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Cybervictimization and Depression In adolescence: an analysis of anxiety, Social Media Rumination, and Gender

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ABSTRACT

CYBERVICTIMIZATION AND DEPRESSION IN ADOLESCENCE: AN ANALYSIS OF ANXIETY, SOCIAL MEDIA RUMINATION, AND GENDER

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Northern Illinois University, 2023
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Bullying is not a new phenomenon, however, given the frequent technology use by youth, bullying has taken on a new platform, the internet (i.e., cyberbullying). Those who are victimized online are at risk for various unfortunate outcomes, such as depression. The World Health Organization (WHO) identifies depression as the “single largest contributor to global disability,” and the impacts of depression are vast, affecting the daily lives of many. Among a sample of middle school students ($N = 126$), the current study initially sought to investigate whether symptoms of social anxiety and social media rumination (SMR) serially mediated the association between cybervictimization and depressive symptoms, and whether gender moderated any pathways. However, for reasons described later, an additional (“exploratory”) model was run and presented as well. In the exploratory model, SMR was divided into two variables (SMR – Self measures rumination on one’s own social media and SMR – Other measures rumination about other’s social media). SMR (Self and Other) and anxiety symptoms, respectively, were included in the model as mediators. Results suggested that serial mediation occurred in a model with symptoms social anxiety and SMR as mediators and when females and males were examined

together. Serial mediation also occurred in the exploratory models with SMR – Self and SMR – Other, however, when boys and girls were examined separately in the multigroup models, serial mediation did not occur for either gender. Last, gender did not significantly moderate any pathways in the model including SMR – Self or SMR – Other.

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CYBERVICTIMIZATION AND DEPRESSION IN ADOLESCENCE:
AN ANALYSIS OF ANXIETY, SOCIAL MEDIA
RUMINATION, AND GENDER

BY

LOGAN RIFFLE

A DISSERTATION SUBMITTED TO THE GRADUATE SCHOOL
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
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Doctoral Director:
Michelle L. Demaray, PhD

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CHAPTER 1

OVERVIEW

Cybervictimization is a well-studied issue that impacts a significant number of adolescents around the globe every day, with devastating outcomes among a number of these individuals (Bauman et al., 2013). Researchers have set out to gain more insight into this phenomenon to inform effective prevention and intervention strategies. One adverse internalizing outcome of cybervictimization is depression (Gámez-Guadix et al., 2013; Wright, 2018); however, more work is still needed to determine what specifically accounts for the association between cybervictimization and depression so applied professionals can make strides towards mitigating the unfavorable effects of cybervictimization, potentially preventing internalizing distress.

First, social anxiety has shown to partially account for the association between depression and both cyberbullying (Wang et al., 2019) and cybervictimization (Landoll et al., 2015); that is, social anxiety mediates these associations. Among a sample of high school participants (ages 14-18 years), Landoll and colleagues (2015) found that cybervictimization was in fact negatively associated with social anxiety, but that social anxiety did significantly mediate the association between cybervictimization and depression. This is the only known study to examine the

mediating role of social anxiety in the association between cybervictimization and depression; therefore, more work is needed to determine whether these results generalize to other populations, such as middle school students. Other researchers have evidenced a significant association between social anxiety and depression, such that social anxiety leads to later depression (Bittner et al., 2004; Stein et al., 2001). Ultimately, additional research is necessary to clarify these associations, which is an aim of the current study. Rumination is another internalizing issue that, to a degree, has been shown to explain the association between cybervictimization and depression (Feinstein et al., 2013). Feinstein and colleagues (2013) examined a sample of college-age students and found that cybervictimization was positively associated with both rumination and depression, and that rumination significantly mediated the association between cybervictimization and depression. Furthermore, there is a new, relevant type of rumination that has emerged in the literature, social media rumination (SMR; Parris et al., 2020), that has yet to be explored as a mediator in the association between cybervictimization and depression. This is important to investigate given that cybervictimization often occurs on social media platforms (Abaido 2020).

Taken together, the current study aims to answer the following questions: a) Does social anxiety mediate the association between cybervictimization and depression? b) Does SMR mediate the association between cybervictimization and depression? c) Is the association between cybervictimization and depression serially mediated by social anxiety and SMR, respectively? d) Are these associations different for boys and girls? Importantly, the current study examined *symptoms* of anxiety and depression.

CHAPTER 2

INTRODUCTION

Cybervictimization and Depression

Historically, definitions of cyberbullying have varied (Tokunaga, 2010); therefore, in a review of the cyberbullying literature, Tokunaga (2010) created a definition derived from those created prior: “Cyberbullying is any behavior performed through electronic or digital media by individuals or groups that repeatedly communicates hostile or aggressive messages intended to inflict harm or discomfort on others” (p. 278). Cyberbullying is an increasingly important area of science, as research has suggested that as many as 20-40% of youth are victimized online (Tokunaga, 2010). Although unfortunate, these high prevalence rates are not entirely surprising given that almost all youth in the United States are connected to the internet in some way (Tokunaga, 2010).

One adverse outcome of cybervictimization is depression, and this association has been well documented in extant research, both cross-sectional (Elgar et al., 2014; Niu et al., 2020) and longitudinal (Gámez-Guadix et al., 2013). Some work has investigated underlying mechanisms of the association between cyberbullying victimization and depression (Niu et al., 2020), highlighting important clinical implications. For example, Elgar and colleagues (2014) examined associations between cyberbullying victimization and various internalizing issues, externalizing issues, and substance use among a sample of high school students. Their results revealed that cyberbullying victimization was most predictive of depression when compared to a number of other internalizing and externalizing issues. In this investigation, girls were more likely to report being cybervictimized compared to boys.

Longitudinal research has contributed meaningfully to current understandings of the associations between cybervictimization and depression as well. In a sample of over 800 participants between the ages of 13 and 17, the results of Gámez-Guadix and colleagues (2013) unveiled a bidirectional association between cybervictimization and depression symptoms, such that cybervictimization predicted depression symptoms six months later and depression symptoms predicted cybervictimization over the same time span. This demonstrates a damaging cycle in which those who are victimized online experience an increased likelihood of depression, and depression is then associated with a higher likelihood of being victimized. This study did not examine differences as a function of gender.

Nixon (2014) completed a review of the cyberbullying literature and found that depression was a frequently studied variable alongside cybervictimization. Thirteen out of 34 cross-sectional studies in this review examined both cyberbullying victimization and depression and found significant results, all of which evidenced a positive association. These studies

examined participants primarily in adolescence and some in young adulthood. These researchers also found, when investigating cybervictimization only, that most studies did not find significant gender differences. To make sense of the association between cybervictimization and depression, Diaz and Fite (2019, p. 530) described that those who are victimized perceive a weak connection to social institutions (like school) and, therefore, engage less in normative behaviors associated with those institutions. Moreover, normative behaviors that are associated with social institutions have been shown to promote positive behavior (Hawkins et al., 1986), and prosocial behavior has shown to be negatively associated with depression (Schacter & Margolin, 2018). Taken together, students who are victimized by their peers at school may feel less connected to their school (i.e., social institution), which may discourage normative/positive behavior (like involvement in extracurricular activities, classroom engagement, or the development of new and healthy peer relationships) and put that student at risk for psychopathology, like depression.

Social Anxiety and Rumination

Researchers have turned their attention to examining mediators of the association between cybervictimization and depression, two of which being social anxiety (Landoll et al., 2015) and rumination (Feinstein et al., 2013). First, social anxiety involves a disproportionate fear of negative evaluation of oneself from others (Alden & Taylor, 2010). Those who have studied this variable in this context have found mixed results related to gender differences, such that some have not found significant differences (Jefferies & Ungar, 2020) and others have

(Abbo et al., 2013; Asher et al., 2017). Both Jefferies and Ungar (2020) and Asher and colleagues (2017) examined international data and participants in adolescence and adulthood. Perhaps mixed findings regarding gender could be due to sampling (e.g., cultural, age related) or methodology differences across studies.

In technical terms, rumination is a transdiagnostic pathological process and is described as a pattern of recurrent negative thinking which is prolonged and related to negative emotions and/or unpleasant experiences (Watkins et al., 2008). Researchers have investigated gender and found that girls are more likely than boys to engage in rumination (Butler & Nolen-Hoeksema, 1994; Johnson & Whisman, 2013) and that this difference emerges around age 12 (Jose & Brown, 2008).

Rumination can intensify psychopathology, specifically depression. In a review of the rumination literature, Watkins and Roberts (2020) proposed four ways that rumination can exacerbate psychopathology. First, rumination is suggested to amplify negative mood and thinking (Nolen-Hoeksema et al., 2008), making it an “emotional magnifier” (p. 2; Watkins & Roberts, 2020). Second, rumination impairs an individual’s ability to problem solve effectively (Lyubomirsky et al., 1999). Third, rumination can prevent engagement in certain action-oriented behavior such as pleasant activities that the individual enjoys (Lyubomirsky et al., 1993). Lastly, because rumination negatively impacts executive functioning (Watkins & Brown, 2002), it impairs concentration (Lyubomirsky et al., 2003) and ability to identify changes in context (Watkins et al., 2008).

Either before or after social situations have occurred, those who are socially anxious may negatively and consistently think about those situations—specifically, perceived negative aspects attributed to their self during those situations—facilitating the maintenance of their anxiety. In

fact, early cognitive-behavioral models of social anxiety disorder (SAD) were predicated on this idea (Clark & Wells, 1995; Rapee & Heimberg, 1997). Rapee and Heimberg's (1997) model posited that those with social anxiety have an intense negative view of themselves that initiates "self-focused attention" (p. 892; Brozovich et al., 2014), laying the foundation for ruminative thoughts. Other investigators like Clark and Wells (1995) posited that it is the ambiguity and uncertainty in social situations that lead to rumination.

It is unsurprising, given that social anxiety and rumination are closely related (Brozovich et al., 2014; Jose et al., 2012; Modini et al., 2018), that social anxiety and depression have also been associated in the literature (Hall et al., 2019; Stein et al., 2001), such that social anxiety has been shown to predict later depression (Bittner et al., 2004; Stein et al., 2001). These two types of psychopathologies are among the top three most common disorders in the U.S. (Kessler et al., 2005) and have a strong literature base. Moreover, few researchers have examined the mediating role of social anxiety in the association between cyberbullying involvement and depression (Wang et al., 2019). For example, Wang and colleagues (2019) found that among college students who reported engaging in cyberbullying perpetration, social anxiety had a significant mediating effect on the association between cyberbullying and depression. However, this study only examined cyberbullying perpetration, with cybervictimization remaining yet to be explored.

