Peer Attachment: A Mediation Relationship Between Peer Victimization, Anxiety, and Depression

The Harvard community has made this article openly available. Please share how this access benefits you. Your story matters


Citable link http://nrs.harvard.edu/urn-3:HUL.InstRepos:33826245

Terms of Use This article was downloaded from Harvard University’s DASH repository, and is made available under the terms and conditions applicable to Other Posted Material, as set forth at http://nrs.harvard.edu/urn-3:HUL.InstRepos:dash.current.terms-of-use#LAA
Peer Attachment: A Mediation Relationship between Peer Victimization, Anxiety, and Depression

Tiffany L. Negri

A Thesis in the Field of Clinical Psychology
For the Degree of Master of Liberal Arts in Extension Studies

Harvard University
May 2017
Abstract

The study examined a mediation analysis of peer attachment, peer victimization, anxiety and depression at two different points. The proposed mediator was peer attachment which was hypothesized to be a protective, or resiliency factor in this study. First, it was hypothesized that the relationship between anxiety and depression at Time 1 with peer victimization at Time 2 would be mediated by peer attachment at Time 1. The second pathway studied, hypothesized the inverse; peer attachment at Time 1 would mediate the relationship between peer victimization at Time 1 with anxiety and depression at Time 2. The Baron and Kenny (1986) mediation model was used to examine both pathways with Pearson correlations. Results from the first pathway demonstrated that peer attachment mediates the relationship between previous anxiety and depression with future peer victimization. Results from the second pathway showed that peer attachment partially mediated the reverse pathway between previous peer victimization and depression. However, peer attachment completely mediated the relationship between peer victimization at Time 1 and anxiety at time 2. It can be concluded that peer attachment is a protective factor in relation to anxiety and depression symptoms and peer victimization. However, it may not be the only mediator and future studies can focus on other mechanisms and protective factors to prevent psychopathology as a result of peer victimization, and to prevent peer victimization as a result of psychopathology.
Dedication

I would like to dedicate this thesis to my wife, Marley Cavalcanti, my parents, Carmine and Deanne Negri, my sister, Victoria Negri and my brother, Carmine Negri Jr. for all of their love, support and motivation during this process. This work would not have been able to be completed without them.
Acknowledgements

I would like to acknowledge and thank Dr. Kate McLaughlin for mentoring me and being gracious enough to allow me to work on her previous research topic and analyze the data from her dissertation. I would also like to thank and acknowledge Dr. Dante Spetter for all of her guidance, support, mentoring and assistance throughout my years at Harvard. Thank you for your advising and direction during the research and writing process.
Table of Contents

Abstract..............................................................................................................................iii
Dedication..........................................................................................................................iv
Acknowledgments..........................................................................................................v
List of Tables......................................................................................................................viii
List of Figures...................................................................................................................ix
I. Introduction..................................................................................................................1
   Research Aims..............................................................................................................2
   Background..................................................................................................................3
      Attachment theory.................................................................................................3
      Three-factor model.................................................................................................5
      Peer victimization.................................................................................................8
      Recent literature.....................................................................................................13
   Present study.............................................................................................................14
II. Method.......................................................................................................................15
   Study focus................................................................................................................16
   Measures....................................................................................................................18
   Statistical analysis....................................................................................................18
   Missing data.............................................................................................................19
   Procedure..................................................................................................................19
   Research Limitations...............................................................................................20
III. Results........................................................................................................................................21

   Step 1: Pathway 1.................................................................24
   Steps 2 & 3: Pathway 1.........................................................25
   Step 4: Pathway 1.................................................................27

Second pathway.................................................................................................28

   Step 1.................................................................29
   Steps 2 & 3 for CDI..............................................................29
   Step 4.................................................................31
   Steps 2 & 3 for MASC.........................................................32
   Step 4.................................................................34

IV. Discussion.................................................................................................................35

   Limitations.................................................................39
   Future Research..............................................................41
   General Discussion and Implications......................................................43

References.................................................................................................................45
List of Tables

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Means and standard deviations for participant characteristics</th>
<th>22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 2</td>
<td>Descriptive statistics of Peer Attachment, Depression and Anxiety Scores at Time 1 and Time 2</td>
<td>22</td>
</tr>
<tr>
<td>Table 3</td>
<td>Paired t-test of the differences between measures at Time 1 and Time 2</td>
<td>23</td>
</tr>
<tr>
<td>Table 4</td>
<td>A regression analysis of depression and anxiety scores with peer attachment</td>
<td>24</td>
</tr>
<tr>
<td>Table 5</td>
<td>A linear correlation of depression, anxiety and peer attachment at time 1 with peer victimization at time 2</td>
<td>26</td>
</tr>
<tr>
<td>Table 6</td>
<td>A linear correlation analysis of peer victimization with peer attachment at time 1</td>
<td>29</td>
</tr>
<tr>
<td>Table 7</td>
<td>Linear correlation of peer victimization at time 1 to depression at time 2 with peer attachment at time 1 as mediator</td>
<td>31</td>
</tr>
<tr>
<td>Table 8</td>
<td>Correlations of peer victimization and peer attachment at time 1 with anxiety at time 2</td>
<td>34</td>
</tr>
</tbody>
</table>
List of Figures

Fig 1  Attachment mediates future victimization..........................................................12

Fig 2  Attachment mediates future symptoms of anxiety and depression...................12

Fig 3  Pathway 1: A mediation analysis of anxiety and depression at time 1
predicting peer victimization at time 2 using peer attachment as a
mediator..........................................................................................................................25

Fig 4  Regression weights for depression and anxiety at time 1 predicting peer
victimization at time 2 without the presence of the mediator, peer
attachment......................................................................................................................28

Fig 5  A mediation analysis of peer victimization at time 1 with depression at time 2
using peer attachment as the mediator.........................................................................30

Fig 6  Peer victimization at time 1 predicting depression at time 2.............................33

Fig 7  Peer attachment at time 1 as a mediator of the relationship between peer
victimization at time 1 and anxiety at time 2...............................................................33

Fig 8  The correlation between peer victimization at time 1 with anxiety at time 2.....33
Chapter I
Introduction

Adolescents frequently experience depression and anxiety, but what are the psychosocial risk factors for this psychopathology? Maladaptive thinking increases risk for depression during stressful life events as described by the cognitive-vulnerability hypothesis (Alloy et al., 2006). Lower popularity among peers has been associated with greater depressive symptomatology in adolescents (Rudolph, 2009; Cole et al., 2013). Internalizing (negative self-evaluation), and avoidance behaviors (coping mechanism where a person refrains from a situation which evokes adverse emotions) are risk factors for depression and anxiety. Such behavior patterns have been associated with peer victimization (Crick & Bigbee, 1998; La Greca & Harrison, 2005; Prinstein, Boergers & Vernberg, 2001; Cappadoica et al., 2013).

Positive aspects of close friendships, lack of involvement in bullying and being a member of a peer crowd have been demonstrated as protective factors against anxiety and depression symptoms in adolescents (Cappadoica et al., 2013; La Greca & Lopez, 1998; Nikiforu et al., 2013). Further, peer attachment (the strong and lasting bond between peers) has been described as a protective factor in cognitive theories of depression and anxiety. However, it has also been linked to peer-victimization (Alloy et al., 2006; Armsden & Greenberg, 1987).

How does the quality of peer attachment shield at-risk teens from the adverse effects of peer victimization? It is expected that although adolescents who are bullied are
at a higher risk for anxiety and depression, peer attachment moderates this relationship or acts as a protective factor.

The purpose of this study was to determine if peer attachment is a mediating factor in the relationship relating peer victimization to anxiety and depression. For the current investigation, data was gathered from participants in a larger study who have completed paper and pencil measures of anxiety, depression, and peer attachment. The interrelationship among these measures was investigated using multiple regression models.

