



Impact of anxiety and depression on academic achievement among underserved school children: evidence of suppressor effects

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Abstract

Anxiety and depression symptoms may leave children at risk for lower academic scores, though this unique linkage to academic achievement in underserved youth is less well established. This study aimed to examine how anxiety and depression are uniquely related to spelling and math achievement beyond attention and hyperactivity deficits in children in underserved schools. Children aged 8 to 11 ($n = 1085$, 47.3% female) from historically underserved groups (Hispanic 75.3%, American Indian 6.4%, Black 4.9%, and White 1.5%) from 13 schools across two public school districts in California participated in the assessment of emotional and behavioral health symptoms that included a spelling and math assessment. While there was no relationship between anxiety or hyperactivity on spelling and math scores, depression and attention problems were significantly negatively related to spelling and math scores. However, when entered simultaneously, evidence of suppressor effects emerged. Anxiety and hyperactivity both became positively predictive of math. Similarly, anxiety became positively predictive of spelling. Subsample analyses showed that these suppressor effects were only in females. The associations among anxiety, depression, attention, and hyperactivity with spelling and math achievement are complex, and when controlling for depression and attention, anxiety levels and hyperactivity may be motivating some level of achievement in these areas.

Keywords Anxiety · Depression · ADHD · Academics · Underserved

Attention-deficit/hyperactivity disorder (ADHD) is a commonly diagnosed psychiatric disorder in childhood characterized by pervasive and impairing levels of inattention, hyperactivity, and impulsivity (Sayal et al., 2018). Results from a national 2016 parent survey indicate an estimated 9.4% of youth aged 2–17 had ever been diagnosed with ADHD (Danielson et al., 2018), and a previous meta-analysis suggests a global peak prevalence of ADHD at approximately nine years of age (Erskine et al., 2013). Alongside ADHD, anxiety and depressive disorders are some of the most prevalent forms of psychopathology experienced by youth (Bernstein & Borchardt, 1991; Ghandour et al., 2018; Kessler et al., 2005). Children's general anxiety symptoms manifest as excessive worry (accompanied by feeling on edge, fatigue, difficulty concentrating, muscle tension,

irritability, or difficulty sleeping) that interferes significantly with psychosocial functioning (DSM V, American Psychiatric Association, 2013). Symptoms of depression in children include depressed or irritable mood, diminished interest in activities, fatigue, difficulty concentrating, decreased attention, and difficulty sleeping (DSM V, American Psychiatric Association, 2013). Anxiety and depression are highly related. For example, in youth diagnosed with an anxiety disorder, 25–28% receive a comorbid diagnosis of depression disorder (Cannon & Weems, 2006; Costello et al., 2003; Grant et al., 2007). Additionally, comorbid diagnoses of ADHD with anxiety or depression are not uncommon; in school-aged children, anxiety and depression are often associated with symptoms of ADHD (Cuffe et al., 2020). A national survey of children with ADHD found that 32.7% of youth had co-occurring anxiety, and 16.8% had co-occurring depression (Danielson et al., 2018).

ADHD, anxiety, and depression share symptoms of inattention and difficulty concentrating and have similar effects on children's social and academic functioning. For example, ADHD is well known to be a strong predictor of poor functioning on measures of executive function, attention, and

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processing speed (DuPaul & Stoner, 2014), and a diagnosis of ADHD is associated with an increased risk for poor academic performance (see Arnold et al., 2020). Children with anxiety or depression symptoms may also experience reckless behavior, frequent absences from school, and poor performance in school (DSM V, American Psychiatric Association, 2013). The potential for anxiety and depression to impact academic achievement is fairly well recognized among school and community mental health professionals. However, the interrelations between anxiety and depression with inattention and hyperactivity among underserved children and their academic achievement are less well-understood (Becker et al., 2014). A better understanding of anxiety, depression, inattention, and hyperactivity symptoms' unique and combined effects may foster school-based intervention and prevention efforts.

