

Moderating Role of Income on Trauma and Anxiety Predicting
School Engagement in Adolescents

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ABSTRACT

School engagement has a significant impact on children's overall success within the school system. Children with high levels of engagement exhibit strong academic achievement, persistence through academic struggles, effective social skills, and avoidance of drop out. Children with low levels of engagement show signs of low cognitive performance, disruptive behaviors, absences, and dropout risk. Yet, specific causes for disengagement are largely unknown. The present study analyzed the degree to which adverse childhood experiences (ACEs) and anxiety affect school engagement levels. Researchers used a public dataset from the National Survey of Children's Health to study adolescents, specifically between the ages of 10 to 17. Data reflected that as the number of ACEs increased in adolescents, the likelihood of school engagement decreased. Similarly, as the severity in anxiety increased, engagement decreased. The study also analyzed the degree to which socioeconomic status moderates the relationship between number of ACEs and severity of anxiety impacting the likelihood of school engagement. Results suggested that as ACEs increased, the likelihood of decreased levels of school engagement was more prominent in low income communities when compared to students that reside in areas that are middle income and high income. When analyzing students below the

poverty line, results were inconclusive. Income did not moderate the likelihood of school engagement as the severity of anxiety increased. The results indicate the need for early schoolwide intervention for coping skills as well as prevention programs designed to target those at risk of dropping out, especially within low income populations. Future research should investigate the moderating role of culture as well as the impact of the recent COVID-19 pandemic on anxiety and trauma, which may have influenced the projection of school engagement levels.

Moderating Role of Income on Trauma and Anxiety Predicting
School Engagement in Adolescents

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CHAPTER I: INTRODUCTION AND LITERATURE REVIEW

The degree to which students engage in school-related activities ultimately predicts social and academic outcomes, and yet the factors that may impede engagement are not clearly understood. To further understand school engagement, it may be necessary to examine it through the lens of trauma and anxiety. Both trauma and anxiety are two factors that can impede engagement levels significantly to the extent of which the adolescent exhibits emotional, cognitive, and/or behavioral challenges in the school setting. It is crucial to understand the role that socioeconomic status (SES) plays in school engagement as well. Previous research suggests that SES is a factor that tends to increase or decrease a child's level of exposure to both trauma and anxiety due to numerous variables including neighborhood violence, resources available, and family engagement.

School Engagement

School engagement is a multidimensional concept that plays a critical role in all aspects of student learning and growth. The term "school engagement" refers to active and sustained participation in school related tasks and activities. Within this concept, there are three distinct forms of engagement (Wang et al., 2019). These include *emotional*, *behavioral*, and *cognitive engagement*. *Emotional engagement* pertains to the affective attitude that a student may have toward their school, peers, and instructors (Pietarinen et al., 2014). The concept of *behavioral engagement* refers to the student's involvement and participation within the classroom (Skinner et al., 2010). And finally, *cognitive engagement* relates to the student's willingness and ability to take on the learning task presented (Rotgans & Schmidt, 2011). When a strong bond and sense of belongingness is established with the school (*emotional engagement*), students are more likely to participate in classroom activities (*behavioral engagement*); thus, over time, with consistency,

this develops into a stronger commitment to learning (*cognitive engagement*). Wang and Fredricks (2014) found that student engagement drops (disengagement) during adolescence, as demonstrated by an increase in dropout rates. Macrosystemic factors may affect a student's ability to engage, including socioeconomic status and school environment (Madox & Prinz, 2003).

Socioeconomic Status

SES appears to have a significant impact on school engagement levels (Berkowitz et al., 2017; Li & Lerner, 2011). Children from disadvantaged communities experience more risk factors than children who reside in affluent communities (McLoyd, 1998). These risk factors include decreased vocabulary and cognitive delays, which can ultimately reduce school engagement levels.

The “vocabulary gap,” evident in toddlers at early stages, is described as dramatic differences in vocabulary skills by socioeconomic status. Low SES students are exposed to fewer vocabulary words than their more affluent peers. Biemiller and Slonim (2011) found that high SES students know 4,000 more words than their low SES peers. Low SES students with limited vocabulary exposure have an increased difficulty in reading comprehension and thus a decreased desire of persisting in classes that use complex terms (Christ & Wang, 2011). Vocabulary is crucial for children because it helps them manipulate and understand information. When unable to understand what the instructor is asking, children may ignore the educator and have decreased self-efficacy. With the contribution of decreased self-efficacy, dropout rates become more likely.

