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The Relationship Between Adolescent Stress in Five Domains and Depression: Rumination as a Moderator

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Abstract

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Abstract

Prior to this study, understanding the impact of rumination as a moderating factor in predicting the interaction between specific domains of stress and adolescent depression remained largely unknown. Guided by the theoretical frameworks of response style theory of depression, control mastery theory, and diasthesis stress model, the purpose of this quantitative nonexperimental study was to examine the link between five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression, the relationship between rumination and depression, and the moderating effect of rumination on these relationships. Participants included previously data collected from 635 adolescents from a midwestern U.S.city. Data were analyzed using correlations and multiple regression with moderation to address research questions regarding the extent to which each of the five domains of adolescent stress predicted depression in adolescence, the extent to which rumination predicted depression, and the extent to which rumination moderates these relationships. Results indicated that each domain of stress was correlated with depression, a significant relationship between rumination and depression in adolescence existed, and rumination moderated the relationship between stress and depression in family stress, peer stress, and appearance stress, with each increasingly related to depression as rumination levels increased. Ruminaton did not moderate the relation in school stress or sports stress. Findings support existing literature in that different domains of stress can differentially predict adolescent depressive symptoms. The implications for positive social change include the application of findings to targeted intervention strategies therapeutic techniques by specific domains of stress.

The Relationship Between Domain Specific Adolescent Stress in Five Domains and Depression: Rumination as a Moderator

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Chapter 1: Introduction to the Study

Most, if not all, adolescents face daily stressors. Due to a host of typical developmental changes, adolescents experience substantial stress levels in their daily lives (Arnett, 1999; Frison & Eggermont, 2016; Rodríguez-Naranjo & Caño, 2016). Often, psychological theories of stress include consideration of an individual's perception a particular stressor (Fehr & Washburn, 2023). Individual differences in stress response and coping mechanism can influence the effects of stress and can negatively impact various dimensions of health (Conner-Smith et al., 2000). For example, previous research results have indicated a link between adolescent stress and depressive symptoms (Frison & Eggermont, 2016).

In response to stress, some adolescents purposefully engage in active coping strategies; however, they might also exhibit involuntary responses to stress. Unlike coping strategies, which rely on voluntary stress responses, rumination is a form of involuntary stress response (Conner-Smith et al, 2000). Ruminative responses often focus on repeated attention to the depressive symptoms (Morrow & Nolen-Hoeksema, 1990). Rumination can result in distorted reflexive thinking (Gazzillo, et al., 2021). Thus, rumination is an important consideration in the relationship between adolescent stress and depression, given that ruminative behaviors have the potential to increase depressive symptoms. In this study, I expected rumination to moderate the relation between stress and depression, such that stress predicts depression more strongly for adolescents who ruminate than adolescents who do not.

While the relationship between adolescent overall stress and depression has been outlined in the literature, scholars also have noted key variation in adolescent stress responses and depressive symptoms based on the type of stressor, known as the domains of stress (Conner-Smith et al., 2000; Mckay & Kaufman, 2013; Nicolai et al., 2013). In this study, the identification of stressors was based on important adolescent developmental tasks, defined by Furman and Rose (2015), as managing peer relationships and mitigating increasing autonomy with family relationships, increasingly difficult school responsibilities, extracurricular activities such as sports, all while going through physical developmental and appearance changes.

Practical applications to understanding the relationships between domains of stress and depression and the moderating effect of rumination on these relationships include potential therapeutic applications to help reduce adolescent stress and rumination leading to depressive symptoms within those specific domains of stress under study. Thus, the potential positive social change implications of this study include an application of findings to develop general therapeutic techniques to help adolescents as a whole and tailored therapeutic techniques to account for variability in race and gender.

I begin this chapter by providing a background to the dynamics of adolescent stress and depression, highlighting specific areas or domains of stress included in this study before moving on to discussions of the problem, purpose, and research questions that guided this study; theoretical framework that guided the study; nature of the study; key definitions; scope and delimitations; assumptions; limitations; and the significance of the study.

Background

Previous research results indicated a link between adolescent stress and depressive symptoms (Conner-Smith et al., 2000; Frison & Eggermont, 2016; Rodríguez-Naranjo & Caño, 2016).). Due to various typical developmental changes, adolescents experience substantial stress levels in their daily lives (Arnett, 1999; Frison & Eggermont, 2016; Rodríguez-Naranjo & Caño, 2016). Scholars have indicated a relationship exists between adolescent stress and depression (Arnett, 1999; Frison & Eggermont, 2016; Rodríguez-Naranjo & Caño, 2016) as well as the impact rumination can have on exacerbating depressive symptom (Broderick & Korteland, 2002; Conner-Smith et al, 2000; Landis et al, 2007; Rodríguez-Naranjo & Caño, 2016). In addition, scholars have considered how different domains of stress can differentially predict adolescent depressive symptoms (Conner-Smith et al., 2000; Mckay & Kaufman, 2013; Nicolai et al., 2013). However, research has not considered the moderating effect of rumination on the relationship among specific domains of adolescent stress and depression. Five domains of stress including school, family, peers, appearance, and sports, were considered in this study (see DuBois & Hirsch, 1990).

Problem Statement

Different domains of stress can predict adolescent depression in unique ways (Conner-Smith et al., 2000; Mckay & Kaufman, 2013; Nicolai et al., 2013). At the same time, rumination can contribute to depressive symptoms (Broderick & Korteland, 2002; Conner-Smith et al, 2000; Landis et al, 2007; Rodríguez-Naranjo & Caño, 2016). These elements have been tested in pieces to show that stress impacts depression and

rumination impacts depression; however, a gap exists in understanding the interplay between all three factors of stress, depression, and rumination, particularly when exploring specific domains of adolescent stress as opposed to overall stress. The specific research problem that was addressed through this study was a lack of understanding the interaction between specific domains of stress, including school, family, peers, appearance, and sports stress, with rumination as a moderating factor in predicting adolescent depression.

Purpose of the Study

The purpose of this quantitative nonexperimental study was to examine the link between five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression, the relationship between rumination and depression, and the potential moderating effect of rumination on the relationship. The independent variables in this study were each of the five domains of adolescent stress: school stress, family stress, peer stress, appearance stress, and sports-related stress. The dependent variable was depression. Rumination served as a moderating variable.

Research Questions and Hypotheses

RQ1: To what extent did each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) predict depression in adolescence?

$H_0$1: There is no significant relationship between each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression in adolescence.

H_a1: There is a significant relationship between each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression in adolescence.

RQ2: To what extent did rumination predict depression?

$H_0 2$: There is no significant relationship between rumination and depression.

$H_a 2$: There is a significant relationship between rumination and depression.

RQ3: Did rumination moderate the relationships between each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression?

$H_0 3$: Rumination does not moderate the relationship between each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression.

$H_a 3$: Rumination moderates the relationship between each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression.

Theoretical Framework

The theories that grounded this study were the response style theory of depression (Nolen-Hoeksema, 1987), control mastery theory (Gazzillo et al., 2021), and diathesis stress model (Colodro-Conde et al., 2018; Meehl, 1962). In the response style theory of depression, Nolen-Hoeksema (1987) posited that ruminative responses to a depressed

mood can lead to longer and more severe depressive episodes. According to the response style theory of depression, engagement in ruminative responses amplifies a prolonged depressive mood, while distracting responses relieve a depressed mood (Morrow & Nolen-Hoeksema, 1990). The concept of rumination includes a repeated focused attention on symptoms and potential consequences of an adverse situation or event. According to the response style theory of depression, rumination can lead increased depression (Morrow & Nolen-Hoeksema, 1990).

In the control mastery theory, Gazzillo et al. (2021) posited that individuals can unconsciously and consciously perform similar complex mental functions, and as such, regulate their own mental functioning through the safety principle, with which individuals work to adapt to their environment to achieve evolutionary-based, healthy goals. However, in some cases trauma can upset our an individual's sense of safety, leading to reflection to try to make sense of why the specific event happened. According to control mastery theory, the resulting pathogenic beliefs and schemas can lead to rumination or repetitive distorted thinking regarding negative possibilities and outcomes (Gazzillo et al., 2021).

The diathesis stress model is used to understand how mental illness is triggered when preexisting physical factors are exposed to an emotional or environmental stressor (Broerman, 2018; Colodro-Conde et al., 2018). Thus, in the diathesis stress model, the interplay between specific environmental and biological factors that essentially trigger the onset of mental illness are stressed. The diathesis stress model contains a dual-risk component that includes a combination of at least two factors to trigger a mental health

condition (Ungvarsky, 2020). The diathesis stress model has applicability in understanding that, while some adolescents might have a biological predisposition toward developing depression, depression is more likely to occur from an environmental stressor, such as the domains of stress under study in this research. Thus, rumination itself may actually be considered a diathesis due to either biological and/or environmental triggers (Driscoll et al., 2009; Starr, 2015).

The logical connections between the framework presented and the nature of the current study included the need to understand the interaction between stress in the domains of school, family, peers, appearance, and sports and rumination in predicting depression specifically in adolescence. I used the response style theory of depression (Nolen-Hoeksema, 1987), control mastery theory (Gazzillo et al., 2021), and diathesis stress model (Colodro-Conde et al., 2018; Meehl, 1962) as a guiding framework to understand the nature of this relationship. Additional detailed explanations of each applicable theory are provided in Chapter 2.

Nature of the Study

I used a nonexperimental design to examine the relationships between the five domains of stress and depression in adolescence as well as the interaction between the five domains of stress in adolescence and rumination in predicting depression. A quantitative approach is most appropriate when a researcher hopes to examine the relationship among variables (McCusker & Gunaydin, 2015). McCusker and Gunaydin (2015) recommended quantitative research when the researcher knows their hypotheses in advance and is using data collected in the form of numbers. Given that this research

study incorporated data from a previously collected survey data set, use of the quantitative approach was most appropriate.

I utilized preexisting self-reported data from over 600 adolescents. Original recruitment occurred through a random sample of public school district contact information in a midsized, university town (Rose et al., 2014; Rose et al., 2016). I conducted secondary data analysis on this previously collected data set containing self-reported data that included the five domains of adolescent stress, depression, and rumination.

Definitions

Adolescence: A period of time between the ages of 10 and 19 years old, where key developmental, physical, and behavioral changes take place (Maharaja, 2018).

Depression: A medical illness defined by symptoms of sadness, neglect, guilt, a self-limiting attitude, and fatigue (Peralta, 2015).

Domains of stress: The identification of stressors based on important adolescent developmental tasks, including peer relationship management and mitigating increasing autonomy with family relationships, increasingly difficult school responsibilities, and extracurricular activities such as sports (Furman & Rose, 2015).

Rumination: An involuntary stress response resulting in a repeated focus on the origins, indicators, and consequences of an individual's negative emotions and experiences (Nolen-Hoeksema, 2004; Morow & Nolen-Hoeksema, 1990).

Stress: A psychophysiological response to danger or perceived negative pressure in one's surrounding environment that involves a complex interplay between reactions to internal and external stimuli (Piotrowski, 2022).

Assumptions

Within many research studies, a scholar must consider some components of that research study as taken for granted as true (Creswell & Creswell 2018; Leedy & Ormrod, 2018; Simon, 2011). I made the following assumptions in this study. It was assumed that the adolescents who participated in this study answered the survey questions honestly and understood the content of each question answered. I also assumed that the adolescent data collected to use in this study were accurately collected using the scientific method. The numerous publications that have utilized this data previously (Rose et al. 2014; Rose et al., 2016), and previous tests of validity conducted, bolster confidence in the accuracy of the data set. My final assumption was that the data collected accurately represented the larger adolescent population, at least throughout the midwestern region of the United States.

Scope and Delimitations

The research scope and delimitations of a study outline that study's boundaries (Creswell & Creswell 2018; Leedy & Ormrod, 2018; Simon, 2011). All data collected for this study included variables to address the research problem of a lack of understanding regarding the interaction between school, family, peers, appearance, and sports domains of stress with rumination as a moderating factor in predicting adolescent depression. The data used in this study were collected through a random sample of public school district

contact information in a midsized university town (Rose et al., 2014; Rose et al., 2016). All participants included in this study were categorized as adolescents during the period in which the data were collected. Constraints included the equitable recruitment of females and males from each grade and oversampling African Americans to comprise at least 25% of the sample (Rose et al., 2014; Rose et al., 2016). Initial recruitment included letters to 1,771 families and 937 attempted follow-up telephone calls, which resulted in 321 participants who visited the observation lab with a best friend or close, nonrelative friend of similar age. After excluding those who did not fit the initial criteria, a final sample included 628 youth in 314 dyads (Rose et al., 2014; Rose et al.. 2016). Given the assumption that this sample was representative of midwestern U.S. adolescents, potential generalizability may be applicable at least to this demographic.

Limitations

Research limitations include factors that limit the scope of the overall study (Creswell & Creswell 2018; Leedy & Ormrod, 2018; Simon, 2011). The primary limitation I encountered, similar to any research containing a data set with already collected data, was that the results were limited to the existing data available. Given that I was not personally involved in the data collection, one limitation of this study was that I had to trust that the data were collected from the minors involved in an ethical manner, as evidenced in the Institutional Review Board (IRB) application submitted and approved through University of Missouri, the original data collection study site.