Social Media Rumination

A new type of rumination, social media rumination (SMR; Parris et al., 2020), has surfaced in the literature. In one report, Lenhart and colleagues (2015) stated that 92% of adolescents use the internet daily, while almost a quarter of those adolescents reported going online “almost constantly” (p. 2). Given the high use of technology (e.g., smartphones) and social media among children and adolescents (Lenhart et al., 2015), it is important to investigate the outcomes of this usage. Research has shown that one harmful effect of social media can be rumination (Parris et al., 2020). Whether individuals are thinking about what they have already posted, what they will post, or what others have posted, these thoughts all fall under SMR.

This type of rumination is a novel area of research, with only one study conducted by Parris and colleagues (2020) investigating this variable. In a sample of 169 high school students, Parris and colleagues (2020) examined SMR (measured by the Social Media Rumination Scale [SMRS]) as a mediator in the association between bullying victimization (both online and in person) and mental distress. They found that SMR did, in fact, significantly mediate the association such that those who were bullied more at school also engaged more in SMR compared to those who were not bullied. This rumination led to more subsequent mental distress. However, when examining cybervictimization, significant results did not emerge. Perhaps this is due to various limitations of the study. For example, to measure bullying, only one indicator was used; the item that was utilized to measure bullying could also be perceived as a more global measure of school climate as opposed to a direct measure of bullying behavior. Lastly, there is a

potential for limited generalizability as the sample in the study was primarily female and African American students in high school.

Ultimately, SMR is a recent area of study and, given this, much has yet to be learned on potential gender differences, developmental differences, and associations with bullying-related behavior. The current study examined SMR and associations with cybervictimization, social anxiety, and depression.

Gender Differences in the Association Between Rumination and Depression

An expanding body of research has suggested that the association between rumination and depression is moderated by gender, particularly in early adolescence (Abela et al., 2012; Jose & Brown, 2008; Krause et al., 2017). For example, Krause and colleagues (2017) examined rumination, depression, and gender in a longitudinal study of over 400 early adolescent children between the ages of 10 and 14. Data from two timepoints, six months apart, were gathered. The study examined developmental differences in bidirectional associations between rumination and depression. Since the onset of gender differences in prevalence of depression are thought to begin in middle adolescence, the authors were particularly interested in differences in the bidirectional associations between rumination and depression during this time. Results suggested that prevalence rates for rumination or depression did not significantly differ between boys and girls. However, rumination did appear to have a stronger effect on prevalence of depression at Timepoint 2, but for girls only. Additional results suggested that a bidirectional relationship

between rumination and depression existed for girls but not boys, at least at this developmental level. In other words, rumination was both a predictor and consequence of depression in girls but was only a consequence of depression for boys. The current study examined gender as a moderator in the association between rumination and depression in hopes to provide clarity to this issue.

Theory

The current study has theoretical foundations in the diathesis-stress model. This model postulates that psychopathology, such as depression, is a culmination of both stressors from the environment as well as individual vulnerabilities (i.e., diatheses). As such, an individual's diatheses, social anxiety and rumination for example, in conjunction with the environmental stressor of cybervictimization (Hymel & Swearer, 2015) was hypothesized in the current study to lead to depression among youth. It is important to note that rumination can be characterized as either state (temporary) or trait (chronic; Watkins et al., 2008). The current study considers SMR as trait rumination, although with the caveat that individuals can ruminate about different things, like about their own social media presence or others'.

Summary

Ultimately, research to date has presented significant associations between cybervictimization, social anxiety, rumination, and depression (Dryman & Heimberg, 2018; Elgar et al., 2014; Hall et al., 2019; Niu et al., 2020; Stein et al., 2001). However, no studies have investigated the mediating effects of social anxiety and rumination (specifically, social media rumination) in the association between cybervictimization and depression. This information could guide intervention strategies for schools among students who are affected by cyberbullying and/or depression. Thus, the current study aimed to investigate these variables with the theoretical foundation of the diathesis-stress model.

Current Study Research Questions and Predictions

The current study aimed to investigate the following research questions: 1) Does social anxiety partially and significantly mediate the association between cybervictimization and depression? 2) Does SMR partially and significantly mediate the association between cybervictimization and depression? 3) Is the association between cybervictimization and depression serially mediated by social anxiety and SMR, respectively? 4) Are the aforementioned associations different for boys and girls?

For Research Question 1, it was hypothesized that social anxiety will partially and

significantly mediate the association between cybervictimization and depression. This hypothesis was informed by prior research which has shown that a significant and negative association exists between cybervictimization and depression (Elgar et al., 2014; Gámez-Guadix et al., 2013; Niu et al., 2020). For Research Question 2, it was predicted that SMR would partially and significantly mediate the association between cybervictimization and depression, a hypothesis that was informed by research on rumination, cybervictimization, and depression (Dryman & Heimberg, 2018; Elgar et al., 2014; Hall et al., 2019; Niu et al., 2020; Stein et al., 2001). However, researchers have yet to investigate these associations with social media rumination.

Next, for Research Question 3, it was hypothesized that the association between cybervictimization and depression would be significantly serially mediated by social anxiety and SMR, respectively. No prior research, to the author's knowledge, has examined the serial mediating role of both social anxiety and SMR in the association between cybervictimization and depression. However, some research has found that anxiety (Landoll et al., 2015) and rumination (Feinstein et al., 2013), separately, mediate this association. Feinstein and colleagues (2013) also found that rumination mediated this association for females but not males. These results informed the last hypothesis for the current study. However, Feinstein examined a sample of adults, whereas the current study investigated these associations among adolescents. Thus, it was predicted for Research Question 4 that gender would moderate the association between SMR and depression.

CHAPTER 3

METHODOLOGY

Participants

The participants for the current study were middle school students between the ages of 10 and 13 years, residing in rural Ohio. Approximately 57% of the sample identified as male and 42% identified as female; 27% of participants were in the fifth grade, 24% were in sixth grade, and 50% were in seventh grade. The entire middle school consisted of approximately 400 students across grades. The largest proportion of students were 13 years old (41%), followed by 12 years (25%), 11 years (19%), and 10 years (13%). Furthermore, the majority of students identified as White (77%), followed by two or more races (9%), African American (5%), Asian American (3%), American Indian/Alaskan Native (3%), Hispanic/Latinx (.6%), and Native Hawaiian/Other Pacific Islander (.3%).

There were important exclusionary criteria that should be noted. First, no data were gathered from eighth-grade participants during the first wave of collection. However, data were obtained from these individuals at wave two. Because no data had been gathered at wave one, these participants were omitted from the second wave of data collection. Next, 62 students indicated that they did not have any social media accounts. Because SMR is a mediator in the

study design, any student who indicated that they did not use social media was omitted from the study. Last, nine participants indicated that they were non-binary and 14 indicated that they would “prefer not to say.” Because there were not enough individuals to achieve statistical significance in the analyses, these additional 23 participants were also omitted given gender was a main variable of interest.

Procedure

After IRB approval was obtained and passive parental consent and student assent were gained, the students completed a Qualtrics survey with questions from the measures below. Timepoint 1 data were collected on October 11th, 2021, and Timepoint 2 data were collected on March 1st, 2022. Cybervictimization and social anxiety data were gathered at Timepoint 1, whereas SMR and depression data were gathered at Timepoint 2. Also, important to note is that I was awarded the Dissertation Grant Award funded by the Society for the Study of School Psychology (SSSP). A total of \$3,354.00 was awarded, which was utilized to 1) provide two Amazon \$25.00 gift cards to each middle school teacher (one for each timepoint) and 2) to purchase the Children’s Depression Inventory, Second Edition (CDI 2).

Importantly, due to an error in the Qualtrics survey, some questionnaires were omitted randomly across participants. This means that the data from students who were not asked to complete the CDI 2 at Timepoint 2 had to be omitted, resulting in the loss of data.

Measures

Descriptive Data

A number of questions related to social media use were included within the Qualtrics survey administered to all participants. These questions asked about how many different accounts participants have across platforms, which social media accounts they have, and approximately how many hours per day they are on social media. There were four questions in total.

Depression

In order to measure depression, the authors utilized the Children's Depression Inventory, Second Edition (CDI 2). Specifically, the Children's Depression Inventory 2 Self-Report Short Version (CDI 2: SR(S); Kovacs, 2014) was used, which is a self-report measure that assesses the extent to which participants experience depression symptoms. Participants were asked to complete 10 items that contain three statements each and were then

instructed to select the statement that describes best how they felt within the past two weeks. For example, participants were presented with the following statements: “I am sad once in a while,” “I am sad many times,” and “I am sad all the time,” and then were asked to select one statement. For scoring, the first statement is given a score of 0, the second statement a score of 1, and the third statement a score of 2. Six items were reversed scored (Items 2, 6, 7, 8, 9, 11). The items were then totaled for a total frequency score of depression ranging from 0 to 24.

Sound psychometric properties have been evidenced in more than one study (Masip et al., 2010; Tobin & Mulderink, 2014). For example, in a sample of children ages 7 to 17 in 28 states in the United States, reliability and validity of the CDI 2: SR(S) was investigated (Tobin & Mulderink, 2014). Effect sizes (Cohen’s *d*) between children with major depression and children without major depression were between 0.39 and 2.09 on all items of the short version of the CDI 2: SR. Additionally, a Pearson correlation between the long and short versions of the CDI 2:SR was .95 ($p < .001$), indicating high construct similarity. Internal consistencies for the CDI 2:SR(S) range from .77 to .85 (Tobin & Mulderink, 2014). Test-retest analyses (two to four weeks) have indicated strong stability over time (with reliability coefficients ranging from .76 to .92; Tobin & Mulderink, 2014). Discriminant function analyses indicated that classifying cases of major depressive disorder (MDD) versus the matched control, correct classification total score was accurate for 80.8% for the short form, and when classifying those with MDD and other diagnoses (ADHD, ODD, GAD), the overall correct classification total score was 70.3% for the short form (Tobin & Mulderink, 2014).

Cybervictimization

In order to assess cybervictimization in the current study, the Cyber Victimization Survey (CVS; Brown et al., 2014) was utilized. The CVS is a 15-item measure in which respondents are asked about the frequency with which they were the victim of various online incidents within the last two to three months. All items are answered on a 5-point scale (1 = *it hasn't happened at all in the past couple of months*, 2 = *only 1 or 2 times in the past couple of months*, 3 = *2 or 3 times a month*, 4 = *about once a week*, and 5 = *several times a week*). Example items include: "...has something been written about you or posted online that made you feel upset;" "...have you been physically threatened online/electronically;" and "...have you been denied access to a peer's webpage?"