Research aims

It was expected that victimization would be associated with higher anxiety and depression scores on standard measures. Secondly, bullying history was expected to contribute to lower peer attachment within peer relationships. Lack of peer attachment was expected to correlate with increases in anxiety and depression. Finally, after controlling for peer attachment, peer victimization would not be associated with internalizing symptoms. If peer attachment is protective (or a resilience factor), then any intervention providing better relationships with peers should be beneficial. As a caveat, it should be mentioned that if a positive relationship between peer attachment and positive outcomes was observed, then it may be difficult to distinguish if either one or both pathways is the cause of this outcome.
Background

Psychopathology is more frequently diagnosed among adolescents subjected to peer victimization, and these youth are particularly vulnerable to depression and anxiety. Prinstein, Boergers and Vernberg (2001) measured relational and overt victimization and depressive symptoms among high school students and found an association between relational victimization based on self-report and a greater number of depressive symptoms (Prinstein, Boergers & Vernberg, 2001). Anxiety, in itself a risk factor for depression, has also been linked to peer victimization. La Greca and Harrison (2005) demonstrated a strong relationship between peer victimization, depression and anxiety. Based on this relationship, the proposed study will investigate how peer attachment (trust, communication, and alienation) may be a mediating factor and that stronger peer attachment contributes to lowering the risk of anxiety and depression to which victimized adolescents are susceptible.

Attachment theory

Attachment theory postulates that natural selection drives infants and children to be instinctually driven to be close to their attachment figure to seek support, reassurance and security (Hazan & Shaver, 1994; Nickerson & Nagel, 2005; Kopala-Sibely, et al., 2012, Lac et al., 2013; & Burton et al., 2013). The central tenet of attachment is that human beings have an innate desire to be accepted (Lac et al., 2013). Bowlby’s theory emphasized three defining features of attachment: proximity maintenance, safe haven, and secure base. Proximity maintenance reflects a child’s desire to maintain a close distance with the parent (proximity seeking) and a fear of separation from the parent.
(separation protest) (Hazan & Shaver, 1994; Nickerson & Nagel, 2005). During childhood, the parent provides a safe haven by being a source of reassurance, support and comfort in times of need. A secure base is formed when the caregiver allows the child to pursue non-attachment related behaviors that are indicative of later autonomy such as exploring (Hazan & Shaver, 1994). The close relationships formed between child and parent are models for relationships as the person matures, and are often predictive of adaptive emotional functioning and autonomy (Nickerson & Nagel, 2005; Ma & Huebner, 2008).

Attachment theory was later expanded to include the time period from late childhood to adolescence when people begin to seek out their peers for comfort, reassurance and support (Hazan & Shaver, 1994; Nickerson & Nagel, 2005). Peer attachment is based on Bowlby’s theory; however, the adolescent seeks out friends as a safe haven in difficult times rather than parental support, and incorporates any peer responses into his/her internal working model (Hazan & Shaver, 1994). Friends are able to confide in each other and provide validation, understanding and support in difficult times. Research by Nickerson & Nagel (2005) also supports this role played by friends, displaying a hierarchy for the transition of attachment from the parent to peers during adolescence. The authors concluded that in early adolescence peers rely on each other for proximity seeking and safe haven, but are dependent on their parents for a secure base. Thus, the present investigation focuses on the importance of peer attachment in adolescence as this relationship becomes more significant in this age range.
Three-factor model

Peer attachment consists of three factors: trust, communication, and alienation which were initially suggested by Armsden and Greenberg (1987). Trust is explained as “felt security” or the idea where the peers as established attachment figures will understand and respect the teen’s needs. Alienation is defined as isolation from the established attachment figure. Communication is the teen’s perceived quality of communication with the established attachment figure (Armsden & Greenberg, 1987). These factors emerged as a result of a factor analysis conducted by Armsden & Greenberg (1987) in order to create the first standardized self-report measure for attachment to peers and parents in late adolescence: the Inventory of Parent and Peer Attachment (IPPA). The authors developed this empirically derived measure based on expanding the Inventory of Adolescent Attachment (IAA) scale constructed by Greenberg et al. (1983) and including additional items from Bowlby’s theory of attachment, such as secure base. The goal of the IPAA was to construct a multifactorial and reliable model of attachment.

The IAA was a measure created by Greenberg and researchers (1983) in a sample of adolescents ages 16-20. There first section was designed to measure “felt security” of an adolescent’s relationships and the second section was designed to assess how frequently the adolescent would speak with their parents, siblings, close friends of same sex, close friends of opposite sex and significant others. The factors for parents and peers loaded onto different arms and which were the quality of affect for parents or peers and the utilization of the expected attachment figure. The IPPA structure differs from that of the IAA in that the questions selected for the factor analysis were related to trust that the
attachment figure would understand the adolescent’s expectations and emotional need of that person. In addition, the IPAA structure was multifactorial in that additional factors besides trust emerged to describe attachment. The IPPA is a more comprehensive measure of attachment based on Bowlby’s attachment theory.

The first portion of the Greenberg and Armsden’s (1987) study focused on developing the IPPA by using two samples of undergraduate students ages 16-20 who completed a 60 item questionnaire on a five-point Likert scale. The items were designed to measure “felt security”: that their attachment figure (parent or peer) would respect, understand and respond to their needs. A factor analysis was conducted on the results from an initial sample of the attachment items in the questionnaire and three underlying dimensions emerged: trust, communication and alienation. As expected, the factors for peer attachment and parental attachment loaded onto separate arms as in the IAA. The second portion of Armsden and Greenberg’s (1987) study, demonstrated the IPPA as reliable, valid and consistent with Bowlby’s theory of attachment as the quality of attachment and peer and parents was correlated to well-being, support seeking and family environment. More specifically, convergent validity was assessed by analyzing summary scores of peer attachment in comparison with scores from the Tennessee Self-Concept Scale (TSCS), Family Environment Scale (FES) and Peer Utilization Factors (teens seeking out peers in times of need).

Trust, communication and alienation are scales from the IPPA, and relative to one another can be taken as a comprehensive measure of peer attachment as these sub-scales were demonstrated to be strongly correlated with each other. Various studies support these three factors as important as interrelated processes such that high trust, high
communication and low alienation is predictive of well-being in adolescents, and have used the IPPA to measure peer attachment (Burton, Florrell and Wygant, 2013; Kopla-Sibley et al., 2012; Laghi et al., 2009; Ma & Huber, 2008 & Nickerson & Nagel, 2005). In the current investigation, it was expected that these factors would work as one comprehensive measure of peer attachment such that low alienation, high trust and high communication indicate a strong attachment. However, because this scale is a three factor solution as opposed to a single factor solution, it may be expected that one of the factors could demonstrate a greater correlation with peer victimization, anxiety and depression. It was unknown if one factor may prove to hold more significance in explaining peer attachment as a resilience factor.

Peer attachment is important because adolescents incorporate their friends’ actions and opinions into their perception of themselves, which in turn influences their behavior. As a result, positive peer attachment is directly related to better self-esteem, overall quality of life, and academic achievement (Nickerson & Nagel, Ma & Huebner, 2008). Conversely, because some adolescents display features such as dependency in their relationships, poor peer attachment may be predictive of vulnerability to depression and propensity to bullying others (Kopala-Sibley et al, 2012; Burton et al., 2013; & Lac et al., 2013). Finally, victimized students are at a very high risk for behaviors such as non-suicidal self-injury, suicidal ideation and completed suicide (Heilbron & Prinstein, 2010; Cole et al., 2013).
Peer victimization

Peer victimization is an aggressive act in which a person intentionally targets and harms a peer through manipulation or physical harm/threats. Two traditional types of peer victimization are relational and overt victimization. Relational victimization is a purposely harmful behavior where a person manipulates a friendship or relationship by spreading rumors, threatening dissolution of friendships and excluding the peer from social events/alienation (Crick & Bigbee, 1998; Prinstein, Boergers & Vernberg, 2001; Storch et al., 2005). This threat may lead the adolescent to associate the potential loss of friendship as a negative reflection on themselves or their actions. Any actual loss of friendship or alienation in their mutual peer group would validate the schemas formed by the adolescents’ distorted thinking (Alloy et al., 2006). Overt victimization/aggression, another form of peer victimization, is where a person uses physical harm or threatens to harm to a peer (Crick & Bigbee, 1998). Recently with the growing use of technology and social media, cyber victimization uses the Internet, text messaging, email and other forms of media to threaten, harass, insult, embarrass and exclude peers (Cappadoica, Craig & Pepler, 2013).

