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The Protective Effects of Physical Activity Coping and Environmental Supports on Academic Stress among Adolescents

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Biography

The author was born in Baltimore, Maryland on February 6, 1997. She graduated from Mount de Sales Academy in Catonsville, Maryland in 2015. She received her Bachelor of Science in Psychology from The Ohio State University in 2019. She is currently pursuing her MA/PhD in Community Psychology at DePaul University.

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Abstract

This study aims to identify how physical activity (PA) coping interacts with environmental risks and resources to predict youth mental health. Academic stress poses a threat to adolescent wellbeing, and has been linked to adverse mental health outcomes, including depression and anxiety. Previous research has established that engaging in PA protects adolescents from depression and anxiety. However, very little is known about how PA may function as a coping mechanism, specifically (i.e. PA coping). PA is influenced by risks (e.g. crime, low built environment quality, etc.) and resources (e.g. accessibility, exercise equipment, etc.) in one's environment, and accordingly, the present study accounted for such factors in the home, school, and neighborhood. Adolescents (N_{T1} = 373, N_{T2} = 170) were surveyed at the beginning and end of a school year. Linear regressions and a series of moderation analyses were used to analyze data. Results indicated that PA coping significantly buffered the relationship between academic stress and depression, but only in the context of high levels of risks for PA in one's school setting (b = -0.07, p = .029). These findings highlight how systems-level risks interact with individual-level coping techniques to predict depression among diverse adolescents living in urban settings. Research, practice, and policy implications are discussed.

Keywords: academic stress, physical activity coping, schools, adolescence, depression, anxiety

Introduction

Adolescence is a pivotal developmental juncture which lays the foundation for life-long health behaviors as youth transition through puberty, gain independence, and spend more time with their peers (Holmbeck, 2002; Wiium et al., 2015). Additionally, during this time adolescents face threats that degrade wellbeing, including amplified stressors and the common onset of internalizing disorders (Kessler et al., 2001). Academic stress is a particular threat to youth as it is strongly linked to negative mental health outcomes. Intrapersonal strategies to promote emotional wellbeing, including the implementation of adaptive coping skills, can protect youth from the harmful impacts of such stress. Similarly, physical activity (PA) has known salutary effects on adolescent mental health. Yet, there is a major gap in the literature regarding how PA may function specifically as a coping mechanism (i.e. PA coping) among youth. Environmental factors, such as neighborhood safety and the built environment, should be considered given their established associations with both psychosocial health and PA. Thus, in alignment with social ecological theory, environmental factors can provide insight into the buffering effects of PA coping on the relationship between academic stress and depression and anxiety. Such research is needed to clarify how adolescents may capitalize on environmental resources to support their coping strategies in response to academic stress.

Academic Stress

Stress has far-reaching consequences on youth physical and mental health (Romeo, 2013). Adolescence is a critical period during which stressors emerge and intensify, especially in domains such as puberty, relationships, and increasing autonomy (Byrne et al., 2007). Academic stressors related to one's education and performance in school are also a central threat to youth both nationally and globally (Pascoe et al., 2020). Some examples of academic stressors include—but are not limited to—failing a test or class, not understanding class concepts, dealing

with large amounts of homework, and managing expectations of parents and teachers. A 2017 systematic review found that the prevalence rate of adolescent school-related stress ranged from 15% to 45% in articles published after 2000 (Reddy et al.). School stressors are one of the most frequently cited stressors among this population (Östberg et al., 2015; West & Wood, 1970). Some literature suggests that academic stress is a greater concern among racially and ethnically diverse youth living in urban settings, as opposed to White youth (Munsch & Wampler, 1993). In a study of 114 urban adolescents, school-related stress, amidst exhaustion and conflict with parents, was ranked in the top three for broadest negative impact on youth wellbeing (Allison et al., 1999). Similarly, research by Farrell and colleagues (2006) indicated that in a list of over 60 stressors ranked by urban, predominantly Black youth (N = 176), school-related stressors made up eight of the 25 most prevalent and difficult events. Academic stress is also heightened among those students living in disinvested neighborhoods with low-resourced schools (Allison et al., 1999) because too often such youth do not have adequate access to the systemic supports needed to meet the demands of this stress (Barbarin, 1983; Partelow, 2018).

Academic stress deteriorates the emotional and behavioral health of adolescents, with clear links to internalizing symptoms (Arsenio & Loria, 2014; Luthar & Becker, 2003; Reddy et al., 2017) as well as suicide risk (Ang & Huan, 2006; Reddy et al., 2017; Ying et al., 2020). Elevated academic stress can elicit anxiety among teenagers (Deb et al., 2015; Trevethan et al., 2022; Verma et al., 2002). In a cross-sectional examination of a predominantly Black sample of urban adolescents (N=143), academic stressors were positively related to internalizing problems, including anxiety (Cory et al., 2020). Despite some prospective longitudinal studies (Trevethan et al., 2022; Verma et al., 2002) confirming the above links, much of this research is cross-sectional, and therefore, the direction of effects may be ambivalent given that mental health

struggles can exacerbate issues with academic performance (Masten et al., 2005).

In addition to anxiety, academic stress can make youth vulnerable to depression. For example, a cross-sectional study conducted with 1,120 Indian adolescents showed that students who reported high levels of academic stress were almost two and a half times more likely to experience depression (Jayanthi et al., 2015). Such risk for depression may also magnify youth's risk for suicide, as Ang and Huan (2006) demonstrated that depression symptoms significantly mediated the relationship between academic stress and suicidal ideation among 1,108 Asian adolescents living in Singapore. Longitudinal research has established directionality in the relationship between academic stress and suicide risk. For example, researchers assessed over 2,500 Australian adolescents for suicide risk over the course of three years, finding that perceived academic performance was the strongest predictor of suicidality above and beyond self-esteem and locus of control (Martin et al., 2005).

Despite academic stress being a prominent focus of American literature in the late 20th century, much of this research is now being conducted in Asia likely because education is highly valued in Confucian Heritage Culture countries, including China, Korea, and Japan (Tan & Yates, 2011). Such cultural value placed on academics influences teacher and parent expectations and the subsequent pressure exerted on Asian youth (Chen & Stevenson, 1995; Lew, 2006). It is important that this academic stress research be replicated in American adolescent populations, particularly with longitudinal methodology and racially and ethnically diverse youth. In light of the widespread prevalence of academic stress and its harmful consequences on adolescent mental health, it is important that researchers address effective strategies for managing distress related to one's education.

Coping

According to Compas and colleagues, coping refers to "conscious volitional efforts to regulate emotion, cognition, behavior, physiology, and the environment in response to stressful events or circumstances" (2001). Such attempts to manage one's stress have been a topic of extensive study among psychological research for many decades, and numerous theories have attempted to classify coping typology, as well as determine which types of coping are advantageous for different stressors. One of the earliest theoretical categorizations of coping mechanisms is Lazarus and Folkman's (1984) problem-focused versus emotion-focused coping. Problem-focused coping is attempts to manage or manipulate the issue causing one's stress, while emotion-focused coping is controlling one's emotional response to the stress. The approach-avoidance model, developed by Roth and Cohen (1986), presents a dichotomous view in which coping strategies are represented by an orientation towards (approach) or away (avoidance) from the stressor. Akin to approach-avoidance, the more recent engagement-disengagement theory is widely supported among many different populations and encapsulates a multi-tiered response to stress (Compas et al., 1999; Connor-Smith et al., 2000). In this model, reactions to stress are first categorized by whether or not the response was voluntary (i.e. controlled) or involuntary (i.e. automatic reactions), and then is divided by engagement (i.e. approach) versus disengagement (i.e. avoidance). Engagement coping is further classified by primary control, referring to attempts to regulate either the stressful situation or one's emotions about the situation, and secondary control, which is an adaptation to the stressor (Connor-Smith et al., 2000). Lastly, another critical theory of coping emphasizes that youth should match coping techniques to specific stressors and contexts, for coping must be considered as part of the general stressor ecology in which it is likely certain coping mechanisms may be adaptive in some cases and maladaptive in others (Tolan & Grant, 2009). Understanding the theoretical underpinnings of

coping typology and theory is crucial if the field is to determine how coping may buffer adverse mental health outcomes.

A meta-analysis (212 studies, N = 80,850 participants) assessing the impacts of various coping mechanisms on child and adolescent mental health found that primary control coping, secondary control coping, and emotional regulation were linked to decreased symptoms of psychopathology, whereas avoidance and disengagement strategies, including emotional suppression and denial, were related to increased symptoms of psychopathology (Compas et al., 2017). These broader trends apply to internalizing symptoms of depression and anxiety, too, with many studies demonstrating the adaptive effects of engagement and approach coping and the maladaptive effects of avoidance coping (Clarke, 2006; Compas et al., 2001; Compas et al., 2004; Simpson et al., 2012). In response to academic stressors specifically, engagement and approach coping strategies are also correlated with positive adjustment, such as less anxiety and better academic performance (Causey & Dubow, 1992). Responding to school-related stress with disengagement coping and lower levels of approach coping, on the other hand, may lead to increased anxiety, lower GPA, and negative perceptions of one's education (Arsenio & Loria, 2014; Causey & Dubow, 1992; Griffith et al., 2000). Indeed, the literature indicates that adolescents most commonly use approach coping mechanisms when managing academic stress (Compas, 1988; Griffith et al., 2000; Moos, 1990). Research with adolescents from diverse racial and ethnic identities also confirms that engagement coping techniques are most adaptive for academic stress (Cory et al., 2020). In sum, certain coping strategies are more advantageous in response to specific stressors, and adolescents must learn how to match the most appropriate coping techniques with their stressors in order to reduce adverse health consequences.

Importantly, there is considerable evidence to show that the coping mechanism selected

for a given problem often depends on how controllable someone perceives that problem to be (Compas et al., 2001; Gamble et al., 1994). Engagement and problem-focused strategies might be particularly useful for social situations, for example, which are likely more controllable than structural and environmental stressors, such as systemic racism. Academic stress may also be perceived as relatively controllable (Cory et al., 2020; Griffith et al., 2000), which may elicit greater use of engagement and approach coping modalities. However, it is also plausible that certain aspects of academic stress are uncontrollable, as may be likely in cases of intellectual disability (Alexander-Passe, 2008) or school-level disinvestment (Eiraldi et al., 2015), such as lack of funding for educational programs and evidence-based mental health resources.