Another limitation to this study was the location of the original study participants, who attended a local public school. Private school and homeschooled students were not

included in this study. This particular sample might not be generalizable to the wider population given relatively homogenous demographic elements. However, the original researchers were cognizant to oversample from the African American population to attempt to retrieve a more representative sample. I did not consider race or gender in this study; consequently, an additional limitation was that differences in these areas were not analyzed in this study.

Significance of the Study

This study is significant in that previous research results indicated a link between adolescent stress and depressive symptoms (Broderick & Korteland, 2002; Frison & Eggermont, 2016; Gazzillo et al., 2021; Rose et al., 2014; Rose et al., 2016); however, researchers had not yet measured the moderating effect of rumination on the relationship between adolescent stress in five domains (i.e., school, family, peers, appearance, and sports) and depression. This study will contribute to filling the gap identified in the problem statement by examining the association between five domains of stress (i.e., school, family, peers, appearance, and sports) and depression in adolescence, the association between rumination and depression, and the interaction between five domains of stress and rumination in predicting depression in adolescence.

This research will support professional practice by contributing to an understanding of factors that impact and contribute to the link between adolescent stress and depression. Practical applications include the potential therapeutic application to help reduce adolescent stress and rumination leading to depressive symptoms within the specific domains of stress under study. Potential findings from this study could lead to

positive social change through an application of findings to develop therapeutic techniques to help adolescents.

Summary

While researchers have indicated that different domains of stress can differentially predict adolescent depressive symptoms (Conner-Smith et al., 2000; Mckay & Kaufman, 2013; Nicolai et al., 2013), rumination can also negatively impact depressive symptoms (Broderick & Korteland, 2002; Conner-Smith et al, 2000; Landis et al, 2007; Rodríguez-Naranjo & Caño, 2016). In this study, the identification of stressors was based on important adolescent developmental tasks, defined by Furman and Rose (2015), as managing peer relationships and mitigating increasing autonomy with family relationships, increasingly difficult school responsibilities, and extracurricular activities such as sports, all while going through physical developmental and appearance changes.

What was unknown and of interest to this study was the interactions between the school, family, peers, appearance, and sports domains of stress with rumination in predicting adolescent depression. The primary theories that guided this study were the response style theory of depression (Nolen-Hoeksema, 1987), control mastery theory (Gazzillo et al., 2021), and diathesis stress model (Colodro-Conde et al., 2018; Meehl, 1962). I used a theoretical framework comprised of these theories to integrate current understanding in the areas of stress, depression, and rumination as well as serve as a guide to help understand the findings of this study.

In Chapter 2, I will present a substantive review of the theoretical framework that guided this study as well as existing literature on stress, depression, domains of stress, and other factors of interest to this study to provide an exhaustive literature review.

Chapter 2: Literature Review

The specific research problem addressed in this study was a lack of understanding regarding the interactions between school, family, peers, appearance, and sports stress and rumination in predicting adolescent depression. The purpose of this quantitative nonexperimental study was to examine the link between five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression, the relationship between rumination and depression, and the potential moderating effect of rumination on the relationship.

Literature has indicated a link between adolescent stress and depressive symptoms (Arnett, 1999; Conner-Smith et al., 2000; Frison & Eggermont, 2016; Rodríguez-Naranjo & Caño, 2016). Likewise, different domains of stress can differentially predict adolescent depressive symptoms (Conner-Smith et al., 2000; Cox et al., 2010; Mckay & Kaufman, 2013; Mezulis et al., 2002; Nicolai et al., 2013). Scholars have also indicated that rumination can exacerbate depressive symptom (Broderick & Korteland, 2002; Conner-Smith et al, 2000; Landis et al, 2007; Rodríguez-Naranjo & Caño, 2016).

While scholars also have noted key variation in adolescent stress response and depressive symptoms based on the type of stressor, known as the domains of stress (Conner-Smith et al., 2000; Mckay & Kaufman, 2013; Nicolai et al., 2013), research is limited in considering the moderating effect of rumination on the relationship among specific domains of adolescent stress and depression (Cox et al., 2010; Mezulis et al., 2002). For this study, the identification of stressors was based on important adolescent developmental tasks, defined by Furman and Rose (2015), as managing peer relationships

and mitigating increasing autonomy with family relationships, increasingly difficult school responsibilities, and extracurricular activities such as sports, all while going through physical developmental and appearance changes.

In this chapter, I describe the literature search strategy used to conduct an exhaustive literature review. The theoretical framework comrpised of the response style theory of depression (Nolen-Hoeksema, 1987), control mastery theory (Gazzillo et al., 2021), and diathesis stress model (Colodro-Conde et al., 2018; Meehl, 1962) are discussed in depth to connect the importance of these guiding theories to this study. Each of the key variables used in this study are described in depth to clarify how topics related to adolescent stress, depression, and rumination have been previously studied. Finally, a synthesis of key topics related to stress, depression, and rumination is presented to highlight the gap in literature that guided the focus of this study.

Literature Search Strategy

The primary databases used in this search included Ebsco Host, Ebsco Host Psyc Combined, APA PsycArticles, and Thoreau Multi Database. I used the following keywords to conduct an exhaustive literature search: *response style theory of depression, control mastery theory, diathesis stress model, response style theory of depression and stress, response style theory of depression and rumination, control mastery theory and depression, control mastery theory and stress, control mastery theory and rumination, diathesis stress model and depression, diathesis stress model and stress, diathesis stress model and rumination, rumination; rumination in adolescence, adolescent depression, depression and stress, adolescent depression and stress, domain specific adolescent*

stress, school stress and adolescent depression, family stress and adolescent depression, peer stress and adolescent depression, appearance stress and adolescence, and *sports stressors and adolescent depression.*

I utilized seminal literature spanning all publication periods to establish the foundational and theoretical baseline for this study. In addition, current, peer-reviewed literature published betweeen 2018–2022 was used to provide a contemporary review of studies in the areas of stress, depression, and rumination both in and of themselves as well as in combination.

Theoretical Framework

To understand the interaction between domains of stress with rumination as a moderating factor in predicting adolescent depression, I combined the following theories to provide a solid framework: the response style theory of depression (Nolen-Hoeksema, 1987), control mastery theory (Gazzillo et al., 2021), and diathesis stress model (Colodro-Conde et al., 2018; Meehl, 1962). Each theory provided a unique perspective to assist in understanding the relationship between factors surrounding the development and perpetuation of adolescent stress and depression.

Response Style Theory of Depression

In the response style theory of depression, how responses to negative moods contribute largely to understanding the onset, maintenance, and severity of depression is underscored (Abeta et al., 2013; Marchetti et al., 2021; Nolen-Hoeksema, 1992). A central concept associated with the response style theory of depression is rumination (Abeta et al., 2013). In the response style theory of depression, it is posited that

ruminative responses to a depressed mood can lead to depressive symptom development as well as longer and more severe depressive episodes (Marchetti et al., 2021; Nolen-Hoeksema, 1987). According to the response style theory of depression, engagement in ruminative responses amplifies a prolonged depressive mood, while distracting responses relieve a depressed mood (Morrow & Nolen-Hoeksema, 1990).

The concept of rumination includes a repeated focused attention on symptoms and potential consequences of an adverse situation or event (Nolen-Hoeksema, 2004; Morow & Nolen-Hoeksema, 1990). According to the response style theory of depression, rumination can lead to increased depression (Morrow & Nolen-Hoeksema, 1990). Abela et al. (2012) discussed stress reactivity as an extension of the response style theory of depression and found high levels of rumination associated with elevated depressive symptoms following a negative event. While the response style theory of depression is associated with understanding the cyclical development and continuation of ruminative symptoms and depression, the control mastery theory is focused on an individual's inherent desire to break this cycle and improve their symptoms.

Control Mastery Theory

Control mastery theory is a psychodynamic theory developed by Weiss (1960) and applied to a host of problems, including depression, in both short- and long-term treatments to achieve the therapeutic goals of overcoming problematic behaviors and feelings (Kanosky & Lieb, 2007). The two foundational elements of control mastery theory are the belief that an individual's control of their mental life is regulated by how

safe or dangerously they perceive their surroundings to be and that individuals enter therapy with the objective to resolve their conflicts and issues (Silberschatz et al., 2021).

In the control mastery theory, it is posited that individuals can unconsciously and consciously perform similar complex mental functions, and as such, regulate their own mental functioning through the safety principle, with which individuals work to adapt to their environment to achieve evolutionary-based, healthy goals (Gazzillo et al., 2021; Silberschatz et al., 2021). However, in some cases, trauma can upset an individual's own sense of safety, leading to reflection to try to make sense of why the specific event happened. According to the control mastery theory, the resulting pathogenic beliefs and schemas can lead to rumination, or repetitive distorted thinking, regarding negative possibilities and outcomes unless the ruminative pattern is disrupted (Gazzillo et al., 2021).

The basic assumptions of the control mastery theory include the belief that individuals are both consciously as well as unconsciously able to control their mental functioning and are autonomously motivated to master their traumatic experiences and solve their issues (Gazzillo et al., 2021). However, rumination can interfere with the ability of an individual to move beyond their circumstances and develop a sense of mastery over their environment (Gazzillo et al., 2021). Thus, the control mastery theory can provide a framework for considering patient beliefs, goals, traumas, and desired outcomes to determine individualized clinical responses (Kanosky & Lieb, 2007; Kealy et al., 2020).

Diathesis Stress Model

The origins of the diathesis stress model are often cited as the 1950s; however, several psychiatric texts have dated its origins much earlier, in some cases as far back as the early 19th century (Kendler, 2020). The primary focus of the diathesis stress model is on the preexisting factors that trigger the onset of a psychiatric condition; thus, the model has been used to understand how mental illness is triggered when preexisting physical factors are exposed to an emotional or environmental stressor (Broerman, 2018; Colodro-Conde et al., 2018; Kendler, 2020). In the diathesis stress model, the interplay between specific environmental and biological factors that essentially trigger the onset of mental illness are stressed, and the model can be used to identify how mental illness and disorders result from both environmental factors and genetic makeup (Ungvarsky, 2020).

The diathesis stress model contains a dual-risk component that includes a combination of at least two factors to trigger a mental health condition (Ungvarsky, 2020). In general, the premise of the diathesis stress model rests on the presumption that it is much easier to prevent exposures, or potential triggers, as opposed to reverse predispositions (Kendler, 2020). Within the diathesis stress model, these predispositions are often referred to as diathesis. For example, Xu et al. (2019) found significant interactions between life events and high cortisol levels on stress anxiety and depression in Chinese adolescents, highlighting the applicability of the diathesis stress model in understanding depression onset.

The diathesis stress model has applicability in understanding that while some adolescents might have a biological predisposition toward developing depression,

depression is more likely to occur for them if triggered by an environmental stressor, such as the domains of stress under study in this research. However, these environmental stressors could function differently depending on numerous factors, such as age, sex, and culture. For example, using the diathesis stress model, Suh et al. (2022) found perfectionism to be a maladaptive trait in international students as compared to domestic students, underscoring the important role demographic factors could play in exacerbating areas of stress.

The additional factor of rumination can exacerbate or trigger the onset of a mental health condition beyond the stress and depression association, particularly given that rumination is thought to be an involuntary biological predisposition, or diathesis (Nolen-Hoeksema, 2004; Morow & Nolen-Hoeksema, 1990). Along these lines, if rumination positively impacts the relationship between stress and depression, avoiding rumination could have applicability in adolescent depression prevention via trigger reduction.

Synthesis of Theoretical Framework

The logical connections between the framework presented and the nature of the current study study included the need to understand the interactions between stress in the domains of school, family, peers, appearance, and sports and rumination in predicting depression specifically in adolescence. I combined the response style theory of depression (Nolen-Hoeksema, 1987), control mastery theory (Gazzillo et al., 2021), and diathesis stress model (Colodro-Conde et al., 2018; Meehl, 1962) as a guiding framework to develop an understanding of the nature of this relationship. The response style theory of depression served as part of the guiding framework to understand the cyclical

development and continuation of ruminative symptoms and depression. The control mastery theory was helpful for developing therapeutic techniques to improve individuals' adjustment, an important social change component of this research study. The diathesis stress model was useful to understand the biopsychosocial origination of depression and ruminative symptoms that arise in certain individuals.

Literature Review Related to Key Concepts and Variables

The theoretical foundation comprised ofthe response style theory of depression, control mastery theory, and diathesis stress model served to underscore the potential relationships and interplay among the key concepts and variables in this study: stress, depression, and rumination. In order to understand the concepts of stress, depression, and rumination in tandem, it was crucial to expand on the extant literature related to each concept and the interplay between variables as presented in the literature.

Stress

Stress is defined broadly as the physiological and psychological consequences of perceived unpredictable, uncontrollable events or situations (Cohen et al., 1983; Stefaniak et al., 2022; Szabo et al., 2012). Multiple theoretical explanations help categorize the conceptualizations of stress, including stress as a potential stimulus and/or response as well as stress as an individual and environmental interaction, and/or transaction (Biggs et al., 2017). Lazarus and Folkman (1984) highlighted how the transactional explanations of stress tend to have a dynamic, relational, and environmental origin. These transactional explanations rest at the heart of the transactional theory of

stress and coping and have been particularly instrumental in shaping research studies on stress over the past several decades (Biggs et al., 2017).