Being victimized has been associated with anxiety and depression, both as a precursor or predictor of anxiety and depression, and as a result of depression and anxiety (Alloy et al., 2006; & Storch et al., 2005). As a predictor of anxiety and depression, adverse peer experiences, such as peer victimization, start or perpetuate negative self-views. Cognitive distortions or thoughts experienced after victimization create a false interpretation of future events (e.g. my friends did not invite me to the movies because I’m a bad person) and are a common feature of depression (Alloy et al., 2006). Social
anxiety often includes a distorted perception of acceptance within a peer group and may occur following peer victimization’s damaging effect on attachment relationships (La Greca & Lopez, 1998). An investigation found high social anxiety scores were related to less supportive perceived friendships. Victimized teens also reported lacking confidence as friends. Furthermore, both feelings of peer acceptance and the number of close friendships predict social anxiety. Armsden and Greenberg (1987) demonstrated that the quality of an adolescent’s peer attachment prognosticated symptoms of depression and anxiety. For example, if a high school student reported acceptance and moderate levels of trust and communication, this student would be less likely to report to depression and anxiety (Armsden & Greenberg, 1987).

However, the pathway between bullying and mood and anxiety symptoms is complex. There is also evidence that previous anxiety and depression makes adolescents more likely to be the targets of peer victimization. Adolescents who are highly anxious and less socially involved are more likely to be the targets because their lack of strong friendships and support may make them more vulnerable and less likely to defend themselves (Storch et al., 2005). Additionally, victims may experience social anxiety as a consequence of being targeted, increasing avoidance of social situations based on these experiences so that anxiety leads to bullying and bullying leads to anxiety (La Greca & Lopez, 1998; Ostrov & Godleski, 2013; & Prinstein, Boergers & Vernberg, 2001).

Of course, while many adolescents are victims of bullying most do not develop psychopathologic symptoms. Positive aspects of close friendships were associated with a lower incidence of social anxiety among adolescents (La Greca & Lopez, 1998). Being a member of a peer crowd (or group of friends who share similar views) has a shielding
effect from social anxiety and depression (La Greca & Harrison, 2005). The attachment between peers may serve as a protective or resilience factor against the harmful effects of peer victimization, but some adolescents are reluctant to create strong bonds with peers, either due to social anxiety or negative perceptions of themselves (Rudolph, 2009).

While the current study focused on peer attachment as a protective or resilience factor against the damaging effects of peer victimization, Burton et al. (2013) in their research on bullying found that adolescents uninvolved in traditional bullying demonstrated significantly higher peer attachment than victimized teens, thereby suggesting that peer attachment is protective against being victimized. Adolescents uninvolved in cyber bullying showed significantly higher peer attachment than the group of teens who were involved in cyber-bullying as both a bully and a victim. Further, results from a study by Cappadoica, Craig and Pepler (2013) demonstrated that quality of communication with friends protected teens against being victimized. The study did not directly assess peer attachment.

Conversely, poor attachment may be a risk factor for a mood disorder, as being excluded or alienated by peers, or hearing rumors, can lead to fear and avoidance of social situations. The poor quality of relationships can also create and reinforce negative self-schemas which are indicative of many people with anxiety and depression (Crick & Bigbee, 1998; La Greca & Harrison, 2005; Prinstein, Boergers & Vernberg, 2001; Roelfs, et al. 2011). Nelis and Rae (2009) concluded that insecure peer attachments were correlated with poor emotional adjustment. Additionally, researchers who studied attachment disorganization discovered that anxiety and other Axis I disorders were strongly correlated with high dysfunction in peer attachments (Brumariu, Obsuth &
Adolescents with greater depressive symptomology were more likely to be victims of both traditional and cyber bullying (Cappadoica et al., 2013). The authors suggested that a teen’s involvement in traditional victimization may be due to social isolation, although they did not specifically measure peer attachment. Crick and Bigbee (1998) suggested that children who are victims of bullying may perceive themselves as “bad,” which could contribute to reduction of self-worth and may begin to internalize their feelings, which would perpetuate a cycle of increased prevalence of victimization and depressive symptomatology. Rumination may also be a factor as research has suggested that this factor mediated the relationship between peer attachment and symptoms of depression (Rutijten, Roelofs and Rood, 2011). Similarly, a theory from Hanken & Abramson (2001) postulates an integrative model for adolescent depression centered on rumination, negative self-schemas, and other interpersonal stressors account for cognitive vulnerabilities. These researchers focused on the function of cognitive vulnerabilities in relation to adolescent depression which they explained by using Beck’s Schema Theory and Abramson’s Hopelessness model (Hanken & Abramson, 2001). The theory of hopelessness from Abramson is centered around the tenant that stressors and negative life events combined can result in negative thoughts and consequences of the event. Adolescents with these negative thoughts may attribute such unfavorable, or adverse events to unchanging and global causes culminating in a self-fulfilling cycle of hopelessness. This cycle of hopelessness may be negative thoughts and feelings about one’s self, lowering self-esteem and increasing the likelihood for negative future expectations (Joorman, 2009).
The relationship between anxiety, depression and peer victimization is bi-directional as seen in Figure 1 and Figure 2. However, research is scarce on the mechanism connecting these concepts. The present study hypothesizes that peer attachment mediates the relationship between peer victimization, anxiety, and depression in both directions.

![Diagram](image-url)

**Figure 1**: Attachment mediates future victimization: This figure shows peer attachment as a mediator of anxiety and depression (as a precursor) with future peer victimization.

![Diagram](image-url)

**Figure 2**: Attachment mediates future symptoms of anxiety and depression. This figure shows peer attachment as mediator of victimization with future symptoms of anxiety and depression.
Recent literature

More recent research has been focused on factors of peer attachment in association with peer victimization, anxiety and depression. However, this research does not specifically address the mechanisms that link these concepts (McLaughlin, Hatzenbuehler & Hilt; 2009 & Nikiforou et al., 2013). On the IPPA, in a sample of college students ages 16-20, lower trust and communication scores and higher alienation scores were associated with more depression and anxiety symptoms (Armsden & Greenberg, 1987).

Additionally, the association of peer attachment, age, gender, well-being and emotional intelligence has been studied (Balleruka, et al. 2016). Interestingly, the authors demonstrated that peer attachment correlated with well being and emotional intelligence. This study used positive scales from the Children’s Depression Survey (CDS) to determine resiliency. This study raises important questions regarding peer attachment as a resiliency factor in the context of emotional intelligence and well being, thus validating the importance of the current study. Another study from Oldfield, Humphrey and Hebron (2016) examined peer attachment versus parent attachment in relation to well-being and pro-social behavior. Peer attachment was strongly associated with pro-social behavior and also mediated the relationship between pro-social behavior and school connectedness. A meta-analysis conducted by Gorrese (2016) reviewed previous literature in peer attachment and concluded with the idea that peer attachment should be examined as a protective, or resiliency factor.
Present study

The focus of the present study is to examine how peer attachment relates to peer victimization, depression and anxiety. First, it is expected that peer victimization at Time 1 will predict anxiety and depression at Time 2 (March 2006). Further, it is predicted that victimization will be associated with decreased peer attachment at Time 2. Peer attachment at Time 2 will be associated with anxiety and depression at Time 2; the lower the quality of relationship, the greater incidence of symptoms of this psychopathology. Finally, when attachment measures are statistically controlled, victimization will not be linked with internalizing behaviors. The caveat to this investigation is that the correlation hypothesized may be due to either or both casual pathways explained in Figures 1 and 2.

