave 2 anxiety. However, there is a decrease in the size of the coefficient for wave 1 peer victimization as well as a decrease in the strength of wave 1 peer victimization as a predictor. In the second model, if a respondent's number of peer victimizations at wave 1 was to increase by one unit, the difference in the logs of expected counts of delinquent acts at wave 3 would increase by 0.14 unit (as compared to 0.15 unit increase in model 1), while holding all other variables constant. Wave 2 anxiety is also a significant predictor of wave 3 delinquency. If a respondent's anxiety scale score at wave 2 increases by one unit, the difference in the logs of expected counts of delinquent acts at wave 3 would increase by 0.16 unit, while holding all other variables constant. This suggests a potential partial mediating effect of wave 2 delinquency. Wave 1 delinquency and being part of a mixed/stepfamily also remain significant predictors of wave 3 delinquency when controlling for wave 2 depression. We also see that gender becomes a significant predictor in the second model. When controlling for wave 2 anxiety, the difference in the logs of expected counts of delinquent acts at wave 3 is expected to be 0.24 unit lower for a female compared to a male, while holding all other variables constant. This suggests a potential suppression effect of wave 2 anxiety.

In order to determine if wave 2 anxiety partially mediates the relationship between wave 1 peer victimization and wave 3 delinquency an OLS regression was run to determine if wave 1 peer victimization significantly predicts wave 2 anxiety. The results of this analysis are found in Table 5.6. As can be seen in Table 5.6, wave 1 peer victimization does not significantly predict wave 2 anxiety when controlling for prior anxiety at wave 1. Since wave 1 peer victimization was not found to be a significant predictor of wave 2 anxiety, this suggests that wave 2 anxiety does not partially mediate the relationship between wave 1 peer victimization and wave 3

delinquency. A Sobel test was also run to add support to this finding. The results of the Sobel test suggest that wave 2 anxiety does not partially mediate the relationship between wave 1 peer victimization and wave 3 delinquency.

The following chapter presents the results of multiple analyses exploring the relationship between wave 1 delinquency and wave 3 peer victimization and three different potential mediating variables.

Table 5.5: Negative Binomial Regressions Predicting Wave 3 Delinquency with Wave 2 Anxiety as Mediator

IVs	M1 Coefficients	M1 z	M2 Coefficients	M2 z
Delinquency W1	<b>.15***</b>	6.15	<b>.14***</b>	5.82
Peer Vic W1	<b>.15***</b>	3.37	<b>.14**</b>	3.05
Anxiety W2	---	---	<b>.16***</b>	3.28
Female	-.16	-1.70	<b>-.24*</b>	-2.48
Age	<b>.14***</b>	8.22	<b>.14***</b>	8.28
Black non-His	-.02	-0.29	-.02	-0.23
Other non-His	-.03	-0.29	-.03	-0.31
Hispanic	.00	0.00	-.01	-0.25
SES W1	.02	0.32	.01	0.23
Single Parent/Other	.20	1.50	.16	1.21
Mixed Family	<b>.35*</b>	2.47	<b>.34*</b>	2.41
Constant	<b>-1.67***</b>	-6.79	<b>-1.60***</b>	-6.53
N=652; LRTA prob>=chi2 = 0.000		N=652; LRTA prob>=chi2 = 0.000		

Table 5.6: OLS Regression of Wave 1 Peer Victimization Predicting Wave 2 Depression

Predicting Wave 2 Anxiety		
IVs	Coef	t
Peer Vic W1	.03	0.93
Anxiety W1	<b>.50***</b>	14.64
Female	<b>.21***</b>	3.22
Age	.00	0.05
Black non-His	-.08	-1.41
Other non-His	.02	0.37
Hispanic	.02	0.48
SES W1	-.00	-0.13
Single Parent/Other	<b>.22*</b>	2.32
Mixed Family	-.06	-0.58
Constant	-.20	-1.37
N=650; Adjusted R-squared=0.30		

Results of Sobel Test for Mediation: p= 0.37



## 6. FINDINGS II – Predicting Wave 3 Peer Victimization

In this chapter I review the findings regarding wave 3 peer victimization. Similar to Chapter 5, this chapter is broken into 3 sections, one section for each mental health outcome (anger, depression, anxiety) I explored as potential mediators of the relationship between experiencing peer victimization and later delinquency. For each section I begin by discussing the results of a negative binomial regression showing the relationship between early delinquent behavior and later experiences of peer victimization. After this I discuss the results of a second negative binomial regression in which I include each negative mental health outcome at wave 2. If there is evidence of potential mediation, then the results of a further regression are discussed. In examining these I aim to address the last two research questions which I reiterate here:

3. Does delinquent behavior at wave 1 increase the likelihood of experiencing peer victimization at wave 3?
4. Is the relationship between delinquent behavior at wave 1 and experiencing peer victimization at wave 3 mediated by mental health issues, specifically anger, depression, and anxiety?
  - a. Does anger mediate this relationship, and does it influence this relationship in a different way than depression or anxiety?
  - b. Does depression mediate this relationship, and does it influence this relationship in a different way than anger or anxiety?
  - c. Does anxiety mediate this relationship, and does it influence this relationship in a different way than anger or depression?