Research shows a negative impact of anxiety on academic achievement, independent of an ADHD diagnosis. These studies, however, focus on domain-specific forms of anxiety, such as math anxiety (see review by Ma, 1999), language anxiety (Horwitz, 2001), or test anxiety (see review by McDonald, 2001). Studies incorporating non-domain-specific anxiety measures have found no effect on academic achievement. For example, Wu et al. (2012) found that math achievement was dependent on math anxiety and was unrelated to trait anxiety. Depression also predicts school achievement outside of ADHD (see review by Kovacs & Goldston, 1991). Symptoms associated with depression (i.e., lethargy, lack of concentration or poor memory, reduced attention span) impact the ability to learn (Lundy et al., 2010).

Research on the effect of anxiety and depression on school achievement comorbid with an ADHD diagnosis is somewhat inconsistent. Some studies have reported that children with ADHD, regardless of comorbid conditions, are generally less likely to compete academically and are more likely to have poorer educational outcomes than their peers who do not exhibit symptoms associated with ADHD (Currie & Stabile, 2006; Lambert, 1988; Loe & Feldman, 2007). Alternatively, Calhoun and Mayes (2005) found that children with both an anxiety disorder and ADHD tend to perform better on the Processing Speed Index, likely due to an underlying motivating factor instead of a paralyzing effect. Notably, 38% to 58% of youth experience one or more symptoms of ADHD without meeting full diagnostic criteria or ever having received a clinical diagnosis (Okumura et al., 2019). This may be especially true in underserved communities. Okumura et al. (2019) found that more than half of youth with undiagnosed ADHD symptoms had little access to health care or medical services. Furthermore, Okumura et al. (2019) found that youth with ADHD symptoms but no diagnosis have higher rates of depression, emotional symptoms, and conduct problems compared to healthy controls, but no differences in school absenteeism. Based on previous research, it is unclear how the combination of anxiety and depressive symptoms and the

core symptoms of ADHD, namely attention problems and hyperactivity, are related to academic achievement.

Theories of mental health symptoms and psychosocial adjustment are largely formed from research involving White, non-Hispanic¹ youth (Becker et al., 2014). Though not reported to the same degree as their non-Hispanic counterparts, Hispanic youth experience high rates of anxiety and depressive symptoms. Previous studies indicate that 11%–29% of Hispanic youth experience anxiety (Potochnick & Perreira, 2010; Yockey et al., 2019), and 7%–22% experience depressive symptoms (Potochnick & Perreira, 2010; Saluja et al., 2004). Further, it has been found that Hispanic girls are more likely to experience depressive and anxiety symptoms (Gudiño & Lau, 2010; Lorenzo-Blanco et al., 2011; McLaughlin et al., 2007). Important to note within the context of mental health is that, compared to youth of other ethnicities, Hispanic youth experience educational disparities. For example, Hispanic students score lower on achievement tests and have higher dropout rates, potentially attributed to poverty, low-quality education, language barriers, and discrimination (see Ceballos et al., 2014). In the context of the growing Hispanic population in the United States, these disparities indicate that more comprehensive literature is needed to better understand how mental health influences academic achievement among Hispanic youth (Becker et al., 2014; Guo et al., 2019; Lorenzo-Blanco et al., 2012).

There are potentially multiple sources of anxiety and depression for Hispanic youth, especially in the school setting. By being a victim of physical bullying, verbal bullying, feeling unsafe in school, and lacking social acceptance and social support (Stapinski et al., 2014; Yockey et al., 2019), school becomes a threatening environment and triggers the cycle of anxiety. Stereotype threat may also be part of this cycle of anxiety. Hispanic students may underperform in a domain in which they are experiencing negative stereotypical evaluation from peers, such as academic achievement (Fischer, 2010). Further, cultural stress may aggravate overall anxiety, including school performance. Cultural stress is acculturation through conflicting gender roles, the loss of Hispanic cultural values, or family conflict (Lorenzo-Blanco et al., 2012). For Hispanic students, cultural stress may result from being an English-language learner, difficulties understanding and completing homework, peer victimization, or disciplinary actions at home regarding educator-parent contact about the student's behavior (Yockey et al., 2019). Beyond acculturation, larger proportions of Hispanic students in the US are immigrants

¹ Some individuals who trace their roots to Latin America or Spain show a preference for “Latino/a/x” versus “Hispanic” (Lopez et al., 2019). The current study chooses “Hispanic” based on US census standards which informed our approach to assessing demographic data.

or first-generation citizens (relative to other cultural/ethnic groups) and therefore may experience increased stress related to challenges with adjustment, child or family legal status, immigration-related trauma exposure, and lack of familiarity with US educational, health care, and social service systems.