Examining peer attachment as a single dimension solution may be advantageous as this design will give a clear picture of peer attachment in relationship to anxiety, depression and anxiety. However, using attachment as a single dimension may be a disadvantage as the three factors of the IPPA may have their own significant implications in their associations with anxiety, depression and peer victimization. A recent meta-analysis from Gorrese (2016) showed that trust and alienation were more significantly associated with increased depression symptomatology than communication. However, Rutijten and colleagues (2011) demonstrated that communication and alienation were correlated more significantly than trust in relation to depression.
Chapter II

Method

The participants, sample demographic and questionnaire completion rate and additional descriptive factors were recorded. The participants were 1,065 students (545 boys, 520 girls) from two middle schools in a town with lower socioeconomic status (income of $18,404 per capita) in central Connecticut. Ages ranged from 10-15 years old with participants from grades 6-8. There were almost an equal number of males than females (51% vs 49%). The subjects were recruited by offering study information and consent forms to the parents. Parents were asked to provide consent for their children’s participation and all study records were confidential. The total participation was 72% at baseline with 22% of parents not returning consent forms, and 6% declining consent.

Inclusion criteria incorporated a signed consent form from the enrolled student in one of the two selected middle schools and agreement to participate in the self-report questionnaires. Exclusion criteria specified that students who did not attend the full school day, such as students in a special education class or a technical program, would not be eligible to participate. This sample data were collected by McLaughlin, Hatzenbuehler and Hilt (2009) as a part of a larger longitudinal study and are being used with the author’s permission for this current data analysis.

The larger longitudinal study (McLaughlin, Hatzenbuehler and Hilt, 2009) examined the relationship between peer victimization and internalizing symptoms in adolescents. It was hypothesized that emotional dysregulation would mediate this
relationship at three time points during one academic year. Participants completed questionnaires on three occasions at 4 months apart: Time 1 (November 2005), Time 2 (March 2006), and Time 3 (June 2006). The current study examined data from the Revised Peer Experiences Questionnaire (RPEQ; Prinstein et al., 2001) to measure experiences with peer victimization, from the Children’s Depression Inventory (CDI; Kovacs, 1992) to measure depressive symptoms, and from the Multidimensional Anxiety Scale for Children (MASC; March, Parker, Sullivan, Stallings & Conners, 1997) to measure anxiety. The authors also used another measure: Emotional Understanding, a measure of emotion expression in terms of sadness and anger, and a measure of rumination in response to emotions. All of the questionnaires were completed at Time 1 and Time 3 except emotion dysregulation, which was only administered at Time 2.

Study focus

The current study will examine measures of peer attachment (trust, communication, alienation/social isolation) as mediators of the relationship between peer victimization and anxiety and depression using data from Time 1 (November 2005) and Time 2 (March 2006). The analysis did not include data from Time 3 described in the original study above.

Measures

The Children’s Depression Inventory (CDI) is a 27 item self-report measure which assesses symptoms of depression in children and adolescents (Kovacs, 1992). Within these twenty-seven items, participants circle the sentence that best describes their
thoughts or feelings within the last week, such as “I hate myself,” “I do not like myself,” and “I like myself.” These measures have been proven to be adequate for this data set (McLaughlin, Hatzenbuehler & Hilt, 2009). For the purposes of this study the CDI only included twenty-six items because participating schools and the human research group would not allow the use of an item assessing suicide ideation (McLaughlin, Hatzenbuehler & Hilt, 2009).

Inventory of Parent and Peer Attachment (IPPA, Armsden & Greenberg, 1987) assesses parent and peer attachment. For the purposes of this study only the peer attachment scale was used. There are 25 items measuring cognitive aspects of peer attachment which are rated on a five-point Likert scale from “almost never or never true” to “almost always or always true (Armsden & Greenberg, 1987). These items measure trust, communication and alienation as aspects of peer attachment and include prompts such as “When we discuss things, my friends care about my point of view” (Armsden & Greenberg, 1987). Gullone & Robinson (2005) reported that while the peer attachment subscale was originally tested in a group of college students, it has demonstrated test-retest reliability and good internal consistency in “mid to late adolescence” (p.69).

Multidimensional Anxiety Scale for Children (MASC; March, Parker, Sullivan, Stallings & Conners, 1997) is a thirty-nine item self-report questionnaire for children and adolescents ages 8-19. The thirty-nine items are divided into four groups to measure types of anxiety: physical symptoms, harm and avoidance, social anxiety, and separation anxiety (March et al., 1997; McLaughlin, Hatzenbuehler & Hilt, 2009). This scale uses a four point Likert scale ranging from “Never true” to “Very True” and corresponds to the DSM-IV-TR criteria for social phobia (March et al., 1997). This scale has been proven to
have good test-retest reliability within a three month time period and has demonstrated internal consistency (March et al., 1997; McLaughlin, Hatzenbuehler & Hilt, 2009).

McLaughlin, Hatzenbuehler and Hilt (2009) describe the MASC for use in children 8-19 years old; therefore, the test is valid for use in this sample.

Revised Peer Experiences Questionnaire (RPEQ) is a nine-item self-report questionnaire which measures aggression and victimization in adolescents (Prinstein, Boergers & Vernberg, 2001). For this study, the peer victimization portion was used. The peer victimization scale includes five items measuring relational victimization, and four items measuring overt victimization. The scale is measured on a five-point Likert scale ranging from “Never” (1) to “A few times a week” (5) (Prinstein et al, 2001). Items of relational victimization include prompts such as “A kid tried to damage my social reputation by spreading rumors about me”, and an item assessing overt victimization, “A kid threatened to hurt me or beat me up” (Prinstein et al, 2001). This measure has demonstrated good internal consistency and reliability to assess peer victimization in adolescents (La Greca & Harrison, 2005).

Statistical Analysis

Linear regression analysis, more specifically Pearson correlations, was used to determine if there was an association between peer victimization and anxiety and depression at Time 2 (March 2006). In addition linear regression was performed to ascertain if peer victimization at Time 1 was associated with decreased trust and communication and increased alienation (lower peer attachment) in adolescents at Time 2. The potential association of lower measures of trust and communication and higher
measures of alienation (peer attachment) with anxiety and depression will be tested using linear regression. A linear regression will be done to demonstrate there is no association between peer victimization and internalizing qualities when controlling for measures of peer attachment (trust, communication and alienation). As this is a large sample size and the data is less likely to be influenced by skew, the Baron and Kenny (1986) mediation model was used and direct effects were measured.

Missing Data

It is acknowledged there is a large amount of missing data, described subsequently in the results section. In order to obtain more accurate results, the missing data was removed from each dataset in this study. This ensured for a clean and more accurate representation of the sample for analysis.

Procedure

After parental consent was obtained the self-report measures were administered to the middle school students in their homeroom classrooms during two different time points - Time 1 (November 2005) and Time 2 (March 2006) (McLaughlin, Hatzenbuehler & Hilt, 2009). The data from these measures was analyzed using the SPSS program to perform linear regressions (Pearson correlations) by using the Baron and Kenny (1986) mediation model. As previously described, missing data was removed prior to the mediation analysis.
Research Limitations

The data from this study were obtained from a larger longitudinal study (McLaughlin, Hatzenbuehler and Hilt, 2009). Despite the large sample size of this study, the data are still at risk for sampling bias. All of the subjects were recruited from two middle schools in an urban area of Connecticut. There were no subjects recruited from suburban schools; therefore, this data may not be representative of all students in grades 6-8 in various neighborhoods and states. The participants were also recruited by means of opportunity sampling, as the middle schools were located in close proximity to the researchers, which may bias the data to this region. The exact choice of participating schools is unclear as described in the original study.