Despite the ample research on types and effectiveness of coping strategies, much of this body of knowledge is derived from predominantly White, middle- to upper-class adolescents (Clarke, 2006; Compas et al., 2001). Such a noticeable gap in the study of coping among youth from varied racial, ethnic, and economic backgrounds can be harmful because coping strategies of affluent White youth are uplifted as the norm, while divergent strategies may be pathologized. For instance, though the general coping literature deems disengagement and avoidance strategies to be maladaptive, some studies have illustrated that disengagement strategies may, in fact, be protective for Black youth (Dempsey et al., 2000; Grant et al., 2000), particularly in the context of chronic, uncontrollable stressors such as community violence (Edlynn et al., 2008). Overall, coping mechanisms are vital for protection against the negative impacts of stress on psychopathology, but there is disagreement over which types of coping are most useful among diverse, multicultural populations and in which situations. PA, on the other hand, is conclusively beneficial for both physical and mental health.

Physical Activity

The positive impacts of PA on adolescent wellbeing are widespread and well-

documented. Indeed, research has repeatedly shown that youth who engage in greater PA are less likely to demonstrate symptoms of depression and anxiety (Ahn & Fedewa, 2010; Bell et al., 2019; Biddle & Asare, 2011; Biddle et al., 2019; Larun et al, 2006). The salutary mental health effects of PA are often attributed to biological mechanisms such as inflammation reduction, improved functioning of hormonal stress response systems, and enhanced neural plasticity and growth factor expression in the brain (Silverman & Deuster, 2014). A recent systematic review by Biddle and colleagues (2019) investigated the major trends emerging from meta-analyses and articles which evaluated the mental health impact of PA on youth ranging from 5- to 18-years-old. This review of reviews included 42 articles which assessed outcomes including depression, anxiety, self-esteem, and cognitive functioning. The authors concluded that greater PA was moderately associated with less depression and that these effects showed notable evidence for causality. On the other hand, higher PA was associated with lower anxiety, but these effects were smaller and without enough evidence to assume causality (Biddle et al., 2019). There is a need for further investigation into the relationship between PA and anxiety given that much of this research has stagnated in the past decade (Biddle et al., 2019). It is possible that the field has placed more recent emphasis on intervention research (e.g. individual therapy, anti-anxiety medications, etc.) rather than larger-scale prevention efforts such as physical activity programs (Ebert et al., 2015; Reynolds et al., 2012).

There is considerable research, including prospective longitudinal studies, to show that PA moderates the relationship between general stress and its harmful outcomes (Gerber & Pühse, 2009). There is also preliminary evidence that PA protects youth from the consequences of academic stress, specifically. A cross-sectional investigation conducted with over 1,600 Norwegian 15-year-olds found that school-related stress more strongly predicted increased health

complaints for those teens who reported lower PA engagement (Haugland et al., 2003). However, a similar cross-sectional study from Switzerland did not find any moderating impacts of PA on the relationship between school stress and psychosomatic health complaints (Gerber & Pühse, 2008). The reason for these conflicting results may be that Gerber and Pühse assessed school-related stress with eight items as opposed to the single item that Haugland and colleagues (2003) used, but such conflict could also be attributed to intercountry variation in sports participation, PA engagement, and school systems (Gerber & Pühse, 2008). To date, there has been at least one study which assessed the interactive impact of academic stress and PA on mental health. Yet, in their longitudinal investigation, Wunsch and colleagues (2017) found that the relationship between academic stress and positive and negative affect was not buffered by physical activity among college students. PA was self-reported in this study, and it is possible that PA would have been a significant moderator if objective PA measurement had been used. Nonetheless, there is a need for similar investigations among adolescents so as to inform potential pathways for reducing psychological problems.

Likewise, there is a paucity of information regarding how PA functions as a coping mechanism. Assessment of PA as a coping technique may help account for youth's motivation and personal meaning behind choosing to exercise. For example, exercising to deal with one's stress may have more direct impacts on mental health outcomes than exercising for the purpose of losing weight. Though it is possible that younger adolescents may not differentiate between their motivations for exercise. Furthermore, PA coping warrants expanded research attention because actual engagement in PA as opposed to reports of how likely one would use PA to cope are separate constructs (Harris et al., 2006). Perhaps self-report and objective measurement of PA engagement may cast too broad a net by including mandatory PA from activities like gym

class, whereas PA coping may capture more volitional actions aimed at stress management. While time spent in PA is certainly beneficial biologically (Silverman & Deuster, 2014), capturing PA coping may clarify whether stress relief motives for PA can also sufficiently predict mental health outcomes. As such, it is possible that adolescents use PA as a means of engagement and approach coping. This might partially explain some of the past findings on the positive psychosocial effects of PA (Biddle et al., 2019), since engagement coping styles are often effective for preventing depression and anxiety (Clarke, 2006). Yet, it is also plausible that PA may represent a form of distraction, which is a coping technique that has more consistently been related to negative mental health outcomes (Compas et al., 2017; Simpson et al., 2012).

There are at least three studies which assess PA specifically as a coping mechanism, all of which have been conducted with adult populations. Harris and colleagues, for instance, longitudinally captured self-reported PA, PA coping, and depressive symptomology among a sample of 424 adults with clinical depression (2006). PA coping was concurrently linked to lower levels of depression in a main effect, but it was also a significant moderator such that it protected participants from the impacts of stressful life events and medical conditions on depressive symptoms (Harris et al., 2006). However, the authors measured PA coping with only a single item, leaving room for psychometric improvement. Moreover, PA coping, as measured by two items, was predictive of lower stress endorsement among a sample of pharmacy students, who also named PA as one of their most frequent coping mechanisms in an open-ended survey question (Garber, 2017). Lastly, in 2020, Dalton explored whether college students' (N=127) beliefs about exercise as a coping technique predicted their actual PA levels following stressful events using a 14-day daily diary longitudinal design. Findings indicated that greater PA coping positively predicted self-reported PA. Similarly, PA coping increased one's likelihood of PA

when daily stress was high and also buffered against the negative impacts of both chronic and daily stress on PA levels (Dalton, 2020). Limitations were present though, as 75% of the sample were women.

In sum, while there is preliminary evidence suggesting PA coping may be related to psychological outcomes, such as stress (Dalton, 2020; Garber, 2017) and depression (Harris et al., 2006), there are considerable gaps in the PA coping literature. The aforementioned studies include adults of generally non-diverse backgrounds and utilize a very limited number of items to measure PA coping. Consequently, it is critical to uncover how PA coping affects psychological outcomes amongst racially and ethnically diverse samples of youth and in response to more targeted stressors, including academic stress. Youth of minoritized racial and ethnic backgrounds should be prioritized for prevention and intervention given they often have lower rates of physical activity (Iannotti & Wang, 2013) and higher rates of chronic stress (Sacks & Murphey, 2018). While PA and PA coping are protective for health, PA is not equally accessible for all. In fact, PA is highly influenced by a range of community and environmental factors.

Environmental Factors

It is essential to consider the impact of contexts beyond the individual when discussing psychosocial health. Social ecological theory provides a useful scaffolding from which to explore the effects of environmental factors on the relationship between academic stress, PA coping, and internalizing disorders. Social ecological theory has been utilized extensively in health behavior research (Golden & Earp, 2012; McLeroy et al., 1988; Sallis et al., 2018; Zhang et al., 2015) and posits that health is determined by a dynamic interplay of influences stemming from five domains: (1) intrapersonal, (2) interpersonal, (3) organizational, (4) community, and (5) public policy (McLeroy et al., 1988). PA, in particular, has been subject to many social

ecological investigations and it is clear that PA participation is dependent upon the interactions between the individual and their social and physical environments. In a recent systematic review, Hu and colleagues (2021) used social ecological theory to guide their examination of youth PA engagement, finding that resources such as accessibility of facilities and neighborhood safety were essential predictors of PA participation. Research from the social ecological framework has also shown that youth participate in a majority of their PA in the neighborhood, home, and school settings (Evenson et al., 2006; Huang et al., 2021; Sallis et al., 2001; Saunders et al., 2018; Yan et al., 2014). Correspondingly, developmental psychology research indicates that urban and suburban adolescents spend a majority of their time in the home and school settings (Larson et al., 2001). Therefore, risks and resources for PA in these settings should be assessed to determine how they may protect youth from stress and emotional dysfunction.

The incorporation of social ecological theory also has important ethical implications. Research that neglects an exploration of broader systemic factors relating to health behaviors often risks a victim-blaming narrative. These narratives too frequently center negative health outcomes as originating from solely the individual, despite evidence of the larger societal, political, and environmental forces at hand (Ryan, 1976). In turn, such victim-blaming research may also disregard the opportunity to spotlight how youth can leverage existing beneficial resources in their environment.

The literature shows that built environment, referring to the physical, often human-made structures in which one lives, works, and plays, is highly related to mental health outcomes (Beyer et al., 2014; Larson et al., 2016; Renalds et al., 2010). Longitudinal research with 2,345 Chicagoan youth found that neighborhood risks and resources, including crime and collective efficacy, were indirectly related to internalizing problems (Dupéré et al., 2012). Likewise,

community level factors are linked to anxiety and depression, as seen in a nationally representative, decade-long longitudinal study of Swedish youth, which found that neighborhood factors accounted for 5% of the variation in internalizing disorders (Sundquist et al., 2015). Among a diverse sample of Boston high school students (*N*=1,170), Duncan and colleagues (2013) employed GIS methodology to cross-sectionally determine effects of the built environment on depression, finding that there was a significant, but minimal, correlation between higher-quality built environment and lower depressive symptomology.

In addition to mental health, there has been comprehensive investigation into the relationship between the environmental factors and PA. Unsurprisingly, neighborhood walkability is linked to increased PA and decreased sedentary time among the adult population (Kärmeniemi et al., 2018; Renalds et al., 2010) and adolescents specifically (Sallis et al., 2018). Greater access to parks, gyms, and recreational spaces also facilitates higher youth PA (Carrol-Scott et al., 2013; Ding & Gebel, 2012; Evenson et al., 2006; Huang et al., 2021; Safron et al., 2011). Moreover, studies have revealed that neighborhood safety (Carver et al., 2008; Evenson et al., 2006) is correlated with greater PA among children and adolescents. These protective benefits of environmental factors have been demonstrated among racially and ethnically diverse youth (Carrol-Scott et al., 2013; Dowda et al., 2020; Evenson et al., 2006; Kaczynski et al., 2018). However, most of the research connecting environmental factors to PA has been cross-sectional to date, and thus, longitudinal investigations are needed to expose the temporal nature of these relationships.