The transactional theory of stress and coping involves two key elements, cognitive appraisal and coping, highlighting how individuals work to appraise stimuli in their environments, resulting in some type of positive, negative, or unresolved coping outcome (Biggs et al., 2017). A key element in understanding stress using the transactional theory of stress and coping involves the appraisal of stress that rests in an individual's perception of that stress. Therefore, the same stressor could impact different individuals in different ways based on that individual's appraisal of the stressful situation or event (Biggs et al., 2017).

Acute stress tends to increase in response to an immediate threat but is often not harmful in small doses (Stefaniak et al., 2022). Chronic stress, conversely, tends to be more constant with potentially detrimental long-term consequences (DuBois et al., 1994). Chronic stress often results from trauma, illness, job or school pressure, and other day-to-day consistent pressures (Stefaniak et al., 2022). In their original theory, Lazazrus and Folkman (1984) proposed that the stress process is a continuous cycle where individuals seek to resolve disruptions to equilibrium through an adaptive coping process and cognitive reappraisal, whereas Folkman's (2008) revised theory highlighted how unsuccessful coping and resulting distress might actually trigger more meaning-focused coping, particularly when the stressor is perceived overwhelmingly aversive (Biggs et al., 2017). Thus, prescribing positive meaning to various types of stressors, or meaning-

focused coping, can elicit positive emotions, restoring personal resources and providing relief from distress (Biggs et al., 2017).

Key variation in adolescent types of stressors, known as the domains of stress, have been outlined in the literature (Conner-Smith et al., 2000; Mckay & Kaufman, 2013; Nicolai et al., 2013, Nunez-Regueiro & Nunez-Regueiro, 2021). A systematic review of adolescent stressors revealed numerous, highly occurring negative stressors that adolescents face throughout their daily lives (Nunez-Regueiro & Nunez-Regueiro, 2021). Nunez-Regueiro and Nunez-Regueiro (2021) classified negative stressors as health issues; parental conflict; issues with peers, friends, teachers, and school; and romantic problems. However, DuBois and Hirsch (1990) more broadly identified the five domains of adolescent stress to include school, family, peers, appearance, and sports, all of which were considered in the current study. Furman and Rose (2015) reported that these stressors are particularly applicable to adolescents given the developmental tasks and changes at this time of life, such as managing peer relationships; navigating increasing autonomy with family relationships, increasingly difficult school responsibilities, and extracurricular activities such as sports; and experiencing physical developmental and appearance changes.

Understanding daily stress can help shape intervention strategies to mitigate negative long-term physical and mental health outcomes (Stefaniak et al., 2022). Mitigating negative health consequences is particularly crucial in adolescents given that acute psychosocial stress has been found to stimulate mucosal secretory immunoglobulin

A secretion during adolescence, a protein complex antibody that plays a crucial role in first defense immunity against infection (Munoz et al., 2022).

Depression

Marchetti et al. (2021) described adolescent depression a global health crisis impacting close to 20% of adolescents before the age of 19 years old, resulting in poor psychosocial functioning, decreased academic performance, and lower overall health. A systemic literature review highlighted an increase from 24% to 37% of point prevalence elevated depression symptoms among adolescents between the years of 2011 and 2020 (Shorey et al., 2022).

Scholars have noted that insights for depression prevention largely rest in understanding the mechanisms associated with depression (Marchetti et al., 2021; Patel, 2013). While psychologists offer varying explanations for depression onset in adolescents, vulnerability often plays a key role. Colodro-Conde et al. (2018) indicated multiplicative interactive events could increase said vulnerabilities to adolescent depression development with variance in polygenic risk scores with life events contributing positively to depression risk.

Stress and Depression

Scholars have indicated a relationship exists between adolescent stress and depression (Arnett, 1999; Conner-Smith et al., 2000; Frison & Eggermont, 2016; Rodríguez-Naranjo & Caño, 2016). Due to various typical developmental changes, adolescents are more likely to experience substantial stress levels in their daily lives (Arnett, 1999; Frison & Eggermont, 2016; Rodríguez-Naranjo & Caño, 2016).

While the relationship between adolescent stress and depression has been outlined in the literature, some scholars have noted key variation in adolescent stress response and depressive symptoms based on the type of stressor, known as the domains of stress (Conner-Smith et al., 2000; Mckay & Kaufman, 2013; Nicolai et al., 2013). For example, Du Preez et al. (2021) found differing depressive outcomes based on type of stress, with key variability in physical and psychosocial stress. In addition. Griffith et al. (2020) explored interactions between positive emotionality and domains of chronic stress with children aged 8-16 years old, and found that parent-child stress but not peer stress, predicted the likelihood of depression. These studies highlight the importance of considering stress within different domains, rather than as a unitary construct, in accurately predicting depression.

Rumination

Rumination is defined as negative, repetitive thinking of an event or stressor (Abeta et al.,2013; Marchetti et al., 2021). While positive coping strategies often rely on voluntary stress responses, rumination is a form of involuntary stress response (Conner-Smith et al, 2000). Ruminative responses often focus on repeated attention to the depressive symptoms (Morow & Nolen-Hoeksema, 1990). Negative coping mechanisms, such a rumination, are more likely to lead to depressive symptom development overtime or exacerbate existing depression (Marchetti et al., 2021; Nolen-Hoeksema, 1991; Pedersen et al., 2022; Whisman et al., 2020).

Rumination can also result in distorted reflexive thinking (Gazzillo et al., 2021). Rumination is thought to amplify depressed moods as well as interfere with potential

actions to alleviate depressive symptoms leading individuals to further create negative inferences, and inhibiting problem-solving behavior, further enhancing the depressed mood (Abeta et al., 2013; Nolen-Hoeksema, 1991).

Moderators to the Relationship between Stress and Depression

Not all adolescents experience the same depressive outcomes in response to the same stressor, thus it is important to examine moderators, or factors that can help explain which adolescents are most likely to experience depressive symptoms in response to stressors. For example, Fu et al. (2022) found that parent child communication moderated the relationship between academic stress and depression. Academic stress was not related to depressive symptoms as strongly when communication was more positive; however stress was related to depressive symptoms when communication was less positive. Other research has also identified a moderating effect of cognitive vulnerability on the relationship between bullying, a type of stress in the peer domain, and the onset of adolescent depression. These findings were consistent with the diathesis stress model (Chicoine et al., 2021).

As another example, scholars have also identified key moderating factors in the relationship between adolescent stress and depression outcomes during the Covid-19 pandemic (Boursier et al., 2022; Gupta et al., 2022; Liu & Wang, 2021). Character strengths were found to moderate the relationship between adolescent stress and depression during the COVID-19 pandemic, in that character strengths acted as a protective factor to buffer youth who experienced stress from depressive symptoms (Liu & Wang, 2021). Relational closeness to online friends was also found to buffer the

impact of loneliness on adolescent stress and depression (Boursier et al., 2022). As another example, Gupta et al. (2022) found a relation between stress and depression from pre-COVID-19 and during COVID-19 pandemic for healthy adolescents however, for those adolescents who were clinically depressed before the pandemic, there was no relation between exposure to additional stressors related to the COVID-19 pandemic and depressive symptoms. These results may have emerged because depressed adolescents were already faced with multiple challenges prior to the COVID-19 and the pandemic really did not increase their experience of stress or associated depressive symptoms.

Rumination as a Moderator

While some scholars have explored how domains of stress differentially predict adolescent depressive symptoms (Conner-Smith et al., 2000; Mckay & Kaufman, 2013; Nicolai et al., 2013), few studies have considered the moderating effect of rumination on the relationship among specific domains of adolescent stress and depression (Cox et al., 2010; Mezulis et al., 2002). For this present study, I considered rumination as a moderator of the relationship between domains of stress and depressive symptoms.

Despite limited research on rumination as a moderating factor in the link between domain specific stress and depression, scholars have explored rumination as a moderating factors in the relationships among other variables. Results from various studies tested rumination as a moderator of the relations of resilience with depressive symptoms, impulsivity and alcohol problems, as well as adaptive self-reflection and resilience. For example, Yanhua et al. (2021) found that rumination moderated the relationship between psychological resilience and depression such that, the relation between resilience and

depression was weaker for individuals who ruminate than for those who do not. Also, Webb et al. (2016) found a significant interaction between impulsivity and rumination such that rumination moderated the link between impulsivity and alcohol problems such that impulsivity was more likely to be related to alcohol problems for individuals who ruminated than those who did not. These findings are consistent with previous research by Gray and McNaughton (2003) that showed that individuals with internalizing problems have greater difficulties behavioral inhibition. Rumination has also been shown to moderate the relationship between adaptive self-reflection and resilience via insight such that, when rumination was low, adaptive self-reflection was related to greater resilience, whereas, when rumination was high, adaptive self-reflection was actually associated with lower resilience (Bucknell et al., 2022).

While the previously discussed studies explored rumination as a moderator in general, Cox et al. (2010) researched rumination as a moderator of some of the associations considered in my present study, such as stress/life events and psychological adjustment. In the Cox et al. study, researchers tested whether rumination moderated the relationship between stressful life events and depressive symptoms in adolescents over a 10 week period and found that rumination marginally moderated the relationship between stressful life events overall and depressive symptoms. However, the authors did find a significant moderating effect of rumination for the association between achievement stress domain and depressive symptoms; no moderating effect was found for the relation between the peer domain of stress and depressive symptoms (Cox et al., 2010). Key

limitations in this study included a small sample size of only 65 participants and limited domains of stress focused primarily on achievement and peer domains.

Thus, additional research is needed beyond the Cox et al. (2010) study to further understand rumination as a moderator of the relationships between other stress domains and depression, as well as the impact a larger sample size might have on the outcomes found in the Cox et al. study. Unlike the Cox et al. study that considered only achievement and peer domains, my project will consider additional domains of stress consistent with important adolescent developmental tasks, originally defined by DuBois and Hirsch (1990) and expanded by Furman and Rose (2015), including managing peer relationships, mitigating increasing autonomy with family relationships, increasingly difficult school responsibilities, extracurricular activities such as sports, and going through physical developmental and appearance changes.

These associations between stressors and depressive symptoms may vary across domains of stress. In my present study I hypothesize that stress in each of the domains will be associated with depressive symptoms, and that each of these associations will be moderated by rumination. Like the Cox et al. (2010) results that indicated variation in the strength of the relationship for the limited stress domains explored, I anticipate that in expanding the domains of stress to align with DuBois and Hirsch (1990) and Furman and Rose (2015), additional variation in the strength of the relationships between additional domains of stress and depression will be present, but the strengths of these specific associations are currently unknown.

Synthesis of Theoretical Framework with Key Concepts and Variables

Morrow and Nolen-Hoeksema's (1990) specified that rumination amplified prolonged depressive mood, illustrating a key point within the response style theory of depression. Likewise, rumination has been known to interfere with actions to alleviate depressive symptoms, inhibiting problem solving behaviors, and further contributing to depressed moods (Abeta et al., 2013; Nolen-Hoeksema, 1991).

Whereas research utilizing response style theory of depression illustrates how the cyclical nature of continued rumination, control mastery theory can be utilized to explore an individual's inherent desire improve their symptoms by breaking this cycle of stress and depression although pathogenic beliefs and schemas can symptoms unless the ruminative pattern is disrupted (Gazzillo et al., 2021). Likewise, variability in domains of stress types can result in differing stress responses (Conner-Smith et al., 2000; Mckay & Kaufman, 2013; Nicolai et al., 2013, Nunez-Regueiro & Nunez-Regueiro, 2021). Thus, control mastery theory's usefulness rests not only in individual development of therapeutic techniques to improve symptoms to reduce rumination but also in the identification of both conscious and unconscious ability to control mental functioning motivation to master traumatic experiences (Gazzillo et al., 2021).

However, as discussed, rumination can interfere with the ability of an individual to move beyond those circumstances and develop a sense of mastery over their environment (Gazzillo et al., 2021). Factors such as relational closeness to online friends (Boursier et al., 2022), character strengths (Liu & Wang, 2021), as well as parent child communication (Fu et al., 2022), operate as effective moderators in terms of social and

emotional buffering between adolescent stress and depression (Fritz & Gallagher, 2020; Scheuplein & van Harmelen, 2022; Tang et al., 2021). Thus, given that few studies have considered rumination as a moderator in the relationship among limited specific domains of adolescent stress and depression (Cox et al., 2010; Mezulis et al., 2002) additional research is needed to understand the rumination as a moderating in the relationships among additional stress domains and depression.

Likewise, depression prevention appears to rest largely in understanding the specific mechanisms associated with depression (Marchetti et al., 2021; Patel, 2013). According to the diathesis stress model, focusing on environmental triggers to depression and understanding daily stress can help shape intervention strategies to mitigate negative long term physical and mental health outcomes (Stefaniak et al., 2022). Pederson et al. (2022) highlighted the importance of accurately understanding contextual and psychological risk factors, like rumination, as well as environmental context, such as stressors, that impact adolescent depression could help to more reliably inform prevention strategies.