The current study examines the unique associations among anxiety and depression on academics, independent of attention and hyperactivity issues, in underserved Hispanic youth. Excessive worry, intrusive thoughts, and impaired focus accompanied by anxiety leave youth at risk of lower academic scores. Children may engage in anxious-avoidant behaviors during school tasks that affect overall performance. Additionally, depressive symptoms of lack of motivation, fatigue, and difficulty concentrating may interfere with academics. This study examines the impact of anxiety and depressive symptoms on two academic skills, spelling and math, in a sample of youth ranging from 3rd grade to 6th grade. Spelling and math are integral to future academic success and positive psychosocial outcomes later in life (Berninger et al., 2010; Outhwaite et al., 2022). Spelling has been considered a skill that strengthens early literacy and reading through the development of phonological, orthographic, and morphological working memory (Berninger et al., 2010). Further, executive functioning, essential in developing school and life skills of self-regulation, problem-solving, and decision-making, reaches important maturation periods between the preschool and middle school years (Cumming et al., 2020).

On the one hand, anxiety or depressive symptoms may uniquely predict academic achievement in Hispanic youth, as previously found in their non-Hispanic counterparts (Lundy et al., 2010). Based on theory and this previous literature, one hypothesis is that controlling for attention or hyperactivity may eliminate the association of anxiety or depression; that is, anxiety and depression may not show incremental prediction controlling for attention and hyperactivity. On the other hand, based on a suppressor effect hypothesis, failure to parse various facets of cognitive, emotional, or behavioral problems may also hide other unique relationships (see e.g., Gaylord-Harden et al., 2010; Weems & Costa, 2005; Weems et al., 2013). For example, the association between depression and anxiety symptoms or attention and hyperactivity may obscure unique associations with academic achievement. Thus, we also considered the alternative hypothesis that anxiety, depression, attention, and hyperactivity may show suppressor effects.

Methods

Participants

In total, 1085 children ranging between the ages of 8 and 11 ($M = 9.19$, $SD = 1.09$) were included in the study. Data were collected from 13 public schools in two school

districts in central California between 2014 and 2018 as part of a broader intervention research project. Data for this study utilizes the baseline data only. The largest ethnic group was Hispanic (75.3%), followed by American Indian (6.4%), Pacific Islander (5.8%), Asian (5.1%), Black (4.9%), White (1.5%), and Filipino (1.0%). Of the sample, 988 (91.1%) youth qualified for free or reduced lunch. Further descriptive analyses of all youth and descriptive analyses of Hispanic youth are outlined in Table 1. At least one variable was missing from 199 participants.

Measures

Anxiety, depression, attention, and hyperactivity scores were derived from a self-report version of the Behavior Assessment System for Children, 2nd edition (BASC-2) (Reynolds & Kamphaus, 2004). The BASC evaluates behaviors and self-perceptions of youth in a variety of domains. A score on the BASC ranging between 60 and 69 indicates the risk of a clinical disorder, and a score of 70 or above indicates clinical significance. T-scores were

Table 1 Participant Demographics

Categories	Frequency	Valid Percent
Gender		
Male	566	52.7
Female	509	47.3
Missing	10	
Age		
8	456	42.0
9	76	7.0
10	448	41.3
11	105	9.7
Ethnicity		
American Indian or Alaska Native	57	6.4
Asian	45	5.1
Pacific Islander	52	5.8
Filipino	9	1.0
Hispanic	667	75.3
Black	43	4.9
White	13	1.5
Missing	199	
Gender (Hispanic)		
Male	348	52.3
Female	318	47.7
Missing	1	
Age (Hispanic)		
8	299	44.8
9	49	7.3
10	263	39.4
11	56	8.4