The aforementioned neighborhood factors may also moderate the connection between PA and psychosocial health, as seen in a cross-sectional adult study which found that the relationship between PA and psychosocial satisfaction was stronger for those participants who reported more

positive perceptions of their neighborhood built environment (Gay et al., 2011). Colabianchi and colleagues (2019) conducted a longitudinal study with middle-school students (*N*=636) to determine whether neighborhood environments that were supportive for PA moderated the impact of psychosocial factors, such as self-efficacy and parental support, on PA engagement. They found a significant interaction between parental support and supportive neighborhood environments, indicating that PA was greatest among youth with high parental support and a supportive environment, but there were no differences in PA by parental support if the youth did not also have a supportive environment. The general results from this study demonstrate that both environmental and psychosocial supports are necessary to curb the decrease in PA that happens as youth progress through adolescence (Colabianchi et al., 2019).

Particularly relevant to the current proposal is a longitudinal study from Dowda et al. (2020), which examines the relationship between PA and environmental factors, including perceived neighborhood environment, objectively measured street quality, and access to PA equipment. These investigators measured PA in the home, neighborhood, and on one's home street. Findings exhibited that more access to PA equipment and better street quality was related to greater PA in the home, positive perceptions of one's built environment was related to greater PA in the neighborhood, and more PA equipment and better perceptions of the environment were related to greater PA on one's street (Dowda et al., 2020). These results demonstrate the strong influence of environmental factors on PA among urban adolescents, as well as the importance of the neighborhood and home settings when assessing PA.

In alignment with social ecological theory, the built environment may also influence the effectiveness of coping strategies. To demonstrate, one's built environment can impact their ability to seek or maintain social support because some neighborhoods and residential facilities

may lack safe spaces for gathering or may not have pedestrian pathways for easy travel (Evans, 2003). Hence, social support seeking, considered an engaged coping strategy, may be more readily accessed or effective in environments that are physically conducive to social gathering. These findings are supported by research that suggests the effectiveness of coping strategies is highly context-dependent (Tolan & Grant, 2009). For example, active and engagement coping, which are typically predictive of positive psychosocial outcomes, are a much less effective strategy in the context of chronic and uncontrollable stressors such as community violence (Edlynn et al., 2008; Gresham et al., 2021) and may even exacerbate mental health and behavioral problems in such circumstances (Carothers et al., 2016). Additionally, a recent longitudinal mixed-methods study with diverse parent-adolescent dyads found that coping effectiveness varied based on the context of parental support, suggesting that some coping strategies attenuate the relationship between chronic stress and psychological problems only in the context of high parental support (Reife et al., 2020). It is plausible, then, that environments which are supportive of PA engagement may also impact the utility and effectiveness of PA coping.

In all, depression and anxiety as well as PA are connected to various environmental factors. Likewise, there is some evidence that environmental factors may also hinder or strengthen one's ability to effectively cope with stressors. The literature on youth PA engagement and adolescent development suggests that the home, school, and neighborhood are settings in which youth spend most their time and receive a majority of their PA. Consistent with social ecological theory, the current study incorporates measures of the home, school, and neighborhood settings to assess the environmental context of PA coping. More specifically, at the intrapersonal level we will be analyzing the moderating impact of using PA as a coping

mechanism to buffer the relationship between academic stress and anxiety and depression, while accounting for community level (i.e. home, school, neighborhood) influences on intrapersonal strategies (i.e. PA coping).

Rationale

Academic stress has severe consequences for adolescents, including increased anxiety (Cory et al., 2020; Deb et al., 2015) and depression (Ang & Huan, 2006; Jayanthi et al., 2015). Academic stress may be particularly relevant to urban youth living in disinvested neighborhoods with low-resourced schools. However, much of the research on academic stress is now being conducted in Asian countries, and it is crucial to understand how academic stress impacts urban American youth of diverse racial and ethnic identities in order to prevent negative health outcomes.

Effective coping strategies have the potential to protect adolescents facing elevated academic stress. In general, engaged coping styles are most adaptive in response to school-related stressors (Causey & Dubow, 1992), while disengaged coping is likely maladaptive (Arsenio & Loria, 2014; Griffith et al., 2000). This may be due to the fact that academic stress is commonly viewed as a controllable problem (Cory et al., 2020). PA has far-reaching positive impacts on adolescent mental health and may serve as a defense against anxiety and depression (Ahn & Fedewa, 2010; Biddle et al., 2019). Yet, there is a critical gap in the literature surrounding how PA can be employed specifically for the purposes of coping. The several studies (Dalton et al., 2020; Garber, 2017; Harris et al., 2006) that investigate PA coping were conducted with mostly White adults. Therefore, efforts must be taken to understand how PA coping functions to shield diverse adolescents living in urban settings from the harmful outcomes of academic stress.

Social ecological theory, which accounts for the interactions of an individual with their social and physical environment, offers a robust framework for examining correlates of health behaviors and internalizing disorders among adolescents. Moreover, there is precedent for use of the social ecological theory in studies of PA and mental health among urban youth of varying racial and ethnic backgrounds (Carrol-Scott et al., 2013; Colabianchi et al., 2019; Dowda et al., 2020). Youth PA participation is highly influenced by a host of environmental factors, including the accessibility of parks and exercise facilities (Ding et al., 2011; Safron et al., 2011), neighborhood safety (Evenson et al., 2006), and aesthetics (Qu et al., 2020). Incorporation of a social ecological framework will elucidate the role of individual coping mechanisms by considering how environmental factors may support or hinder PA coping.

Therefore, the current study addresses a major gap in the literature by assessing whether PA coping buffers the relationship between academic stress and depression and anxiety more strongly among those adolescents with access to greater environmental supports. This research tests whether academic stress is predictive of anxiety and depression symptomology and whether PA coping moderates the impact of academic stress on these internalizing disorders. Additionally, the current study incorporates environmental factors measured at the level of the home, school, and neighborhood to determine whether they interact with PA coping and academic stress to prospectively predict anxiety and depression. These results also identify whether resources or risks are more impactful when interacting with PA coping to predict depression and anxiety.

Statement of Hypotheses and Research Questions (See Appendix A for conceptual models).

1. Higher levels of baseline academic stress will predict greater depression and anxiety at the six-month follow-up when controlling for baseline depression and anxiety.

2. PA coping will moderate the relationship between baseline academic stress and follow-up depression and anxiety such that this relationship will be weaker among those who engage in higher levels of baseline PA coping, even when controlling for baseline depression and anxiety.
3. Controlling for baseline depression and anxiety, there will be a three-way interaction such that the buffering effect of baseline academic stress and PA coping on follow-up depression and anxiety will be dependent upon risks and resources for PA in one's environment. This hypothesis will enable examinations of the relative contributions of home, school, and neighborhood factors to the three-way interaction predicting follow-up depression and anxiety.

Methods

Recruitment & Participants

Demographic information can be found in Table 1. Participants (N_{T1} = 373, N_{T2} = 170) were, on average, 14 years old and a greater proportion of the sample was female than male. Additionally, the sample was notably racially and ethnically diverse. This study was conducted with a secondary dataset in which adolescents between the ages of 11 and 18 years old were approached to participate in a larger, longitudinal study designed to explore broader concepts related to stress and coping. Participants were recruited from one high school and two K-8 public schools in neighborhoods across Chicago, one of which was located in a higher income, predominantly White neighborhood, while the other two were located in disinvested South Side neighborhoods that are typically lower-income with higher proportions of residents of color. Researchers of the larger study aimed to understand a broader range of stressors than what is typically found in adolescent stress literature, much of which has oversampled White, middle-

and upper-class youth (Clarke, 2006; Compas et al., 2001). Therefore, the investigators attempted to include youth from diverse socioeconomic, racial, and ethnic backgrounds by recruiting from several schools in which a larger portion of students were given free or reduced lunch.

Table 1

Demographic Characteristics of Participants at T1

Total Sample N_{T1} = 373	
Characteristic	***M* (SD) or Percent (n)**
T1 Age	14.0 (1.92)
Gender, % Female	53% (198)
Race	
Black or African American	34.7% (129)
White or Caucasian	36.6% (136)
Asian or Asian American	10.8% (40)
American Indian or Alaska Native	1.1% (4)
Native Hawaiian or Pacific Islander	0.5% (2)
Multiracial	16.4% (61)
Ethnicity (% Hispanic)	38% (142)
T1 Family Income	$51,890 ($26,921)

Procedure

At Time 1 (T1), DePaul research staff visited 6th-12th grade classrooms in the abovementioned schools. Staff described the research study and distributed consent forms for students to bring to their parents/guardians. Students received a $10 gift card for returning their

parents' forms regardless of whether they consented to participate. Youth participants provided informed assent before survey completion. So that changes in stress and coping could be assessed longitudinally over the course of a full school year, T1 took place in Fall 2012 followed by Time 2 (T2) in Spring 2013. At T2, participants from T1 were contacted based on tracking information received from T1 and asked to return for the second round of data collection.

At T1, participants came to DePaul University to complete surveys and a battery of additional behavioral and physiological tasks for the larger study. They were informed that the researchers were interested in learning more about what sorts of challenges youth from Chicago face, as well as what kinds of strategies help them deal with those challenges. Youth indicated their demographic information, including their age, gender, race, ethnicity, nationality, SES status, school, and neighborhood, as well as completed measures related to stress, coping, and various mental health outcomes. At home, parents/caregivers also provided responses to demographic items and those psychological measures with corresponding parent reports. Participants were assigned random subject identification numbers to protect confidentiality, and the document which linked participant information to the identification number was only accessible to study staff. Following the completion of all tasks, participants were debriefed and compensated. Youth incentives included a $50 gift card and two entries to a raffle to win an additional $100 gift card. Parents/guardians were given a $10 gift card and entered for two chances to win a $100 gift card.

At the end of the school year, youth and parents/guardians reconsented to participate in T2. Participants then returned to the lab at DePaul University in the Spring to complete the same battery of surveys and tasks as T1. The same compensation procedures as T1 were repeated at T2.