### *Anger as a Potential Mediator*

Table 6.1 shows results from two negative binomial regressions predicting wave 3 peer victimization. Results from the first negative binomial regression show that delinquency at wave 1 is a significant predictor of peer victimization at wave 3 even when controlling for peer victimization at wave 1. If a respondent's number of delinquent acts at wave 1 was to increase by one unit, the difference in the logs of expected counts of peer victimization at wave 3 would increase by 0.06 unit, while holding all other variables constant. Peer victimization at wave 1 is also a significant predictor of wave 3 peer victimization. If a respondent's number of peer victimization at wave 1 increases by one unit, the difference in the logs of expected counts of peer victimization at wave 3 would increase by 0.37 unit, while holding all other variables constant. Age is also a significant predictor of wave 3 peer victimization. If a respondent's age increases by one year, the difference in the logs of expected counts of peer victimization at wave 3 would decrease by 0.11 unit, while holding all other variables constant.

As can be seen in the second analysis in Table 6.1, after controlling for anger at wave 2, wave 1 delinquency is no longer significant. This suggests that the relationship between wave 1 delinquency and wave 3 peer victimization may be mediated by one's anger at wave 2. Wave 2 anger is a significant predictor of wave 3 peer victimization. If a respondent's wave 2 anger scale score increases by one unit, the difference in the logs of expected counts of peer victimization at wave 3 would increase by 0.19 unit, while holding all other variables constant. Results from the second analysis also show that wave 1 peer victimization and respondent's age remain significant predictors of wave 3 peer victimization.

In order to determine if the relationship between wave 1 delinquency and wave 3 peer victimization is mediated by wave 2 anger, I ran an OLS regression predicting wave 2 anger. The

results for this regression are found in Table 6.2. As seen in Table 6.2, when controlling for wave 1 anger, wave 1 delinquency does not predict wave 2 anger. Since wave 1 delinquency does not predict wave 2 anger, this suggests that the effect we saw in Table 5.7 is not the result of mediation. A Sobel test for mediation was also run and did not yield any evidence of mediation. Since there was no support for mediation, this may indicate a spurious relationship. Taking this into consideration, future research should examine the potential confounding effect that anger may have on this relationship.

The next section presents the results of the same main relationship with depression at wave 2 as a potential mediator.

Table 6.1: Predicting Wave 3 Peer Victimization – Anger – Negative Binomial Regressions

IVs	M1 Coefficients	M1 z	M2 Coefficients	M2 z
Delinquency W1	<b>.06*</b>	2.47	.04	1.74
Peer Vic W1	<b>.37***</b>	7.79	<b>.35***</b>	7.37
Anger Score W2	---	---	<b>.19***</b>	3.73
Female	-.11	-1.07	-.14	-1.37
Age	<b>-.11***</b>	-6.74	<b>-.11***</b>	-7.06
Black non-His	.10	1.08	.08	0.86
Other non-His	-.05	-0.49	-.10	-0.91
Hispanic	-.09	-1.24	-.12	-1.57
SES W1	-.01	-0.16	.00	0.02
Single Parent/Other	-.26	-1.59	-.25	-1.57
Mixed Family	.15	0.93	.14	0.83
Constant	.28	1.33	.41	1.93
N=652; LRTA prob>=chi2 = 0.06		N=652; LRTA prob>=chi2 = 0.12		

Table 6.2: Predicting Wave 2 Anger

OLS Predicting Wave 2 Anger		
IVs	Coef	t
Delinquency W1	.00	0.09
Anger W1	<b>.58***</b>	13.49
Female	.03	0.42
Age	.01	1.19
Black non-His	.02	0.29
Other non-His	.09	1.61
Hispanic	.04	1.09
SES W1	-.01	-0.19
Single Parent/Other	-.02	-0.24
Mixed Family	-.05	-0.45
Constant	-.19	-1.55
N=649; Adjusted R-squared=0.28		

Results of Sobel Test for Mediation:  $p = 0.92$

### *Depression as a Potential Mediator*

Table 6.3 shows results from two negative binomial regressions predicting wave 3 peer victimization. Results from the first negative binomial regression show that delinquency at wave 1 is a significant predictor of peer victimization at wave 3 even when controlling for peer victimization at wave 1. If a respondent's number of delinquent acts at wave 1 was to increase by one unit, the difference in the logs of expected counts of peer victimization at wave 3 would increase by 0.06 unit, while holding all other variables constant. Peer victimization at wave 1 is also a significant predictor of wave 3 peer victimization. If a respondent's number of peer victimization at wave 1 increases by one unit, the difference in the logs of expected counts of peer victimization at wave 3 would increase by 0.37 unit, while holding all other variables constant. Age is also a significant predictor of wave 3 peer victimization. If a respondent's age increases by one year, the difference in the logs of expected counts of peer victimization at wave 3 would decrease by 0.11 unit, while holding all other variables constant.