generated to determine the clinical range of anxiety and depression. Higher anxiety levels indicated more nervousness and/or worrying. Questions about self-reported anxiety included rating items such as “Little things bother me.” For anxiety, 11% of youth ($n = 122$) were at-risk of clinical levels, and 4% ($n = 45$) fell within the clinical range. High levels of depression indicated youth experienced feelings of being misunderstood and/or youth experienced a general lack of care, and an example item of depression included “I just don’t care anymore.” For depression, 11% of youth ($n = 116$) were at-risk of clinical levels, and 6% ($n = 60$) fell within the clinical range. For attention problems, high scores indicated a short attention span and/or the propensity to be forgetful (e.g., “I have attention problems”), while a high score of hyperactivity indicated an inability to sit still and/or the tendency to be overly noisy (e.g., “I have trouble sitting still”). For attention problems, 16% ($n = 170$) of youth were at risk and 3% ($n = 36$) scored within the clinical range. For hyperactivity, 11% ($n = 119$) were within the at-risk range and 4% ($n = 42$) scored within the clinical range. Students’ raw scores on anxiety, depression, attention, and hyperactivity were used for all other analyses.

School achievement scores were assessed with the Wide Range Achievement Test-Revised (WRAT-R) (Jastak, 1984). The WRAT-R was used to assess achievement scores as it is easy to administer and obtains a large amount of information in a brief testing period (15–45 minutes, dependent on the test-taker’s age) (Robertson, 2010). For the current study, the spelling and math computation subscales were used as indicators of school achievement. The spelling scale was a phonetic subtest that assessed the student’s ability to encode sounds into written words. The math computation scale consisted of a computation component. This subscale measured the student’s ability to count, identify numbers, and solve written mathematics problems. For both subscales, scores of 69 and below were in the lower extreme, scores of 70–79 were considered low, scores of 80–89 were below average, and scores of 90–109 were considered average. In the upper range, scores of 110–119 were considered above average, while scores of 120–129 were considered superior. Any score above 130 fell within the upper extreme range.

Procedures

A written consent form in both English and Spanish was distributed to school families before the commencement of the research. Due to the minimal risk posed by the research and the sample size, a waiver of documentation of informed consent was obtained from the Stanford University Institutional Review Board and implemented with agreement from the participating school districts. Students’ legal

guardians were given the opportunity to opt students out of research by returning a signed opt-out form to the school. Researchers explained the study to each group of students, and signed assent was obtained from participating students. The BASC-2 Self Report of Personality (SRP) questionnaire and WRAT-4 Spelling & Math tests were administered to students in whole-classroom assessments during regular school hours. Researchers read all BASC-2 questions and answer options aloud as students followed along silently. Students were instructed to circle their answers only and not to respond verbally or share their answers with others. For the math portion of the WRAT-4, students were given a 15-minute timed quiz. Students did not receive any assistance on how to complete math problems. All data were analyzed using the Statistical Package for Social Sciences (SPSS) Version 20.

Results

Assessment of the distribution of scores found a positive skew of ethnicity, which was expected for this sample. After establishing that no other dependent variables displayed high skewness or kurtosis, Pearson’s correlations were calculated (Table 2) to determine relationships between gender, age, spelling computation scores, math computation scores, and self-reported anxiety, depression, attention problems, and hyperactivity. For the current study, Cronbach’s alpha for the BASC-2 items indicated robust reliability with a value of 0.81. Cronbach’s alpha for the WRAT-4 indicated fairly high reliability with a value of 0.77. To determine whether anxiety, depression, attention problems, or hyperactivity independently predicted school achievement scores, correlations and linear regressions were used.

Zero-order correlations showed no relationship between anxiety and scores on spelling and math ($p > 0.05$). Depression was significantly negatively related to spelling scores ($B = -0.14$, $p < 0.01$) and math computation scores ($B = -0.15$, $p < 0.01$) after controlling for age and ethnicity. Attention problems were also negatively related to spelling scores ($B = -0.11$, $p < 0.01$) and math computation scores ($B = -0.15$, $p < 0.01$) after controlling for age and ethnicity. No significant relationship emerged between hyperactivity and either spelling or math achievement scores ($p > 0.05$).