It is common among children with low SES to have delayed cognitive and social development. Najman and colleagues (2009) found that exposure to economic hardship for an extended period is negatively related to achievement tests and general intelligence. Structural developmental differences in children's brains are apparent in less affluent communities when compared to other SES levels (Hair et al, 2015). Physiologically, the neural circuitry becomes severely impacted with elevated cortisol levels (Vliegthart et al., 2016). The disruptions in neural development play a factor in the child's social development. The child is not able to regulate their emotions as well as their peers. Some may display signs of impulsivity, aggression, attention-deficit/hyperactivity disorder, or conduct disorder. Others find it hard to relate to one another, deal with their own emotions, and even experience a decreased desire to get to know others. With these impairments socially and cognitively, students are unable to provide a solid engagement level within the classroom due to the impact of toxic stress on the brain.

Additionally, factors such as poor access to healthcare, limited nutritional foods, and lack of family relationships can indirectly impact school engagement. Students with low SES have decreased access to medical care and inaccurate diagnoses, which can result in increased exposure to certain health risks (Sargent, et al., 1995; Gottlieb & colleagues, 1995). Their difficulty in receiving the care needed increases their susceptibility to health risks in the future such as diabetes, cardiovascular diseases, and drug abuse (Mellow & Wiebe, 2020; Valero-Elizondo et al., 2018; Altekruze et al., 2020). Health related diseases and health risk behaviors places students at a higher risk of "chronic school absenteeism", which in turn produces a greater risk for poor school performance and school dropout (Allison et al., 2019).

From a nutritional standpoint, not all students have the financial means or access to nutritional foods. Basch (2011) conducted a literature review and found a disproportionate number of urban school aged students skipping breakfast, which contributed to low school achievement. In a study based on self-reports of students' dietary intake and breakfast frequency, results determine that students who do not regularly eat a high-quality breakfast may experience disruptive behaviors within the class setting (Overby and Hoigaard, 2012).

Finally, Barajas-Gonzalez and Brooks-Gunn (2014) researched family and neighborhood influences related to low income and found lower SES is associated with higher reports of neighborhood disorder, greater fear for safety, and more family conflict than middle- and high-income communities. A recent study from Simons and Steele (2020) investigated the negative impact of economic hardship on adolescent academic engagement. Their results confirmed that of previous researchers which highlighted that neighborhood disadvantages interfere with parents' ability to share positive youth development activities with their children due to living in an area that has fewer resources and safe areas (Gutman et al., 2005). Positive youth development activities include shopping, playing sports, or even going for a walk with parents. Low engagement in shared activities with parents negatively affected academic outcomes. Within low income communities, there exist both direct influences of the "vocabulary gap" and cognitive delays as well as indirect influences of nutrition and family and neighborhood influences.

Trauma

Heinzelmann and Gill (2013) found that nearly 90% of American children experience some form of a traumatic experience at least once in their lives. Trauma is described as acute, chronic, and complex trauma (Department of Children and Families [DCF], 2012). Acute trauma is defined as resulting from one single incident such as a natural disaster or physical altercation. Chronic (i.e. repeated) is defined as a repetitive and prolonged form of trauma. Examples of this include physical/sexual abuse, neglect, and community violence. Complex trauma is exposure to multiple traumatic events and the long-term effects of this exposure. The greater number of traumatic experiences, the higher risk of physical and mental health impairments over time (Chang et al., 2019; Hughes et al., 2017). Adverse childhood experiences (ACEs) encompass various forms of physical and emotional abuse, neglect, and household dysfunction during childhood (Negriff, 2020). The National Survey of Children's Health (NSCH) defines ACEs as traumatic events that occur during a child's lifetime and that are strongly related to a range of health problems (Crouch et al., 2019).