As can be seen in the second analysis in Table 6.3, after controlling for depression at wave 2, wave 1 delinquency remains significant. There is not much change in the size of the coefficient or the test statistic for wave 1 delinquency. Also, wave 2 depression is not a significant predictor of wave 3 peer victimization. This suggests that the relationship between wave 1 delinquency and wave 3 peer victimization is not mediated by one's depression at wave 2. Results from the second analysis also show that wave 1 peer victimization and respondent's age remain significant predictors of wave 3 peer victimization.

The next section presents the results of the same main relationship with anxiety at wave 2 as a potential mediator.

Table 6.3: Predicting Wave 3 Peer Victimization – Depression – Negative Binomial Regressions

IVs	M1 Coefficients	M1 z	M2 Coefficients	M2 z
Delinquency W1	<b>.06*</b>	2.47	<b>.05*</b>	2.14
Peer Vic W1	<b>.37***</b>	7.79	<b>.35***</b>	7.34
Depression W2	---	---	.09	1.92
Female	-.11	-1.07	-.17	-1.52
Age	<b>-.11***</b>	-6.74	<b>-.11***</b>	-6.68
Black non-His	.10	1.08	.12	1.26
Other non-His	-.05	-0.49	-.09	-0.77
Hispanic	-.09	-1.24	-.10	-1.28
SES W1	-.01	-0.16	-.00	-0.07
Single Parent/Oth	-.26	-1.59	-.27	-1.64
Mixed Family	.15	0.93	.14	0.83
Constant	.28	1.33	.31	1.49
N=652; LRTA prob>=chi2 = 0.06		N=652; LRTA prob>=chi2 = 0.08		

*Anxiety as a Potential Mediator*

Table 6.4 shows results from two negative binomial regressions predicting wave 3 peer victimization. Results from the first negative binomial regression show that delinquency at wave 1 is a significant predictor of peer victimization at wave 3 even when controlling for peer victimization at wave 1. If a respondent's number of delinquent acts at wave 1 was to increase by one unit, the difference in the logs of expected counts of peer victimization at wave 3 would increase by 0.06 unit, while holding all other variables constant. Peer victimization at wave 1 is also a significant predictor of wave 3 peer victimization. If a respondent's number of peer victimization at wave 1 increases by one unit, the difference in the logs of expected counts of peer victimization at wave 3 would increase by 0.37 unit, while holding all other variables constant. Age is also a significant predictor of wave 3 peer victimization. If a respondent's age increases by one year, the difference in the logs of expected counts of peer victimization at wave 3 would decrease by 0.11 unit, while holding all other variables constant.

As can be seen in the second analysis in Table 6.4, after controlling for anxiety at wave 2, wave 1 delinquency remains significant. While there is some change in the size of the coefficient and the test statistic for wave 1 delinquency, it is not very substantial. However, wave 2 anxiety is a significant predictor of wave 3 peer victimization. If a respondent's wave 2 anxiety scale score increases by one unit, the difference in the logs of expected counts of peer victimization at wave 3 would increase by 0.12 unit, while holding all other variables constant. This suggests that the relationship between wave 1 delinquency and wave 3 peer victimization may be partially mediated by one's anxiety at wave 2. Results from the second analysis also show that wave 1 peer victimization and respondent's age remain significant predictors of wave 3 peer victimization.

In order to determine if the relationship between wave 1 delinquency and wave 3 peer victimization is mediated by wave 2 anxiety, I ran an OLS regression predicting wave 2 anxiety. The results for this regression are found in Table 6.5. As seen in Table 6.5, when controlling for wave 1 anxiety, wave 1 delinquency does not predict wave 2 anxiety. Since wave 1 delinquency does not predict wave 2 anxiety, this suggests that the effect we saw in Table 6.4 is not the result of mediation. A Sobel test for mediation was also run and did not yield any evidence of mediation.

The following chapter presents the discussion of the findings of this study regarding delinquency and peer victimization as dependent variables. It also discusses this study's contributions to the research on the relationship between peer victimization and delinquency. Limitations of this study and prospects for future research are also discussed.