Brown et al. (2014) published evidence of validity and reliability using a sample ($N = 106$) of students in middle school. Correlations were conducted between the CVS and the Cyberbullying and Online Aggression Survey Instrument (Hinduja & Patchin, 2008) as well as the Cyberbullying and Online Aggression Survey, created by Kowalski and Limber (2007). These correlations, respectively, were .59 and .52 ($p < .01$). Moreover, Brown and colleagues (2014) found that the CVS was positively correlated with the Cyberbullying and Online Aggression Survey Instrument, providing additional evidence of construct validity. The same study found that internal consistency for the CVS was .94. Next, a factor analysis, also completed by Brown et al. (2014), indicated that a single factor explained 52% of the variance. On the single factor, item loadings ranged from .62 to .81, with the coefficient alpha emerging at .92.

Social Anxiety

To measure social anxiety, the social anxiety scale from the Screen for Child Anxiety-Related Disorders (SCARED; Birmaher et al., 1997) was utilized. This self-report measure consists of eight items and respondents are asked to indicate their answers on a 3-point scale (0 = *Not True or Hardly Ever True*, 1 = *Somewhat True or Sometimes True*, 2 = *Very True or Often True*). Further, respondents are asked to report how they felt in the last three months.

The SCARED is a widely used measure, and research has shown that it has sound psychometric properties (Birmaher et al., 1997). The developers originally created a scale with 85 items but it was then reduced to 38 items. Regarding internal consistency, alpha values of .96 and .93 emerged for the original scale and the final (reduced) one, respectively. The scale also yielded a five-factor structure, the factors being somatic/panic, generalized anxiety, separation anxiety, social phobia, and school phobia. Although users can be provided a total anxiety score, scores can also be obtained for each of these factors as well. Test-retest reliability was also investigated; the ICC for the total score was .86 and between .70 and .90 for the individual factors. The SCARED also had good discriminant validity, between those with anxiety and other disorders as well as among anxiety disorders, also evidenced in Birmaher and colleagues (1997).

In the current study, the SCARED was administered in its entirety; however, only the social anxiety subscale was included in the initial model, while the total score was utilized in the exploratory model.

Social Media Rumination

I used the Social Media Rumination Scale (SMRS; Parris et al., 2020) in order to assess SMR in the current sample. This scale was created by Parris and colleagues (2020) and includes 12 items. Some examples from the SMRS are: “I worry about how people will react to my social media posts,” “I can’t stop thinking about what somebody posted on social media,” and “I am worried that I won’t look attractive in my social media posts.” Respondents are requested to respond on a 4-point scale (1 = *Almost Never*, 2 = *Sometimes*, 3 = *Often*, 4 = *Almost Always*). Parris et al. (2020) reported some psychometric data for the SMRS. They described that although two factors emerged when they ran an EFA, after cross loadings and poorly loading items were accounted for, the one-factor model provided the best fit with their sample. Their final measure, as stated above, consisted of 12 items and provided an alpha value of .86, falling within an adequate range.

Because this is a new measure, a confirmatory factor analysis (CFA) was completed as part of a separate project (Riffle et al., under review). This CFA suggested poor fit, and therefore more in-depth analyses took place, including an exploratory factor analysis (EFA). Riffle and colleagues found that two factors suggested the best fit, with loadings ranging from 0.56 to 0.96. The final measure contained seven items, with four loading onto one factor (items relating to rumination about one’s *own* social media) and three items on the other (items relating to rumination about *others* social media). Alpha value for factor one (SMR – Self) was 0.85 and 0.80 for Factor 2 (SMR – Other). Thus, some proposed analyses utilized the total rumination score, and additional exploratory analyses investigated the two newly found factors.

Data Analyses

The statistical software that was utilized in the current study included SPSS and R Studio. First, SPSS was used to screen the data, examine descriptive information, and calculate means and standard deviations for all study variables. Internal consistencies for all the measures utilized were calculated. The *lavaan* package in R Studio was utilized to run the mediation (Research Questions 1-3) and the moderated mediation (Research Question 4) analyses in order to answer the research questions for the current study (see below). Cybervictimization was the independent variable, Depression the dependent variable, Social Anxiety as Mediator 1, Social Media Rumination as Mediator 2, and Gender as a moderator. For Research Questions 1-3, the paths are labeled for clarity in Figure 1.

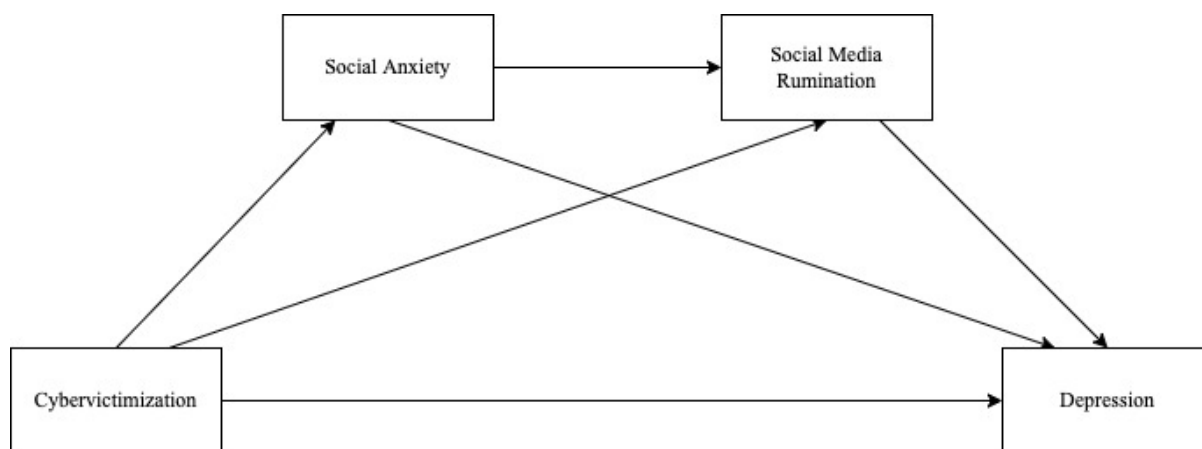


Figure 1. Conceptual serial mediation model (initial).

To examine the research questions in the current study, single group serial mediation analyses were run as well as multigroup serial mediation analyses across gender (Hayes, 2022). To complete these analyses, full-information maximum likelihood was utilized in *R* (R Core Team, 2021) with the *lavaan* package (Rosseel, 2012). Bias-corrected bootstrapping confidence intervals were utilized to examine the degree to which SMR and anxiety mediated the association between cybervictimization and depression for boys and girls. Furthermore, bootstrapped likelihood ratio tests were run in order to examine the serial indirect effects of cybervictimization on depression through SMR and anxiety using the Bollen-Stine transformation (Bollen & Stine, 1992).

CHAPTER 4

RESULTS

Social Media Usage

Descriptive information on social media use was gathered from participants, as indicated previously. All participants were asked, “Do you have social media accounts that you use regularly (e.g., Facebook, Instagram, Twitter, Snapchat, etc.)?” One hundred twenty-six students answered “Yes” to this item. Next, only those who answered “Yes” to this question were asked the following questions: 1) How many different accounts do you have across platforms? 2) Indicate all social media accounts you have below. 3) Approximately how many hours per day do you think you are on your social media? See responses to these items in Tables 1 through 3. Most participants indicated that they had four or more social media accounts (Table 1); the three most endorsed platforms were WhatsApp, TikTok, and Snapchat (Table 2 and Table 4), and over one-third of the sample (39%) stated that they spend more than 4 hours per day on social media (Table 3)

Table 1

Number of Social Media Accounts

# of Accounts	Frequency	Percent
1 Account	25	20%
2 Accounts	27	21%
3 Accounts	15	12%
4 or More Accounts	55	44%

Table 2

Social Media Platforms Utilized

Platforms	Frequency	Percent
Facebook	54	43%
Instagram	70	56%
Twitter	31	25%
Snapchat	99	79%
TikTok	105	83%
YouTube	42	33%
Pinterest	8	6%
WhatsApp	113	90%
Reddit	18	14%
Other(s) not listed here	38	30%

Table 3

Hours Per Day on Social Media

Platforms	Frequency	Percent
0 hours	2	2%
Less than 1 hour per day	12	10%
1 to 2 hours per day	34	27%
3 to 4 hours per day	29	23%
More than 4 hours per day	49	39%

Table 4
Social Media Use Breakdown by Gender

Platforms	Frequency / Percent	Frequency / Percent
	Boys	Girls
Facebook	32 / 44%	22 / 41%
Instagram	37 / 51%	37 / 67%
Twitter	17 / 24%	12 / 22%
Snapchat	52 / 72%	45 / 83%
TikTok	58 / 81%	46 / 85%
YouTube	8 / 11%	34 / 63%
Pinterest	2 / 3%	6 / 11%
WhatsApp	67 / 93%	46 / 85%
Reddit	16 / 22%	2 / 4%
Others	26 / 36%	14 / 26%

Note. Percentages are relative to the corresponding sex; for example, 44% of boys endorsed having a Facebook account, not 44% of the total sample, Bolded platforms indicate top three used by participants.

Scoring and Missing Data

All surveys were administered to students online via Qualtrics prior to being downloaded to SPSS and R Studio. To account for item-level missing data, participant item-level means were created for each participant for each measure. For participants who had missing data, if at least 80% of the items were completed for that measure, mean scores were calculated. However, if a participant did not answer at least 80% of the items for that subscale, no mean score was created. See Table 5 for a breakdown of missing data.

Table 5
Missing Data

Measure	# Participants Missing	Percent
Cybervictimization	7	6
Anxiety	5	4
SMR – Self	5	4
SMR – Other	3	2
Depression	43	35

There were two models tested in the current study: the initial model which was proposed and an exploratory model. Rationale for running the exploratory model is presented after results for the initial model. Preliminary analyses were run for data relevant to both models.

Preliminary Analyses

Means and standard deviations of all variables (Cybervictimization, Social Media Rumination [Self, Other], Anxiety, and Depression) for the total sample by Gender (Table 6) as well as by Grade (Table 7) were examined. Alpha values were examined to determine internal consistencies for all measures. First, the CVS had an alpha value of .920, The SCARED Social Anxiety scale an alpha of .873, and the SCARED Total scale a value of .953. The SMRS Total yielded an alpha value of .916 while the Self and Other scales yielded values of .852 and .800, respectively. Last, the CDI showed an alpha value of .900. Furthermore, to determine

associations among all variables, Pearson correlation analyses were calculated. See Table 8 for correlations for the total sample and Table 9 for correlations by gender.