Children may be especially vulnerable to the effects of trauma due to their rapidly growing brain. When they experience any type of trauma, toxic stress can develop. Toxic stress is the prolonged activation of the stress response with failure to recover fully. When the child is constantly in a heightened state of stress, their emotional, behavioral, and cognitive development is redirected to maintaining and promoting survival (Rushton & Kraft, 2014). Toxic stress can affect a child's skills of attention, decision-making, learning, and response to future stress; all these skills are necessary for school engagement. The Center for Disease Control (CDC) reports that living in under-resourced communities especially and having ACEs can cause toxic stress that can alter brain development (Centers for Disease Control and Prevention, 2021)

A high prevalence of ACE exposure (3 or more) is linked to poor school attendance, behavioral issues, and a failure to meet grade level standards in courses including mathematics, reading, or writing. Crouch and colleagues (2019) compared child and family characteristics and the likelihood of reported exposure to ACEs. They found that economic hardship and parent or guardian divorce were the most prevalent ACE exposures. Older children, non-Hispanic African American children, children with special needs, children in poverty, and children in rural areas were more likely to experience parental divorce than non-Hispanic white, Hispanic, and Other non-Hispanic children.

Bethell and colleagues (2014) conducted a longitudinal study assessing ACEs impact on health and school engagement and the mitigating role of resilience. Children's who had ACEs had lower rates of school engagement and higher rates of chronic disease. Children who were able to build resilience were protected from the negative impact. Therefore, not all students that come from low SES communities and encounter ACEs experience detrimental effects. Other factors, such as resiliency or psychological health can protect or hinder them within a school environment. Children who do not possess resiliency factors, such as family and/or social support, are at a higher risk of developing an anxiety disorder (Fernandes & Osório, 2015).

Anxiety

Although anxiety is a normal feeling, when experienced at disproportionate levels, it can become impairing. These disproportionate levels include excessive nervousness, apprehension, a specific fear, and too much worry. McCarthy (2019) stated that one in three adolescents from ages 13 to 18 experience anxiety, and the rate of youth who experience anxiety continues to increase. From 2007 to 2012, the prevalence rate of anxiety went up by 20% (McCarthy, 2019). There are many factors that can influence anxiety in adolescents, including grand expectations,

increased pressure to succeed, a scary or threatening world, and even social media. Factors, such as toxic stress derived from trauma, can result in increased anxiety levels.

Few studies examine the potential links between anxiety and school engagement, but self-reported anxiety appears to increase with age and is associated with poor school performance (e.g., grades) (Mazzone et al., 2007). Children with a high score a self-report anxiety scale were more likely to have poor school grades (< 60%) than those with a “non-anxious” score. Among high school students, 90% of students that had self-reported anxiety symptom scores in the anxious range also had poor school performance. Cagiran and Souturk (2021) found that those students who had anxiety had a negative association with student’s own feeling of responsibility toward learning.

Researchers have established a relationship between SES and anxiety. Those in low income communities were found to have increased levels of anxiety symptoms compared to more affluent communities. Vine and colleagues (2012) found that individuals from low income households demonstrated significantly higher rates of anxiety symptoms (physical symptoms, harm avoidance, and separation/panic) in comparison to individuals with medium income. Students in low income communities tend to suffer from increased stress due to lack of resources, neighborhood violence, and even reduced support levels from family and friends. Interestingly, researchers found social anxiety to be more common in individuals with high income than low income. Adolescents in high income communities tend to suffer from anxiety related to social problems such as peer approval and social comparisons. Although anxiety can be experienced at any SES level, low SES communities have limited resources compared to high income communities, which when combined with external factors begins to limit their success in the future

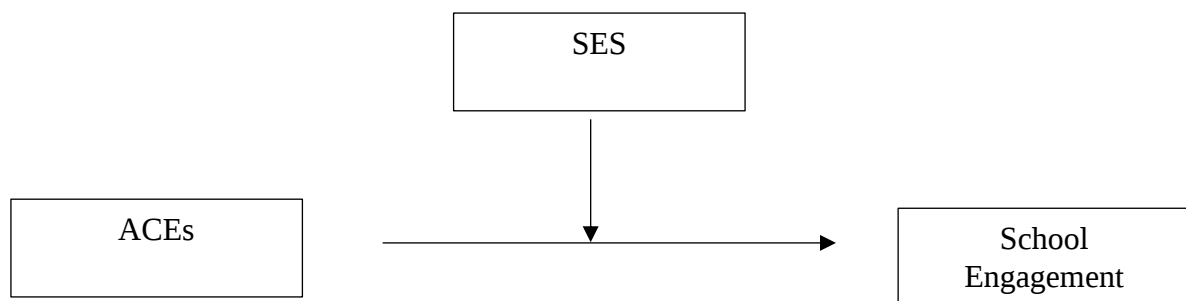
Aims and Hypotheses

The first aim is to determine the likelihood of the number of ACEs and anxiety severity predicting school engagement.