Table 6.4: Predicting Wave 3 Peer Victimization – Anxiety – Negative Binomial Regressions

IVs	M1 Coefficients	M1 z	M2 Coefficients	M2 z
Delinquency W1	<b>.06*</b>	2.47	<b>.06*</b>	2.18
Peer Vic W1	<b>.37***</b>	7.79	<b>.36***</b>	7.53
Anxiety W2	---	---	<b>.12**</b>	2.58
Female	-.11	-1.07	-.17	-1.55
Age	<b>-.11***</b>	-6.74	<b>-.11***</b>	-6.73
Black non-His	.10	1.08	.11	1.21
Other non-His	-.05	-0.49	-.07	-0.66
Hispanic	-.09	-1.24	-.10	-1.27
SES W1	-.01	-0.16	-.00	-0.07
Single Parent/Oth	-.26	-1.59	-.29	-1.79
Mixed Family	.15	0.93	.15	0.90
Constant	.28	1.33	.33	1.54
N=652; LRTA prob>=chi2 = 0.06		N=652; LRTA prob>=chi2 = 0.06		

Table 6.5: Predicting Wave 2 Anxiety

Predicting Wave 2 Anxiety		
IVs	Coef	t
Delinquency W1	.00	0.24
Anxiety W1	<b>.51***</b>	14.61
Female	<b>.21**</b>	3.11
Age	-.00	-0.21
Black non-His	-.09	-1.50
Other non-His	.02	0.30
Hispanic	.01	0.40
SES W1	-.00	-0.11
Single Parent/Oth	<b>.22*</b>	2.30
Mixed Family	-.06	-0.57
Constant	-.13	-1.04
N=650; Adjusted R-squared=0.30		

Results of Sobel Test for Mediation:  $p = 0.81$



## 7. DISCUSSION

### *Summary and Discussion of Findings 1: Peer Victimization as a Predictor of Later Delinquency*

The findings from Chapter 5 provide answers to both Research Question 1 and Research Question 2. Research Question 1 refers to the direct relationship between wave 1 peer victimization and wave 3 delinquency. Research Question 2 refers to the potential mediating effects of negative mental health, specifically anger, depression, and anxiety. Regarding Research Question 1, the findings in Chapter 5 illustrate that experiencing peer victimization both directly, and indirectly, increases one's risk for later delinquent behavior. I find that experiencing peer victimization at wave 1 remains a strong predictor of delinquency at wave 3, even when controlling for concurrent delinquency as well as wave 2 mental health outcomes. The finding that peer victimization at time 1 is a significant predictor for delinquent behavior at time 3 is consistent with prior literature (Wong and Schonlau 2013; Lester et al. 2012) but it expands on that knowledge by finding this relationship even when controlling for negative mental health outcomes. This finding adds strength to the body of evidence that peer victimization is related to an increased risk for delinquent behavior. These findings also further the current body of literature on peer victimization and delinquency by establishing causation between experiencing peer victimization at wave 1 and delinquent behavior at wave 3. This is important because up to now, there has been no definitive evidence of causation in this relationship.

By successfully addressing the requirements for causation – temporality, correlation, and nonspuriousness, this study is the first of its kind to present evidence of a causal relationship

between experiencing peer victimization at wave 1 and delinquent behavior at wave 3. This is important because this adds further credence to the need for effective prevention and intervention strategies. Not only is it important to prevent peer victimization because it violates children's mental, physical, and emotional integrity and well-being, it is also important as a means of preventing future delinquency. Many prevention programs are universal school-based programs aimed at reducing bullying and spreading awareness of the effects of peer victimization such as the Olweus Bullying Prevention Program (OBPP). This program, which is targeted at children in elementary school through high school, is one of the more popular evidence-based bullying prevention programs. Many of the bullying prevention/intervention programs, such as the fairplayer manual used in Germany, implement multiple strategies including school-wide policies such as bans on bullying behavior, classroom level policies meant to bring both teachers and students together in preventing or intervening in bullying behaviors, and peer and individual level interventions such as changing attitudes towards bullying behavior and providing support for victims of bullying. In their meta-analysis of bullying intervention programs, Ttofi and Farrington (2011) find that the most important and effective components of bullying intervention programs were supervisory in nature (including parent meetings, improved playground supervision, firm discipline, classroom management, and teacher training) as well as cooperative group work aimed at developing stronger social bonds between adolescents. They also found that the longer these intervention programs lasted and the more intense they were, the more effective they were in reducing bullying and bully victimization. In another meta-analysis of bullying intervention programs, Merrell et al. (2008) found that programs were effective in enhancing students' social competence, self-esteem, and peer acceptance. They also found that these programs were effective in enhancing teachers' knowledge of effective practices, their feelings

of efficacy regarding bullying intervention skills, and actual behavior in responding to bullying incidents. In their study of a bullying intervention program, Salmivalli, Kaukiainen, and Voeten (2005) found that interventions were more effective among younger age groups. While this study did not address such interventions, it does suggest the need for prevention and intervention in peer victimization. The findings suggest that school-wide interventions which involve students, staff, and parents may be most effective in helping prevent bullying and thus help prevent future delinquency associated with peer victimization. Delinquency interventions could also be included as many of the components are shared with bullying intervention programs specifically increased social skills training to help develop stronger peer supports; and increasing parenting skills including reinforcement contingencies and sustained supervision as these are associated with decreases in delinquency (Vitaro, Brendgen, and Tremblay 2001). Such interventions should also be implemented earlier as their effectiveness decreases the older one gets (Vitaro et al. 2001). Future research in this area should examine the effects of social supports from the family, school, and peer groups as these types of social supports have been found to help prevent or mitigate the effects of peer victimization.