To determine if depression predicted school achievement above and beyond attention problems, attention problems were separately regressed onto math and spelling scores while controlling for depression. Attention problems remained significant in predicting math scores after controlling for depression [Model $R^2 = 0.07$, $F(2, 936) = 38.05$, $p < 0.001$]. However, attention problems became nonsignificant after depression was entered into the model [Model $R^2 = 0.05$, $F(2, 907) = 24.34$, $p < 0.001$]. This

Table 2 Pearson Correlations

	1	2	3	4	5	6	7	8
1. Gender	–							
2. Age	.06*	–						
3. Hispanic	–.01	–.08**	–					
4. Spelling Score	–.06	.42**	–.18**	–				
5. Math Score	.04	.55**	–.11**	.63**	–			
6. Anxiety	–.04	–.07*	–.01	–.02	–.06	–		
7. Depression	.01	–.15**	.03	–.22**	–.26**	.55**	–	
8. Attention Problems	.13**	–.06*	.03	–.16**	–.20**	.49**	.54**	–
9. Hyperactivity	.15**	.01	–.02	–.03	–.05	.51**	.43**	.69**

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed). Hispanic youth were coded as 1, and non-Hispanic youth were coded as 0

is partially consistent with the hypothesis, indicating that depression has predictive power in spelling scores beyond problems in attention.

When anxiety, depression, attention problems, and hyperactivity were entered into the model, a significant positive relationship emerged for anxiety ($p < .001$) and hyperactivity ($p < .01$) as well as a significant negative relationship for depression ($p < .001$) and attention problems ($p < .001$) in predicting spelling scores with a significant overall model [Model $R^2 = 0.08$, $F(4, 907) = 19.65$, $p < 0.001$]. When controlling for age, a similar pattern was found [Model $R^2 = 0.22$, $F(5, 907) = 51.24$, $p < .001$] except for the positive association with hyperactivity. The significant positive relationship for anxiety ($p < .001$) as well as significant negative relationships for depression ($p < .001$) and attention problems ($p < .001$) in predicting spelling scores remained. In predicting math scores, the overall model including anxiety, depression, attention problems, and hyperactivity was significant [Model $R^2 = 0.11$, $F(4, 936) = 27.47$, $p < 0.001$]. Similar to spelling scores, there emerged a significant positive relationship for anxiety ($p < 0.01$) and hyperactivity ($p < 0.001$) and a significant negative relationship remained for depression ($p < 0.001$) and attention problems ($p < 0.001$). When controlling for age, there was no effect on the overall model [Model $R^2 = 0.36$, $F(5, 936) = 103.99$, $p < .001$] and there remained a significant positive relationship for anxiety ($p < 0.01$) and hyperactivity ($p < 0.05$) and a significant negative relationship remained for depression ($p < 0.001$) and attention problems ($p < 0.001$). The emergence of anxiety and hyperactivity as predictors when controlling for variation in other dependent variables indicated a suppressor effect. Suppressor effects were examined by comparing the zero-order, partial, and semi-partial correlations. Results were reported for both the full sample and by gender to determine potential gender differences. To examine if there was a different pattern of prediction/suppression, we calculated the same regression analyses for Hispanic youth only. The results for the full

sample by gender and within the Hispanic subsample are summarized in Table 3. Overall, the pattern of suppression was similar in the Hispanic subsample, more pronounced in girls, and did not emerge in the subsample of boys.

Discussion

This study underscores the importance of considering how diverse groups of individuals, namely Hispanic youth in historically under-resourced school systems, experience symptoms of anxiety, depression, and ADHD symptoms and how these symptoms affect school achievement. Indeed, minority youth have been found to have greater levels of anxiety and depression, of which amounts have been reported to be considerably high at the elementary school level (Saluja et al., 2004; Yockey et al., 2019), thus leaving minority youth at greater risk of poor academic achievement (Valencia, 2002). The current study finds that anxiety and hyperactivity positively predict spelling and math computation, while depression and attention problems negatively predict spelling and math computation.