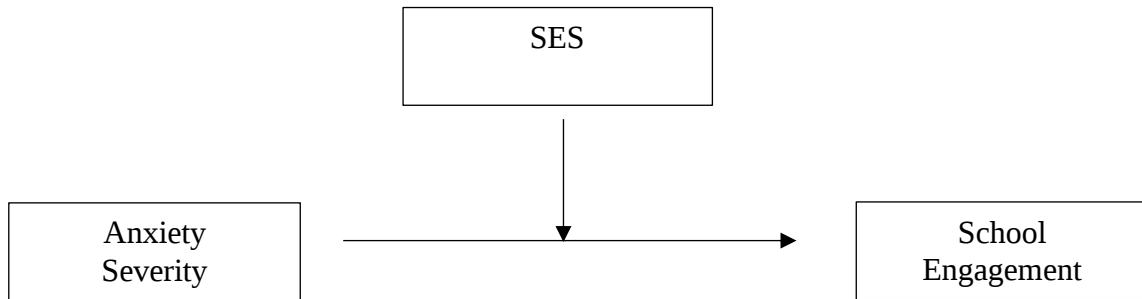
- Aim 1a: As the number of ACEs increases, the likelihood of school engagement will decrease such that those with increasing number of ACEs will be more likely to have lower levels of school engagement.
- Aim 1b: As anxiety severity increases, the likelihood of school engagement will decrease, such that those with increasing levels of anxiety will likely have low levels of school engagement

The second aim is to examine the moderating role of SES in the relationship between number of ACEs and school engagement as well as anxiety severity and school engagement.

- Aim 2a: Income will moderate the number of ACEs impairing school engagement, such that students from low income communities with increasing levels of ACEs are more likely to have lower levels of school engagement



- Aim 2b: Income will moderate the likelihood of anxiety levels impairing school engagement, such that students from low income communities with increasing anxiety levels are more likely to experience decreasing school engagement level.



CHAPTER II: METHODS

Participants

The present study used a public dataset from the National Survey of Children's Health, using a combination of the years 2018 and 2019. In this dataset, households were randomly sampled and contacted by mail to identify children younger than 18 years of age. Surveys were based on one child per household. A total of 59,963 surveys were completed for both years, with 30,530 in 2018 and 29,433 in 2019. These years combined resulted in a response rate of 43.1% and 42.4%, for 2018 and 2019, respectively.

Modifications had to be made to adjust to the sample of interest. The World Health Organization defines adolescents as existing in ages of 10 to 19. The current study's sample focuses on adolescents, who are ages 10 to 17. Participants who were missing from variables of interest or did not respond to questions relating to federal poverty level (FPL), ACEs, anxiety, and school engagement were removed, which reduced the eligible sample to 31,006 participants

Measures

Demographics

Demographic variables included age, sex, and race collected through the household screener. Age was determined by asking: "How old is this child?" Sex was determined by asking: "What is this child's sex?" Race was determined by asking: "What is this child's race/ethnicity (7 groups)?" The results are summarized in Table 1.

Table 1*Demographic Variables*

	<i>n</i>	Percent
Total	31,006	
Gender		
Male	16,192	52.2
Female	14,814	47.8
Age		
10	3,232	10.4
11	3,387	10.9
12	3,416	11.0
13	3,724	12.0
14	3,805	12.3
15	4,204	13.6
16	4,542	14.6
17	4,696	15.1
Race		
White	21,691	70.2
African American	2,056	6.7
Asian	1,520	4.9
Hispanic	3,603	11.7
American Indian	207	0.7
Native Hawaiian	82	0.3
Multi-Race	1,727	5.6
Other	120	0.4
Federal Poverty Level		
0-99%	3,393	10.9
100-199%	5,029	16.2
200-399%	9,541	30.8
>400%	13,043	42.1

School Engagement

School engagement was determined from two questions which are “Does the child care about doing well in school” and “Do they do their required homework?” The parent answered *yes* or *no* to each question. This variable was combined into one school engagement variable where if the answer was *yes* to both, it would be “engaged”. If there was a *no* response to at least one question, then it would be “disengaged” (see Table 2).