Materials

Depression. The Children's Depression Inventory (CDI; Kovacs, 1979, 1992) is a widely used self-report tool for measuring depression symptoms among youth ages seven through 17. The CDI has demonstrated good construct, predictive, and discriminant validity (Carey et al., 1987; Fauber et al., 1987; Kovacs, 1985). This 27-item scale produces a total depression score, as well as subscales of anhedonia, ineffectiveness, interpersonal problems, negative mood, and negative self-esteem. Each item consists of three statements of varying degree of symptom severity and participants select the option that most applies to them. For example, a sample item includes the following statement choices: "I have fun in many things," "I have fun in some things," and "Nothing is fun at all." Before responding to CDI questions, the following directions were displayed to participants:

> "People sometimes have difference feelings and ideas. Below feelings and ideas are listed in groups. From each group of three sentences, pick ONE sentence that describes you best over the past TWO WEEKS. After you pick a sentence from the first group, go on to the next group. There is no right or wrong answer. Just pick the sentence that best describes the way you have been recently."

The CDI yields a total depression score that is created by summing all 27 items, with possible scores ranging from 0 to 54. Higher scores indicate greater depressive symptomology. Thirteen of the items need to be reverse coded. The Cronbach's alpha coefficient measuring internal consistency for the items was 0.89, suggesting that it was a reliable scale in the current study.

Anxiety. Anxiety was captured with the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1985), which is a self-report instrument used to measure anxiety among children and adolescents. It has demonstrated excellent structural, convergent,

and predictive validity (Hadwin et al., 1997; Reynolds, 1980; Reynolds & Richmond, 1979). The RCMAS yields subscales of physiological anxiety/hyperarousal, worry/oversensitivity, and social anxiety. It consists of 28 questions and some sample items include: "I worry a lot of the time," "Often I feel sick in my stomach," and "I feel that others do not like the way I do things." Participants responded to statements dichotomously by selecting yes or no. Additionally, the following instructions were displayed to participants before completing the RCMAS:

> "Below are some sentences that tell how some people think and feel about themselves. I will read each sentence out loud. Select the word YES if you think the sentence is true about you. Select the word NO if you think it is not true about you. Select an answer for every sentence, even if it is hard to choose one that fits you. There are no right or wrong answers. Remember, after you read each sentence; ask yourself, "Is this true about me?" If it is, select Yes. If it is not select No."

According to the RCMAS scoring manual (Reynolds & Richmond, 1985), an overall anxiety score was calculated by summing all 28 items. Possible scores range from 0 to 28, with higher scores indicating greater anxiety. Reverse coding of individual items is not necessary. The current anxiety data is highly reliable ($\alpha = 0.98$).

Academic stress. Connor-Smith and colleagues' Responses to Stress Questionnaire (RSQ; 2000) was used to measure academic stress. The RSQ is a well-validated and -documented scale that measures how people cope with stress. There are many versions of this scale which have been created to assess coping in response to different types of stressors (i.e. community violence, chronic illness, social stressors, etc.), and each scale includes a set of questions about the stressors themselves rather than the coping response. These items are typically included at the beginning of the measure because they are meant to prime participants

for envisioning the ways that they cope with these specific stressors. The version of the scale used for this proposal included 10 statements that each capture a school-specific stressor. Sample items include: "Getting bad grades or report cards," "Not understanding homework," and "Pressure from parents or teachers to perform perfectly." Youth ranked how stressful they found the item to be on a four-point scale ranging from "not at all stressful" to "very stressful". Before completing these items, respondents saw the message below:

> "This is a list of things about school that children and teenagers sometimes find stressful or a problem to deal with. Please circle the number indicating how stressful the following things have been for you in the past 6 months."

The first 11 items on the RSQ were summed to create the total academic stress score. Possible scores ranged from 10 to 40 with larger scores corresponding to increased stress. None of the items require reverse coding and there are no subscales. The academic stress items yielded a Cronbach's alpha of 0.94, suggesting high reliability in the present study.

PA coping. In addition to academic stress, the RSQ was also used to measure PA coping. Though PA coping is not one of the specific subscales that Connor-Smith and colleagues (2000) created, the questionnaire includes three items that capture engagement in PA as a means of managing stress. Those items include: "I let my feelings out by exercising," "I keep my mind off my problems by exercising," and "I walk to calm myself down when I'm having problems." Adolescents selected yes or no to indicate whether these statements applied to them. The instructions below were displayed to participants prior to completing the RSQ:

> "Below is a list of things that children and teenagers sometimes do, think, or feel when they are dealing with problems. Everyone deals with problems in their own way – some people do a lot of the things on this list or have a bunch of feelings, other people just do

> or think a few of these things. Think of all the stressful parts of being around the problems that you indicated on the last page. For each item below, HOW MUCH you do or feel these things when you are around the stressors like you indicated on the last page. Please let us know about everything you do, think, and feel, even if you don't think it helps make things better."

A total PA coping variable was computed by summing the abovementioned three items from the RSQ. Scores ranged from zero to three with higher scores indicating increased use of PA to cope with academic stress, and reverse coding is not warranted. The three items yielded acceptable reliability ($\alpha = 0.67$).

Environmental Factors. The Systems Level Stressor questionnaire (SLS; Grant et al., 2022) was developed for the larger study. It included questions which capture environmental factors that are either protective (i.e. resource) or detrimental (i.e. risk) for engaging in PA in the setting of one's home, school, and neighborhood. Participants were provided with 30 statements and asked to select yes or no to indicate if the statement was applicable to them. Sample items include: "My home has a backyard," "My school has sports teams," "My neighborhood has a nice place for running or sports," and "My neighborhood has gang lines you can't cross safely." The items were categorized into subscales which measure resources among each domain (i.e. home, school, neighborhood), as well as school and neighborhood risks scales. Researchers supplied youth with the following instructions before beginning the SLS: "The next questions ask you to think about your school and neighborhood. Answer the questions as honestly as you can."

Five composite variables for environmental factors were calculated: home resources (4 items), school resources (7 items), school risks (4 items), neighborhood resources (9 items), and

neighborhood risks (5 items). The school risks subscale consisted of youth checking whether or not their school has the following: “a lot of stealing and crime,” “a lot of people who are in gangs,” “a lot of fights and violence,” and “a lot of drinking or using or selling drugs.” To determine which items accord with each subscale, two independent raters reviewed and categorized each item, after which discrepancies were resolved through consensus coding. These variables were calculated by summing the corresponding items in each scale. Possible scores ranged from 0 to 4 on home resources, 0 to 7 on school resources, 0 to 4 on school risks, 0 to 9 on neighborhood resources, and 0 to 5 on neighborhood risks. Higher values reflect greater protective or risk factors in the given environmental setting. To facilitate descriptive comparisons across the environmental factors subscales, proportional scores for each subscale were also calculated by dividing the amount of items endorsed by the total amount of items in each scale. These scales measure discrete counts of stressful items that are not theoretically expected to be highly correlated with one another, and thus, measuring internal consistency is not appropriate.

Analysis

Pre-processing & Preliminary Analyses. To prepare the data for analyses, it was necessary to check for missing data and participant noncompliance/inattention. If data was missing, a prorated sum was computed in which the mean of answered items were imputed for missing items as long as at least 75% of the items in a given scale or subscale were answered. This was repeated across all measures and subscales with the exception of the RSQ. Mean imputation was not used for PA coping items that had missing data due to the small number of items which comprise the scale, meaning that all three items had to be answered to create the scale. Treating missing data conservatively was warranted since this is a novel method of

assessing these RSQ items.

Furthermore, attrition analyses were conducted to determine how many participants were retained from T1 to T2. Independent t-tests and chi-square tests were run to determine whether the youth who participated at both time points differed from those who participated only at T1 on demographics and study variables. Means and standard deviations were calculated for all model and demographic variables. Bivariate correlations were also calculated in order to preliminarily test the strength and direction of the relationships between the predictor and criterion variables, as well as the demographic and criterion variables. Additionally, demographic variables were entered into a linear regression predicting follow-up depression and anxiety, and the significant demographic predictors were used as control variables in the model analyses.

Model Analyses. IBM SPSS Version 27 was used to run the following statistical analyses. More specifically, linear regressions and the PROCESS macro software version 4 (Hayes, 2017) were used to test the proposed conceptual models (see Appendix A). SPSS PROCESS software allows for the simple conducting of moderation analyses. Linear regressions were run to determine the main effect of academic stress on depression and anxiety (*Hypothesis 1*). Two-way interaction models were used to reveal whether PA coping moderated the association of academic stress with depression and anxiety (*Hypothesis 2*). Likewise, three-way interaction models were run separately with each of the five environmental factors subscales on both depression and anxiety (*Hypothesis 3*).

Results

Preliminary Analyses

Means and correlation coefficients are reported in Table 2. Academic stress was positively associated with T2 anxiety and depression, which were also strongly positively associated with one another. PA coping demonstrated a significant association with school and

neighborhood resources such that higher levels of PA coping were associated with greater endorsement of school and neighborhood resources. Home, school, and neighborhood resources were positively associated with one another; school and neighborhood risks were also positively associated.

Table 2

Means, standard deviations, Cronbach's alphas, and bivariate correlations of model and demographic variables

Measures	*M*(*SD*)	1	2	3	4	5	6	7	8	9	10
1. Academic stress (T1)	21.88(8.14)										
2. PA coping (T1)	0.92(1.07)	.029									
3. Home resources (T1)	0.61(0.25)	-.062	.018								
4. School resources (T1)	0.89(0.14)	-.015	.112*	.173**							
5. School risks (T1)	0.31(0.34)	.104	.036	-.025	-.035						
6. Neighborhood resources (T1)	0.65(0.29)	-.076	.179**	.305**	.229**	.075					
7. Neighborhood risks (T1)	0.30(0.32)	.090	-.017	-.076	.009	.309**	-.294**				
8. Depression (T2)	5.47(5.71)	.285**	-.119	-.077	-.144	.146	-.096	.080			
9. Anxiety (T2)	10.71(5.29)	.422**	-.028	-.092	-.071	.041	-.122	.102	.609**		
10. Age (T1)[a]	-	.113*	.078	-.154**	-.117*	.449**	-.024	.200**	.115	.105	
11. Family income (T1)[a]	-	.064	.048	.022	-.119*	.175**	.300**	-.348**	-.013	-.011	.158**

Note. Means for the SLS environmental factors subscales (i.e. 3-7 above) are derived from the proportional scores to facilitate comparison across subscales.
[a]*M*(*SD*) values found in Table 1.
*p<.05, **p< .01

Demographic variables were entered into a regression predicting depression and anxiety. Gender significantly predicted anxiety, but not depression (see Table 3). However, to remain consistent in the analytical approach, gender was controlled for in both depression and anxiety models.