Table 6

Means and Standard Deviations of All Study Variables by Gender

		<i>N</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Cybervictimization	Boys	69	1.32	0.53	1.00	3.29
	Girls	50	1.68	0.71	1.00	3.59
	Total	119	1.48	0.63	1.00	3.59
SMR – Total	Boys	69	1.32	0.53	1.00	3.29
	Girls	50	1.76	0.68	1.00	3.75
	Total	121	1.50	0.63	1.00	3.75
SMR – Self	Boys	69	1.34	0.66	1.00	4.00
	Girls	50	1.79	0.79	1.00	4.00
	Total	121	1.54	0.74	1.00	4.00
SMR – Other	Boys	69	1.29	0.53	1.00	4.00
	Girls	52	1.97	0.94	1.00	4.00
	Total	121	1.58	0.80	1.00	4.00
Anxiety	Boys	70	0.34	0.34	1.00	2.31
	Girls	53	1.78	0.40	1.18	2.64
	Total	123	1.57	0.42	1.00	2.64
Social Anxiety	Boys	70	1.51	0.49	1.00	3.00
	Girls	53	2.02	0.57	1.00	3.00
	Total	123	1.73	0.58	1.00	3.00
Depression	Boys	43	1.32	0.33	1.00	2.25
	Girls	40	1.75	0.51	1.00	2.75
	Total	83	1.53	0.48	1.00	2.75

Note. The minimum score for the CVS (cybervictimization) is 1 and the maximum is 5; the minimum score for the SMRS (SMR) is 1 and maximum is 4; the minimum score for the SCARED (anxiety) is 1 and the maximum is 3; the minimum score for the CDI is 1 and the maximum is 3.

Table 7

Means and Standard Deviations of All Study Variables by Grade

		<i>N</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Cybervictimization						
	Grade 5	32	1.80	0.78	1.00	3.53
	Grade 6	29	1.35	0.49	1.00	3.06
	Grade 7	60	1.38	0.57	1.00	3.59
SMR – Total						
	Grade 5	32	1.77	0.75	1.00	3.50
	Grade 6	30	1.29	0.34	1.00	2.33
	Grade 7	61	1.48	0.65	1.00	3.75
SMR – Self						
	Grade 5	32	1.88	1.00	1.00	4.00
	Grade 6	30	1.36	0.41	1.00	2.50
	Grade 7	61	1.45	0.66	1.00	3.75
SMR – Other						
	Grade 5	32	1.83	0.91	1.00	4.00
	Grade 6	30	1.32	0.48	1.00	3.00
	Grade 7	61	1.60	0.85	1.00	4.00
Anxiety						
	Grade 5	32	1.78	0.40	1.15	2.64
	Grade 6	30	1.51	0.38	1.00	2.36
	Grade 7	63	1.51	0.44	1.00	2.64
Anxiety						
	Grade 5	32	1.78	0.40	1.15	2.64
	Grade 6	30	1.51	0.38	1.00	2.36
	Grade 7	63	1.51	0.44	1.00	2.64
Social Anxiety						
	Grade 5	32	1.88	0.55	1.00	2.86
	Grade 6	30	1.72	0.54	1.00	3.00
	Grade 7	63	1.68	0.62	1.00	3.00
Depression						
	Grade 5	22	1.74	0.54	1.08	2.75
	Grade 6	30	1.50	0.48	1.00	2.67
	Grade 7	40	1.43	0.41	1.00	2.33

Note. The minimum score for the CVS (cybervictimization) is 1 and the maximum is 5; the minimum score for the SMRS (SMR) is 1 and maximum is 4; the minimum score for the SCARED (anxiety) is 1 and the maximum is 3; the minimum score for the CDI is 1 and the maximum is 3.

Table 8*Intercorrelations Including All Study Variables for Total Sample*

	1	2	3	4	5	6	7
1. Cybervictimization	--	.678**	.618**	.621**	.573**	.398**	.442**
2. SMR – Total		--	.902**	.844**	.628**	.428**	.515**
3. SMR - Self			--	.613**	.505**	.334**	.422**
4. SMR - Other				--	.666**	.485**	.545**
5. Anxiety					--	.817**	.655**
6. Social Anxiety						--	.489**
7. Depression							--

** $p < .01$

Note. SMR = Social Media Rumination

Table 9*Intercorrelations Including All Study Variables by Gender*

	1	2	3	4	5	6	7
1. Cybervictimization	--	.554**	.474**	.483**	.471**	.210	.303
2. SMR - Total	.758**	--	.861**	.802**	.454**	.203	.427**
3. SMR - Self	.711**	.934**	--	.458**	.271	.070	.336*
4. SMR - Other	.749**	.868**	.760**	--	.570**	.355**	.460**
5. Anxiety	.585**	.676**	.606**	.632**	--	.763**	.446**
6. Social Anxiety	.441**	.464**	.419**	.413**	.774**	--	.221
7. Depression	.453**	.428**	.354*	.362*	.688**	.547**	--

** $p < .01$

Note. SMR = Social Media Rumination

Gender and Grade Level Differences

Gender and grade differences were investigated by running a series of analyses of variance (ANOVAs) with Depression, SMR – Total, Social Anxiety, and Cybervictimization (see Table 10 below). There were significant main effects of gender on each of these study variables. First, more Cybervictimization was reported among girls ($M = 1.68, SD = 0.71$) than boys ($M = 1.32, SD = 0.53$). Girls also reported more Social Media Rumination (Total; $M = 1.76, SD = 0.68$) than boys ($M = 1.32, SD = 0.53$), more Social Anxiety ($M = 2.02, SD = 0.57$) than boys ($M = 1.51, SD = 0.49$), more Total Anxiety ($M = 1.78, SD = 0.40$) than boys ($M = 0.34, SD = 0.34$), and Depression ($M = 1.75, SD = 0.51$) than boys ($M = 1.32, SD = 0.33$).

There were also significant grade differences for each of the variables except for Social Anxiety and Depression. Fifth graders reported the highest levels of Cybervictimization ($M = 1.80, SD = 0.78$), Social Media Rumination (Total; $M = 1.77, SD = 0.75$), and Total Anxiety ($M = 1.78, SD = 0.40$). Additional analyses (post hoc Scheffé) showed that fifth graders reported significantly more Cybervictimization than both sixth ($M = 1.35, SD = 0.49$) and seventh graders ($M = 1.80, SD = 0.78$). Regarding reports of Social Media Rumination - Total, significant differences emerged between fifth and sixth graders ($p = .010$) only, with fifth graders reporting more Social Media Rumination – Total ($M = 1.77, SD = 0.75$) than seventh graders ($M = 1.48, SD = 0.65$). Furthermore, fifth graders ($M = 1.78, SD = 0.40$) reported significantly more Total Anxiety compared to both sixth ($M = 1.51, SD = .0.38$) and seventh graders ($M = 1.51, SD = 0.44$). Lastly, fifth graders reported significantly more Depression ($M = 1.74, SD = 0.54$)

compared to seventh graders ($M = 1.43$, $SD = 0.41$). No significant Gender by Grade interactions emerged (Wilks' lambda = .824, $F(10, 132) = 1.35$, $p = .213$).

Table 10

Analysis of Variance (ANOVA)

Source	Variable	Sum of Squares	<i>F</i>	df	<i>p</i>
Gender					
	Cybervictimization	47.31	9.65	118	.002
	SMR – Total	48.29	17.14	120	< .001
	Social Anxiety	41.55	27.80	122	< .001
	Total Anxiety	22.02	41.20	122	< .001
	Depression	18.57	21.13	82	< .001
Grade					
	Cybervictimization	47.31	6.41	118	.002
	SMR – Total	48.29	4.96	120	.009
	Social Anxiety	41.55	1.40	122	.250
	Total Anxiety	22.02	5.88	122	.004
	Depression	18.57	3.09	82	.051

Note. Note. SMR = Social Media Rumination; Cybervictimization, SMR - Total and Social Anxiety from Timepoint 1; Depression from Timepoint 2.

Next, multivariate analyses of variance (MANOVAs) were conducted on Social Media Rumination – Self (SMR – Self) and Social Media Rumination – Other (SMR – Other) to investigate gender and grade differences (Table 11). Results showed significant gender differences (Wilks' lambda = .050, $F(3, 116) = 740$, $p < .001$), with girls reporting more SMR–Self ($M = 1.79$, $SD = 0.79$) and SMR–Other ($M = 1.97$, $SD = 0.94$) than boys ($M = 1.34$, $SD =$

0.66 for SMR – Self, and $M = 1.29$, $SD = 0.53$ for SMR – Other). Furthermore, results suggested that there were significant grade differences, Wilks' lambda = .847, $F(6, 230) = 3.32$, $p = .004$. Those in fifth grade reported the highest levels of both SMR– Self and SMR– Other. More specifically, fifth graders ($M = 1.88$, $SD = 1.00$) reported significantly more SMR – Other when compared to both sixth graders ($M = 1.36$, $SD = 0.41$) and seventh graders ($M = 1.45$, $SD = 0.66$). Regarding SMR – Other, the only statistically significant differences emerged between fifth and seventh graders, with fifth graders ($M = 1.83$, $SD = 0.91$) reporting more SMR – Other than seventh graders ($M = 1.60$, $SD = 0.85$). No significant Gender by Grade interactions emerged (Wilks' lambda = .957, $F(4, 228) = 1.23$, $p = .281$).

Table 11

Multivariate Analysis of Variance (MANOVA)

Source	Variable	Sum of Squares	<i>F</i>	df	<i>p</i>
Gender					
	SMR – Self	5.50	10.66	1	.001
	SMR – Other	13.19	24.28	1	<.001
Grade					
	SMR – Self	5.57	5.36	2	.006
	SMR – Other	4.42	3.55	2	.032

Note. SMR = Social Media Rumination; Cybervictimization, SMR - Total and Social Anxiety from Timepoint 1; Depression from Timepoint 2.

Initial Model Results

Single Group Serial Mediation Model

In the single group mediation model with Social Anxiety and Social Media Rumination (SMR, both Self and Other), statistically significant mediation did occur. First, Social Anxiety mediated the association between Cybervictimization and Depression ($\beta = .04$), SMR mediated the association between Cybervictimization and Depression ($\beta = .15$), and last, significant serial mediation occurred when both Social Anxiety and SMR were included in the model. All effects were in the hypothesized direction (Figure 2 and Table 12). Furthermore, the R-square for the model was .37, meaning 37% of the variability in Depression is explained by the regression model.