Income

Income was based on FPL, derived from responses to the survey question about income and number of family members. For income, participants were asked to report each type of income the family received and their best estimate of the total amount in the last calendar year. Types of income included the following: “Wages, salary, commissions, bonuses, or tips for all jobs”; “Self-employment income from own nonfarm businesses or farm businesses, including proprietorships and partnerships”; “Interest, dividends, net rental income, royalty income, or income from estates and trusts”; “Social security or railroad retirement; retirement, survivor, or disability pensions”; “Supplemental security income (SSI); any public assistance or welfare payments from the state or local welfare office”; “Any other sources of income received regularly such as Veterans’ (VA) payments, unemployment compensation, child support, or alimony.”. Total income and number of family members were combined to determine percentage at FPL. Those participants who fell in the 0-99% range were labeled as below poverty level, 100-199% were low income, 200-399% were middle income, and 400% were high income (see Table 1).

Adverse Childhood Experiences (ACEs)

The NSCH dataset measures a sample of ACEs within the definition of the ACEs concept. The ACEs measure covers areas of socioeconomic hardship, divorce/parental separation, substance abuse in household, victim/witness of neighborhood violence, mental illness in household, witness domestic violence, parent served time in jail, race/ethnicity discrimination, and death of parent. The NSCH does not include indicators of child abuse and neglect. Participants were asked to answer *yes* or *no* to the following questions: (1) parent or guardian divorced or separated; (2) parent or guardian died; (3) parent or guardian served time in jail; (4) saw, or heard parents or adults slap, hit, kick punch one another in the home; (5) victim of violence or witnessed violence in neighborhood; (6) lived with anyone who was mentally ill, suicidal, or severely depressed; (7) lived with anyone who had a problem with alcohol or drugs; and (8) treated or judged unfairly due to race/ethnicity. Answers were combined to create one variable that contained the total number (count) of ACEs per child (see Table 2).

Anxiety

The anxiety variable was determined through the questions “Does your child have anxiety?” and “If so what level of anxiety?” Respondents indicated *yes* or *no* and whether it was *mild*, *moderate*, or *severe*. These responses were then combined into one variable with three categories: does not have, mild, and moderate/severe condition (see Table 2).

Table 2*Predictor Variables*

Predictors	<i>n</i>	<i>Percent</i>
Anxiety Severity		
Do not have	26,544	85.6
Mild	2,073	6.7
Moderate/Severe	2,389	7.7
Number of ACEs		
0	18,026	57.1
1	7,093	22.9
2	2,727	8.8
3	1,496	4.8
4	804	2.6
5	469	2.5
6	280	0.9
7	91	0.3
8	20	0.1
School Engagement		
Engaged	16,776	54.1
Not Engaged	14,230	45.9

Data Analysis

All analyses were conducted using IBM SPSS Statistics (Version 28). First, missing data in the sample were handled via listwise deletion. Next, frequencies and percentages were calculated amongst demographic variables, anxiety level, number of ACEs, and school engagement level. Additionally, the average amount of ACEs was calculated. A product of income and anxiety, as well as income and number of ACEs, was created as two additional variables to test indirect effects of the moderator, income. School engagement was recoded as 0 being disengaged and 1 being engaged. To test differences in likelihood of anxiety or trauma impairing school engagement levels, two logistic analyses were conducted, each with a

moderator included, using PROCESS v4.0. The first logistic moderation analysis examined anxiety and its relation to school engagement with the moderation factor of SES at four levels (below poverty level, low, middle, and high income). A second logistic moderation analysis examined the impact of trauma on school engagement with the moderation factor of SES at four levels (below poverty level, low, middle, and high income).