Table 3

Demographics at T1 predicting T2 depression and anxiety in linear regression models

	Depression [$F(5,172)=1.82$, $p=.111$, $R^2=.05$]				**Anxiety** [$F(5,154)=3.84$, $p=.003^{**}$, $R^2=.11$]			
Effect	Estimate	*SE*	95% CI		Estimate	*SE*	95% CI	
			LL	*UL*			*LL*	*UL*
Intercept	-5.13	4.56	-14.14	3.88	1.28	3.97	-6.57	9.12
Age	0.33	0.25	-0.16	0.81	0.26	0.22	-0.16	0.68
Family Income	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gender	1.14	0.98	-0.80	3.08	3.46***	0.87	1.75	5.17
Race	0.64	0.33	-0.01	1.29	0.21	0.29	-.02	.14
Ethnicity	1.87	1.37	-0.84	4.58	-0.03	1.21	-2.42	2.37

Note. CI = confidence interval; *LL* = lower limit; *UL* = upper limit.
*p <.05, **p < .01, ***p < .001

Attrition analyses revealed that compared to youth who participated at both T1 and T2 (N = 197), those who participated only at T1 (N = 203) were more likely to be older ($t(369) = -5.28$, $p < .001$), as well as report greater depression ($t(369) = -3.00$, $p = .003$), school risks ($t(370) = -2.76$, $p = .006$) and neighborhood risks ($t(370) = -2.67$, $p < .008$), and lower home ($t(370) = 2.28$, $p = .023$) and neighborhood ($t(370) = 2.67$, $p = .008$) resources at T1. There were no significant differences between these two groups on T1 gender (χ^2 (1) = 2.42, $p = .120$), race (χ^2 (5) = 10.39, $p = .065$), ethnicity (χ^2 (1) = 1.01, $p = .315$), income ($t(335) = -0.97$, $p = .333$), PA coping ($t(351) = -1.04$, $p = .298$), school resources ($t(370) = 1.92$, $p = .056$), or anxiety ($t(354) = -1.31$, $p = .193$).

Academic Stress Predicting Symptoms

Depression. The simple regression tested the impact of academic stress on T2 depression while controlling for T1 depression and gender. In this regression, academic stress did not significantly predict T2 depression ($b = .09$, $p = 0.209$). Though the overall model was significant ($F(3) = 21.19$, $p < .001$, $R^2 = .28$), the only significant predictor in this model was T1

depression (b = .09, p = 0.209).

Anxiety. Academic stress significantly predicted T2 anxiety (b = .21, p < .001) even when controlling for T1 anxiety (b = .61, p < .001) and gender (b = .08, p = .177), demonstrating that increased academic stressed is linked to greater anxiety. The overall model was also significant ($F(3) = 59.47$, $p < .001$, $R^2 = .53$).

Physical Activity Coping Moderation

Depression. Controlling for T1 depression and gender, the overall model, which included the main and interactive effects of academic stress and PA coping, was significant [$F(5,162) = 13.41$, $p < .001$, $R^2 = .29$]. However, the only significant predictor was T1 depression (b = 1.02, $p < .001$).

Anxiety. The overall model for anxiety was also significant when controlling for T1 anxiety and gender [$F(5,155) = 35.79$, $p < .001$, $R^2 = .54$]. The main effects of academic stress (b = .15, $p < .01$) and T1 anxiety (b = .53, $p < .001$) were significant, but the PA coping main effect and the interactive effect of academic stress and PA coping were not significant.

Environmental Factors Moderated Moderation

Three-way interactions between academic stress, physical activity coping, and environmental factors results can be found in Table 4.

Table 4

Moderated moderation model results: Academic stress, physical activity coping, and environmental factors predict depression (Hypothesis 3)

	Depression (T2)				**Anxiety (T2)**			
Effect	**Estimate**	***SE***	**95% CI**		**Estimate**	***SE***	**95% CI**	
			LL	***UL***			***LL***	***UL***
Home resources	[$F(9, 158) = 7.89$***, $R^2 = .31$]				[$F(9, 151) = 20.13$***, $R^2 = .55$]			
Intercept	-6.54	4.92	-16.28	3.19	5.38	3.32	-1.17	11.94

Academic stress	-0.20	0.19	-0.57	0.18	-0.04	0.14	-0.32	0.25
PA coping	-3.10	3.43	-9.87	3.67	0.28	2.69	-5.04	5.59
Home resources	-2.60	1.49	-5.55	0.35	-1.61	1.13	-3.83	0.62
Depression/Anxiety (T1)	1.03***	0.16	0.71	1.35	0.53***	0.05	0.42	0.63
Gender	0.06	0.83	-1.58	1.70	0.80	0.66	-0.51	2.10
AS x PAC x HRE	4.30	1.63	1.08	7.51	0.00	0.04	-0.09	0.08
School Resources	[$F(9, 158) = 8.18$***, $R^2 = .32$]				[$F(9, 151) = 20.37$***, $R^2 = .55$]			
Intercept	-15.63	8.94	-33.29	2.03	1.91	6.49	-10.90	14.73
Academic stress	-15.63	8.94	-0.25	1.21	0.27	0.28	-0.23	0.83
PA coping	6.87	7.76	-8.46	22.19	7.15	5.97	-4.63	18.94
School resources	0.31	1.30	-2.24	2.91	-0.08	1.00	-2.05	1.88
Depression/Anxiety (T1)	1.04***	0.16	0.73	1.34	0.55***	0.05	0.44	0.65
Gender	0.16	0.81	-1.43	1.75	0.65	0.65	-0.62	1.93
AS x PAC x SRE	0.07	0.05	-0.03	0.17	0.06	0.04	-0.02	0.13
School Risks	[$F(9, 158) = 9.03$***, $R^2 = .34$]				[$F(9, 151) = 20.03$***, $R^2 = .54$]			
Intercept	-11.20***	2.80	-16.74	-5.67	0.49	1.58	-2.63	3.61
Academic stress	-0.01	0.07	-0.15	0.13	0.18**	0.06	0.07	0.29
PA coping	-0.86	1.19	-3.21	1.49	0.25	0.92	-1.57	2.07
School risks	-1.90	0.91	-3.70	0.10	0.90	0.73	-0.53	2.33
Depression/Anxiety (T1)	0.98***	0.16	0.67	1.29	0.53***	0.05	0.43	0.64
Gender	0.36	0.79	-1.20	1.93	0.72	0.65	-0.56	2.00
AS x PAC x SRI	-0.07*	0.03	-0.13	-0.01	0.00	0.02	-0.05	0.05
Neighborhood Resources	[$F(9, 158) = 7.73$***, $R^2 = .31$]				[$F(9, 151) = 20.33$***, $R^2 = .55$]			
Intercept	-9.07	4.53	-18.02	-0.12	5.47	3.04	-0.53	11.48
Academic stress	-0.03	0.16	-0.35	0.28	0.04	0.12	-0.20	0.28
PA coping	-0.04	3.19	-6.35	6.27	-1.07	2.48	-5.98	3.84
Neighborhood resources	-0.68	0.53	-1.73	0.37	-0.63	0.41	-1.43	0.17
Depression/Anxiety (T1)	1.03***	0.16	0.71	1.35	0.53***	0.05	0.42	0.63
Gender	0.14	0.82	-1.48	1.77	0.62	0.65	-0.65	1.90
AS x PAC x NRE	0.00	0.02	-0.03	0.04	0.00	0.01	-0.03	0.02
Neighborhood Risks	[$F(9, 158) = 7.30$***, $R^2 = .29$]				[$F(9, 151) = 19.70$***, $R^2 = .54$]			
Intercept	-13.26***	2.99	-19.17	-7.34	0.53	1.72	-2.86	3.92
Academic stress	0.09	0.08	-0.07	0.24	0.18**	0.06	0.06	0.30
PA coping	0.42	1.20	-1.95	2.79	0.51	0.91	-1.28	2.31
Neighborhood risks	-0.18	1.01	-2.17	1.83	0.58	0.77	-0.94	2.09
Depression/Anxiety (T1)	1.02***	0.16	0.71	1.34	0.53***	0.05	0.43	0.64
Gender	0.28	0.82	-1.34	1.91	0.82	0.65	-0.47	2.11
AS x PAC x NRI	4.20	1.62	1.01	7.40	0.02	0.02	-0.03	0.07

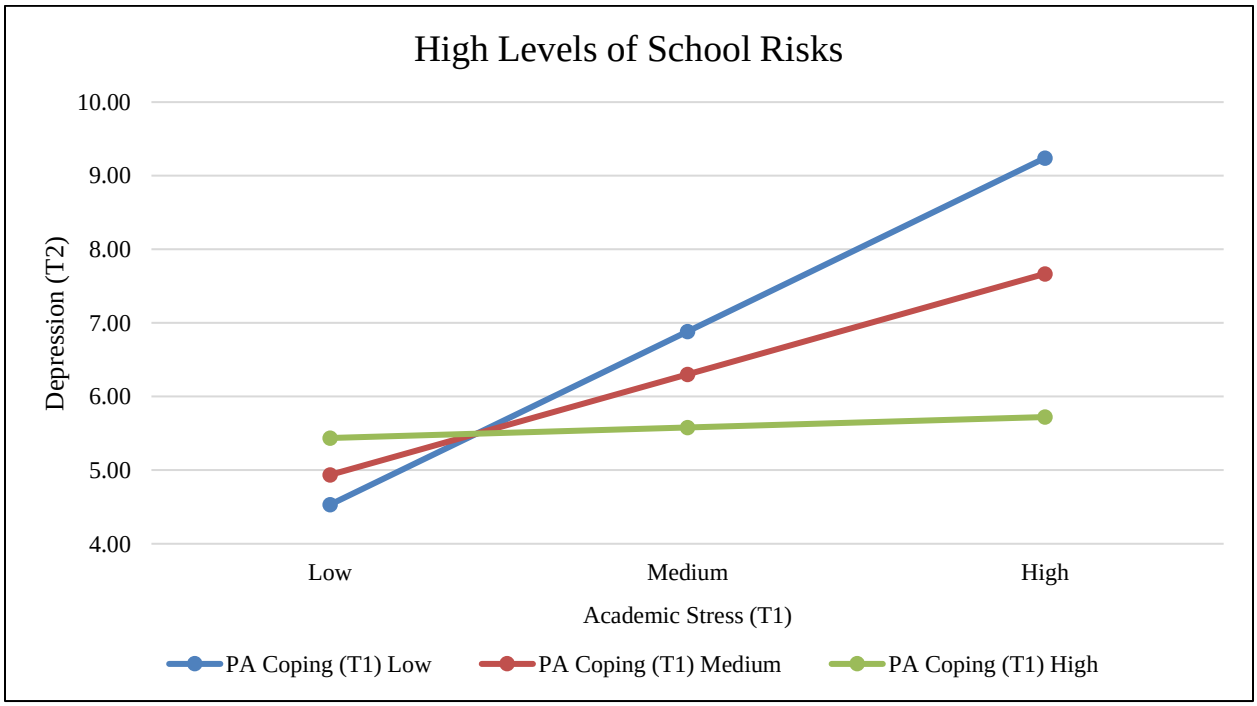
Note. Estimates are unstandardized. CI = confidence interval; *LL* = lower limit; *UL* = upper limit; AS = Academic Stress; PAC = Physical Activity Coping; HRE = Home Resources; SRE = School Resources; SRI = School Risks; NRE = Neighborhood Resources; NRI = Neighborhood Risks.
*$p < .05$, **$p < .01$, ***$p < .001$