Summary and Conclusion

Response style theory of depression (Nolen-Hoeksema, 1987), control mastery theory (Gazzillo et al., 2021), and the diathesis stress model (Colodro-Conde et al., 2018; Meehl, 1962) each provide a unique perspective to understand the relationship between adolescent stress and depression, as well as whether rumination moderates the link between stress and depression. Whereas the response style theory of depression can serve a guiding framework to understand the cyclical development and continuation of

ruminative symptoms and depression, and control mastery theory's usefulness in understanding individuals' subsequently developing therapeutic techniques to improve symptoms to reduce rumination, diathesis stress model is focused on environmental triggers to depression. In this study, the environmental stressors include the five domains of stress (school, family, peers, appearance, and sports) that adolescents face throughout this point in their life course.

Since adolescents experience variability in depressive outcomes in response to the same stressor, it is important to examine moderators, or factors that can help explain which adolescents are most likely to experience depressive symptoms in response to stressors. While some scholars have explored how domains of stress can differentially predict adolescent depressive symptoms (Conner-Smith et al., 2000; Mckay & Kaufman, 2013; Nicolai et al., 2013), few studies have considered the moderating effect of rumination on the relationship among specific domains of adolescent stress and depression (Cox et al., 2010; Mezulis et al., 2002).

In Chapter 2, I outlined the purpose of this quantitative nonexperimental study, which will include an examination of the link between five domains of adolescent stress (school, family, peers, appearance, and sports) and depression, the relationship between rumination and depression, as well as the potential moderating effect of rumination on the relationship between stress and depression. The following research questions served to guide the study. To what extent are each of the five domains of adolescent stress (school, family, peers, appearance, and sports) associated with depression in adolescence? To what extent is rumination associated with depression? Does rumination moderate the

relationships of the five domains of adolescent stress (school, family, peers, appearance, and sports) with depression?

In Chapter 2, I provided a comprehensive literature review and synthesis of key theories (response style theory of depression, control mastery theory, and diathesis stress model) and variables such as stress, depression, rumination, as well as how these operate in tandem. In Chapter 3, I will provide a detailed explanation of the quantitative methodology, the nonexperimental research design, the previously collected data set of approximately 635 adolescents, a data analysis plan which included multiple regression with moderation, as well as a discussion on threats to validity.

Chapter 3: Research Method

The purpose of this quantitative nonexperimental study was to examine the link between five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression, the relationship between rumination and depression, and the potential moderating effect of rumination on the relationship. Chapter 3 begins with a discussion of the research design and rationale followed by a detailed explanation of the quantitative methodology; population and sample; a data analysis plan that included multiple regression with moderation; and an examination of threats to validity, including the ethical procedures that were followed.

Research Design and Rationale

I used a quantitative nonexperimental design to examine the relationship of the five domains of adolescent stress (i.e., school stress, family stress, peer stress, appearance stress, and sports related stress) with depression as well as to examine rumination as a moderator of the link between the five domains of adolescent stress and depression. The independent variables in this study were each of the five domains of adolescent stress: school stress, family stress, peer stress, appearance stress, and sports-related stress. The dependent variable was depression. Rumination served as a moderating variable.

A quantitative approach is most appropriate for examining the relationship among variables (McCusker & Gunaydin, 2015). McCusker and Gunaydin (2015) recommended quantitative research be used when the researcher knows in advance the research questions to be tested with the data. Given that I used previously collected survey data in this study, a quantitative methodology was most appropriate.

Specifically, I used a nonexperimental design in this study. A nonexperimental design is used when comparing the association or predictive relationship among variables without manipulating any variables (Creswell & Creswell, 2018). Given that this study incorporated the use of data that were previously collected as part of a larger study and no variables were manipulated, a nonexperimental design was most suitable.

No time or resource constraints were present, given that the data were previously collected, other than the time involved in becoming familiar with the procedures, data set, and variables utilized in the original data collection. Since the data were previously collected, I needed to work within the confines of the existing data in terms of how the data were originally collected, the sample size, and overall instrument reliability.

Methodology

Because this research study used previously collected numerical data, a quantitative methodology was most appropriate. In this section, I describe the population, sampling strategy, sample size, and sampling frame, including specific inclusion and exclusion criteria used to collect the original data, along with any necessary permissions obtained and the operationalization of variables.

Population

The target population for this study included adolescents in the United States. The U.S. Department of Health and Human Services (2022) defined adolescents as those aged 10 through 19 years old. While the data for this study were collected from 2007–2009, the U.S. adolescent population has remained largely unchanged. In both 2010 and 2019, there were approximately 42 million adolescents across the United States (Statistia,

2020), making up about 12% of the U.S. population (U.S. Department of Health and Human Services, 2022). Over half of the adolescent population in the United States reside in suburban areas outside of a principal city, with another third living in urban areas and less than a quarter residing in rural areas of the United States (Semega et al., 2020).

Sampling and Sampling Procedures

For this research study, I used preexisting self-reported data from a larger study of over 600 adolescents, collected in three cohorts spanning three consecutive summers. Original recruitment involved contacting a random sample of families using contact information provided by a public school district in a midsized university town (Rose et al., 2014; Rose et al., 2016). Initial recruitment included letters being sent to 1,771 families and follow-up telephone calls, which resulted in 321 participants. Because the larger study focused on friendship, the adolescents participated in the study with a best friend or close, nonrelative friend of the same sex at birth and within 2 years of age (Rose et al., 2014). In total, 642 adolescents (i.e., 321 friend dyads) participated. Inclusion criteria included being in Grades 7 or 10 and having a same-sex best friend. Exclusion criteria included not being in Grades 7 or 10 and not identifying a same-sex best friend.

After excluding those who did not fit the inclusion criteria (e.g., adolescents who brought a relative to the lab with them rather than a friend), the final sample included 628 youth (Rose et al., 2014; Rose et al., 2016). Because the present study did not focus on friendships, the number of individual participants (rather than the number of friend dyads) was of interest. The final sample of 628 adolescents included 314 seventh-grade

students (composed of 154 males and 160 females) and 314 10th- grade students (composed of 148 males and 166 females; Rose et al., 2014; Rose et al., 2016). The racial and ethnicity composition of the sample was 62.8% European American, 29.2% African American, 3.7% Latino, and less than 2% in each of the following: American Indian, Pacific Islander, and Asian American (Rose et al., 2014; Rose et al., 2016).

G*Power Analysis

A G* Power analysis is a commonly used tool to establish the sample size needed to detect significant effect (Field, 2017). A power analysis is typically expressed as 1-B, representing the likelihood of not encountering a Type II error (Field, 2017). Given the acceptable probably of failing to detect a genuine effect is 0.2, a power of 0.8 is typically used in power analyses (Field, 2017). In addition, in power analyses, setting the alpha to .05 is standard (Field, 2017). I expected a medium effect size, $f^2 = .15$, in this study given that effects in psychological research are often not large.

I conducted the power analysis for the research question with the largest number of predictors because, as the number of predictors increases, the number of participants needed to detect effects increases. This research question (i.e., RQ3) included the five domains of stress as five predictors, rumination as one predictor, and the interaction between each domain of stress and rumination as five predictors, resulting in 11 total predictors. The G* Power analysis yielded a sample size of 123 to achieve a power of .80 with an effect size of .15. This analysis indicated that the current sample had sufficient power to detect medium effects.

Recruitment, Participation, and Data Collection Procedures

Given that the data had been previously collected and I was conducting secondary analyses, no new participant recruitment was required. Once necessary approvals were received from my chair, committee member, and university research reviewer, I applied for IRB approval to access the previously collected data. Once IRB approval was granted, I received access to the de-identified data set from my doctoral chair who, along with a research team at University of Missouri, originally collected the data.

The number of participants included in the final sample was 636 adolescents; however, given that one respondent did not complete the survey questions on depression, this participant was eliminated from the overall analysis, resulting in a total sample of 635 participants. While earlier studies utilizing this data set deleted outliers, given that the outliers represented 1.2% of the sample size and both the leverage value and Cook's distance tests indicated no problematic leverage points (as described later in this chapter), I ultimately included the outliers in the study analyses.

The final sample of 635 adolescents was 52% female and 48% male. The racial and ethnic composition of the sample was 62.8% European American, 29.2% African American, 3.7% Latino, and less than 2% in each of the following: American Indian, Pacific Islander, and Asian American (Rose et al., 2014; Rose et al., 2016). Although there were four missing values for race, I did not use race as a factor in this particular study; hence, there was no need to delete those cases.

Instrumentation and Operationalization

The three key constructs used in this study were the five domains of stress (operationalized as daily hassles), depression, and rumination.

Daily Hassles

Stress was measured using the modified Daily Hassles Questionnaire, an 81-point inventory first constructed by Rowlison et al. (1988) and adapted by Dubois et al. (1994) to explore specific domains of stress. Respondents were asked to rate the level of hassle on a 4-point scale with 1 = *not a hassle at all* to 4 = *a very big hassle*. Rowlison et al. noted original pilot studies showed high internal reliability (a = .95). Dubois et al. adapted a portion of this original Daily Hassles Questionnaire to understand the impact of daily hassles. In the Dubois adaptation, for each item representing a stressor, participants indicated whether the either the existence of the daily hassle (i.e., stress) or a lack of the daily hassle (i.e., no stress). The items assessed the five main domains of stress used in the current study (see Dubois et al., 1994). To measure each domain of stress, the mean of the ratings of the items for that particular stressor was computed (Rose, 2002).

Depressive Symptoms

Depressive symptoms were measured using Radloff's (1977) . Utilizing the Center for Epidemiologic Studies–Depression Scale, the participants rated 20 items on a 4-point scale in terms of how often they experienced the depressive symptom described. Response options ranged from 1 = *rarely or none of the time* to 4 = *every 5 to 7 days*. Scores were the mean of the 20 measured items (a = .86; Rose et al., 2004).

Rumination

The instrument used to assess rumination was a revised version of Nolen-Hoeksema and Morrow's (1991) Responses to Depression Questionnaire, modified by Rose (2002) for use with youth. The instrument assesses the extent to which individuals ruminate when they feel depressed. Word adjustments were made to 15 of the 21 rumination items from the original Responses to Depression Questionnaire so that the items would be appropriate for youth (Rose, 2002). While study participants responded to 21 items assessing rumination and 10 items assessing distraction, in the current study I only utilized the rumination scale, given rumination as the moderating variable for this study (see Rose, 2002). For each item assessing rumination, participants rated the frequency with which they engaged in the ruminating behavior described when feeling down, sad, or depressed. Each item was rated on a 4-point Likert scale ranging from 1 = *almost never* to 4 = *almost always* (Rose, 2002).

Rose (2002) conducted a pilot study with an older adolescent sample ($N = 194$) in which participants responded to both the original items and the items revised for use with youth. All correlations computed between original and revised rumination items were significant with an average correlation of .69 (Rose, 2002). Rose indicated that Cronbach's alpha computed across the 21 rumination items was high ($a = .91$). Rumination scores were the mean rating across all items.

Research Questions and Hypotheses

RQ1: To what extent did each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) predict depression in adolescence?

$H_0$1: There is no significant relationship between each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression in adolescence.

H_a1: There is a significant relationship between each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression in adolescence.

RQ2: To what extent did rumination predict depression?

$H_0$2: There is no significant relationship between rumination and depression.

H_a2: There is a significant relationship between rumination and depression.

RQ3: Did rumination moderate the relationships between each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression?

$H_0$3: Rumination does not moderate the relationship between each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression.

H_a3: Rumination moderates the relationship between each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression.

Data Analysis Plan

After obtaining appropriate IRB approvals, data were provided to me in a Microsoft Excel file. I then upload the data into IBM SPSS Statistics 27 for Mac. Finally, I ran the appropriate statistical tests described in this section. For Research Questions 1 and 2, I computed correlations to understand the extent to which each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) were related to depression in adolescence as well as the correlation between rumination and depression. Research Question 3 incorporated multiple regression with moderation. Multiple regression is used to examine the relationship between multiple predictor variables and the dependent variable (Warner, 2021). Results of multiple regression analyses indicated the percent of variance in the dependent variable accounted for by the predictor variables together as well as individually. Moderation is an important technique in multiple regression analysis involving testing the interaction between predictor variables (Warner, 2021). The regression analysis included 11 predictors: each of the stressors, rumination, and the interactions between each of the stressors and rumination. My analysis included all of the domains in the first analysis, followed by separate analyses for each stress domain.

Threats to Validity

Establishing reliability is one important component of validity. Reliability ensures consistent results, with low reliability implying some form of measurement error (Warner, 2021). Reliability refers to the repeatability or consistency of the instrument behaving the same way when testing is repeated (Creswell & Creswell, 2018). A

common indicator of reliability, internal consistency, can be evaluated with Cronbach's alphas, with optimal values ranging from .7 to .9 (Creswell & Creswell, 2018). Cronbach's alpha for original pilot studies on domains of stress showed high internal reliability (a = .95; Rowlison et al., 1988). Depression scores were derived as the mean of the measured items (a = .86; Rose et al., 2004). Finally, Cronbach's alpha computed across the 21 rumination items was high (a = .91). The Cronbach's alpha for rumination was also computed by grade, resulting in a range from .89 to .92, indicating that rumination can be reliably assessed with children as young as third grade using the MRDQ (Rose et al., 2004).