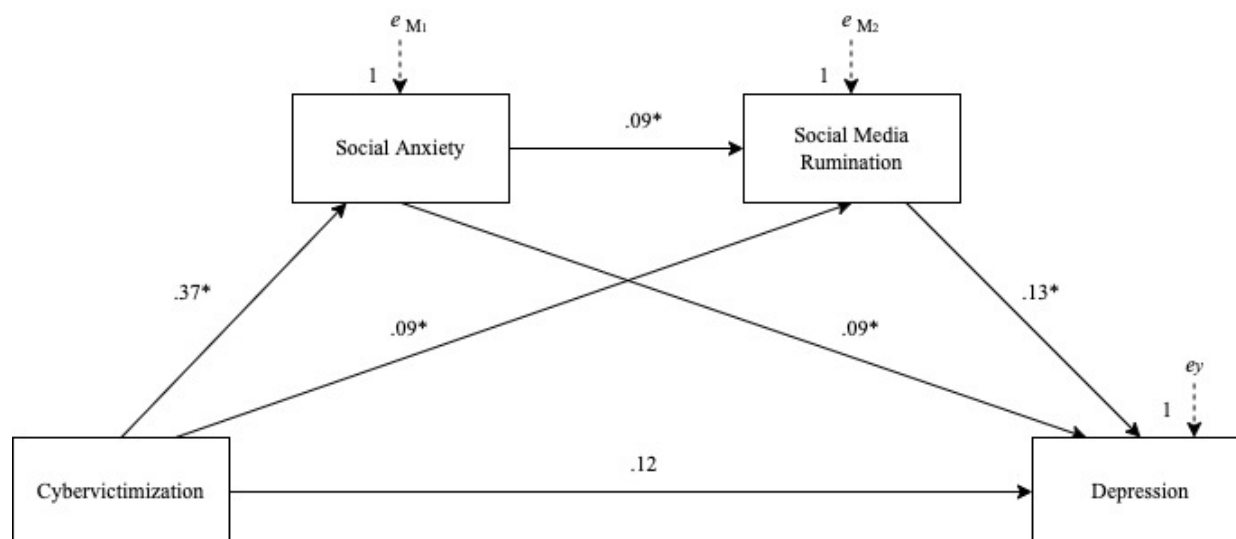


Figure 2. Statistical single group serial mediation model (initial model).

Table 12

Serial Multiple Mediation Indirect Effects of the Association Between Cybervictimization and Depression Through Social Anxiety and Social Media Rumination (Initial Model)

Model	Serial Multiple Mediation	Social Anxiety	Social Media Rumination
1. Single Group	.01*	.04*	.15*
2. Multigroup			
Females	.00	.02	.15*
Males	.00	.15*	.05
Differences	.00	-.13	.10

Note. All coefficients are unstandardized. Differences across gender in indirect effects were computed by subtracting the indirect effects for females from the indirect effects for males.

* = $p < .05$

Multigroup Serial Mediation Model

In the multigroup serial mediation model where gender was separated, no statistically significant serial mediation occurred for either boys or girls. However, Social Anxiety significantly mediated the association between Cybervictimization and Depression ($\beta = .15$) for boys only, while SMR mediated the same path for girls only ($\beta = .15$). These effects were in the expected direction (see Table 12).

Rationale for Exploratory Model

There were a few changes made to the initial model. First, for exploratory purposes, the order of the mediators was switched. In the initial model Anxiety was the first mediator and Social Media Rumination the second, but for this exploratory model Social Media Rumination was changed to the first mediator and Anxiety the second. The initial model was arranged in a way that was informed by theory, namely, the diathesis-stress model. As stated above, this theory posits that diatheses as well as environmental stressors lead to psychopathology. Related to the current study, cybervictimization (i.e., environmental stressors) in conjunction with anxiety and rumination about social media (e.g., diatheses) lead to depression. Both mediators were from Timepoint 1.

The second change in the model was regarding type of anxiety assessed. In the initial model, only social anxiety was assessed, and this was informed by previous literature (Landoll et al., 2015). However, for the exploratory model, a more comprehensive indicator, *total* anxiety, was utilized. This variable includes panic/somatic, separation anxiety, generalized anxiety, and school phobia.

Last, for another project (Riffle et al., under review), a confirmatory factor analysis (CFA) was completed on the Social Media Rumination Scale (SMRS). An acceptable fit did not emerge for a one-factor model; therefore, an exploratory factor analysis (EFA) was conducted which suggested a two-factor model. The authors identified two patterns across the two separate factors, one being rumination about *others'* social media posts and the other factor being rumination about one's *own* social media posts (i.e., self). The current study examined these factors separately. Items included in Factor 1 (SMR – Self) included: 1) I worry about what my social media posts say about who I am, 2) I spend several minutes deciding what to post on social media, 3) I worry about how people will react to my social media posts, and 4) My self-esteem can depend on how many likes my posts get. Items included in Factor 2 (SMR – Other) included: 1) I feel jealous about other peoples' posts on social media, 2) I can't stop thinking about what somebody posted on social media, and 3) Seeing what others post on social media makes me self-conscious.

Given that these changes were made after the proposal of the initial model, both models are presented. The initial model includes Social Anxiety as the first mediator and SMR (-Self and Other) as the second mediator (Figure 3). The exploratory model examined SMR (both self and other) as the first mediator and total anxiety as the second (Figure 4).

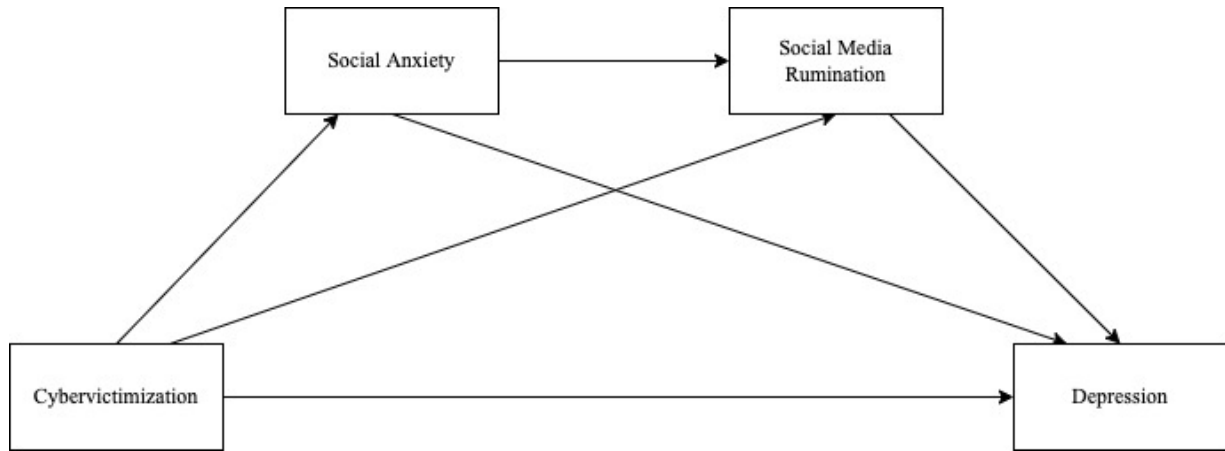


Figure 3. Conceptual serial mediation model (initial).

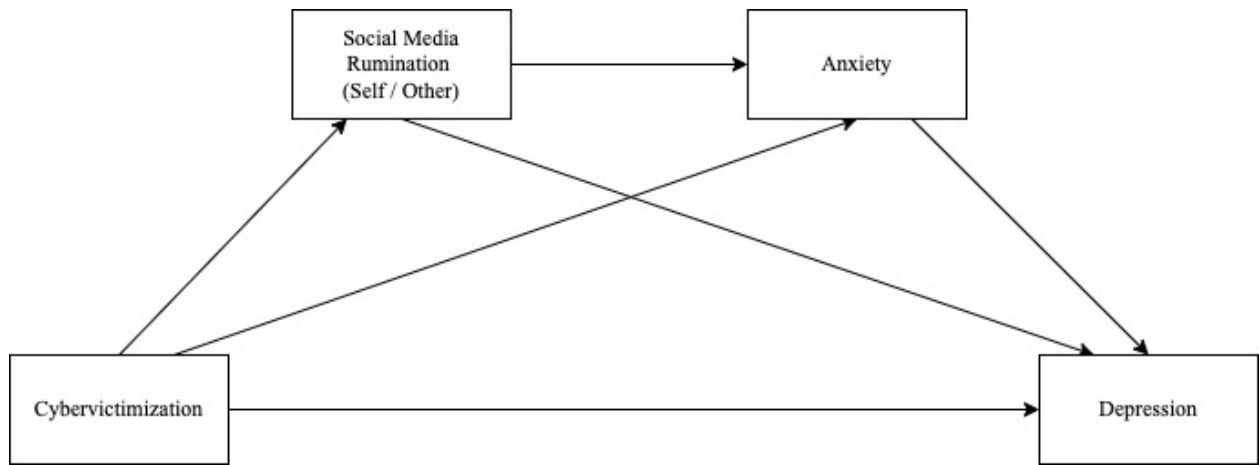


Figure 4. Conceptual serial mediation model (exploratory model).

Main Analyses – Exploratory Model

Single Group Serial Mediation Models

Tables 13 and 14 include the indirect effects for the association between Cybervictimization and Depression through SMR-Self and Other, respectively, and Anxiety for the whole sample. Separate models were run, one with SMR - Other and the other model SMR - Self. In the model that includes SMR - Self, Anxiety mediated the association between Cybervictimization and Depression ($\beta = .19$). Serial mediation occurred where both Anxiety and SMR mediated the same association in the model including SMR – Self ($\beta = .07$) as well as the model including SMR – Other ($\beta = .14$). However, SMR – Self or SMR – Other did not mediate this association alone ($\beta = .04$ and $\beta = .07$). Except for two indirect effects, all effects were in the expected direction for both models. The two direct effects that emerged in the unexpected directions were the indirect effect of Cybervictimization on Depression through SMR for both SMR - Self ($\beta = -.10$) and SMR - Other ($\beta = -.19$). See Figures 5 and 6. The R-square for the model including SMR-Other was .42, while the R-square was .43 for the model containing SMR-Self. Said another way, 42% and 43% of the variability in Depression is explained by the regression models including SMR-Other and SMR-Self, respectively.