This study not only finds evidence of a direct relationship between peer victimization at wave 1 and delinquency at wave 3, it also finds evidence of an indirect relationship mediated by wave 2 depression. The finding that wave 2 depression significantly affects wave 3 delinquency is consistent with prior research which found a positive relationship between depression and delinquency (Bao et al. 2004; Kofler et al. 2011). It is also consistent with Cho and Galehan (2020) who found that negative emotions (composite measure of depression and anxiety) mediated the relationship between bullying victimization and delinquency. However, this is the first study to find evidence of mediation through depression explicitly. Experiencing peer

victimization at wave 1 acts as a stressor on the child which leads to depression at wave 2. As a result of experiencing peer victimization at wave 1, children are more likely to experience depression at wave 2, which in-turn, leads to a greater risk for delinquency at wave 3. In this study we see how the effects of experiencing stressors in childhood continue throughout childhood, leaving children at greater risk for future stressors and distress. Finding this mediating relationship adds to the current literature by providing a fuller and more nuanced depiction of the relationship between experiencing peer victimization and subsequent delinquency. This is very important because it helps inform prevention and intervention strategies by providing information as to what types of preventions and interventions will work at specific stages in this relationship. As discussed with the direct relationship between peer victimization and subsequent delinquency, bullying prevention strategies such as the OBPP, can be used before children experience peer victimization. However, for those children unfortunate enough to have experienced peer victimization, there are still options to help them cope with their victimization and intervene before their depression increases their risk for delinquency. This finding suggests that for children who experience peer victimization, developing and improving coping mechanisms and self-efficacy may help lessen the deleterious effects of peer victimization. Hampel, Meier, and Kummel (2008) find that increasing and improving coping mechanisms including emotion-focused coping (minimizing techniques such as saying to one's self that it isn't serious; and distraction techniques such as reading something fun) and problem-focused coping (situation control such as figuring out what the problem is; positive self-instructions like saying to one's self, "I can make it"; and social support such as asking somebody for help or advice) were related to better adjustment of adolescents who were dealing with stressors. They also found that increasing self-efficacy (feelings like trusting in one's abilities and strengths;

believing in one's academic abilities; and feelings that one is able to have good conversations with others) is also related to better adjustment among adolescents dealing with stressors (Hampel et al. 2008). While there are mixed results regarding the efficacy of antidepressants, Tsapakis et al. (2008) find that selective serotonin reuptake inhibitors (SSRIs), in particular Fluoxetine, may be effective in treating depression among adolescents. Such medications may help reduce the negative effects of depression and in turn, reduce the potential for future delinquency. The finding that depression is related to an increase in delinquency is helpful because programs to help increase coping mechanisms and self-efficacy can be targeted at adolescents who are experiencing depression as a result of experiencing peer victimization. These strategies coupled with the use of SSRIs, such as Fluoxetine, could also help to build other social supports such as stronger school supports and peer supports, all of which would help decrease the risk for future delinquency.

While depression was the only negative mental health outcome to mediate the relationship between wave 1 peer victimization and wave 3 delinquency, several other variables including anger and anxiety were significant predictors of wave 3 delinquency. The finding that anger significantly predicts wave 3 delinquency is consistent with prior research finding an increased risk of delinquency among children displaying externalizing behaviors, especially anger (Aseltine, Jr. et al. 2000; Bao et al. 2004; Sigfusdottir et al. 2004). This is important because it suggests that interventions such as cognitive behavioral therapy (Sukhodolsky, Kassinove, and Gorman 2004) and emotion regulation (Szasz, Szentagoti, and Hofmann 2011) can be useful tools to help regulate and dampen the effects of anger. Children with elevated anger are more likely to participate in delinquent behavior as they are less capable of controlling their emotions and may be more likely to act impulsively. Therefore, resources such as cognitive

behavioral therapy and the development of emotion regulation strategies should be considered when working with children with anger, depression, and anxiety as they may help them develop skills they can use to curb their impulsivity and their likelihood of acting delinquently. Anxiety was also found to be a significant predictor of wave 3 delinquency but did not mediate the relationship between wave 1 peer victimization and wave 3 delinquency. This is consistent with some of the prior research finding a positive association between anxiety and delinquency (Bao et al. 2004). Again, this finding is important as it helps inform prevention and intervention strategies. As with depression, developing coping mechanisms and increasing self-efficacy may be helpful in curbing the negative effects of anxiety (Hampel et al. 2008)

Considering that all three negative mental health outcomes significantly increased the risk of delinquency at wave 3, there should be more research into the potential various ways that they may affect future delinquency. Since the measure of delinquency used in this study was a composite of multiple forms of delinquency, it may be that depression, anger, and anxiety are more significantly related to certain forms. For instance, it may be that depression is more related to forms of substance use while anger is associated with forms of violent or aggressive delinquency. These would be very important to determine as they would have important implications for prevention and intervention strategies. Knowing if one type of negative mental health outcome is a stronger predictor for a certain type of delinquency would help tailor prevention and intervention strategies to best use those resources and help children and adolescents suffering from those forms of negative mental health.