In the current study, anxiety and hyperactivity alone do not predict school achievement. Unexpectedly, when anxiety and hyperactivity are included as predictors together with depression and attention problems, they explain a significant portion of the variance in both spelling and math computation. This result indicates a suppressor effect. Suppression is said to occur when a third (or more) variable contributes to a variable's association with another variable by helping to account for error variance (Gaylord-Harden et al., 2010). Cooperative suppression, for example, has been defined as a situation in which one or more variables and suppressor variable(s) both become more strongly correlated with another variable when included together in a regression (Gaylord-Harden et al., 2010). Ultimately suppression occurs when the simultaneous analysis of two or more variables (e.g., anxiety, depression,

Table 3 Summary of suppressor analyses

	Spelling Score			Math Computation Score		
	Zero-order	Partial	Semi-Partial	Zero-order	Partial	Semi-Partial
Full sample						
Anxiety	−0.02	0.12**	0.12**	−0.06	0.10**	0.10**
Depression	−0.22**	−0.21**	−0.20**	−0.26**	−0.23**	−0.22**
Attention	−0.16**	−0.13**	−0.12**	−0.20**	−0.16**	−0.16**
Hyperactivity	−0.03	0.09**	0.09**	−0.05	0.12**	0.11**
Hispanic youth only						
Anxiety	−0.03	0.09*	0.09*	−0.08	0.08	0.07
Depression	−0.20**	−0.17**	−0.17**	−0.25**	−0.20**	−0.19**
Attention	−0.14**	−0.11**	−0.11**	−0.19**	−0.16**	−0.15**
Hyperactivity	−0.03	0.07	0.07	−0.04	0.13**	0.12**
Boys only						
Anxiety	−0.04	0.08	0.08	−0.07	0.07	0.07
Depression	−0.25**	−0.26**	−0.26**	−0.27**	−0.23**	−0.23**
Attention	−0.10*	−0.03	−0.03	−0.15**	−0.09*	−0.09*
Hyperactivity	−0.02	0.06	0.06	−0.05	0.07	0.07
Girls only						
Anxiety	0.01	0.14**	0.14**	−0.04	0.15**	0.14**
Depression	−0.18**	−0.15**	−0.14**	−0.27**	−0.22**	−0.21**
Attention	−0.20**	−0.24**	−0.23**	−0.27**	−0.28**	−0.27**
Hyperactivity	−0.01	0.15**	0.15**	−0.05	0.18**	0.17**

* indicates $p < .05$, ** indicates $p < .01$

attention, and hyperactivity) improves the association of one or all with additional variables (e.g., spelling and math achievement). In experimental ANCOVA designs, suppressor effects occur when a covariate is controlled by removing predictable variance that may mask an effect, increasing the power of the ANOVA (see Tabachnick et al., 2019). Typically, suppressor effects are considered post hoc in regression models and correlational designs, though research suggests suppression is replicable and should guide a priori predictions, similar to analyses such as mediators and moderators (see Gaylord-Harden et al., 2010; Weems et al., 2013). Previous research shows that anxiety, as measured by different facets (generalized, separation, and social), has demonstrated suppressed variance, where associations between different age groups for youth and multiple facets of anxiety were more robust when observing partial correlations (Weems et al., 2013). Where zero-order correlations are the direct relationships between two variables, partial correlations account for variance shared between two variables after variance from other dependent variables is controlled. For both anxiety and hyperactivity, the zero-order correlations were negative and non-significant until all variables were entered into the regression, where they became significant positive predictors. This finding suggests that mental health symptoms should not be considered in isolation but as a whole.