Depression. Though the overall models predicting T2 depression were significant, the three-way interactions between academic stress, PA coping, and the environmental factors

subscales were non-significant, except for the in the context of school risks in which a significant three-way interaction was found (b = -.07, p = .039) (see Table 4). The change in variance explained from adding the three-way interaction to this model was also significant (ΔR^2 = .020, p = .03). The three-way interaction was probed and it was found that academic stress significantly interacted with PA coping at high levels of school risks only (b = -.17, p < .05), meaning that for those participants who reported the greatest amount of school risks, PA coping buffered the negative relationship between academic stress and depression such that the slope for those who endorsed high levels of PA coping was not significant (p = .866; see Figure 1).

Figure 1

Three-way interaction between academic stress, PA coping, and school risks significantly predicts depression.



Anxiety. None of the three-way interactions were found to be significant in the anxiety models (see Table 4). However, in the school and neighborhoods risks models, academic stress

had a significant positive main effect on T2 anxiety, suggesting that increased stress positively predicted anxiety, even in the presence of T1 anxiety, gender, and the main and interactive effects of other model variables.

Further, comparisons can be made across the environmental factors subscales. As seen in Tables 4 and 5, neither neighborhood resources nor risks yielded significant interactions. While home and school resources were not significant moderators, school risks did yield a significant three-way interaction in predicting depression as discussed above (see Table 4).

Discussion

This research aimed to elucidate the impact of academic stress, PA coping, and environmental factors on adolescent depression and anxiety. More specifically, it sought to address whether PA coping buffered the association of academic stress with depression and anxiety, as well as whether this buffering relationship was dependent upon the levels of environmental resources and risks for PA in youth's home, school, and neighborhood settings. The project fills a gap in the literature as PA coping has been understudied, particularly among racially, ethnically, and economically diverse youth. The incorporation of environmental factors is important because it demonstrates that successful ability to cope with stress is not only dependent on individual actions but also on systems level resources. Partial support was found for study hypotheses. Academic stress significantly predicted anxiety but not depression (*Hypothesis 1*). PA coping did not significantly interact with academic stress to predict depression or anxiety (*Hypothesis 2*). However, the three-way interaction between academic stress, PA coping, and school risks significantly predicted depression, providing support for the proposed moderated moderation model (*Hypothesis 3*).

Academic Stress Predicting Symptoms

The hypothesis that academic stress would predict greater follow-up depression and anxiety was partially supported. Increased academic stress predicted higher anxiety but not depression. The findings for anxiety are in alignment with several other studies which found evidence for a link between academic stress and anxiety in middle- and high-schoolers (Deb et al., 2015; Trevethan et al., 2022; Verma et al., 2002). These studies were all conducted in India, a nation with high-pressure educational examinations, so the current findings provide evidence for similar associations in American adolescents living in urban settings. Similarly, other types of stress, such as chronic stressful life events (D'Imperio et al., 2000) and racial discrimination stress (Gaylord-Harden & Cunningham, 2009), predict increased anxiety in urban, American youth. On the other hand, null results were found for the association between academic stress and depression in this simple linear regression model, running counter to previous studies (Ang & Huan, 2006; Jayanthi et al., 2015). These studies were cross-sectional, however. Therefore, perhaps the null effect in the current longitudinal study stems from baseline depression accounting for most of the model variance. Furthermore, it is possible that the link between academic stress and depression is only evident among certain settings, as seen in our significant moderated moderation findings. It is also worth noting that effects for the depression models in this study may be underestimated in light of the fact that participants who dropped out of the study after T1 were more likely to be depressed than those who participated at T1 and T2.

Physical Activity Coping Moderation

The second hypothesis that PA coping would serve to buffer the negative association between academic stress and follow-up depression and anxiety was not supported. PA coping did not significantly interact with academic stress to predict depression or anxiety, nor did PA

coping have a significant main effect on either outcome. While this study is one of the first to use PA coping, rather than PA engagement, as a moderator for the relationship specifically between academic stress and depression and anxiety, there are studies with adjacent findings to which these can be compared. In fact, several studies have similarly failed to uncover a significant buffering effect of PA engagement on other negative consequences of academic stress, including psychosomatic health complaints (Gerber & Pühse, 2008) and negative affect (Wunsch et al., 2017). It is interesting to note that these null findings were similar even though these adjacent studies took place in European countries because it demonstrates that perhaps these results may hold internationally. Attrition analyses also revealed that participants who dropped out between T1 and T2 were more likely to be older than those who participated at both timepoints. It is plausible, then, that having a younger final sample may have underestimated the effect of PA coping because perhaps older youth are better able to differentiate between various motivations for PA (e.g. to relieve stress, to improve physical fitness, to obtain social benefits as may be the case in team sports, to fulfill mandatory physical education requirements). Conversely, as evidenced by the significant three-way interaction results from this study, it is possible that PA coping does indeed buffer the relationship between academic stress and depression, but that this moderating effect is only seen in certain settings or contexts.

Environmental Factors Moderated Moderation

Depression. The hypothesis that environmental factors would moderate the buffering effect of PA coping on the association between academic stress and follow-up depression was partially supported. Only the school risks subscale significantly interacted with academic stress and PA coping, such that in the context of high levels of risk in the school setting, academic stress did not predict depression for those youth who endorsed high levels of PA coping but did

positively predict depression for youth with low levels of PA coping. Therefore, in the context of high risks in the school setting, but not in the home or neighborhood settings, greater PA coping buffered the relationship between academic stress and depression.

Such findings speak to the importance of the school setting for both PA and emotional wellbeing. While there are not comparable studies that assess the interactive effects of stress, PA, and school risks on adolescent depression, the current results are consistent with research which has established that neighborhood resources moderate the relationship between PA engagement and psychological needs like self-efficacy and autonomy (Gay et al., 2011). Gay and colleagues (2011) tested a sample of 477, majority-White adults living in urban settings, finding evidence for an amplifying effect of neighborhood resources on the relationship between PA and better psychosocial outcomes. The current study extends this buffering effect of environmental determinants to a different psychosocial outcome (i.e. depression), as well as to adolescents in the school setting, which is particularly important given how much time youth spend in their schools (Larson et al., 2001). Additionally, these findings align with research from Sallis and colleagues (2001) which found that school-level resources, such as size and type of physical activity areas offered on school premises, account for a significant amount of the variance in middle-school youth's PA levels. School disinvestment is related to increased depressive symptoms among high-school youth (Coley et al., 2018), providing further support for the present findings. Exposure to school violence, more specifically, is also connected to depressive symptomology in adolescents (Kim et al., 2020), which may help explain why PA coping is especially useful to youth in the context of high levels of school risk.

Interestingly, while research provides evidence for the importance of neighborhood built environment for adolescent PA (Ding & Gebel, 2012; Dowda et al., 2020; Evenson et al., 2006;

Sallis et al., 2018) and depression (Duncan et al, 2013), it was risks in the school setting, rather than the neighborhood setting, for which a significant interactive effect emerged. In the current study, the comparative research questions showed that school factors, but not home or neighborhood factors, significantly moderated the buffering impact of PA coping on depression. The question remains, then, why is the school setting particularly relevant as a context compared to home and neighborhood settings? According to Tolan and Grant (2009), matching the coping strategy to the type of stressor and context is important for maximum coping effectiveness, and thus, it is likely that the school setting was particularly important because the main predictor variable was academic stress. Therefore, risks for PA coping in the school setting might be particularly relevant to the deleterious outcomes of school-related stress. It is also possible that the null home and school three-way interaction findings are a result of measurement limitations, such as not capturing the full spectrum of risks and resources relevant to PA in these settings. For instance, measurement of aesthetics and quality of the built environment for PA (e.g. street lights, environmental pollution, etc.) may have improved these scales. Alternatively, there may be other factors not measured by this study which are more likely to affect the impact of PA coping in the home and neighborhood settings. For example, self-efficacy and social support have both been proposed as moderators of physical activity outcomes in youth (Dishman et al., 2009) and therefore these constructs may be more salient moderators of PA-related variables than environmental factors.

Furthermore, the significant environmental factors findings emerged from the risk subscales rather than the resources subscales, meaning that PA coping was protective in settings of high risk rather than high resources. It is likely that PA coping does not make as much of an impact on youth who are already living and learning in high-resourced environments, for these

youth likely have greater opportunities to develop and use adaptive coping mechanisms (Farmer et al., 1999). Another explanation is that those with access to more resources may be less likely to experience academic stress in the first place leaving stress to be buffered (Gonzales et al., 1996). This is less likely to explain the null finding in the present study because family income and academic stress were not correlated in the current data (see Table 2). Another important distinction to make is that attrition analyses demonstrated that those youth who participated only at T1 were generally less resourced (i.e. lower home and neighborhood resources, greater school and neighborhood risks) than the youth who were retained at T2. Consequently, it is possible that effects for the environmental factors were underestimated and that the resources subscales may have been significant if the full sample had participated at follow-up.