The findings discussed above have several theoretical implications as well. We see that the stress process model does in fact inform this relationship well. Peer victimization at wave 1 leads to distress at wave 2 in the form of depression, and this distress mediates the relationship to

subsequent delinquency. Bearing this in mind, we see that peer victimization is a very important form of stress in that it has multiple negative effects on one's life chances both directly and indirectly. As Turner (2010) points out, peer victimization is a major source of stress in children and adolescents. Therefore, this stressor should be considered more when using the stress process model to examine childhood adversity and its effects.

Aside from the effects of negative mental health, being in a mixed family or stepfamily was also associated with an increased risk for delinquency at wave 3. This is congruent with Rebellon's (2002) findings that remarriage was associated with an increase in several forms of delinquency.

In summary, this study adds greatly to the current literature on peer victimization and delinquency by being the first study to provide evidence of a causal relationship between experiencing peer victimization at wave 1 and delinquency at wave 3, as well as identifying an indirect relationship mediated by wave 2 depression. While It is also consistent with other theories including general strain theory (Agnew 1992). Not only do these findings add to the literature, they are also very useful when determining the allocation of resources for preventing peer victimization and intervening in the effects of peer victimization and negative mental health outcomes.

#### *Summary and Discussion of Findings 2: Delinquency as a Predictor of Later Peer Victimization*

The findings in Chapter 6 provide answers to both Research Question 3 and Research Question 4. Research Question 3 refers to the direct relationship between wave 1 delinquency and wave 3 peer victimization. Research Question 4 refers to the potential mediating effects of negative mental health, specifically anger, depression, and anxiety. Regarding Research Question

3, the findings in Chapter 6 illustrate that at first delinquency appears to be a significant predictor of later peer victimization. In the first model in Table 6.1 wave 1 delinquency is a significant predictor of wave 3 peer victimization. However, as we see in the second model in Table 6.1, once we control for wave 2 anger the effect of wave 1 delinquency goes away. As previously mentioned, this suggests full mediation. As seen in the model reported in Table 6.2, we did not find any evidence that wave 1 delinquency predicted wave 2 anger, therefore mediation was ruled out. As a result, future research should examine the potential confounding effect that anger may have in this relationship. Considering RAT, delinquency would seem to be a logical predictor of experiencing peer victimization because participating in delinquent acts probably places one in contact with motivated offenders (delinquent peers) as well as retaliation motivated persons. Also, by involving oneself in delinquent behavior that person places themselves in situations that lack guardianship. However, considering the findings in chapter 6, we must conclude that delinquency is not a predictor of later peer victimization. This is important because as we see with RAT, delinquency has been considered an important risk factor for peer victimization, and this is in fact not the case. As such, RAT may not be the best framework to follow when looking at predictors of peer victimization. In light of the results of this study, I argue that it is one's anger and aggression that is more likely to influence one's decisions and increase impulsivity. This is more consistent with self-control theory (Gottfredson and Hirschi 1990). It seems that one's anger and aggression increase the risk of being in delinquent situations and once in those situations, one's anger is more likely to place a child at risk of being victimized by their peers. If one is more likely to act delinquently as a result of anger and aggression, it stands to reason that those same attributes would make one a more likely target for peer victimization on account of acting aggressively and impulsively towards other peers who are likely also inclined to act



similarly. This finding is very helpful in focusing the limited resources available for preventing and intervening in peer victimization. This shows us that focusing on anger will be a better use of resources in the fight against peer victimization. Similar to the prior discussion, by focusing on resources like cognitive behavioral therapy (Sukhodolsky et al. 2004) and emotion regulation strategies (Szasz et al. 2011), and self-control improvement programs (Piquero et al. 2016), we will have a greater impact on children's delinquency and experiences of peer victimization.