Validity, conversely, involves whether a study measures what it is intended to measure (Warner, 2021). Threats to validity can occur when construct validity is violated. Construct validity is focused on whether the items measure the concepts intended (Creswell & Creswell, 2018). Construct validity is often evaluated by considering whether the variables assessed are related to other variables in conceptually meaningful ways. Past research has found that the constructs assessed with the measures used in this study are related to other constructs in meaningful ways (see Dubois et al., 1994).

Ethical Procedures

Given that the data used in this study were previously collected, I had no direct access to participants; however, the original researcher obtained necessary permissions to collect the data (see Rose et al., 2007). For the present study, the original data were de-identified. Once receiving the de-identified data, I maintained its security on a password-protected computer. Appropriate Collaborative Institutional Training Initiative (CITI)

training was updated prior to my IRB application. I received the IRB approval number 11-17-22-0487630 from Walden University prior to conducting any data analysis for this study.

Summary

The purpose of this quantitative nonexperimental study was to examine the link between five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression, the relationship between rumination and depression, and the potential moderating effect of rumination on the relationships. In Chapter 3, I provided justification for the use of a quantitative nonexperimental approach and multiple regression with moderation to analyze the relationships among variables. In Chapter 4, I will present the results of the study, including describing the data analysis procedures and results corresponding to each of the key research questions.

Chapter 4: Results

The purpose of this quantitative nonexperimental study was to examine the link between five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression, the relationship between rumination and depression, and the potential moderating effect of rumination on the relationships. The independent variables in this study were each of the five domains of adolescent stress: school stress, family stress, peer stress, appearance stress, and sports-related stress. The dependent variable was depression. Rumination served as a moderating variable. The research questions and hypotheses that guided this study were as follows:

RQ1: To what extent did each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) predict depression in adolescence?

$H_0$1: There is no significant relationship between each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression in adolescence.

H_a1: There is a significant relationship between each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression in adolescence.

RQ2: To what extent did rumination predict depression?

$H_0$2: There is no significant relationship between rumination and depression.

H_a2: There is a significant relationship between rumination and depression.

RQ3: Did rumination moderate the relationships between each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression?

$H_0$3: Rumination does not moderate the relationship between each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression

H_a3: Rumination moderates the relationship between each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression

In Chapter 4, I provide the results of the study. The first section includes a description of the data collection process, descriptive statistics, and assumptions testing. Next, the statistical analysis findings are presented and analyzed according to research question and hypotheses. In the findings, I discuss the statistical tests and associated probability values used to assess the extent to which each of the five domains of stress were related to adolescent depression, both with and without rumination as a moderator.

Data Collection

The data used in this study were previously collected, and I received access to the de-identified data set and composite scores from my doctoral chair who, along with a research team at University of Missouri, originally collected the data. The number of participants included in the final sample of was 636 adolescents; however, given that one respondent did not complete the survey questions on depression, this participant was eliminated from the overall analysis, resulting in a total sample of 635 participants. While

earlier studies utilizing this data set deleted outliers in the study, given that the outliers represented 1.2% of the sample size and both the leverage value and Cook's distance tests indicated no problematic leverage points, I included the outliers in the study analyses.

The final sample of 635 adolescents was 52% female and 48% male (see Table 1). The racial and ethnic composition of the sample was 62.8% European American, 29.2% African American, 3.7% Latino, and less than 2% in each of the following: American Indian, Pacific Islander, and Asian American (Rose et al., 2014; Rose et al., 2016). Although there were four missing values for race, I did not use race as a factor in this particular study; hence, there was no need to delete those cases.

The sample is fairly representative of the target population of this study, which included adolescents in the United States defined by the U.S. Department of Health and Human Services (2022) as those aged 10 through 19 years old. The fact that this is an older data set will be discussed as a limitation to the study in Chapter 5. Despite this limitation, in both 2010 and 2019, there were approximately 42 million adolescents across the United States (Statistia, 2020), making up about 12% of the U.S. population (U.S. Department of Health and Human Services, 2022).

As previously noted, the data for depression contained one missing value, which was deleted from the study, leaving a sample size of 635 participants. There were no missing data for the stress variables or rumination. In Table 1, descriptive statistics, such as the number, range, mean, and variance, are outlined for school stress, family stress, peer stress, appearance stress, sports stress, depression, and rumination.

Table 1

Descriptive Statistics for Study Variables

Variable	Range	Min	Max	*M*	*SE*	*SD*	Variance
School stress	3.5	1.0	4.49	1.69	0.02	0.61	0.37
Family stress	4.0	1.0	5.00	1.84	0.02	0.60	0.36
Peer stress	4.0	1.0	5.00	1.61	0.02	0.50	0.25
Appearance stress	3.4	1.0	4.41	1.74	0.02	0.58	0.34
Sports stress	3.6	1.0	4.58	1.50	0.02	0.53	0.28
Depression	2.4	1.0	3.40	1.57	0.02	0.41	0.17
Rumination	2.9	1.0	3.90	1.97	0.02	0.55	0.30

Note. $N = 635$.

Results

Assumptions

Multiple regression includes eight specific assumptions: the utilization of a continuous dependent variable and either continuous or nominal independent variables; there should be independence of observations, a linear relationship between the dependent and each independent variable, homoscedasticity, the absence of multicollinearity and significant outliers; and normality (Laerd Statistics, 2023). I examined each of these elements to ensure the assumptions had been met.

Assumptions 1 and 2 included an exploration of the levels of measurement of each variable. Specifically, the dependent variable should be continuous (i.e., scale, interval, ratio), and the independent variables should be continuous or nominal (Laerd Statistics, 2023). Assumptions 1 and 2 were met because appropriate levels of measurement were used for the regression analysis.

Assumption 3 indicates that independence of observations or independence of residuals should be observed, which is indicated through a Durbin-Watson statistic of approximately 2 to indicate no correlation exists between residuals (Laerd, 2013). The Durbin-Watson statistic of 2.06 indicated independence of residuals in the current study (see Table 2).

Table 2

Durbin-Watson to Assess Assumption 3: Independence of Observation

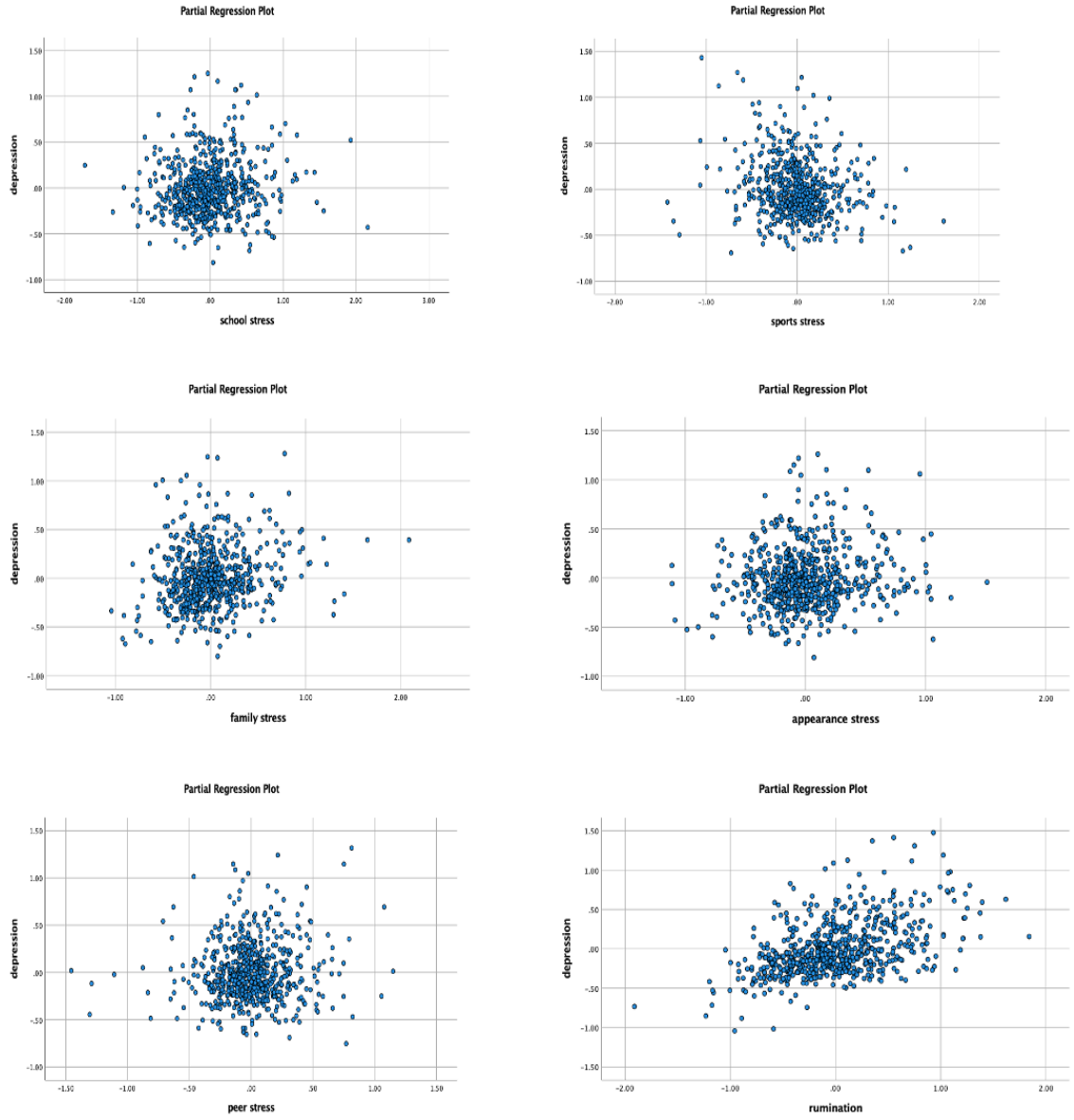
R	R^2	Adj R^2	*SE*	Durbin-Watson
0.67	0.44	0.44	0.31	2.06

Note. $N = 635$. Predictors: constant, sports stress, school stress, appearance stress, family stress, peer stress, rumination. Dependent variable = adolescent depression.

Assumption 4 refers to a linear relationship between dependent and each independent variable and the dependent variable and independent variables collectively. Figure 1 indicates the partial regression plots for each independent variable (i.e., school stress, family stress, peer stress, appearance stress, sport stress), the moderating variable (i.e., rumination), and the dependent variable (i.e., depression). Upon visual inspection, a linear relationship seems plausible between each of the independent variables, moderating variable, and dependent variables.

Figure 1

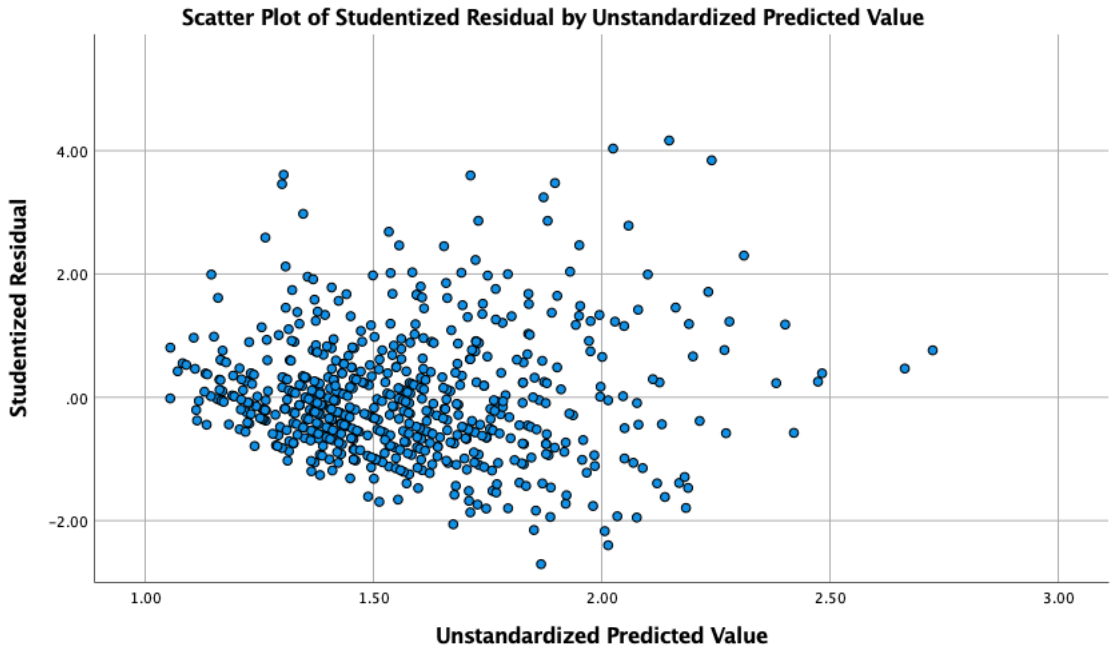
Regression Assumption to Assess Linearity Between Adolescent Depression and Each of the Five Domains of Stress and Rumination



Another element of Assumption 4 included an exploration of a linear relationship between the dependent variable and independent variable collectively. The output for this assumption included a scatterplot of studentized residuals and unstandardized predicted values. I also used this scatterplot to assess Assumption 5 that should show homoscedasticity among residuals, meaning equal error variances are assumed. Assumption 5 was met due to lack of pattern in studentized residuals versus unstandardized predicted values (see Figure 2).