Table 13

Serial Multiple Mediation Indirect Effects of the Association Between Cybervictimization and Depression Through Social Media Rumination (Self) and Anxiety

Model	Serial Multiple Mediation	Anxiety	Social Media Rumination (Self)
1. Single Group	.07*	.19*	.04
2. Multigroup			
Females	.00	.13*	.07
Males	.14*	.15	-.10
Differences	-.14	-.02	.17

Note. All coefficients are unstandardized. Differences across gender in indirect effects were computed by subtracting the indirect effects for females from the indirect effects for males.

* = $p < .05$

Table 14

Serial Multiple Mediation Indirect Effects of the Association Between Cybervictimization and Depression Through Social Media Rumination (Other) and Anxiety

Model	Serial Multiple Mediation	Anxiety	Social Media Rumination (Other)
1. Single Group	.14*	.11*	.07
2. Multigroup			
Females	.04	.05	.09
Males	.19*	.15	-.19
Differences	-.15	-.10	.28

Note. All coefficients are unstandardized. Differences across gender in indirect effects were computed by subtracting the indirect effects for females from the indirect effects for males.

* = $p < .05$

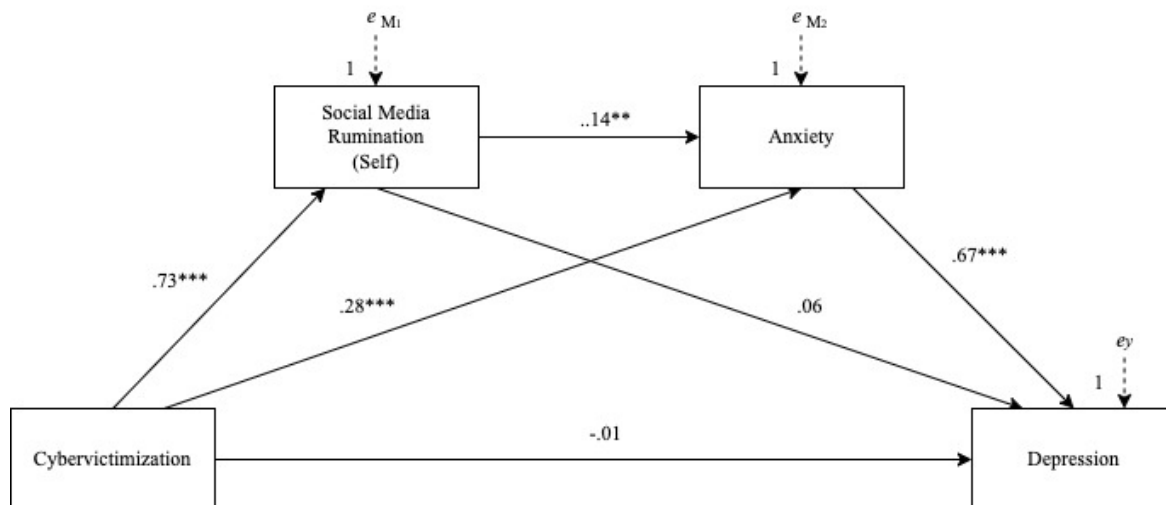


Figure 5. Statistical Single Group Serial Mediation Model with SMR – Self.

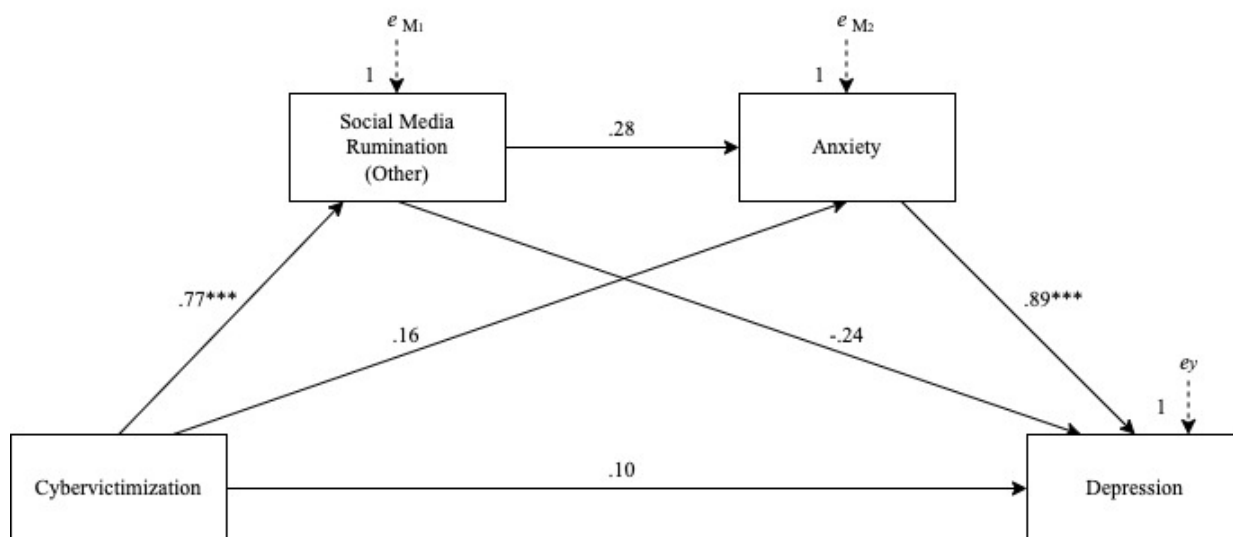


Figure 6. Statistical Single Group Serial Mediation Model with SMR – Other.

Multigroup Serial Mediation Model

Results showed that serial multiple mediation occurred for males, but not females. This was true for both models including SMR - Self ($\beta = .14$) and SMR - Other ($\beta = .19$). Regarding simple indirect effects, results showed that Anxiety significantly mediated the association between Cybervictimization and Depression for girls only ($\beta = .13$). This was the only significant simple indirect effect that emerged in the results. The indirect effects for both Anxiety and SMR differed significantly between boys and girls within the model that included SMR – Other (Figures 7 and 8).

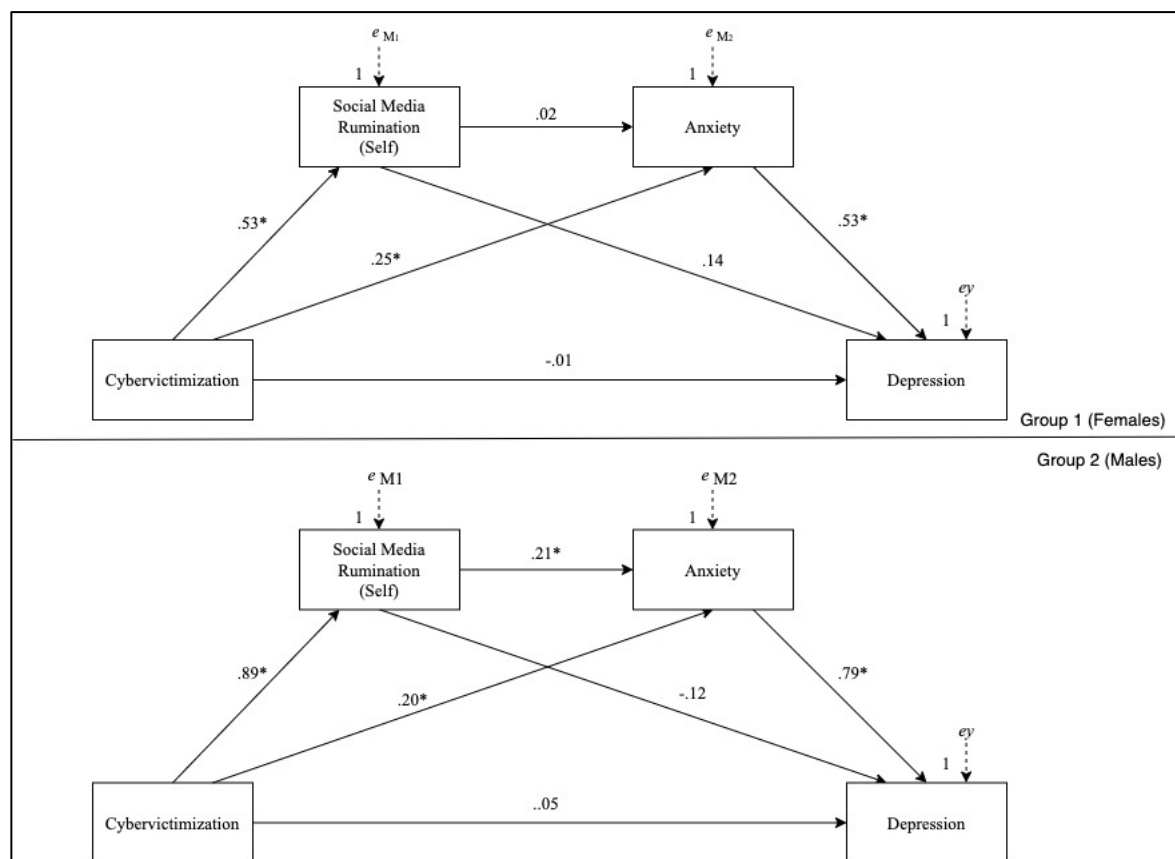


Figure 7. Statistical multigroup serial mediation model with SMR – Self.