Regarding the other negative mental health measures, wave 2 anxiety also significantly predicted wave 3 peer victimization. This is consistent with prior research that finds anxiety to be associated with an increased risk for peer victimization (Storch et al. 2005; Reijntjes et al. 2010). However, anxiety did not have a mediating effect on the relationship between wave 1 delinquency and wave 3 peer victimization. Interventions should aim at developing coping mechanisms and increasing self-efficacy as they may be helpful in mitigating the negative effects of anxiety (Hampel et al. 2008). Wave 2 depression did not significantly predict wave 3 peer victimization. This is in contrast to prior research that finds that depression significantly increases the risk for peer victimization (Lehrer et al. 2006; Reijntjes et al. 2010). While prior research has found depression to be predictive of peer victimization, I argue that the finding in this study also makes sense. If children are depressed, they may be more likely to seclude themselves from others and therefore, insulate themselves from potential situations where peer violence could arise. However, once in those situations, they may have fewer resources to deter or defend themselves from peer victimization – thus the previous findings that depression increases one's risk for peer victimization. As discussed in the prior section, social supports, particularly school, and peer supports should be investigated for their potential preventative and alleviating effects in this relationship.

The findings above also have important theoretical implications when dealing with the risk factors for peer victimization. In the case of peer victimization, we see that RAT is not the best theoretical model to explain the causes of peer victimization. Since wave 1 delinquency was not a significant predictor of wave 3 peer victimization after controlling for wave 2 anger, it stands to reason that other theories such as Self Control Theory may better explain why some children and adolescents are more likely to experience peer victimization. Since wave 2 anger was such a strong predictor of wave 3 peer victimization, it is likely that one's aggressive and impulsive behavior is what places one at risk for peer violence whether it be offensive or retaliatory. Again, this is very important when developing intervention and prevention strategies to help tackle peer victimization. By determining that delinquency is not a predictor of peer victimization, those working in prevention and intervention can focus on methods that will be more useful such as strategies to help regulate emotion and cognitive behavioral therapy.

In summary, this study adds greatly to the current literature on delinquency and peer victimization by finding that delinquency is, in fact, not a significant predictor of later peer victimization. This is an important finding for two reasons: (1) it is very informative for important policy implications regarding prevention and intervention strategies for peer victimization; and (2) it has important theoretical implications regarding the causes of peer victimization and the relationship between peer victimization and delinquency.

### *Conclusion of Findings*

In conclusion, this study finds support for a causal relationship between experiencing peer victimization and later delinquent behavior. This relationship seems to be partially mediated by depression but not anger or anxiety. Therefore, I argue that peer victimization is a stronger

predictor for delinquency and that, while delinquency is associated with peer victimization, it is not a significant predictor of peer victimization.

### *Limitations and strengths*

This research has some limitations that need to be addressed. First, this study generalizes across a broad age spectrum. As such, there may be important variations by age group that are unseen. Research finds that bully victimization decreases with age (Hemphill et al. 2011) as such, future research should explore potential variations by age group as this may lead to important differences in how these processes work. Second, while the sample size is relatively large (652 participants), there may not be enough power to detect significant differences. There were several factors that approached significance in the models, and perhaps would have been significant with a larger sample. A larger sample could also help tease out the potential variations by age, as previously discussed. Third, the issue of attrition should also be considered. Considering that the first wave of the DVS included 2,030 children and only 989 of them participated in all three waves, some of those who dropped out of the study may have varied on important variables in this study such as delinquency and peer victimization. It may be that children who experienced victimization to a greater degree, or who were more delinquent, or who suffered more negative mental health outcomes were more likely to drop out of the study. Fourth, the stress process often looks at forms of social support as potential mediators or moderators of the relationships between stressors and outcomes. This would help provide a fuller understanding of the processes at work in these relationships. Fifth, the delinquency scale used in this study combines measures that could potentially be broken into different types of delinquency, such as violent delinquency, drug and alcohol related delinquency, and other non-violent forms of delinquency, however, the number of cases was too small to disaggregate the

delinquency measure. This could help explain why contrary to some of the prior literature, this study found that delinquency at wave 1 was not a significant predictor of peer victimization at wave 3. This could also help explain the some of the relationships between negative mental health outcomes and delinquency. It may be that depression is associated with more delinquency that deals with substance use while anger may be related to forms of delinquency that deals with aggression and externalization such as vandalism and violent delinquency. As such, future research should consider differentiating between types of delinquency when investigating its relationship to future peer victimization as certain forms of delinquency may be more influential. Future research should also differentiate between types of delinquency when investigating the relationship between negative mental health outcomes and later delinquency as these mental health outcomes may differ in their effects according to the type of delinquency. Finally, the measures used in this study are a combination of self-report and proxy reports (parental reports). As such, there is likely to be a discrepancy in the accuracy of these measures as research finds that self-report data and parent proxy reports do not always agree (Kim et al. 2018; Hope et al. 1999), with self-report data being better able to predict outcomes (Hope et al. 1999)

This study also has multiple strengths that need to be acknowledged. First, the measures included in this study for peer victimization, negative mental health, and delinquency, are all very comprehensive. This allows for a detailed exploration of these relationships. Second, this study uses three waves of data to explore the mediating effects of negative mental health on wave 3 peer victimization and delinquency. This study finds evidence of a nonspurious relationship between wave 1 peer victimization and wave 3 delinquency and finds that this relationship is partially mediated by wave 2 depression. Third, by using three waves of data, this allows me to address the temporal requirement for a cause and effect relationship. As such, this

study is the first to present evidence of a causal relationship between peer victimization at wave 1 and delinquency at wave 3.