The inclusion and exclusion criteria were not extensive for this study, which allowed the authors to obtain a larger sample. If a child returned an assent form signed by a parent he or she could participate unless he or she did not attend school for a full day. A major limitation to consider for this study is the risk of self-report bias because all of the measures were questionnaires given to the students. Because of potential self-report bias, the data should be interpreted with a caveat about this limitation. Also, because linear regressions were done to analyze the data it must be noted that the results will only describe correlations/associations and will not demonstrate causation between the variables. As a final caveat, because this investigation hypothesizes a bi-directional relationship between peer victimization, depression and anxiety with attachment as a mediator, it may not be possible to determine if the relationship is due to one or both of the proposed pathways.
Chapter III

Results

First, descriptive statistics were examined for all demographics and outcome variables. Table 1 shows the mean age at time of survey was 12.21 years and the mean grade was 7.03. Because the data were collected at two different time points, missing data varied for each variable. From a sample of 1,318 participants, there were 260 missing cases at Time 1 and 271 of missing cases at Time 2 for CDI assessments. There were 253 missing cases at Time 1 and 269 at Time 2 for MASC assessments. IPAA scores also showed an increase number of missing cases with 287 Time 1 and 333 cases at Time 2. From the same sample there were 532 missing cases at Time 1 and 559 missing cases at Time 2 for PVQ scores. Cases with missing data were excluded from subsequent analysis. In SPSS, cases were selected by using the “if condition is satisfied function” and clicking >=, and highlighting each total questionnaire score at both Time 1 and Time 2. After the missing data was removed, the new $n$ was reduced by more than half for each questionnaire, to 538 participants with fully completed data.

Table 2 displays the descriptive statistics of measures of peer attachment, depression, anxiety and peer victimization at times 1 and 2. Peer victimization scores from the PVQ test were reported as being higher at time 2 (7.47) when compared with time 1 (7.60). Peer attachment scores from the IPPA were higher at time 1 (82.45) than time 2 scores (81.96). The MASC scores of anxiety were reported as higher at time 1 (40.01) than at time 2 (10.09).
Table 1

Means and standard deviations for participant characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at time of survey</td>
<td>12.21</td>
<td>.997</td>
</tr>
<tr>
<td>Grade</td>
<td>7.03</td>
<td>.813</td>
</tr>
</tbody>
</table>

Table 2

Descriptive statistics of Peer Attachment, Depression and Anxiety Scores at Time 1 and Time 2

<table>
<thead>
<tr>
<th>Measures</th>
<th>M</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVQ T1</td>
<td>7.47</td>
<td>6.35</td>
<td>538</td>
</tr>
<tr>
<td>IPPA at Time 1</td>
<td>82.45</td>
<td>15.46</td>
<td>538</td>
</tr>
<tr>
<td>MASC at Time 1</td>
<td>40.01</td>
<td>15.16</td>
<td>538</td>
</tr>
<tr>
<td>CDI at Time 1</td>
<td>9.24</td>
<td>6.25</td>
<td>538</td>
</tr>
<tr>
<td>PVQ T2</td>
<td>7.60</td>
<td>6.62</td>
<td>538</td>
</tr>
<tr>
<td>IPPA T2</td>
<td>81.96</td>
<td>15.66</td>
<td>538</td>
</tr>
<tr>
<td>MASC T2</td>
<td>34.60</td>
<td>18.01</td>
<td>538</td>
</tr>
<tr>
<td>CDI T2</td>
<td>10.09</td>
<td>7.96</td>
<td>538</td>
</tr>
</tbody>
</table>

Note. The following abbreviations are used above: Revised Peer Victimization Questionnaire (PVQ), Inventory of Parent and Peer Attachment (IPPA), Multidimensional Anxiety Scale for Children (MASC) and the Peer Victimization Questionnaire (PVQ).

In Table 3, paired t-tests showing the differences between means for each assessment are displayed. The results for PVQ were not significant \( t = -0.33 \) (1071.6), \( p = 0.37 \). Similarly, there was no statistical significance for the difference of means at Time 1 and Time 2 for IPPA scores \( t = 0.52 \) (1073.1), \( p = 0.70 \) and MASC scores \( t = 5.86 \) (1043.1), \( p = 1.00 \). However, CDI scores decreased between Time 1 and Time 2 which was statistically significant, \( t = -1.95 \) (1016.3), \( p < 0.05 \). The means for both PVQ and CDI scores decreased from Time 1 to Time 2, \( t = -0.33 \) (1071.6) for PVQ and CDI \( t = -1.94 \) (1016.3).
Table 3

Paired T test of the differences between measures at Time 1 and Time 2

<table>
<thead>
<tr>
<th>Measure</th>
<th>t</th>
<th>SD</th>
<th>SE</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVQ</td>
<td>-0.329</td>
<td>12.95</td>
<td>0.3955</td>
<td>1071.6</td>
<td>0.371</td>
</tr>
<tr>
<td>IPPA</td>
<td>0.516</td>
<td>31.089</td>
<td>0.9487</td>
<td>1073.1</td>
<td>0.697</td>
</tr>
<tr>
<td>MASC</td>
<td>5.862</td>
<td>32.788</td>
<td>1.0149</td>
<td>1043.1</td>
<td>1.000</td>
</tr>
<tr>
<td>CDI</td>
<td>-1.948</td>
<td>13.913</td>
<td>0.4363</td>
<td>1016.3</td>
<td>0.026</td>
</tr>
</tbody>
</table>

Note. The following abbreviations are used above: Revised Peer Victimization Questionnaire (PVQ), Inventory of Parent and Peer Attachment (IPPA), Multidimensional Anxiety Scale for Children (MASC) and the Peer Victimization Questionnaire (PVQ).

The data analysis was conducted in SPSS by using the Baron and Kenny (1986) method of mediation analysis. First, the hypothesis that peer attachment mediates the relationship between prior anxiety and depression with future peer victimization was analyzed. This hypothesis was analyzed using the Baron and Kenny (1986) mediation model which uses four different steps. First, the regression weight between the independent variables, CDI and MASC and the mediator, IPPA was calculated. Second, two models are analyzed: The mediator predicting the dependent variable and the independent variable predicting the dependent variable. Lastly, the regression weights were compared with and without the mediator to determine the effect of the mediator on the relationship between the independent and dependent variables.
Step 1 Pathway 1

The first step was to analyze the MASC and CDI total scores at time 1, with IPPA total score at time 1 mediating the relationship with PVQ total victimization score at time 2. To test the relationship between anxiety, depression and peer attachment, a general linear correlation was calculated for the MASC and CDI total scores at time 1 as the independent variables with the mediator, IPPA total scores at time 1 as the dependent variable.

Table 4

A regression analysis of depression and anxiety scores with peer attachment.

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Constant)</td>
<td>86.558</td>
<td>1.819</td>
<td>47.579 .000</td>
</tr>
<tr>
<td>CDI total score</td>
<td>-.982</td>
<td>.107</td>
<td>-.391</td>
</tr>
<tr>
<td>masc tot</td>
<td>.125</td>
<td>.044</td>
<td>.121</td>
</tr>
</tbody>
</table>

Note. The following abbreviations are used above: Children’s Depression Inventory (CDI) and Multidimensional Anxiety Scale for Children (MASC).

As demonstrated in Table 4, the results showed the regression weights for the a pathway with t= -.98 for CDI time 1 (df=537, p<.001) and t=.13 for MASC time 1 (df=537, p<.01). These results show a strong correlation with both independent variables, anxiety and depression with the mediator, peer attachment, thus satisfying the first
condition of the Baron & Kenny (1986) mediation model. This step is shown as pathway 
a in Figure 3 which shows the coefficients of MASC and CDI totals as, .13 and -.98 respectively in relation to the mediation model.

![Diagram](image)

**Figure 3.** Pathway 1: A mediation analysis of anxiety and depression at time 1 predicting peer victimization at time 2 using peer attachment as the mediator. The following abbreviations are used above: Children’s Depression Inventory (CDI), Revised Peer Victimization Questionnaire (PVQ), Inventory of Parent and Peer Attachment (IPPA), and Multidimensional Anxiety Scale for Children (MASC). *p<.01; **p<.001

Steps 2 & 3: Pathway 1

Next, in Table 5, the correlation between anxiety depression and peer victimization was calculated with, and without peer attachment, the proposed mediator. The first model used MASC and CDI total scores at Time 1 to correlate with PVQ victimization scores at Time 2. This analysis was run to establish the original pathway, anxiety and depression scores at Time 1, predicting peer victimization at Time 2, without the mediator. The second model, kept PVQ total score at Time 2 as the dependent variable and used the mediator, IPPA scores at Time 1 as the independent variable.
Table 5.