CHAPTER III: RESULTS

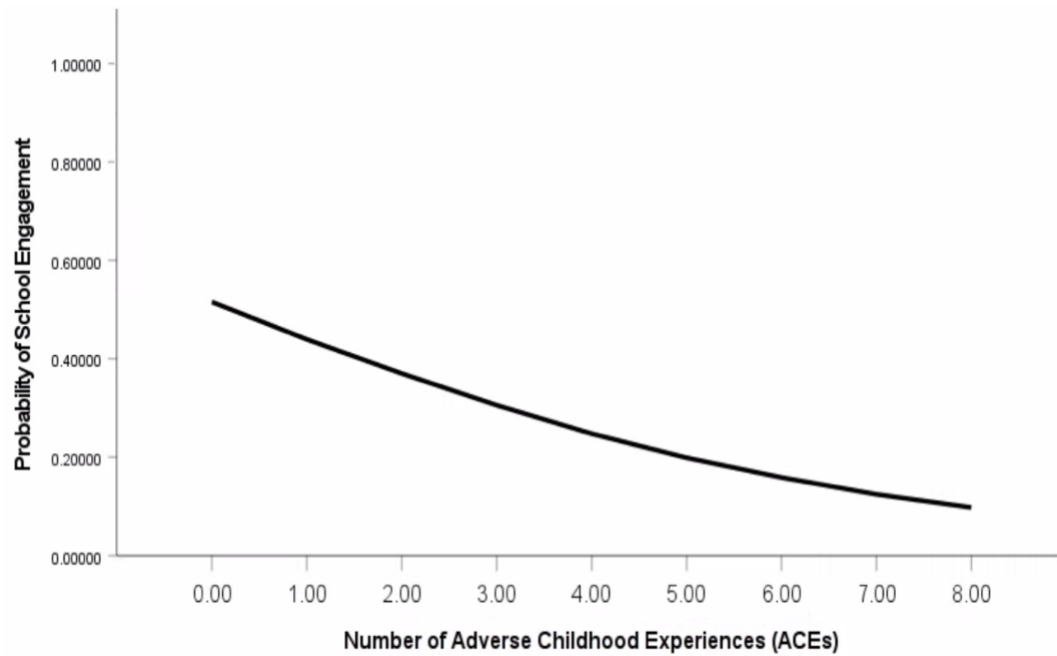
Table 1 and 2 displays the counts and frequencies for the variables used in the analyses. The table represents the distribution of gender, age, and student engagement. The dataset contained a large proportion of white participants (70.2%) in comparison to Hispanic (11.7%), Black (6.7%), multi-race (5.6%) Asian (4.9%), and other races (<1%). High income (42.1%) represented a larger amount of the population when compared to that of below poverty level (10.9%). More students did not have anxiety (85.6%) than those who did (14.2%). Finally, there was a greater proportion of students who did not have a single ACE (57.1%) versus those who had at least one in their lifetime (22.9%). Average number of ACEs was 0.81 and standard deviation was 1.29.

ACEs and School Engagement

Table 3, Model 1 presents the results of the logistic regression model. The likelihood of school engagement levels decreased as the number of ACEs increased, with the likelihood of having one or multiple ACEs increasing 0.76 times for each 1 unit decrease in school engagement, controlling for income (Figure 1).