### *Contributions and future research*

The findings presented in Chapter 5 and Chapter 6 contribute to the research on the relationships between peer victimization, delinquency, and mental health in several important ways. First, by examining both peer victimization and delinquency as causal variables and outcomes, this study helps determine which of these is a greater risk factor for the other. The finding that peer victimization is a significant predictor for later delinquency, but that delinquency is not a significant predictor of later peer victimization is very important. This study suggests that peer victimization may be more important as it predicts both delinquency and future peer victimization. As discussed earlier, this helps provide a more in depth look at the association between peer victimization and delinquency.

Second, this study contributes to the research by addressing the mediating effects of mental health issues specifically anger, depression and anxiety, regarding the relationships between peer victimization and delinquency. As can be found in social research, there are often mediating effects of a third, outside variable that may help explain a correlation between two variables. While there is ample evidence to support the correlation between peer victimization and delinquency, few studies have explored a third variable that may help explain this correlation. By examining mental health issues as possible third variables, this study contributes to the research by helping flush out potential mechanisms that may affect the link between peer victimization and delinquency. In this study, peer victimization was found to be a significant predictor of later delinquency and depression was found to partially mediate that relationship.

Third, by using three waves of the DVS, a nationally representative survey, this study helps establish causality. As mentioned previously, there are few studies that have looked at this relationship using multiple waves of data. The studies that have done so have looked primarily at delinquency as a risk factor for peer victimization. This study not only contributes by adding more evidence for causality by using three waves of the DVS, it also adds to the research by examining peer victimization as a risk factor for delinquency. It also allows for further replication as will be discussed in number 5.

Fourth, by using the stress process to help understand the relationships between peer victimization and delinquency this study expands on the stress process literature by treating victimization and delinquency as outcomes, instead of more traditional outcomes such as mental health.

Fifth, by replicating some of the findings in previous research and adding new findings, this study contributes to our understanding of the relationships between peer victimization and delinquency. This study found similar results to past research regarding the effects of negative mental health on peer victimization and delinquency. This study also found that peer victimization was a significant predictor of later delinquency, this is consistent with Wong and Schonlau (2013). This adds robustness to these findings. This study also expands the research by finding that depression acts as a mediator in the relationship between peer victimization and later delinquency. In contrast to the two studies that looked at delinquency as a predictor of peer victimization this study did not find evidence to support the idea that delinquency significantly predicts later peer victimization. While there was some initial evidence of a direct relationship, once anger was accounted for the relationship between delinquency and later peer victimization disappeared.

This research opens the door for several future research projects. As discussed before, one such project could investigate the potential confounding effect that anger may have on the association between delinquency and experiencing peer victimization. The finding that wave 1 delinquency does not predict wave 3 peer victimization after controlling for wave 2 anger suggests that this may in fact be a spurious relationship. It may be that one's anger causes one to participate in more delinquent behaviors as well as placing one at greater risk of victimization from peers due to more aggressive behavior and more impulsive actions.

Another research project could also investigate the potential confounding effects that child abuse may have on the relationship between peer victimization and delinquency. It may be that experiencing child abuse like physical abuse, emotional abuse, sexual abuse and neglect may predict both peer victimization and delinquency. As such, future research should investigate the relationship between child abuse, peer victimization, and delinquency.

Another project could expand on these models and explore other factors that could act as buffers throughout various stages in these relationships. Such research could include social supports (school, family, and peer) as well as measures of coping mechanisms and self-efficacy or mastery. In doing so, future research could better inform policies and programs aimed at preventing or dampening the negative effects of peer victimization and delinquency.

Another research project could explore potential interaction effects between gender and mental health as well as gender and social supports. What we know from prior research, suggests that different mental health issues may have different effects for girls and boys. Likewise, some forms of social support may be more effective for girls compared to boys and vice-versa. In the same vein, future research could investigate similar interactions with age as these relationships

may differ for younger versus older children. This would be important to discern especially when it comes to informing programs and policies regarding such issues.

Another research project could look at disaggregating the influence of victimizations on delinquency as they may vary from one another. Forms of child abuse may act differently than peer victimization in their influence on delinquency and mental health. Also discerning between peer victimization and sibling victimization may help provide more nuance to our understanding of the relationship between victimization and delinquency.

Lastly, another project could include macro-level stressors, such as county-level poverty, crime, and other indicators that may help explain and add nuance to these relationships. It may be that childhood family victimization affects children differently based on macro-level factors. This may also be true of the effects of social supports and other factors that may dampen the effects of such adversities.



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