A linear correlation analysis of depression, anxiety and peer attachment at time 1 with peer victimization at time 2.

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>SE</td>
<td>β a</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>3.370</td>
<td>.793</td>
</tr>
<tr>
<td></td>
<td>CDI total score</td>
<td>.192</td>
<td>.047</td>
</tr>
<tr>
<td></td>
<td>masc_tot</td>
<td>.059</td>
<td>.019</td>
</tr>
<tr>
<td>2</td>
<td>(Constant)</td>
<td>4.442</td>
<td>1.815</td>
</tr>
<tr>
<td></td>
<td>CDI total score</td>
<td>.180</td>
<td>.050</td>
</tr>
<tr>
<td></td>
<td>masc_tot IPPA Total Scale</td>
<td>.061</td>
<td>.019</td>
</tr>
<tr>
<td></td>
<td>Total Scale</td>
<td>-.012</td>
<td>.019</td>
</tr>
</tbody>
</table>

Note. The following abbreviations are used above: Children’s Depression Inventory (CDI), Inventory of Parent and Peer Attachment (IPPA), and Multidimensional Anxiety Scale for Children (MASC).

This correlation was calculated to establish a correlation between the mediator, peer attachment at time 1, with the outcome variable, peer victimization at the time 2. As seen in Table 5, the outcome variables for the first model resulted in an unstandardized regression weight of .10 for CDI at time 1 (df=537, p <.001) and .06 for MASC at time 1 (df=537, p <.01). In the second model in Table 5, the coefficients resulted in unstandardized regression weights of .18 for CDI total 1 (df=537, p <.001), .06 for MASC total 1 (df=537, p <.01) and IPPA at time 1 of -.01 (df=537, p =.51). Figure 3 shows the
unstandardized regression weights for the IPPA total scores with the peer victimization (PVQ total scores) which was not statistically significant in pathway b at time 1 of -.01 (df= 537, p=.51). Pathway c in Figure 3 was statistically significant with unstandardized regression weights for MASC and CDI totals as .06 and .18 respectively. Although, step 2 was not statistically significant in pathway b as seen in Figure 3, a final step in Baron and Kenny’s (1986) mediation model was conducted.

Step 4: Pathway 1

To support the hypothesis that removing the mediator, IPPA (total peer attachment score at time 1), does not impact the relationship between both anxiety and depression at time 1 with peer victimization at time 2, the mediation effect was measured. In order to demonstrate this effect, the relationship between the variables must be zero when the mediator is removed (c – c1). The values for c are shown in Figure 4 as .19 for the correlation between CDI total scores at time 1 with PVQ at time 2, and .06 for the correlation between MASC total scores at time 1 with PVQ at time 2. Table 4 and Figure 3 show the regression weights for the correlation between CDI and PVQ without the mediator is c =19, with the mediator is c1=.18. The mediation effect of peer attachment on the relationship between depression at time 1 and peer victimization at time 2 was calculated as c –c1 (.19-.18)= .01. As the value was essentially zero, this result complete mediation and supports the hypothesis that there will be an effect on the relationship between depression and future peer victimization when the mediator, peer attachment is removed. In Table 4 and Figure 3, the regression weights for the correlation between MASC at time 1 and PVQ at time 2 without the mediator is c=.06 and c1= .06. The
mediation effect of peer attachment on the relationship between anxiety at time 1 with peer victimization at time 2 is c=c1 (.06-.06) = 0. As the value is zero, this result demonstrates complete mediation and supports the hypothesis. Finally, the hypothesis that peer attachment mediates the relationship between prior anxiety and depression with future peer victimization, was partially supported with partial mediation.

Second pathway

It was also predicted that, attachment would mediate future anxiety and depression in participants who had been victimized by their peers. In order to test this hypothesis, the same method as described above (Baron and Kenny’s 1986 procedure) was used.

\[ c = .061 \] * MASC
\[ c = .180 * CDI \]

**Figure 4.** Regression weights for depression and anxiety at time 1 predicting peer victimization at time 2 without the presence of the mediator, peer attachment. The following abbreviations are used above: Children’s Depression Inventory (CDI), Revised Peer Victimization Questionnaire (PVQ), and Multidimensional Anxiety Scale for Children (MASC). *p<.001.
Step 1

First, to demonstrate the relationship between peer victimization and peer attachment, a general linear regression using PVQ scores at time 1 with the mediator, IPPA scores at time 1 was examined. This correlation was performed to demonstrate that peer victimization is expected to contribute to lower peer attachment within peer relationships. Table 6 shows the correlation weight of the correlation between decreased peer victimization at time 1 with the mediator, peer attachment at -.31 (standard error .11, p<.01). The p value is significant at p<.01 demonstrating a statistically significant correlation between peer victimization and peer attachment at time 1. This step is also represented on Figures 5 and 7 as pathway a with the regression weight of -.31.

Table 6.

A linear correlation analysis of peer victimization with peer attachment at time 1.

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>SE</td>
<td>B</td>
</tr>
<tr>
<td>1 (Constant)</td>
<td>84.896</td>
<td>1.021</td>
<td>83.185</td>
</tr>
<tr>
<td>PVQ Total</td>
<td>-.311</td>
<td>.105</td>
<td>-.127</td>
</tr>
<tr>
<td>Victimization Scale</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Steps 2 & 3 for CDI

Next, a linear regression with two models was used. To demonstrate the relationship between peer victimization with depression, a linear correlation was
performed without the mediator. This method was done to test the hypothesis that lack of peer attachment will be correlated with increase in anxiety and depression scores. In step 2, PVQ time 1 total scores was the independent variable to demonstrate a correlation with the outcome variable, CDI scores at time 2. Table 7 showed the correlation between peer victimization at time 1 and depression scores at time 2 with an unstandardized regression weight of .34 (standard error = .054, p < .0001). This result is displayed as pathway c in Figure 6 showing the correlation between peer victimization at time 1 and depression at time 2. For step 3, the mediator, IPPA at time 1, was selected as the independent variable and CDI at time 2 remained the dependent variable. Table 7 results for this step were as follows, the unstandardized regression weight equaled -.10 with a standard error of .02 and p < .0001. Figure 5 shows this result as pathway b in the mediation model. This value is statistically significant and satisfies one of the conditions of the Baron & Kenny (1986) mediation model.

![Pathway Diagram]

**Figure 5.** A mediation analysis of peer victimization at time 1 with depression at time 2 using peer attachment as the mediator. The following abbreviations are used above: Children’s Depression Inventory (CDI), Revised Peer Victimization Questionnaire (PVQ), and Multidimensional Anxiety Scale for Children (MASC). *p < .001
Step 4

In order to test the hypothesis that, after controlling peer attachment, peer victimization will not be associated with internalizing symptoms, the two different steps were compared as described above. If the mediator lowered the correlation between peer victimization and depression, it would demonstrate that peer attachment mediates the relationship between peer victimization and depression.

Table 7.

Linear correlation of peer victimization at time 1 to depression at time 2 with peer attachment at time 1 as a mediator.

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>Std. Error</td>
<td>B</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>7.139</td>
<td>.493</td>
</tr>
<tr>
<td></td>
<td>PVQ Total Victimization Scale</td>
<td>.336</td>
<td>.051</td>
</tr>
<tr>
<td>2</td>
<td>(Constant)</td>
<td>15.672</td>
<td>1.799</td>
</tr>
<tr>
<td></td>
<td>PVQ Total Victimization Scale</td>
<td>.304</td>
<td>.050</td>
</tr>
<tr>
<td></td>
<td>IPPA Total Scale</td>
<td>-.101</td>
<td>.020</td>
</tr>
</tbody>
</table>

Note. The following abbreviations are used above: Revised Peer Victimization Questionnaire (PVQ), and Inventory of Parent and Peer Attachment (IPPA).
The mediation effect was calculated as described previously \((c - c_1)\), but with the values in Table 7 and Figure 6, \(c = .34\) and \(c_1 = .30\) from Figure 7. As such, the mediation effect \((.34-.30) = .034\) which did not equal zero. This step showed a partial mediation, not complete mediation, thus partially proving the hypothesis that peer attachment mediates the relationship between previous peer victimization and subsequent depression symptoms.