Anxiety. None of the environmental factor subscales interacted with academic stress and PA coping to predict anxiety. While there is correlational research that demonstrates a predictive main effect of environmental factors on PA (Carrol-Scott et al., 2013; Dowda et al., 2020; Evenson et al., 2006; Kaczynski et al., 2018), there is no research to our knowledge that investigates the moderating effect of environmental factors on PA-related variables in the context of anxiety outcomes. The most comparable study is the aforementioned research by Gay and colleagues (2011), which found that neighborhood resources moderate the impact of PA on self-efficacy in adults. The null anxiety three-way interaction models in the current study did not align with the Gay et al. (2011) findings, which is not surprising given that this research tested not only a different population (i.e. diverse adolescents), but also a different outcome.

In sum, PA coping had a buffering effect among certain high risk settings for youth depression, but not anxiety. However, there is more widespread evidence for the connection between PA and depression in youth than there is for PA and anxiety (Biddle et al., 2019), which

may explain the above discrepancies. Moreover, much of the research connecting environmental resources to mental health, while including measures of anxiety, do not make a distinction between anxiety and depression, often rather collapsing both constructs under internalizing symptoms (Dupéré et al., 2012; Krefis et al, 2018; Sundquist et al., 2015). Combining these two internalizing states makes it difficult to distinguish how environmental factors are related to depression and anxiety separately in previous studies. Therefore, it is possible that depressive symptoms are actually driving the variance in the relationship between environmental factors and internalizing disorders, which may explain why depression, but not anxiety, was significant in the current moderated moderation model.

Strengths & Limitations

The present study has various strengths worth noting. Primarily, it fills a major gap in the literature in its study of PA coping given that most research with youth typically assesses amount of actual PA rather than the tendency to use PA to cope. While there are a few studies that make this distinction between PA engagement and PA coping (Dalton, 2020; Garber, 2017; Harris et al., 2006), none of these studies have been conducted with adolescent populations. Second, this research is longitudinal and can thus ensure that any significant effects are not due to variance in baseline levels of depression and anxiety. Research on the impact of environmental factors on youth PA is often cross-sectional (Ding & Gebel, 2012), so these results offer an improvement over the available literature. Furthermore, the current sample was notably racially, ethnically, and economically diverse, which bolsters the generalizability of findings and is critical especially when studying topics of systems-level resources and risks. Similarly, the use of social ecological theory (McLeroy et al., 1988) to guide this study allowed the researchers to assess effects at

various levels of analysis (i.e., individual, home, school, neighborhood), which provides several pathways by which efforts can be made to prevent emotional dysfunction in youth.

Conversely, there are limitations to the current study which must be discussed in addition to its strengths. Methodologically, the PROCESS plug-in (Hayes, 2017) of SPSS employs listwise deletion, and therefore the power of the full sample was hindered. However, it is noteworthy that a significant three-way interaction was found despite this reduced power. Likewise, there is room for improvement in the measurement of environmental factors due to the fact that the subscales were fashioned from a measure that was not initially developed to capture risks and resources specific to PA. For instance, the risks subscales contain many crime items whereas a more robust subscale may also include items about aesthetics and the built environment such as sidewalk quality, tree cover, or vacant buildings, as well as non-physical variables like lack of parental and social support for PA. Yet, even so, it remains largely unknown whether adolescents, like adults (Dalton, 2020; Harris et al., 2006), take measures such as aesthetics into consideration when engaging in PA. Therefore, the researchers selected to include only those factors (e.g. crime) which are likely to have a more immediate and greater impact on PA. It would also be useful if future scales were to consider not only the number of risk factors, but also the severity of those risks. Similarly, future studies could improve upon the current methods by including more objective measurements of neighborhood risks, resources, and built environment as determined by GIS techniques or windshield tours, for example. Lastly, the biological and neurological mechanisms linking PA to improved mood and psychosocial outcomes are well-established (Silverman & Deuster, 2014), but this research does not account for such mechanisms. While biological influences fall outside the purview of the present study, future research linking PA coping and environmental factors to adolescent depression and

anxiety may benefit from incorporating biological measures of stress, such as cortisol or heart rate variability.

Future Directions

The findings of this study highlight potential directions for future research, practice, and policy. Given there is a major lack of research which differentiates PA coping from actual PA engagement, psychometric improvements should be made to PA coping instruments, including a larger number of items, types and intensity of PA people use to cope, types of stress for which people use PA to cope, as well as reliability and validity assessments of these improved scales. It is notable that in the present study PA coping was not a significant two-way interaction moderator, leading one to question at what age youth may start differentiating between PA engagement and PA coping, as is seen in adult samples (Harris et al., 2006). As such, though age and PA coping were not significantly associated in this sample, future researchers may want to test connections between age and PA coping more directly. Additionally, because PA benefits physical and mental health (Biddle et al., 2019; Silverman & Deuster, 2014), researchers should attempt to uncover whether PA coping is actually predictive of PA. Environmental factors related to PA coping should also be more explicitly explored in youth so that future research may understand the broader variety of systems-level risks and resources for adolescent PA.

For the field of psychological practice, PA coping should be encouraged as a prevention technique for adolescent depression, especially in the school settings. Practitioners such as school psychologists may be particularly well-positioned to encourage PA coping both individually with youth and systemically by collaborating with physical educators to spearhead school-wide campaigns for promoting PA to reduce stress. While physical activity is not often included in schoolwide coping toolkits specifically, there are well-established toolkits for

promoting physical activity in schools, such as that from the World Health Organization (2021). It would be useful to amend such toolkits so that physical activity is discussed not only as a vehicle to physical health, but coping and mental health as well. Indeed, a recent meta-analysis established that school-based physical activity interventions can reduce anxiety and improve positive mental health in children and adolescents (Andermo et al., 2020).

In cases of prevention program development, it is likely that each school and its students face unique contextual strengths and challenges (Payne et al., 2006), and therefore, collaborating closely with students to learn of these contexts and co-design physical activity programs may improve feasibility and strengthen community buy-in. However, creating and sustaining these programs requires funding for resources and personnel. Considering that the present research identifies high risk schools as those which may benefit most from PA coping, policy efforts at local, state, and national levels must be directed at improving funding for physical activity among schools that are low-resourced or located in disinvested neighborhoods. Policy changes have long been advocated by physical activity researchers (Stone et al., 1998). Yet, the United States public school system continues to be plagued by systemic inequities which drive resource distribution and further harm children who are already exposed to disproportionate amounts of risk (Anderson et al., 2022). As an intermediate solution, schools may also consider partnering with community organizations to pool resources and offer safe, effective after-school PA programming. Similarly, additional funding for and collaborations with PA-based non-profits such as Girls on the Run, Kids Enjoy Exercise Now, and The Center for Healing and Justice through Sport may open additional avenues by which schools can reinforce PA programming. Girls on the Run, for example, is an after-school PA-based youth development program which

has demonstrated increases not only in physical activity but also improvements in psychosocial constructs like social competence and self-esteem (Weiss et al., 2019).

Conclusion

The present research demonstrates that PA coping buffers the relationship between academic stress and increased depression among youth in the contexts of schools with high numbers of risk factors for PA. Though there are limitations which should be considered alongside the findings, this study addresses gaps in the research literature regarding PA coping and is strengthened by its longitudinal nature, diverse sample, and multi-level approach to preventing mental health disorders in youth. Future research should improve upon the measurement of PA coping and environmental factors, as well as assess whether PA coping is predictive of actual PA engagement. Practice and policy are also implicated in the findings of this research, for psychologists and policymakers should direct planning and funding towards the development and growth of PA programs in low-resourced schools. In all, this study highlights how individual coping techniques (i.e., PA coping) interact with systems-level resources in order to predict youth well-being.

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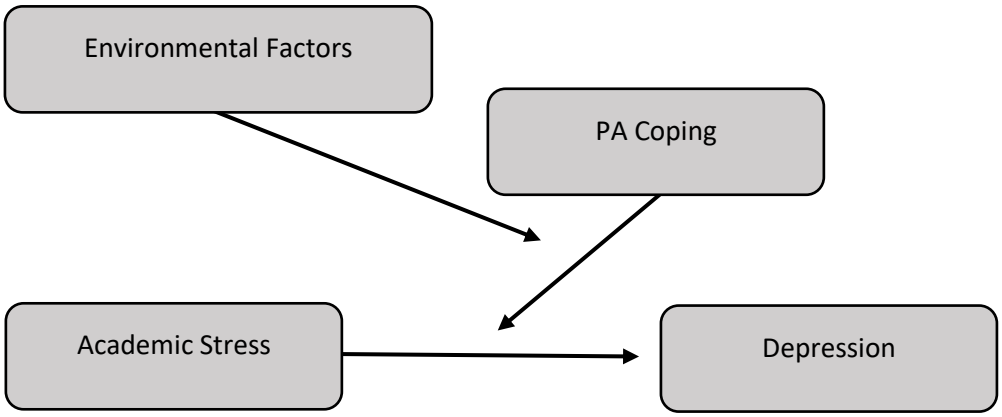
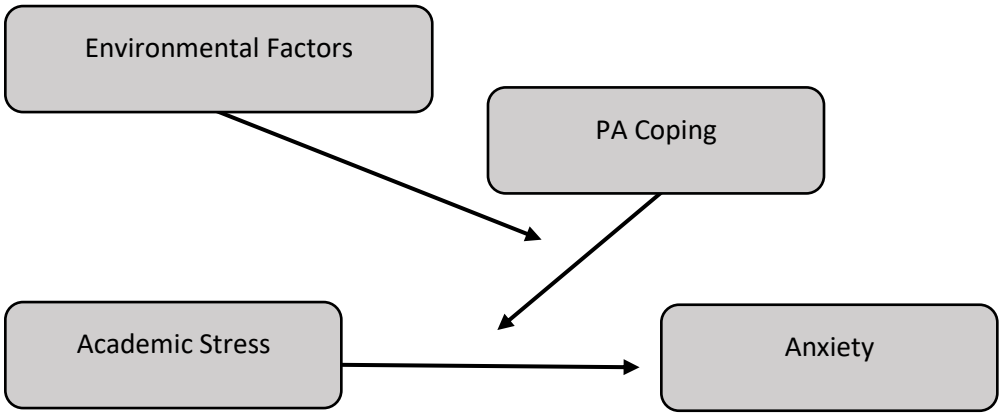
Appendix A: Conceptual Models

Conceptual diagrams of the hypothesized relationships between academic stress, physical activity coping, environmental factors and mental health outcomes of depression and anxiety.

Model 1.



Model 2.