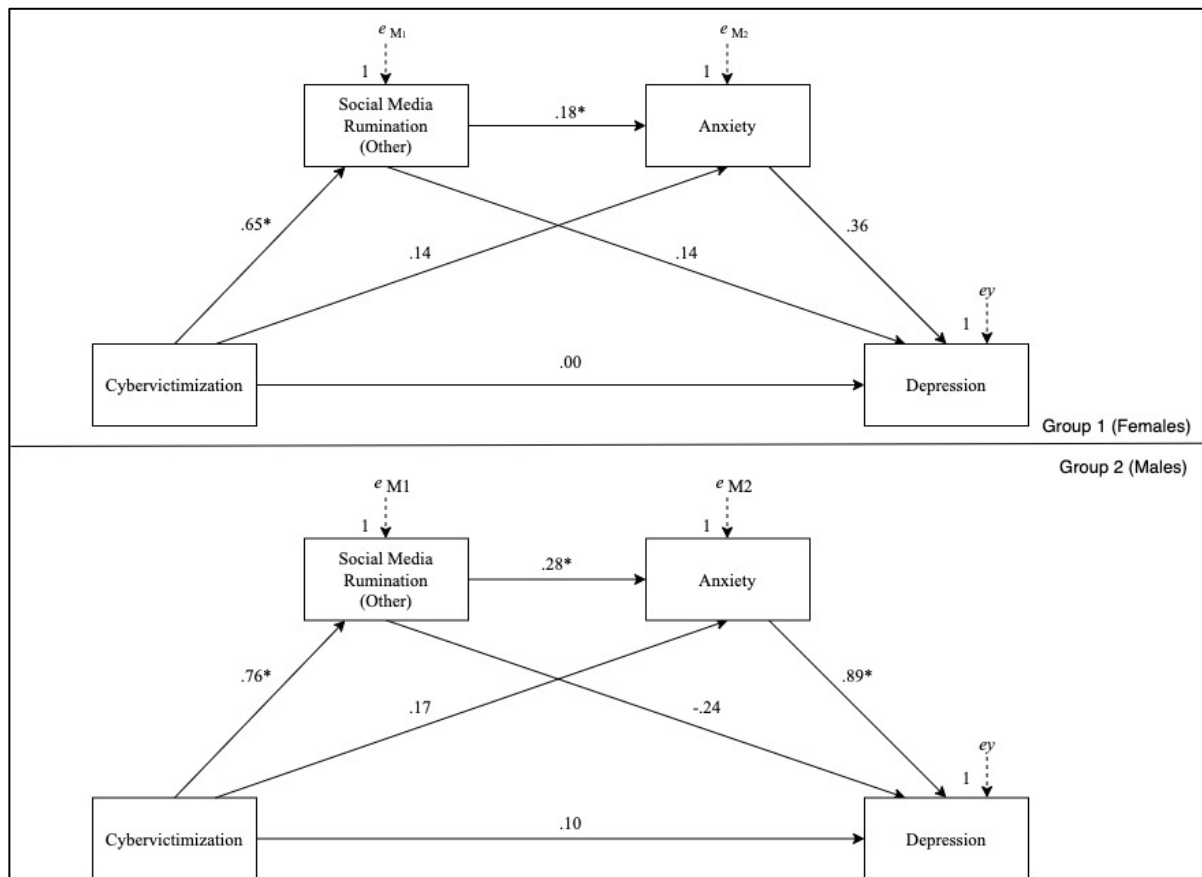


Figure 8. Statistical multigroup serial mediation model with SMR – Other.

Bootstrapped likelihood ratio tests (LRTs) were also run on each pathway to determine if any statistically significant differences emerged between gender (Research Question 4). In other words, this approach was utilized in order to determine whether the indirect effect was conditional on gender. Results showed that no direct or indirect effects were moderated by Gender, including the model containing SMR - Other and SMR - Self.

CHAPTER 5

DISCUSSION

Cybervictimization has been shown by numerous studies to be associated with later depression among adolescents (Gámez-Guadix et al., 2013; Niu et al., 2020; Wright, 2018). Studies have also shown that anxiety (Landoll et al., 2015) and rumination (Niu et al., 2020) mediate this association. Given this, with the high amount of technology use among adolescents, it is important to consider that rumination about social media may help explain the association between cybervictimization and depression as well. Taken together, the aim of the current study was to examine the potential mediating roles of anxiety and social media rumination (SMR) in the association between cybervictimization and depression among middle schoolers and to investigate whether gender moderates these associations.

Preliminary Analyses

The investigators first asked participants about their social media use. Only those who reported that they had social media accounts were kept in the study. Almost half of students (44%) indicated that they had four or more social media accounts, and of these students, the

majority indicated that they had accounts on the WhatsApp, TikTok, and Snapchat platforms. Furthermore, over one-third of these students stated that they are on these platforms for more than four hours per day. ANOVA, MANOVA, and post hoc Scheffé results showed significant gender and grade differences. First, girls reported more cybervictimization, SMR– Other, anxiety, and depression than boys. Second, overall, fifth graders reported significantly more cybervictimization and total anxiety than both sixth and seventh graders, significantly more SMR – Total than sixth graders, and significantly more depression than seventh graders. No significant Gender by Grade level interactions were found.

Initial Model Results

Because changes to the model were made after the proposal, the results of the initial model were analyzed and presented. The initial model included Social Anxiety as the first mediator and SMR as the second mediator. SMR was not separated into Self and Other because this is how previous literature utilized the measure (Hynes et al., 2022; Parris et al., 2020; Parris et al., 2022). However, once a confirmatory factor analysis (CFA) was completed on the measure using the data from the current study, it was gleaned that a one-factor model was not an appropriate fit. Thus, an exploratory factor analysis (EFA) was completed as part of another study in development (Riffle et al., under review).

In the single group mediation model, both Social Anxiety and Social Media Rumination – Total mediated the association between Cybervictimization and Depression. Serial multiple

mediation also occurred with these variables. These results supported the hypotheses in the current study. However, when examining the multigroup models where gender was examined separately, only Social Anxiety significantly mediated for boys, but not girls. The opposite was true for Social Media Rumination which only significantly mediated for girls. Serial multiple mediation did not occur for either boys or girls, which is contrary to the study hypotheses.

Changes Made to the Initial Model

There were various changes to the proposed model resulting in the exploratory model. First, the Riffle et al. (under review) results showed that a two-factor model for the SMRS led to acceptable fit. The patterns that emerged showed that one factor was most related to rumination about one's *own* social media engagement (e.g., posts, comments, etc.) and the other factor was most related to rumination about *others* social media engagement. Thus, the current study examined two types of SMR, both SMR – Self and SMR – Other. Separate models were examined that included these variables. The current study is one of the first studies to examine *types* of SMR and how these types are related to other variables such as internalizing issues (i.e., depression, anxiety) as well as cybervictimization.

The next change is related to the Social Anxiety variable. Although the inclusion of social anxiety specifically was initially informed by previous studies (Landoll et al., 2015), it was decided to broaden this variable to include Total Anxiety. The SCARED (Birmaher et al., 1997) provides various scores: somatic/panic, generalized anxiety, separation anxiety, social

phobia, school phobia, and a *total* anxiety score that includes all of the domains above and is a more comprehensive view of anxiety compared to examining only social anxiety. Furthermore, when only social anxiety was included in the model, it did not perform well, such that it did not lead to significant results. It was for these reasons that total anxiety was examined.

The third change involves the mediators, Anxiety and SMR. In the proposed model, Anxiety was the first mediator and SMR was the second, while in the exploratory model these were switched, making SMR the first mediator and Anxiety the second. This change was made for exploratory purposes given that there is not an entirely strong literature base supporting either order. The exploratory model would suggest that rumination leads to anxiety instead of anxiety leading to rumination. Other research has examined anxiety and its association with rumination in this particular order as well (Vally et al., 2021; Qiu et al., 2022).

Main Analyses – Exploratory Model

The first research question was: Does anxiety partially and significantly mediate the association between cybervictimization and depression? It was hypothesized that anxiety would partially and significantly mediate the association between cybervictimization and anxiety and that this association would be positive. Results showed that Anxiety did significantly mediate the association between Cybervictimization and Depression in the single group analysis where gender was not separated. This finding is consistent with prior research (Landoll et al., 2015). Furthermore, upon examination of the multigroup models, Anxiety mediated the association for

girls only in the model where SMR – Self was included, but not in the model where SMR – Other was included. Anxiety may not have emerged as a significant mediator when SMR – Other was included because SMR – Other could have accounted for more variance in the total model compared to SMR – Self. It is important to note that the effect size was small ($\beta = .13$) in the model where anxiety emerged as a significant mediator.

The second research question was: Does SMR partially and significantly mediate the association between Cybervictimization and Depression? It was hypothesized that SMR would significantly mediate the association between Cybervictimization and Depression. As described above, SMR was separated into two separate variables, SMR – Self and SMR – Other. Results showed that SMR did not mediate this association in either the combined models or the models separated by gender for either SMR – Self or SMR – Other. These insignificant results could be due to a measurement issue. The SMRS was validated on a sample of high school students who were primarily Black/African American females (Parris et al., 2020), while the current study had a largely different sample as participants were White middle school males. It is important to note that SMR – Self and SMR - Other were highly correlated.

The third research question was: Is the association between Cybervictimization and Depression serially mediated by Anxiety and SMR, respectively? Serial mediation did occur for both single group models (SMR – Self and SMR – Other), meaning that when boys and girls were examined as part of a single group SMR and Anxiety partially accounted for the association between Cybervictimization and Depression, as hypothesized. Upon examination of the multigroup models, serial mediation only occurred for males, and this did occur for both models (SMR – Self and SMR – Other). Serial mediation did not occur for girls in either of the models. These results suggest that anxiety and SMR serially account for the association between

Cybervictimization and later Depression for boys in middle school. As for the differences between males and females, it is possible that the direct path between Cybervictimization and Depression accounted for the most variance for girls compared to boys. Perhaps middle school girls do not experience the rumination and anxiety following a cybervictimization event as was hypothesized. Furthermore, boys may be more likely to experience adverse outcomes after a cyberbullying situation due to what is called the healthy context paradox (Salmivalli, 2018). This suggests that outcomes may be worse for those who continue to experience victimization in contexts where the overall level of aggression and victimization is low. Related to the current study, it could be that boys, overall, experience less cybervictimization compared to girls, and therefore when they do experience this type of aggression, they have worse outcomes compared to their female counterparts. While gender differences in cybervictimization have been mixed, many studies have examined populations older than the sample in the current study (e.g., Erdur-Baker, 2010; Walrave & Heirman, 2011). However, Huang and Chou (2010) examined adolescents in seventh, eighth, and ninth grade (i.e., junior high students) and found that cybervictimization rates were higher among males. Similarly, over 40% of Pelfrey and Weber's (2013) study included students in Grades 6 and 7. These researchers found that boys were more likely than girls to be both victims and perpetrators of cyberbullying.

The last research question was: Are the aforementioned associations different for boys and girls? To investigate this research question, bootstrapped likelihood ratio tests (LRTs) were run. Both models, including SMR – Self and SMR – Other, were assessed. Gender did not moderate any pathway in either model. Although I had planned to gather data from eighth-grade students, due to a collection error this did not happen. Thus, the oldest participants in the sample

were 13 years old. This age could potentially be before the onset of gender differences in depression, leading to the insignificant results.

To gain an accurate understanding of the current sample and to better understand the results, I examined how many participants endorsed high anxiety and depression. Twenty-two participants (17% of sample) had a mean overall score of at least 2.00 on the SCARED, the 16 participants (13% of sample) indicated a mean above 2.00 on the CDI. Taken together, majority of the participants in the current sample did not indicate high levels of anxiety or depression.