Figure 2

Regression Assumption to Assess Homoscedasticity Between Studentized Residuals and Unstandardized Predicted Values



Assumption 6 includes the assessment of multicollinearity among variables. According to this assumption, multicollinearity, or a high correlation, typically above .7, between independent variables should not be present (Laerd, 2013). Table 3 indicates a

correlation over .7 between peer stress and appearance stress, family stress and appearance stress, peer stress and family stress, and peer stress and sports stress.

Table 3

Correlations to Assess Multicollinearity Among Variables

	Pearson Correlation						
	Depression	School stress	Family stress	Peer stress	Appearance stress	Sports stress	Ruminate
Depression							
School stress	.36*						
Family stress	.47*	.63*					
Peer stress	.41*	.65*	.73**				
Appearance stress	.43*	.57*	.71**	.74**			
Sports stress	.26*	.59*	.66*	.71**	.68*		
Ruminate	.59*	.28*	.36*	.33*	.38*	.27*	

Note. $N = 635$.
*$p = .001$, **above .7

Hair et al. (2014) noted that if the tolerance value is less than 0.1 and VIF greater than 10, then a collinearity problem could be present. Upon conducting an analysis of multicollinearity among the independent variables, I found the collinearity statistic tolerance levels were all greater than .1 and VIF indicated values that were all less than 10 (see Table 4). Thus, confidence was established that no collinearity issue was present.

Table 4

Collinearity Statistics: Tolerance and VIF

	Tolerance	VIF
School stress	0.51	1.98
Family stress	0.36	2.78
Peer stress	0.31	3.19
Appearance stress	0.36	2.77
Sports stress	0.41	2.42
Ruminate	0.84	1.20

Assumption 7 should indicate no significant outliers as indicated through a standard residual value of greater than 3 (Laerd, 2013). Table 5 indicated that eight possible outliers with standard residuals were present in the data; thus, a secondary analysis of leverage values and Cook's distance was necessary to continue to assess the existence of these datapoints as outliers.

Table 5

Assumption Assessment for Significant Outliers: Casewise Diagnostics

Case number	Standard Residual	Depression	Predicted value	Residual
361	3.93	3.4	2.03	1.37
366	3.41	2.9	1.71	1.19
387	4.23	3.4	1.92	1.48
416	3.75	2.95	1.64	1.31
417	3.20	2.75	1.63	1.12
419	4.05	3.25	1.84	1.41
433	3.23	2.8	1.67	1.13
611	3.12	2.4	1.31	1.09

Note. Dependent variable = depression.

Table 6 indicated the results for leverage value and Cook's distance tests to further explore the existence of potential outliers. No problematic leverage points, as

indicated by values above .2, were present. Likewise, no Cook's distance value above 1 was present. Therefore, I made the decision to keep the datapoints presented in Table 5 in the study results.

Table 6

Assumption Assessment for Significant Outliers: Centered Leverage Value and Cook's Distance

	Minimum	Maximum
Leverage value	0.00	0.11
Cook's distance	0.00	0.07

The final assumption, Assumption 8, should indicate that the residuals (i.e., errors) are normally distributed (Laerd, 2013). Figure 3 indicated a normal distribution among residuals. Figure 4 indicated a P-P plot, where the distribution of residuals were normally distributed; thus, there was no violations of the assumption of normality present.

Figure 3

Regression Assumption to Assess Normality: Histogram

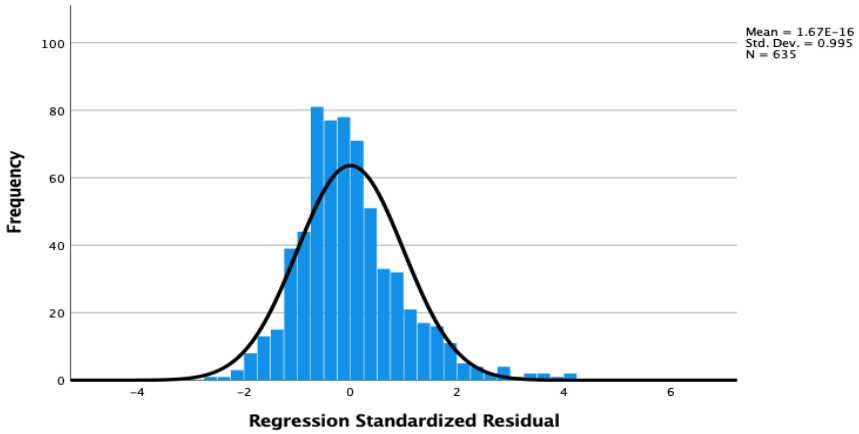
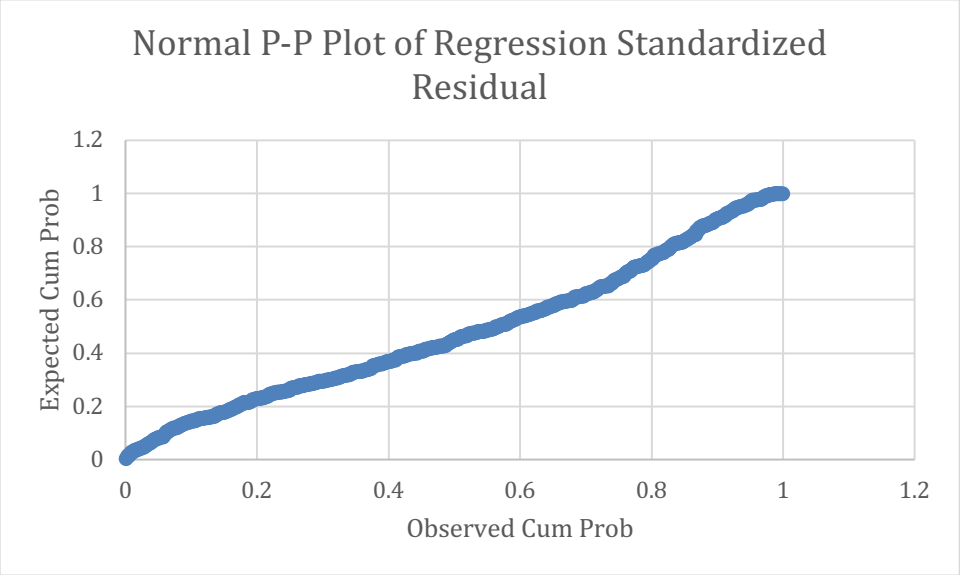


Figure 4

Regression Assumption to Assess Normality: Normal P-P Plot



Statistical Analysis Findings by Research Questions and Hypotheses

For Research Questions 1 and 2, I computed correlations to determine the extent to which each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) were related to depression in adolescence as well as the correlation between rumination and depression. Research Question 3 incorporated multiple regression with moderation. Multiple regression is used to examine the relationship between multiple predictor variables and the dependent variable (Warner, 2021). The results of the multiple regression analyses indicated the percent of variance in the dependent variable accounted for by the predictor variables together as well as individually. Determining moderation included testing the interaction between each of the five domains of stress and the moderating variable of rumination. My analysis

included all of the domains in the first analysis, followed by separate analyses for each stress domain and rumination as the moderating variable.

Five Domains of Adolescent Stress and Depression

To answer Research Question 1, I computed individual correlations to determine the extent to which each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) were related to depression in adolescence. Results indicated a significant moderate correlation between each of the domains of stress and depression (see Table 3). There was a significant positive correlation between school stress and depression, family stress and depression, peer stress and depression, appearance stress and depression, and sports stress and depression. When assessing the individual correlations between each of the five domains of adolescence stress and depression, the results indicated that the null hypothesis should be rejected because there is a significant relationship between each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression in adolescence.

The Relationship Between Rumination and Adolescent Depression

To address Research Question 2, I computed a correlation to determine the extent that rumination was related to depression in adolescence. Results indicated a significant correlation between rumination and depression (see Table 7). When assessing the correlation between rumination and depression, I rejected the null hypothesis because there is a significant relationship between rumination and depression in adolescence.

Table 7

Correlation Between Rumination and Depression

		Rumination	Depression
Rumination	Pearson Correlation		.59**
	Sig. (2-tailed)		< .001
	N	635	635

** $p < 0.001$ level (2-tailed)

Rumination as a Moderator Between Each of the Five Domains of Adolescent Stress and Depression

I conducted separate multiple regression analyses for each of the five domains of stress.

School Stress. I conducted a multiple regression analysis to predict depression from school stress, rumination, and the interaction between school stress and rumination. The model summary of results are presented in Table 8. The multiple regression model significantly predicted depression, $F(3,631) = 134.16$, $p < .001$, adj. $R^2 = .39$, indicating a large effect size.

Table 8

Model Summary: Regression of Rumination as a Moderator Between School Stress Predicting Depression

R	R^2	Adj R^2	*SE*	R^2 change	*F* change	*p*
0.62	0.39	0.39	0.32	0.39	134.16	<.001

Likewise, as indicated in Table 9, I found a significant relationship between rumination and depression, in that for every 1 unit change in rumination, there was a 0.30

unit change in depression ($p < .05$). However, school stress and the interaction variable (school stress X rumination) were not significant predictors of depression (see Table 9).

Table 9

Individual Effects: Regression of Rumination as a Moderator Between School Stress Predicting Depression

Variable	*B*	*SE*	β	*t*	*p*	CI 95% LL	CI 95% UL
Constant	0.75	0.13		5.75	<.001	0.49	1.01
School stress	0.04	0.07	0.06	0.54	0.59	-0.10	0.17
Ruminate	0.30*	0.06	0.40	4.70	<.001	0.17	0.42
Interaction	0.05	0.03	0.29	1.64	0.10	-0.01	0.11

Note. $N = 635$, CI = confidence interval, LL = lower limit, UL = upper limit.

Family Stress. A multiple regression was conducted to predict depression from family stress, rumination, and the interaction between family stress and rumination. The results of the analysis are presented in Table 10. The multiple regression model significantly predicted depression $F(3,631) = 154.74$, $p < .001$, adj. $R^2 = .42$, indicating a large effect size (Table 10).

Table 10

Model Summary: Regression of Rumination as a Moderator Between Family Stress Predicting Depression

R	R^2	Adj R^2	*SE*	R^2 change	*F* change	*p*
0.65	0.42	0.42	0.31	0.42	154.74	<.001

Likewise, as indicated in Table 11, there was a significant relationship between rumination and depression, in that for every 1 unit change in rumination, there was a 0.20

unit change in depression ($p < .05$). There was also a significant effect of the interaction variable (family stress X rumination).

Table 11

Individual Effects: Regression of Rumination as a Moderator Between Family Stress Predicting Depression

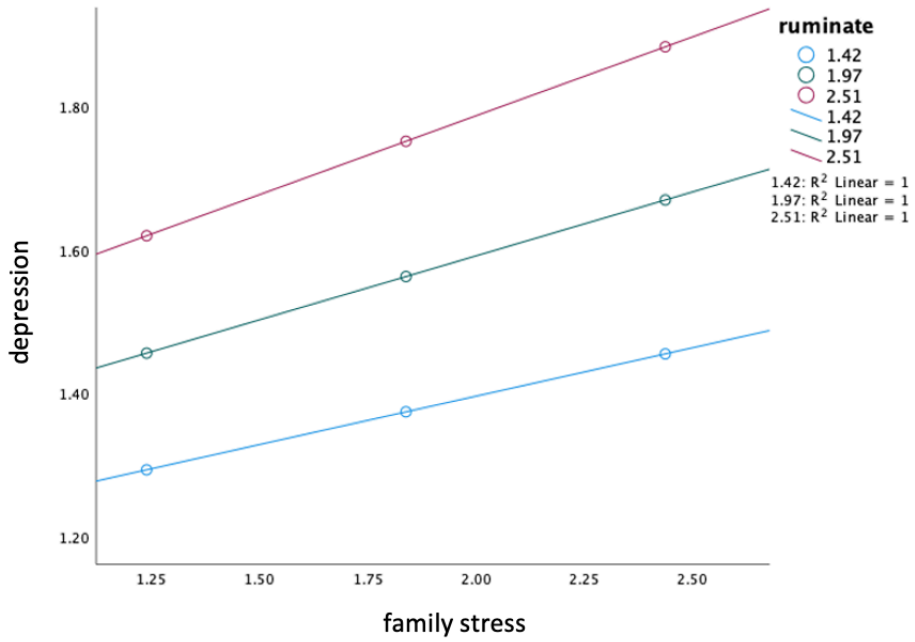
Variable	*B*	*SE*	*β*	*t*	*p*	CI 95% LL	CI 95% UL
Constant	0.84	0.13		6.4	<.001	0.58	1.09
Family stress	0.03	0.07	0.04	0.38	0.706	-0.11	0.16
Ruminate	0.20*	0.06	0.27	3.34	<.001	0.08	0.32
Interaction	0.08*	0.03	0.39	2.77	0.006	0.02	0.13

Note. N=635
CI= Confidence Interval, LL Lower Limit, UL = Upper Limit.