The current study finds that greater levels of depression and attention problems predict poorer academic achievement in spelling and math computation. Importantly, depression predicts spelling scores, but not math scores, above and beyond attention problems. This study also finds a positive relationship between anxiety and school achievement. One explanation for this finding may be that anxiety in school-aged children can manifest as worries concerning competence in achievement, often to the point of redoing tasks because of excessive dissatisfaction with performance (DSM V, American Psychiatric Association, 2013). It should be noted that considerable research has found a strong correlation between anxiety and academic achievement in children; however, these studies have focused on domain-specific forms of anxiety, such as math anxiety (see review by Ma, 1999), language anxiety (Horwitz, 2001), or test anxiety (see review by McDonald, 2001). Previously, studies incorporating non-domain-specific anxiety measures have found no effect on academic achievement (Wu et al., 2012). The current study, therefore, provides some evidence that non-specific anxiety corresponds with academic achievement, which may be due to sample characteristics or a more nuanced analytic approach.

Unexpectedly, a positive relationship between hyperactivity and school achievement emerged in the overall model. Attention problems are often comorbid with hyperactivity and have been previously found to negatively predict school

achievement. The Model of Dual Developmental Pathways posits that conduct disorders (such as disruptive behavior disorders) are negatively related to scholastic achievement by their correlation with attention deficit behaviors, and conduct problems alone are not related to academic underachievement (Frick et al., 1991; Rapport et al., 1999). Indeed, results here replicate differential outcomes on academic achievement between attention problems and hyperactivity, though the theory behind the positive association between hyperactivity and academic achievement remains unclear. In school contexts where there are multiple cultural, economic, and other contextual barriers to academic achievement, anxiety and heightened goal-directed behavior (hyperactivity) may prove adaptive. Hyperactivity (in the absence of attention problems) may be indicative of highly motivated, “gritty,” and goal-driven academic behaviors. However, while these suppressor effects were seen in the overall sample and the subsample of Hispanic youth, the effect appeared to only be in girls.

Internalizing behaviors, such as depression and anxiety, are more common among girls (see Zahn-Waxler et al., 2008). Indeed, research has found that girls often score higher on levels of trait math anxiety than boys (see Goetz et al., 2013). Results from the current study partially reflect these findings, where anxiety uniquely predicted academic achievement in girls but not boys. These unique gender differences suggest further investigation into the associations between mental health symptoms and academic achievement in underserved youth.

This study is not without limitations. Due to the unique sociocultural and socioeconomic nature of this sample, the generalizability of results is limited. Additionally, the novelty of results (i.e., suppressor effects and the positive association between hyperactivity and academic achievement) warrants confirmation and replication in future studies. Indeed, when forming predictions of behavioral and cognitive outcomes, attention must be paid to the nature of dependent variables and their interrelations, and suppression should be considered in a priori predictions. It should also be noted that classroom-based administration of assessments may result in some measurement errors. To ease the potential error of administration and events that may affect the overall quality (classroom behavior, translation issues, etc.), administration should be followed up with quality assessments where quality can be considered in subsequent analyses.

Intervention techniques utilizing anxiety reduction have significantly improved school performance in a sample of highly anxious youth (Wood, 2006). However, simply taking ethnicity and culture into account may ease school-related anxiety in underserved youth. For example, Hispanic youth may experience academic-related difficulties due to anxiety and depression stemming from cultural stress, stereotypic stress, and other culturally

sensitive underlying factors (Varela et al., 2007). Additionally, a high prevalence of mental health concerns has been reported in youth during the COVID-19 pandemic, stemming from stressors related to social deprivation, disruptions of routines, and concerns about family illness (Mayne et al., 2021). Hispanic youth may face unique challenges and increased risks of mental health consequences related to widespread pandemics, as these youth are particularly negatively affected by health disparities and concerns about family illness and death (Penner et al., 2021). It is recommended that school health professionals provide culturally competent psychosocial interventions, including focusing on cultural barriers (such as language and norms) and connecting with parents of anxious Hispanic youth to enhance youths’ morale (Yockey et al., 2019). School characteristics or climate are significantly associated with educational achievement and overall mental well-being for youth and adolescents (Irvin et al., 2011; Smith-Adcock et al., 2006; Way & Robinson, 2003). This suggests that targeted interventions, culturally responsive teaching, and inclusive school environments are beneficial and necessary to provide educational equity to underserved students. Interventions that address core features of emotion regulation may be effective in this regard (Weems et al., 2015).

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Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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