As there were two outcome variables in the second pathway, another linear regression with two models as described immediately above, except CDI scores were replaced with MASC scores at time 2. The first step was described previously in Table 6 with a regression weight of \(-.31\) (standard error \(.11\), \(p < .01\)) and is also displayed as pathway \(a\) in Figure 7.

Steps 2 & 3 for MASC

The association between peer victimization at time 1 with anxiety at time 2, without the mediator, peer attachment was measured. Table 8 lists the results for this correlation with a regression weight of \(.82\) (standard error \(.11\), \(p < .0001\)). This result is displayed in Figure 8 which shows the correlation between peer victimization at time 1 with anxiety scores at time 2. The correlation between previous peer victimization with future anxiety was statistically significant (standard error \(.11\), \(p < .0001\)). The third step was done in order to show a correlation between the mediator, peer attachment at time 1 and anxiety at time 2. These results were demonstrated in Table 8 with regression weight \(-.042\) (standard error \(.047\), \(p = .372\)) and were not statistically significant, thus one step in this mediation model was not supported.
Figure 6. Peer victimization at time 1 predicting depression at time 2. The following abbreviations are used above: Revised Peer Victimization Questionnaire (PVQ), and Children’s Depression Inventory (CDI). *p<.001.

Figure 7. Peer attachment at time 1 as a mediator of the relationship between peer victimization at time 1 and anxiety at time 2. The following abbreviations are used above: Revised Peer Victimization Questionnaire (PVQ), Multidimensional Anxiety Scale for Children (MASC) and Inventory of Parent and Peer Attachment (IPPA). *p<.001.

Figure 8. The correlation between peer victimization at time 1 with anxiety at time 2. The following abbreviations are used above: Revised Peer Victimization Questionnaire (PVQ), and Multidimensional Anxiety Scale for Children (MASC). *p<.001
Table 8.

Correlations of peer victimization and peer attachment at time 1 with anxiety at time 2.

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>Correlations</th>
<th>Zero-order</th>
<th>Partial</th>
<th>Part</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$</td>
<td>$SE$</td>
<td>$B$</td>
<td>t</td>
<td>p.</td>
<td></td>
</tr>
<tr>
<td>1 (Constant)</td>
<td>28.553</td>
<td>1.105</td>
<td>25.8</td>
<td>49</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>PVQ Total Victimization Scale</td>
<td>.815</td>
<td>.114</td>
<td>.295</td>
<td>7.15</td>
<td>.000</td>
<td>.295</td>
</tr>
<tr>
<td>2 (Constant)</td>
<td>32.101</td>
<td>4.120</td>
<td>7.79</td>
<td>1</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>PVQ Total Victimization Scale</td>
<td>.802</td>
<td>.115</td>
<td>.291</td>
<td>6.98</td>
<td>.000</td>
<td>.295</td>
</tr>
<tr>
<td>IPPA Total Scale</td>
<td>-.042</td>
<td>.047</td>
<td>-.037</td>
<td>-.894</td>
<td>.372</td>
<td>-.074</td>
</tr>
</tbody>
</table>

Note. The following abbreviations are used above: Revised Peer Victimization Questionnaire (PVQ), and Inventory of Parent and Peer Attachment.

Step 4

The final step to prove that peer attachment at time 1 mediates the relationship between previous peer victimization and future anxiety was to calculate the mediation effect. The mediation effect, as described previously, is $c-c_1$. In order to support a complete mediation, the result must be zero. Table 7 lists the result for $c$ as .82 and $c_1$ as .80. The mediation effect was calculated as $c-c_1 (.82-.80) = .02$ which is essentially zero and shows a complete mediation. This value did prove the hypothesis that peer attachment mediates the relationship between previous peer victimization and future anxiety as the result showed complete mediation.
This study examined the relationship between depression, anxiety and peer victimization to determine if peer attachment mediated the relationship between anxiety and depression. A large sample of students rated their feelings of depression, anxiety, attachment to their peers and experience being victimized by their peers at two different points in time. The goal was to compare the effect of peer attachment on this model with either anxiety and/or depression as precursors to peer victimization, or peer victimization as precursors to anxiety and depression.

Peer attachment was considered as a single measure despite being comprised of different components: trust, alienation and communication. These sub-scales were not analyzed separately; therefore, when referring to peer attachment subsequently, it is one measure of these combined factors.

As students completed all measures at two different time points, Time 1 and Time 2, the significance between the means was measured. Both CDI and PVQ scores had negative t-test scores demonstrating that the scores on these assessments were higher at Time 2, but only the increase for CDI scores was statistically significant. Adolescents showed increases in depression symptoms over time as the incidence of peer victimization became more prevalent. These findings support previous literature demonstrating associations between increased depression in adolescents who have been victimized in the past (Cappadoica et al., 2013; Crick & Bigbee, 1998).
For the mediation model (Baron & Kenny, 1986), this study focused on binomial correlations between the anxiety, depression and peer victimization with and without the mediator, peer attachment. In order to demonstrate that peer attachment completely mediates this relationship, the model without the mediator would need to show zero effect. Peer attachment would be a partial mediator if, by adding peer attachment to the model, the effect on the pathway was reduced, and a lower correlation was observed.

First, it was anticipated that peer victimization would be associated with higher anxiety and depression scores. This hypothesis was supported for both depression and anxiety. The findings are not surprising when compared to previous literature demonstrating correlations between prior peer victimization with anxiety and depression (La Greca & Harrison, 2005; Prinstein, Boergers & Vernberg, 2001). Adolescents who were victims of peer victimization may have been less likely to complete the measures of anxiety and depression at time 2, thus influencing the results. However, adolescents who are victims of bullying are more likely to avoid school due to anxiety and depression and this may explain why fewer completed the measure at Time 2 (Juvoven, Nishina & Graham, 2000).

The second hypothesis proposed was that bullying history was expected to contribute to lower attachment to peers. This hypothesis was supported by the data. Being victimized by peers contributes linking negative self-schemas and internal working models. If adolescents have negative self image and more internalizing symptoms as a result of victimization, these thoughts may be detrimental to their own peer relationships with close friends as they may not be likely to participate in social activities and may
increasingly isolate themselves over time (La Greca & Lopez, 1998; Ostrov & Godleski, 2013; & Prinstein, Boergers & Vernberg, 2001).

The absence of peer attachment was expected to be correlated with increased anxiety and depression in the future. This hypothesis also was supported by the data. It can be inferred that having strong peer relationships, particularly close friends, may serve as a protective factor against future anxiety and depression symptoms (La Greca & Harrison, 2005).

Lastly, for the first pathway, it was hypothesized that after controlling for peer attachment, peer victimization would not be associated with internalizing symptoms (demonstrated in depression). This hypothesis was supported by the data. This result explains that peer attachment is a complete mediator of this relationship. As the result was essentially zero, it can be inferred that this demonstrated a significant correlation, complete mediation effect. This complete mediation is still significant as it can be interpreted that peer attachment can be one influencing factor in the relationship between peer victimization and depression.

This study also examined a second pathway where peer attachment would mediate the relationship between past incidence of depression and anxiety with future peer victimization. The reasoning behind testing this pathway was to determine if the precursor affected the relationship, especially given the addition of a peer attachment, as a mediator in this study.

It was proposed that a history of anxiety and depression (Time 1) would be associated with future peer victimization (Time 2). This hypothesis strongly supported by the data which is consistent with previous literature (Alloy et al., 2006; Armsden &
Greenberg, 1987). The explanation for this result may be that adolescents who may have either social anxiety or depression could be isolating themselves and not participating in group activities, perpetuating a cycle of being singled out and may lead them more likely to be victimized.

At Time 1 anxiety and depression were expected to be associated with peer attachment. This hypothesis was strongly supported by the data. Both anxiety and depression at Time 1 were significantly correlated with peer attachment at Time 2. This result demonstrates the significance of peer attachment in adolescents who are anxious and depressed as teens with a greater support system may be less likely to be depressed or anxious and vice-versa.