Appendix B: Study Measures

Children's Depression Inventory (Kovacs, 1979, 1992)

People sometimes have different feelings and ideas. Below feelings and ideas are listed in groups. From each group of three sentences, pick ONE sentence that describes you best over the past TWO WEEKS. After you pick a sentence from the first group, go on to the next group. There is no right or wrong answer. Just pick the sentence that best describes the way you have been recently.

Item 1	I am sad once in a while	I am sad many times	I am sad all the time
Item 2	Nothing will ever work out for me	I am not sure if things will work out for me	Things will work for me O.K.
Item 3	I do most things O.K.	I do many things wrong	I do everything wrong
Item 4	I have fun in many things	I have fun in some things	Nothing is fun at all
Item 5	I am bad all the time	I am bad many times	I am bad once in a while
Item 6	I think about bad things happening to me once in a while	I worry that bad things will happen to me	I am sure that terrible things will happen to me
Item 7	I hate myself	I do not like myself	I like myself
Item 8	All bad things are my fault	Many bad things are my fault	Bad things are not usually my fault
Item 9	I do not think about killing myself	I think about killing myself but I would not do it	I want to kill myself
Item 10	I feel like crying everyday	I feel like crying many days	I feel like crying once in a while
Item 11	Things bother me all the time	Things bother me many times	Things bother me once in a while
Item 12	I like being with people	I like being with people many times	I do not want to be with people at all
Item 13	I cannot make up my mind about things	It is hard to make up my mind about things	I make up my mind about things easily
Item 14	I look O.K.	There are some bad things about my looks	I look ugly
Item 15	I have to push myself all the time to do my schoolwork	I have to push myself many times to do my schoolwork	Doing schoolwork is not a big problem
Item 16	I have trouble sleeping every night	I have trouble sleeping many nights	I sleep pretty well

Item 17	I am tired once in a while	I am tired many days	I am tired all the time
Item 18	Most days I do not feel like eating	Many days I do not feel like eating	I eat pretty well
Item 19	I do not worry about aches and pain	I worry about aches and pains many times	I worry about aches and pains all the time
Item 20	I do not feel alone	I feel alone many times	I feel alone all the time
Item 21	I never have fun at school	I have fun at school only once in a while	I have fun at school many times
Item 22	I have plenty of friends	I have some friends but I wish I had more	I do not have any friends
Item 23	My schoolwork is alright	My schoolwork is not as good as before	I do very badly in subjects I used to be good in
Item 24	I can never be as good as other kids	I can be as good as other kids if I want to	I am just as good as other kids
Item 25	Nobody really loves me	I am not sure if anybody loves me	I am sure that somebody loves me
Item 26	I usually do what I am told	I do not do what I am told most times	I never do what I am told
Item 27	I get along with people	I get into fights many times	I get into fights all the time

Revised Children's Manifest Anxiety Scale (Reynolds & Richmond, 1985)

Below are some sentences that tell how some people think and feel about themselves. I will read each sentence out loud. Select the word YES if you think the sentence is true about you. Select th e word NO if you think it is not true about you. Select an answer for every sentence, even if it is hard to choose one that fits you. There are no right or wrong answers.

Remember, after you read each sentence; ask yourself, "Is this true about me?" If it is, select Yes, if it is not, select No.

1. I have trouble making up my mind.
    - Yes
    - No
2. I get nervous when things do not go the right way for me.
    - Yes
    - No
3. Others seem to do things easier than I can.
    - Yes
    - No

4. I like everyone I know.
    - Yes
    - No
5. Often I have trouble getting my breath.
    - Yes
    - No
6. I worry a lot of the time.
    - Yes
    - No
7. I am afraid of a lot of things.
    - Yes
    - No
8. I am always kind.
    - Yes
    - No
9. I get mad easily.
    - Yes
    - No
10. I worry about what my parents will say to me.
    - Yes
    - No

11. I feel that others do not like the way I do things.
    - Yes
    - No
12. I always have good manners.
    - Yes
    - No
13. It is hard for me to get to sleep at night.
    - Yes
    - No
14. I worry about what other people think about me.
    - Yes
    - No
15. I feel alone even when there are other people with me.
    - Yes
    - No
16. I am always good.
    - Yes
    - No
17. Often I feel sick in my stomach.
    - Yes
    - No
18. My feelings get hurt easily.
    - Yes

- No

19. My hands feel sweaty.
    - Yes
    - No
20. I am always nice to everyone.
    - Yes
    - No
21. I am tired a lot.
    - Yes
    - No
22. I worry about what is going to happen.
    - Yes
    - No
23. Other people are happier than I.
    - Yes
    - No
24. I tell the truth every single time.
    - Yes
    - No
25. I have bad dreams.
    - Yes
    - No
26. My feelings get easily hurt when I am fussed at.
    - Yes
    - No
27. I feel someone will tell me I do things the wrong way.
    - Yes
    - No
28. I never get angry.
    - Yes
    - No
29. I wake up scared sometimes.
    - Yes
    - No
30. I worry when I go to bed at night.
    - Yes
    - No
31. It is hard for me to keep my mind on schoolwork.
    - Yes
    - No
32. I never say things I shouldn’t.
    - Yes
    - No
33. I move around in my seat a lot.
    - Yes
    - No

34. I am nervous.
    - Yes
    - No
35. A lot of people are against me.
    - Yes
    - No
36. I never lie.
    - Yes
    - No
37. I often worry about something bad happening to me.
    - Yes
    - No

Responses to Stress Questionnaire (Connor-Smith et al., 2000) – Academic Stress and Physical Activity Coping measures

Academic Stress Questions:

This is a list of things about school that children and teenagers sometimes find stressful or a problem to deal with. Please circle the number indicating how stressful the following things have been for you in the past 6 months.

1. Doing badly on a test or paper.
    - Not at all
    - A little
    - Somewhat
    - Very
2. Getting bad grades or report cards.
    - Not at all
    - A little
    - Somewhat
    - Very
3. Not understanding classes.
    - Not at all
    - A little
    - Somewhat
    - Very
4. Not understanding homework.
    - Not at all
    - A little
    - Somewhat
    - Very
5. Feeling pressured to do something.
    - Not at all
    - A little
    - Somewhat

    - Very
6. Having bad classes or teachers.
    - Not at all
    - A little
    - Somewhat
    - Very
7. Having trouble studying.
    - Not at all
    - A little
    - Somewhat
    - Very
8. Not having your homework done.
    - Not at all
    - A little
    - Somewhat
    - Very
9. Teachers that yell or get angry.
    - Not at all
    - A little
    - Somewhat
    - Very
10. Pressure from parents or teachers to perform perfectly.
    - Not at all
    - A little
    - Somewhat
    - Very

Physical Activity Coping Questions (*Asterisked items below are those which were included in the study.)

Below is a list of things that children and teenagers sometimes do, think, or feel when they are dealing with school problems. Everyone deals with problems in their own way – some people do a lot of the things on this list or have a bunch of feelings, other people just do or think a few of these things.

Think of all the stressful parts of school that you indicated. For each item below, circle one number from 1 (not at all) to 4 (a lot) that shows HOW MUCH you do or feel these things when you have problems with school like the ones you indicated. Please let us know about everything you do, think, and feel, even if you don't think it helps make things better.

WHEN DEALING WITH THE STRESS OF SCHOOL PROBLEMS:

1. I let my feelings out:
    a. None
    b. A little
    c. Some
    d. A lot
2. I do this by (check all that apply):

   a. Writing in my journal/diary
   b. Drawing/painting
   c. Complaining to let off steam
   d. Being sarcastic/making fun
   e. Listening to music
   f. Punching a pillow
   g. Exercising*
   h. Yelling
   i. Crying
   j. None of these

3. I keep my mind off stressful parts of school problems by doing an activity:
   a. None
   b. A little
   c. Some
   d. A lot
4. Check all that you do:
   a. Exercising*
   b. Seeing friends
   c. Watching TV
   d. Playing video games
   e. Doing a hobby
   f. Listening to music
   g. None of these
5. I do something to calm myself down when I'm dealing with the stress of school problems.
   a. None
   b. A little
   c. Some
   d. A lot
6. Check all that you do:
   a. Take deep breaths
   b. Pray
   c. Walk*
   d. Listen to music
   e. Take a break
   f. Meditate
   g. None of these

Systems Level Stressor questionnaire (Grant et al., 2022) – Environmental Factors measure with resources* and risks items asterisked below.**

Life is unfair. Some people have more than they need and other people don't have enough. The questions below ask about your family's situation. Answer as honestly as you can.

1. Check all that are true about the place you live most of the time:

- has trees in front*
- has flowers in the summer
- has good heating
- has more people than bedrooms
- has a backyard*
- has cockroaches
- is clean
- has more bedrooms than people*
- is not a safe place to live
- has good air conditioning*
- has more than one bathroom
- has more bathrooms than people

The next questions ask you to think about your school and neighborhood. Answer the questions as honestly as you can.

2. Check all that your school has:
    - computers for everyone
    - a beautiful building
    - a lot of disrespect and arguments
    - a gymnasium*
    - art supplies
    - a lot of stealing and crime**
    - internet
    - principals and staff who work well with kids
    - after school programs*
    - a lot of people who are in gangs**
    - a building that is falling apart
    - notebooks, pens, pencils, calculators
    - books for everyone
    - a lot of fights and violence**
    - a lot of safe places to hang out*
    - teachers who know their subjects
    - clubs or activities*
    - sports teams*
    - teachers for every class
    - sports equipment*
    - musical instruments
    - a lot of drinking or using or selling drugs**
    - many trees*
    - quiet places to study
    - teachers who work well with kids
    - students who don't listen to adults
    - a library
    - metal detectors
3. Check all that your neighborhood has:

- lots of trees and grass*
- safe places for children to play*
- streets and sidewalks that are clean*
- neighbors who will help you
- people drinking or using or selling drugs**
- safe places to hang out during the day*
- a club or church where kids can go*
- a liquor store
- a library
- buildings that no one is living in
- lots of graffiti
- a lot of disrespect and arguments
- flowers in spring and summer
- safe places to hang out at night*
- a lot of crime**
- a lot of trash
- a grocery store
- neighbors you can trust*
- police who are kind and want to help
- parks with jungle gyms and sports courts*
- restaurants where families can eat
- gangs**
- fights and violence**
- a nice place for running or sports*
- lots of businesses and places to get jobs
- gang lines you can't cross safely**
- a lot of noise