Limitations and Future Research

There are various limitations of the current study that should be considered when interpreting results. First, there are a handful of limitations related to the sample size. The sample utilized was relatively small. This was due to data collection issues (e.g., error with Qualtrics described below, errors with participants including their student ID numbers, etc.) and exclusionary criteria (i.e., social media usage). However, the bootstrapping method does help overcome issues with type II errors that result from small sample sizes (Koopman et al., 2015). The sample was also primarily White and so results may not be generalizable across populations. Related, a small number of participants indicated that they did not identify as male or female, and because of this small number, these participants' data were omitted from the study. Future research should aim to study a larger, more diverse sample.

Furthermore, as described above, there are limitations regarding missing data. At Timepoint 2, random measures were omitted from the survey due to an error made in Qualtrics. This resulted in the loss of data.

The next limitation is related to the Social Media Rumination Scale (SMRS; Parris et al., 2020). This measure is new and, therefore, has only been used in a handful of studies (Hynes et al., 2022; Parris et al., 2020; Parris et al., 2022). All of these studies included only high school students. Future research should continue to gain more information on the validity and reliability of this measure with additional populations. Related to SMR, future research should also consider examining SMR – Self and SMR - Other in analyses and investigating how these two variables differ from one another. Further, future researchers should also explore the different platforms that youth are using. It is possible that the rumination participants experience is related to the type of social media they are using (i.e., which platform they are using, e.g., Facebook, WhatsApp, etc.). This was outside the scope of the current study, although it would be a beneficial addition to the literature.

Another limitation worth noting is that the current study only utilized self-report surveys. This was problematic as there were numerous students who did not include their student ID number or complete parts of the surveys. Self-report data also can increase the risk of bias related to social desirability. In other words, some students may have answered questions in such a way that they feel is more socially desirable than their honest answers. Of course, this is a risk that must be considered with any study that utilizes self-report data.

Last, future researchers should consider that in the current study, the models overall held more for boys when compared to girls. Perhaps this may change depending on factors such as

developmental level or even type of social media use. Thus, this issue should be explored further to determine how and why such gender differences emerge.

Conclusion

Ultimately, depression among our youth today is a critical issue that impacts communities around the world. Researchers have established that cyberbullying (Elgar et al., 2014; Gámez-Guadix et al., 2013; Niu et al., 2020) and anxiety play important roles in depression among young people (Landoll et al., 2015); however, it is important to also consider the role that social media may play as well. This is one of the first studies to utilize the SMRS, examine types of SMR (i.e., self and other), and consider the role that anxiety and SMR play in the association between cybervictimization and depression. These results suggest that although significant gender differences did not emerge in this study, anxiety and social media rumination did serially mediate the association between cybervictimization and depression for boys in middle school in a predominantly White sample.

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APPENDIX A

CYBERVICTIMIZATION SCALE

<i>For questions 1 to 17, think about things that have happened to you.</i>					
In the last 2 to 3 months.....					
1. ...has something been written about you or posted online that made you feel upset?	1	2	3	4	5
2. ...has something been written about you or posted online that made others laugh at you?	1	2	3	4	5
3. ...have you been teased online/electronically?	1	2	3	4	5
4. ...have you been called names online/electronically?	1	2	3	4	5
5. ...have you been made fun of online/electronically?	1	2	3	4	5
6. ...have rumors been spread about you online/electronically?	1	2	3	4	5
7. ...has someone pretended to be you online in order to hurt you?	1	2	3	4	5
8. ...has someone pretended to be someone else online/electronically in order to tease or hurt you?	1	2	3	4	5
9. ...has someone posted pictures of you online/electronically in order to hurt you?	1	2	3	4	5
10. ...has someone lied about you online/electronically?	1	2	3	4	5
11. ...have you been physically threatened online/electronically?	1	2	3	4	5
12. ...has someone intentionally shared a private message that you sent to a friend in order to hurt you?	1	2	3	4	5
13. ...has someone intentionally shared an embarrassing picture or video of you in order to hurt you?	1	2	3	4	5
14. ...have you felt excluded while involved in an online activity (gaming, chatting, texting, instant messaging) with others?	1	2	3	4	5
15. ...have you seen conversations or pictures online that made you feel left out or excluded?	1	2	3	4	5
16. ...have you been denied access to a peer's webpage?	1	2	3	4	5
17. ...have you been denied access to a friend's webpage?	1	2	3	4	5

APPENDIX B

CHILDREN'S DEPRESSION INVENTORY, SECOND EDITION (CDI-2)

Remember, for each group, pick out the sentence that describes you best in the PAST TWO WEEKS.	
<p>ITEM 1</p> <p>I am sad once in a while. I am sad many times. I am sad all the time.</p>	<p>ITEM 6</p> <p>I hate myself. I do not like myself. I like myself.</p>
<p>ITEM 2</p> <p>Nothing will ever work out for me. I am not sure if things will work out for me. Things will work out for me O.K.</p>	<p>ITEM 7</p> <p>All bad things are my fault. Many bad things are my fault. Bad things are not usually my fault.</p>
<p>ITEM 3</p> <p>I do most things O.K. I do many things wrong. I do everything wrong.</p>	<p>PLEASE SKIP THIS BOX.</p>
<p>ITEM 4</p> <p>I have fun in many things. I have fun in some things. Nothing is fun at all.</p>	<p>ITEM 9</p> <p>I feel like crying every day. I feel like crying many days. I feel like crying once in a while.</p>
<p>ITEM 5</p> <p>I am important to my family. I am not sure if I am important to my family. My family is better off without me.</p>	<p>ITEM 10</p> <p>I feel cranky all the time. I feel cranky many times. I am almost never cranky.</p>

...CONTINUED FROM THE FRONT PAGE.

Remember, for each group, pick out the sentence that describes you best in the PAST TWO WEEKS.	
ITEM 11 I like being with people. I do not like being with people many times. I do not want to be with people at all.	ITEM 20 I never have fun at school. I have fun at school only once in a while. I have fun at school many times.
ITEM 12 I cannot make up my mind about things. It is hard to make up my mind about things. I make up my mind about things easily.	ITEM 21 I have plenty of friends. I have some friends but I wish I had more. I do not have any friends.
ITEM 13 I look O.K. There are some bad things about my looks. I look ugly.	ITEM 22 My schoolwork is alright. My schoolwork is not as good as before. I do very badly in subjects I used to be good in
ITEM 14 I have to push myself all the time to do my schoolwork. I have to push myself many times to do my schoolwork. Doing schoolwork is not a big problem.	ITEM 23 I can never be as good as other kids. I can be as good as other kids if I want to. I am just as good as other kids.
ITEM 15 I have trouble sleeping every night. I have trouble sleeping many nights. I sleep pretty well.	ITEM 24 Nobody really loves me. I am not sure if anybody loves me. I am sure that somebody loves me.
ITEM 16 I am tired once in a while. I am tired many days. I am tired all the time.	ITEM 25 It is easy for me to get along with friends. I get into arguments with friends many times. I get into arguments with friends all the time.
ITEM 17 Most days I do not feel like eating. Many days I do not feel like eating. I eat pretty well.	ITEM 26 I fall asleep during the day all the time. I fall asleep during the day many times. I almost never fall asleep during the day.
ITEM 18 I do not worry about aches and pains. I worry about aches and pains many times. I worry about aches and pains all the time.	ITEM 27 Most days I feel like I can't stop eating. Many days I feel like I can't stop eating. My eating is O.K.

ITEM 19 I do not feel alone. I feel alone many times. I feel alone all the time.	ITEM 28 It is easy for me to remember things. It is a little hard to remember things. It is very hard to remember things.
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APPENDIX C

SCREEN FOR CHILD ANXIETY RELATED DISORDERS (SCARED)

Directions:

Below is a list of sentences that describe how people feel. Read each phrase and decide if it is “Not True or Hardly Ever True” or “Somewhat True or Sometimes True” or “Very True or Often True” for you. Then, for each sentence, fill in one circle that corresponds to the response that seems to describe you *for the last 3 months*.

	0 Not True or Hardly Ever True	1 Somewhat True or Sometimes True	2 Very True or Often True
1. When I feel frightened, it is hard to breathe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I get headaches when I am at school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I don't like to be with people I don't know well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I get scared if I sleep away from home.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I worry about other people liking me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. When I get frightened, I feel like passing out.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I am nervous.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I follow my mother or father wherever they go.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. People tell me that I look nervous.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I feel nervous with people I don't know well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I get stomachaches at school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. When I get frightened, I feel like I am going crazy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. I worry about sleeping alone.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. I worry about being as good as other kids.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. When I get frightened, I feel like things are not real.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. I have nightmares about something bad happening to my parents.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. I worry about going to school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. When I get frightened, my heart beats fast.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. I get shaky.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. I have nightmares about something bad happening to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. I worry about things working out for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. When I get frightened, I sweat a lot.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. I am a worrier.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. I get really frightened for no reason at all.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25. I am afraid to be alone in the house.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26. It is hard for me to talk with people I don't know well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27. When I get frightened, I feel like I am choking.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28. People tell me that I worry too much.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
29. I don't like to be away from my family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
30. I am afraid of having anxiety (or panic) attacks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
31. I worry that something bad might happen to my parents.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
32. I feel shy with people I don't know well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
33. I worry about what is going to happen in the future.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
34. When I get frightened, I feel like throwing up.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
35. I worry about how well I do things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
36. I am scared to go to school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

37. I worry about things that have already happened.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
38. When I get frightened, I feel dizzy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
39. I feel nervous when I am with other children or adults and I have to do something while they watch me (for example: read aloud, speak, play a game, play a sport).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
. I feel nervous when I am going to parties, dances, or any place where there will be people that I don't know well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
41. I am shy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX D

SOCIAL MEDIA RUMINATION SCALE (SMRS)

	Almost Never	Sometimes	Often	Almost Always
I worry about what my social media posts say about who I am	1	2	3	4
I spend several minutes deciding what to post on social media	1	2	3	4
I worry about how people will react to my social media posts.	1	2	3	4
I feel jealous about other peoples' posts on social media	1	2	3	4
I can't stop thinking about what somebody posted on social media	1	2	3	4
I beat myself up for posting something stupid on social media	1	2	3	4
I worry that other people might be angry at me for the things I post	1	2	3	4
I am worried that I won't look attractive in my social media posts	1	2	3	4
I obsess over what I am going to post on social media	1	2	3	4
Seeing what others post on social media makes me self-conscious	1	2	3	4
I don't post on social media because I am afraid I won't get many likes	1	2	3	4
My self-esteem can depend on how many likes my posts get	1	2	3	4