Simple slopes were calculated using PROCESS in SPSS to determine the association between family stress and depression at -1 *SD* below the mean, at mean, and +1 *SD* above the mean levels of rumination (Figure 5). Results indicated significant positive associations between family stress and depression at all levels of rumination, with family stress being more strongly related to depression at higher levels of rumination (B =.22, SE = .02, $p < .001$) than moderate (B =.18, SE = .02, $p < .001$), and low levels (B =.14, SE = .03, $p < .001$).

Figure 5

Simple Slopes: Regression of Rumination as a Moderator Between Family Stress Predicting Depression



Peer Stress. A multiple regression was conducted to predict depression from peer stress, rumination, and the interaction between peer stress and rumination. The results of the analysis are presented in Table 12. The multiple regression model significantly predicted depression $F(3,631) = 141.59$, $p < .001$, adj. $R^2 = .40$, indicating a large effect size (Table 12).

Table 12

Model Summary: Regression of Rumination as a Moderator Between Peer Stress Predicting Depression

R	R^2	Adj R^2	*SE*	R^2 change	*F* change	*p*
0.63	0.40	0.40	0.32	0.40	141.59	< .001

As indicated in Table 13, there was a significant relationship between rumination and depression, in that for every 1 unit change in rumination, there was a 0.21 unit change in depression ($p < .05$), as well as a significant relationship between the interaction variable (peer stress X rumination). However, a significant association was not found for the relation between peer stress and depression.

Table 13

Individual Effects: Regression of Rumination as a Moderator Between Peer Stress Predicting Depression

Variable	*B*	*SE*	*β*	*t*	*p*	CI 95% LL	CI 95% UL
Constant	0.86	0.13		6.46	<.001	0.60	1.13
Peer stress	-0.02	0.08	-0.02	-0.19	0.852	-0.17	0.14
Ruminate	0.21*	0.07	0.28	3.21	0.001	0.08	0.33
Interaction	0.10*	0.04	0.41	2.87	0.004	0.03	0.17

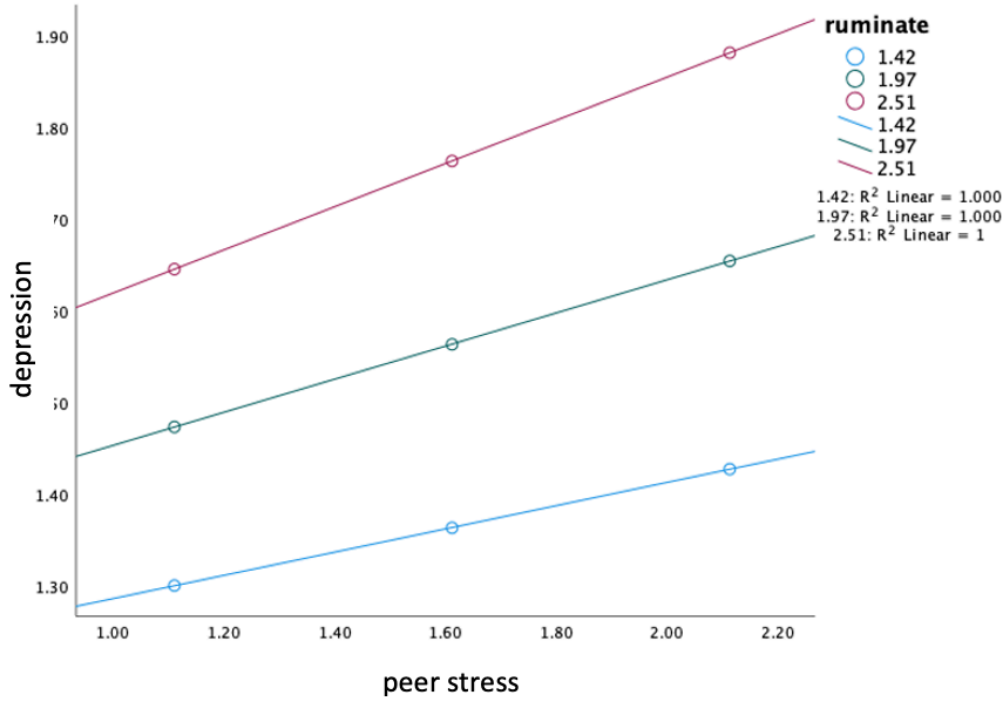
Note. N=635,
CI= Confidence Interval, LL Lower Limit, UL= Upper Limit

Simple slopes were calculated using PROCESS in SPSS to determine the association between peer stress and depression were tested at -1 *SD* below the mean, at mean, and +1 *SD* above the mean levels of rumination (Figure 6). Results indicated significant positive associations between peer stress and depression, with peer stress being more strongly related to depression at higher levels of rumination (*B* =.24, *SE* =

.03, $p < .001$) than moderate (B =.18, SE = .03, $p < .001$), and low levels (B =.13, SE = .04, $p < .001$).

Figure 6

Simple Slopes: Regression of Rumination as a Moderator Between Peer Stress Predicting Depression



Appearance Stress. A multiple regression was conducted to predict depression from appearance stress, rumination, and the interaction between appearance stress and rumination. The results of the analysis are presented in Table 14. The multiple regression model significantly predicted depression $F(3,631) = 143.50$, $p < .001$, adj. $R^2 = .40$, indicating a large effect size (Table 14).

Table 14

Model Summary: Regression of Rumination as a Moderator Between Appearance Stress Predicting Depression

R	R^2	Adj R^2	*SE*	R^2 change	*F* change	*p*
0.64	0.41	0.4	0.31	0.41	143.5	<.001

As indicated in Table 15, there was a significant relationship between rumination and depression, in that for every 1 unit change in rumination, there was a 0.17 unit change in depression ($p < .05$), as well as a significant relationship between the interaction variable (appearance stress X rumination). However, a significant association was not found for the relation between appearance stress and depression (Table 15).

Table 15

Individual Effects: Regression of Rumination as a Moderator Between Appearance Stress Predicting Depression

Variable	*B*	*SE*	*β*	*t*	*p*	CI 95% LL	CI 95% UL
Constant	0.95	0.13		7.12	<.001	0.69	1.21
Appearance stress	-0.05	0.07	-0.07	-0.72	0.474	-0.20	0.09
Ruminate	0.17*	0.06	0.23	2.68	0.008	0.05	0.30
Interaction	0.11*	0.03	0.50	3.27	0.001	0.04	0.17

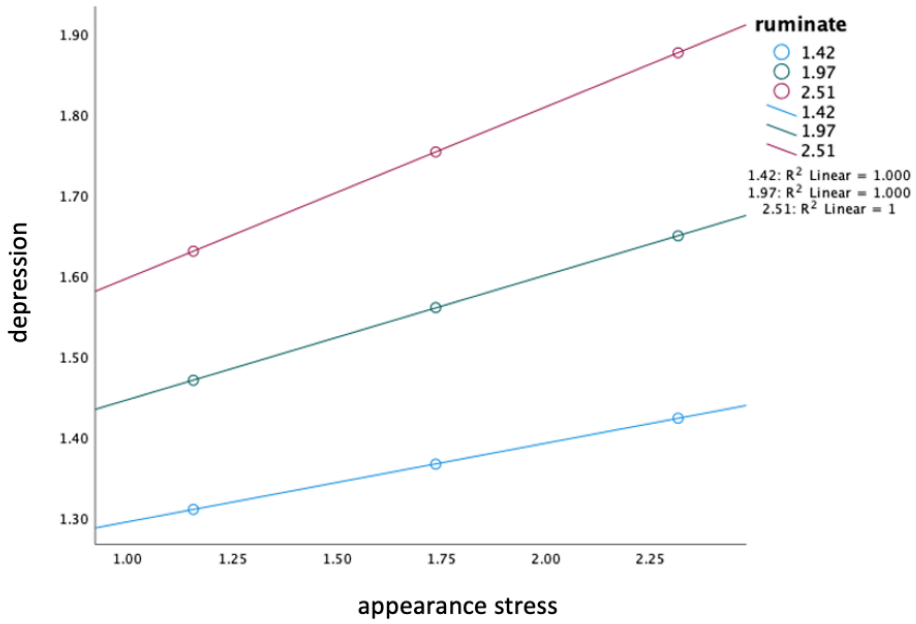
Note. N=635
CI= Confidence Interval, LL Lower Limit, UL= Upper Limit

Simple slopes were calculated using PROCESS in SPSS to determine the association between appearance stress and depression were tested at -1 *SD* below the mean, at mean, and +1 *SD* above the mean levels of rumination (Figure 7). Results indicated significant positive associations between appearance stress and depression at all

levels of rumination, with appearance stress being more strongly related to depression at higher levels of rumination (B =.22, SE = .02, p < .001) than moderate (B =.18, SE = .02, p < .001), and low levels (B =.14, SE = .03, p < .001).

Figure 7

Simple Slopes: Regression of Rumination as a Moderator Between Appearance Stress Predicting Depression



Sports Stress. A multiple regression was conducted to predict depression from sports stress, rumination, and the interaction between sports stress and rumination. The results of the analysis are presented in Table 16. The multiple regression model significantly predicted depression $F(3,631) = 116.28$, $p < .001$, adj. R^2 =.35, indicating a large effect size (Table 16).

Table 16

Model Summary: Regression of Rumination as a Moderator Between Sports Stress Predicting Depression

R	R^2	Adj R^2	*SE*	R^2 change	*F* change	*p*
0.6	0.36	0.35	0.33	0.36	116.28	<.001

Likewise, as indiciated in Table 17, there was a significant relationship between rumination and depression, in that for every 1 unit change in rumination, there was a 0.35 unit change in depression ($p < .05$). However, sports stress and the interaction variable (sports stress X rumination) were not significant predictors of depression (Table 17).

Table 17

Interaction Effects: Regression of Rumination as a Moderator Between Sports Stress Predicting Depression

Variable	*B*	*SE*	*β*	*t*	*p*	CI 95% LL	CI 95% UL
Constant	0.78	0.13		6.005	<.001	0.52	1.03
Sports stress	-0.01	0.08	-0.01	-0.123	0.902	-0.17	0.15
Ruminate	0.35*	0.06	0.47	5.928	<.001	0.23	0.46
Interaction	0.04	0.03	0.18	1.264	0.207	-0.02	0.11

Note. N=635
CI= Confidence Interval, LL Lower Limit, UL= Upper Limit

Summary

Findings for Research Question indicated that each domain of stress was significantly and moderately correlated with depression. Therefore, results indicated that the null hypothesis is rejected, meaning there is a significant relationship between each of the five domains of adolescent stress (school, family, peers, appearance, and sports) and depression in adolescence.

Findings for Research Question 2 indicated a significant correlation between rumination and depression. When assessing the correlation between rumination and depression, the null hypothesis is rejected. Thus, there is a significant relationship between rumination and depression in adolescence.

Findings for Research Question 3 indicated mixed results across the five domains of stress. The interaction variable (family stress X rumination) was significant. Simple slope analyses were calculated at -1 *SD* below the mean, at mean, and +1 *SD* above the mean levels of rumination. Results indicated a significant positive association between family stress and depression, with family stress increasingly related to depression as rumination levels increased.

The interaction variable (peer stress X rumination) was also significant. Simple slopes analyses were calculated at -1 *SD* below the mean, at mean, and +1 *SD* above the mean levels of rumination. Results indicated a significant positive association between peer stress and depression, with peer stress increasingly associated with depression as rumination levels increased. The interaction variable (appearance stress X rumination) was significant as well. Simple slopes analyses were calculated at -1 *SD* below the mean, at mean, and +1 *SD* above the mean levels of rumination. Results indicated a significant positive association between appearance stress and depression, with appearance stress increasingly associated with depression as rumination levels increased.

However no statistical significance was indicated for school stress or the interaction variable (school stress X rumination). Also, no statistical significance was indicated for sports stress or the interaction variable (sports stress X rumination). In

Chapter 5, I will compare results found in this study to the literature presented in Chapter 2 to understand how this study contributes to the existing body of knowledge, and the role of these results in promoting positive social change.

Chapter 5: Discussion, Conclusions, and Recommendations

Stress response and coping mechanism differences in individuals can influence the impact of stress and can negatively affect various dimensions of health (Conner-Smith et al., 2000). Of important consideration as a possible moderator of the relationship between adolescent stress and depression is rumination, particularly since according to Nolen-Hoeksema (2004), ruminative behaviors have the potential to increase depressive symptoms. The purpose of this quantitative nonexperimental study was to examine the link between five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) and depression, the relationship between rumination and depression, and the potential moderating effect of rumination on the relationship. I expected rumination to moderate the relation between stress and depression, such that stress would predict depression more strongly for adolescents who ruminate than adolescents who do not. To understand this relationship, I conducted secondary data analysis of a previously collected data set containing self-reported data that included the five domains of adolescent stress, depression, and rumination.