It also was hypothesized that peer attachment would mediate the relationship between previous anxiety, depression and future peer victimization. The data did not demonstrate that peer attachment completely mediated the relationship between prior depression and future peer victimization. However, the data did show a partial correlation which in itself may be significant as it does not completely eliminate the role of peer attachment in this relationship. These results can be interpreted to demonstrate the importance of peer attachment in adolescents who may experience depression. Although it does not completely eliminate being targeted it appears that strong peer attachment may reduce the incidence of peer victimization in these teens possibly by making them less likely to be bullied. Conversely, adolescents with lower quality peer attachments may be more likely to be victimized by their peers. Finally, the reason that peer attachment may not be as influential in this relationship may be related to prior research showing that depression is related to negative feedback seeking behaviors (Borelli & Prinstein, 2006).
These adolescents who are prone to depression may seek out negative feedback as part of a vicious cycle to validate their perceived self-worth.

The relationship between prior anxiety and future peer victimization, with peer attachment as the mediator, demonstrated a complete mediation. This result is significant as peer attachment can be a protective factor, or could increase resiliency in teens who have a history of anxiety. By having close friends, anxious teens have a support system and may be less likely to be victimized by their peers.

Limitations

This study may be limited by missing data. Missing data is always a challenge in longitudinal investigations. As the data was collected at a few different schools over multiple time periods, data was often missing either from one of the two data collection points. Further cases had to be excluded due to incomplete questionnaires. It is unknown whether students who were victims of bullying were equally represented among missing and non-missing cases. Students who are victimized are known to miss more school than their peers, and in extreme cases they may even move schools (Juvoven, Nishina & Graham, 2000). Therefore, this data set may not accurately represent adolescents who were bullied during both time points.

Another analysis could be used to compare correlations between all variables at Time 1 and Time 2 separately to demonstrate the relationships more accurately. The proposed method of analysis may have limited the results by trying to demonstrate predictions over time. Time may have been an important factor in this model as the time points were less than six months apart, depending on the severity of victimization, peer
attachment may or may not have been as influential as it would over a longer period of
time. However, it would be interesting to analyze if peer attachment has more short-term
versus long-term effect.

By using the Baron and Kenny (1986) mediation model, the sample must follow a
normal distribution curve. As the data was demonstrated a slight skew for some of the
questionnaires, it may have limited the statistical analysis. Due to the large sample size, it
was thought that the skew would not have impacted the results. According to Google
Scholar, the Baron and Kenny mediation model is the most cited with over 65,000
citations in 2017, but more researchers argue for the use of other models such as
bootstrapping (Zhao, Lynch & Chen, 2010). More recent literature has criticized the
Baron and Kenny mediation model for having a low power and for avoiding possible
significant assumptions based on indirect effects (Hayes, 2009).

By analyzing the dataset with a bootstrapping method, may have yielded more
statistically accurate results as bootstrapping does not require a normally distributed
sample. Bootstrapping is a statistical analysis where the data is resampled randomly over
a series between 1000 and 5000 times (Hayes, 2009; Preacher & Hayes, 2004). The
benefits of using this model are an increased statistical power of at least .8 (deemed to be
adequate statistical power), the model does not assume normal distribution of the data set
and focuses on analyzing indirect effects (Fritz & MacKinnon, 2007; Hayes, 2009;
Preacher & Hayes, 2004; Zhao, Lynch, & Chen, 2010). Additionally, Fritz and
MacKinnon, determined that in order to have an adequately powered mediation analysis,
the Baron and Kenny model would require a sample size of at least 20,886. The current
study had a significantly smaller dataset of 1,065 participants and may have been best
analyzed by using the bootstrapping model. The researchers also determined that six different models of mediation analysis used less than adequate power of .8 and emphasized that researchers may be unaware or uncomfortable using the bootstrapping model. It would be interesting to compare the results from a mediation model using bootstrapping with the current study in order to determine if the method of statistical analysis changes the interpretation of the data.

Future Research

Future research concerning peer attachment may compare other factors as mediators to determine the most effective preventative methods for either limiting future anxiety and depression in adolescents who were victimized, or reducing future victimization in adolescents with anxiety and depression. Additional studies on this subject may also examine the factors of peer attachment, trust, communication, and alienation and compare these items as separate measures to determine if it’s more significant than analyzing peer attachment as one factor. It would be interesting to see if there were any differences between subscales of the questionnaires used in this study. Instead of examining a wide range of adolescents to determine if peer attachment mediates this relationship, future studies may examine adolescents who have clinical depression or social anxiety and may recruit participants from a clinical setting instead of a general population of students. Other areas of focus can be spent can on the role of peer attachment in a selective group of adolescents who have experienced significant peer victimization (either overt, relational or cyber victimization).
Future research may also examine why the relationship between previous anxiety and future peer victimization was completely mediated by peer attachment, but previous depression and future peer victimization was only partially mediated by peer attachment. Are there other influencing factors that mediate the relationship between a history of depression and future victimization in peers and if so, what are these factors?

This study did not compare types of victimization to determine if peer attachment was more significant as a protective factor for overt, relational or cyber victimization. Future studies may focus on comparing the effect of peer attachment on the different types of victimization. Conversely, it would be interesting to examine peer attachment in the context of teens initiate the victimization of peers and if attachment plays a role, how does it influence teens to victimize their peers.

Additionally, as this study measured outcomes over a four month period, it would be interesting if a longitudinal study were conducted with the same variables over a longer time period such as a year, or even throughout the duration of high school. This type of study would be very difficult obtain a consistent sample of the same students over this length of time, but may yield different results.

As suicidal ideation was excluded as a measured factor due to IRB concerns, it would be interesting to determine if peer attachment is a significant moderator of the relationship between peer victimization, and suicidal ideation, or self-injury. Recent research has examined suicidal ideation, peer victimization and parental emotional abuse. After controlling for past depression and suicidal ideation, researchers discovered that peer victimization and parental emotional abuse was correlated with increased incidence of suicidal ideation (Hamilton, Stange, Abramson & Alloy 2013). A meta-analysis in
non-clinical populations of adolescents showed significant amount of literature correlating victims of bullying with increases in NSSI. The researchers only discussed age as a moderating factor, but it would be interesting to determine if there were other mediators, or moderators of this relationship (Van Geel, Goemans & Vedder, 2015).

It would also be interesting to look more closely at the scales of the MASC questionnaire to determine if peer attachment is more protective over certain types of anxiety (e.g. social anxiety).

General Discussions and Implications

The main proposed reason for this analysis was that to determine if peer attachment is protective or a resilience factor in order to understand what types of interventions would be beneficial to adolescents who are victimized, or in order to prevent victimization in depressed or anxious teens. Peer attachment was demonstrated to be a more significant protective factor with past anxiety than depression in predicting peer victimization. This study demonstrates the significance of peer attachment as a mediator in the relationship between peer victimization, anxiety and depression as peer attachment was an influential mediator, to at least some extent between in all described pathways. Recent research studying life satisfaction showed that peer attachment correlated with life satisfaction over time as opposed to parental attachment (Laghi, et al. 2016). The implications of this study show how positive peer attachments, may be one protective factor against anxiety, depression and peer victimization in adolescents. Heres (2015) studied four different coping mechanisms, one was social support seeking coping. The researcher measured coping strategies, and anxiety and depression symptoms in
adolescents to determine which coping strategy most effectively showed the least amount of depression and anxiety symptoms. Interestingly, the social support seeking coping group scored the second best with reduction of anxiety and depression symptoms which demonstrates the importance of social support as a coping strategy. The implications of this study show the need to focus on coping strategies for victimized adolescents and adolescents with anxiety and depression to help them build strong peer attachments and develop a support system in school.
References


Ma, C.Q., & Huebner, E.S. (2008). Attachment relationships and adolescents’ life
satisfaction: some relationships matter more to girls than boys. Psychology in the Schools, 45 (2), 177-190. doi: 10.1002/pits.20288.