In Research Question 1, I asked to what extent each of the five domains of adolescent stress (i.e., school, family, peers, appearance, and sports) predicted depression in adolescence. The results indicated a significant relationship between each of the five domains of adolescent stress and depression in adolescence. Research Question 2 addressed to what extent rumination predicted depression. The results indicated a significant positive correlation between rumination and depression in adolescence. This correlation was much stronger than any of the correlations between the individual

domains of stress and depression. In Research Question 3, I asked whether rumination moderated the relationships between each of the five domains of adolescent stress and depression. The results showed mixed outcomes across the five domains of stress. I noted a significant positive association between family stress and depression, with family stress increasingly related to depression as rumination levels increased. A significant positive association was indicated between peer stress and depression, with peer stress increasingly associated with depression as rumination levels increased. I found a significant positive association between appearance stress and depression, with appearance stress increasingly associated with depression as rumination levels increased. However, the interactions with rumination were not significant for school stress or sports stress.

Interpretation of Findings

Stress and Depression

Existing literature has indicated a link between adolescent stress and depressive symptoms (Arnett, 1999; Conner-Smith et al., 2000; Frison & Eggermont, 2016; Rodríguez-Naranjo & Caño, 2016).). Results for Research Question 1 indicated a significant relationship between each of the five domains of adolescent stress and depression in adolescence, with family, peer, and appearance stress more strongly correlated with depression than school and sports stress.

These findings support existing literature that noted that different domains of stress can differentially predict adolescent depressive symptoms (see Conner-Smith et al., 2000; Cox et al., 2010; Mckay & Kaufman, 2013; Mezulis et al., 2002; Nicolai et al.,

2013). Likewise, Folkman (2008) revised Lazarus and Folkman's (1984) original theory regarding the stress process as a continuous cycle to highlight how unsuccessful coping and resulting distress might actually trigger more meaning-focused coping, particularly when the stressor is perceived overwhelmingly aversive (Biggs et al., 2017). The diathesis stress model focuses on the interplay between specific environmental and biological factors and was applicable for understanding that, while some adolescents might have a biological predisposition toward developing depression, depression is more likely to occur for them if triggered by an environmental stressor, such as the domains of stress under study in this research (see Ungvarsky, 2020). However, as evidenced in the current study results, these environmental stressors could function differently toward impacting depression.

Rumination and Depression

Existing literature on rumination has underscored how rumination can exacerbate depressive symptom (Broderick & Korteland, 2002; Conner-Smith et al, 2000; Landis et al, 2007; Rodríguez-Naranjo & Caño, 2016). Findings related to Research Question 2 indicated a significant correlation between rumination and depression. These findings support existing literature that showed rumination to amplify depressed moods as well as interfere with the ability to alleviate depressive symptoms, which can inhibit problem-solving behaviors (see Abeta et al., 2013; Nolen-Hoeksema, 1991). In addition, these findings align with the response style theory of depression, in which it was posited that engagement in ruminative responses amplifies a prolonged depressive mood, leading to depressive symptom development, while distracting responses relieve a depressed mood

(see Marchetti et al., 2021; Morrow & Nolen-Hoeksema, 1990; Nolen-Hoeksema, 1987). Finally, one of the basic assumptions of the control mastery theory was the belief that while individuals are able to control their mental functioning and are autonomously motivated to master their traumatic experiences and solve their issues, rumination can interfere with the ability of an individual to move beyond their circumstances and develop a sense of mastery over their environment (Gazzillo et al., 2021). In my current study, higher levels of rumination were associated with increased depression in adolescence.

Rumination as Moderator of the Relationship Between Stress and Depression

Existing research was limited in considering the moderating effect of rumination on the relationship among specific domains of adolescent stress and depression (Cox et al., 2010; Mezulis et al., 2002). Despite limited research on rumination as a moderating factor in the link between domain specific stress and depression, scholars have explored rumination as a moderating factors in the relationships among other variables. Results from studies that examined rumination as a moderator of the relations of resilience with depressive symptoms, impulsivity and alcohol problems, as well as adaptive self-reflection and resilience found that relations were stronger at higher levels of rumination (Webb et al., 2016; Yanhua et al., 2021).

Cox et al. (2010) researched rumination as a moderator of some of the associations considered in the current study. Although Cox et al. found a significant moderating effect of rumination on the association between the achievement stress domain and depressive symptoms, they found no moderating effect for the relationship

between the peer domain of stress and depressive symptoms. The finding for peer stress is especially relevant to the current study in which peer stress also was considered. Cox et al. reported that the interaction between peer stress and rumination was significantly related to depression. Simple slopes analyses in the current study indicated a significant positive association between peer stress and depression, with peer stress increasingly associated with depression as rumination levels increased. A key limitation in Cox et al.'s study was the small sample size of only 65 participants, so they may not have had sufficient power to detect an interaction with a small or moderate effect size. In contrast, the current study had a much larger sample size of 635 adolescents and considerably more power.

In addition, as compared to the Cox et al. (2010) study, which considered only the achievement and peer domains of stress, the current study included all five domains of stress. I anticipated that in expanding the domains of stress to align with DuBois and Hirsch (1990) and Furman and Rose (2015), variation in the strength of the relationships between additional domains of stress and depression would be present. Results from the current study largely supported this hypothesis. Specifically, simple slope analyses for family stress, peer stress, and appearance stress indicated the relationship between the specific domain of stress and depression were stronger at higher levels of rumination. These findings somewhat align with Rose et al. (2022) who noted the importance of fostering better problem-solving skills among adolescents experiencing interpersonal problem, which ultimately could lead to a resolution prior to corumination among friends.

When thinking about stressors, such as appearance, peer, and family stress, that showed stronger links between the domain of stress and depression at higher levels of rumination, other domains of stress, such as sports stress and school stress, did not illustrate a moderating effect of rumination. Speculatively, unlike the first three domains, school stress could potentially be alleviated through actions, such as studying harder for an exam. Likewise, working harder to overcome physical obstacles to win a game might alleviate sports stress. This finding could also possibly align with Biggs et al. (2017) who noted that prescribing positive meaning to various types of stressors, or meaning-focused coping, can elicit positive emotions, restoring personal resources and providing relief from distress, similar to what Rose et al. (2022) previously discussed.

Limitations of Study

Research limitations are factors that limit the scope of the overall study (Creswell & Creswell 2018; Leedy & Ormrod, 2018; Simon, 2011). The primary limitation to this study was that study results were limited to the secondary data used from the existing data available at the location and time the data were collected.

While no study can be conducted everywhere, the location of the original study could also be considered a limitation in certain instances given that participants attended a local public school in the midwestern United States, while private school and homeschooled students were not included in the data set. In addition, this particular sample might not be generalizable to the wider population given relatively homogenous demographic elements, even though the original researchers were cognizant to oversample from the African American population to attempt to retrieve a more

representative sample. Likewise, this study is limited in that I did not consider race or gender in my analyses, so key differences that could have existed related to stress, depression, and rumination for these groups. For example, specific races or genders might have been more strongly related to increases in rumination, thus impacting the moderating effect rumination had on the relationship between stress and depression.

The data collection for this study occurred prior to the COVID-19 pandemic. Scholars, such as Jin et al. (2022), have noted a stronger link between stress and depression, particularly as it related to gender and coping mechanisms used during the COVID-19 pandemic. Likewise, other studies conducted by the American Academy of Pediatrics, Children's Hospital Association, and American Academy of Child and Adolescent Psychiatry have highlighted a decline in adolescent mental health since the start of the COVID-19 pandemic as a national emergency, particularly in the domain of family stress and social isolation (Vestal, 2021).

Recommendations

One area of suggested further research involves replicating the results of this present study regarding five domains of stress. This is especially important given that different results emerged in at least one study. In the current study, the interaction of peer stress and rumination was significantly related to depression with simple slopes indicating that peer stress is increasingly associated with depression as rumination levels increased. In contrast, Cox et al. (2010) did not find that rumination moderated the relationship between the peer domain of stress and depression. However, a key limitation of Cox et al.'s study was the small sample size of 65 participants. In the Cox et al. study,

the interaction effect between peer stress and rumination approached significance (p = .14) and likely would have reached significance in a larger sample. Still, it would be beneficial to replicate the current study with either a similar population or a different population. Moreover, the Cox study did not focus on the same five domains of stress as I did in the current study, only peer stress.

Along similar lines, expanded demographics could be a key area of interest for future researchers on adolescent stress, rumination, and depression. For example, I did not consider race or gender in this study. Future research could test whether differences between adolescent stress, rumination, and depression differ based on race or gender similar to the Jin et al. (2022) who found stronger levels of ruminartion tied to the female gender. Likewise, another age could be used to test the relationship among variables in areas other age groups, such as high school- or elementary school-aged children. Young adults in college could also serve as an interesting population for future research on stress, rumination, and depression.

Location could serve as an additional factor of consideration for future research. Future studies could either choose an area outside of the midwestern United States, or a study could explore regional or urban/rural differences in adolescent stress, rumination, and depression to see if any key differences exist based on location.

Finally, future research is needed to determine how specific domains of stress, such as sports and school stress, could be supported, expanding on specific ways individuals work to adapt to their environment to achieve evolutionary-based, healthy goals, as indicated by both Gazzillo et al. (2021) and Silberschatz et al. (2021) in the

context of the control mastery theory. Additionally, according to the diathesis stress model, focusing on environmental triggers to depression and understanding daily stress can help shape intervention strategies to mitigate negative, long-term, physical and mental health outcomes (Pederson et al., 2022; Stefaniak et al., 2022). Along these lines, if rumination increases the relationship between certain domains of stress and depression, further research in the areas of types of prevention strategies to avoid rumination could be applicable in adolescent depression prevention.

Implications

The implications of the current study include the potential positive impact that could result from an application of this study's findings as they relate to intervention strategies targeted toward specific domains or stress, rumination, and depression. The development of therapeutic techniques or interventions tailored to adolescents impacted by specific domains of stress, rumination, and depression could lend itself to positive social change, particularly when integrated with existing theoretical frameworks, such as the control mastery theory, response style theory of depression, and diathesis stress model as a basis.

For example, by integrating the study results with the control mastery theory, adolescent therapeutic techniques could be developed to focus on environmental adaptation strategies. Or by utilizing the study results with the response style theory of depression, therapeutic and intervention strategies could be created that focus on how individuals responses to particular stressors, and how, in turn, those contribute the to onset, maintenance, and severity of depression for the individual. Likewise, as noted by

Stefaniak et al. (2022), maintaining a focus on environmental triggers that shape variation in particular domains of daily stress, rumination, and depression or prescribing positive meaning to various types of stressors (i.e., meaning-focused coping) can elicit positive emotions. These positive responses can, according to Biggs et al. (2017), have the potential to increase personal resources or an individual's tool kit for dealing with stress and provide relief from distress. Taken together, these elements can be used to help shape intervention strategies to mitigate the negative, long-term, physical and mental health outcomes through positive coping mechanisms to reduce domain-specific stress, rumination, and depression, resulting in positive social change.

Conclusion

The existence of stressors combined with the ways individuals cope with stress can have an overall impact on various dimensions of health (Conner-Smith et al., 2000; Mckay & Kaufman, 2013; Nicolai et al., 2013). Likewise, rumination has been shown to contribute to the onset and maintenance of depressive symptoms (Broderick & Korteland, 2002; Conner-Smith et al, 2000; Landis et al, 2007; Rodríguez-Naranjo & Caño, 2016). Rumination was of important consideration in the current study when examining the relationship between adolescent stress and depression, particularly because ruminative cognitions have the potential to increase depressive symptoms. While previous research has tested these elements in pieces to show that stress, both as a whole and in limited domains, impacts depression as well as how rumination impacts depression, in this study I explored the interaction between five specific domains of stress (i.e., school, family, peers, appearance, and sports stress) with rumination as a moderating factor in predicting

adolescent depression.Results indicated a significant relationship between each of the five domains of adolescent stress and depression in adolescence as well as a significant, positive correlation between rumination and depression in adolescence. I expected rumination to moderate the relationship between stress and depression, such that stress would predict depression more strongly for adolescents who ruminate than adolescents who do not. The findings indicated mixed outcomes across the five domains of stress. A significant positive association was found between depression and family stress, peer stress, and appearance stress, with simple slope analyses indicating that the relationship between these specific domains of stress and depression were stronger at higher levels of rumination.

The results of this study added to the existing body of knowledge regarding rumination as a moderator of the relationships between resilience and depressive symptoms as well as adaptive self-reflection and resilience (Webb et al., 2016; Yanhua et al., 2021), and aligned with research by Gray and McNaughton (2003) that showed that individuals with internalizing problems have greater difficulties with behavioral inhibition. While additional research in this area could prove beneficial in expanding this study to include elements, such as location, race, and gender, overall, the study results could prove useful in helping to shape intervention strategies to mitigate negative mental health outcomes related to the interaction between rumination and various stress domains in predicting depression.

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