Figure 1

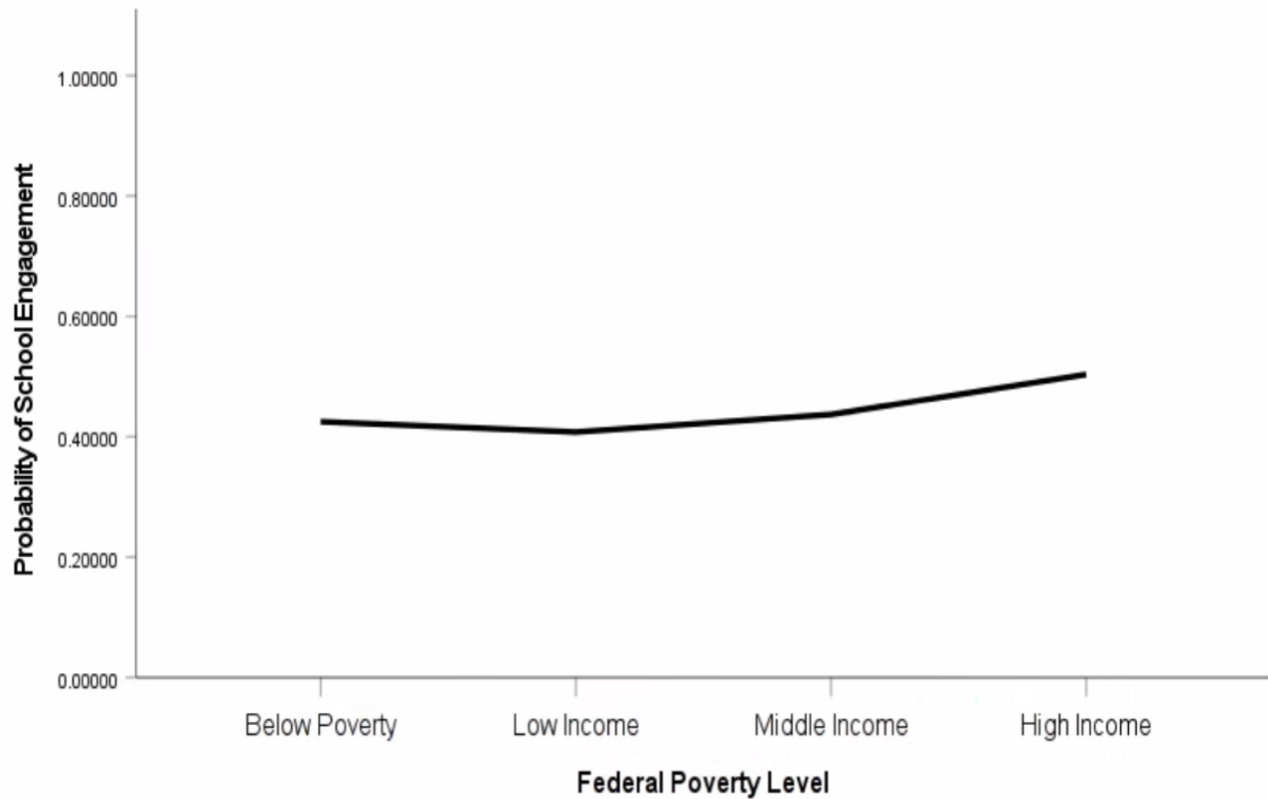
Probability of School Engagement Across Number of Adverse Childhood Experiences (ACEs)



For youth whose income was at below poverty level range, odds of school engagement were (0.88 times) less than youth at high income range. Youth whose income was at low income, the odds of school engagement were (0.79 times) lower than those at high income. Finally, those whose income was at middle income, the odds of school engagement were (0.83 times) lower than those at income of high income (Figure 2)

Figure 2

Probability of School Engagement Across Federal Poverty Level Controlling for Adverse Childhood Experiences (ACEs)



Income Moderation

Table 3, Model 2 showed significance amongst the variables and evidence of several interactions. The relationship between ACEs and school engagement is significantly moderated by income. Specifically, among children from low income, middle income, and high income homes, the number of ACEs has a significant negative relationship with school engagement, whereas for children from below poverty level households, the relationship is inconclusive (Figure 3). The interaction between low income and number of ACEs predicting the likelihood of school engagement was significant, suggesting the likelihood of number of ACEs predicting school engagement depended on low income, $B = -0.25$, $SE = 0.02$, $p < .001$, 95% CI [-0.29,

-0.20]. The odds of low income moderating ACEs in predicting school engagement was 1.08 times higher than that of those in the high income. At the low income, number of ACEs predicted the likelihood of school engagement. The interaction between middle income and number of ACEs predicting school engagement was also significant, suggesting that effect of number of ACEs on school engagement depended on middle income of federal poverty, $B = -0.26$, $SE = 0.02$, $p < .001$, 95% $CI [-0.30, -0.23]$. The odds of middle-income moderating ACEs in predicting school engagement were 1.07 times higher than that of those in the high income. At the middle income, ACEs predicted the likelihood of school engagement. Finally, the interaction between high income and number of ACEs predicting school engagement was also significant, suggesting that effect of number of ACEs on school engagement depended on high income, $B = -0.33$, $SE = 0.02$, $p < .001$, 95% $CI [-0.37, -0.29]$.

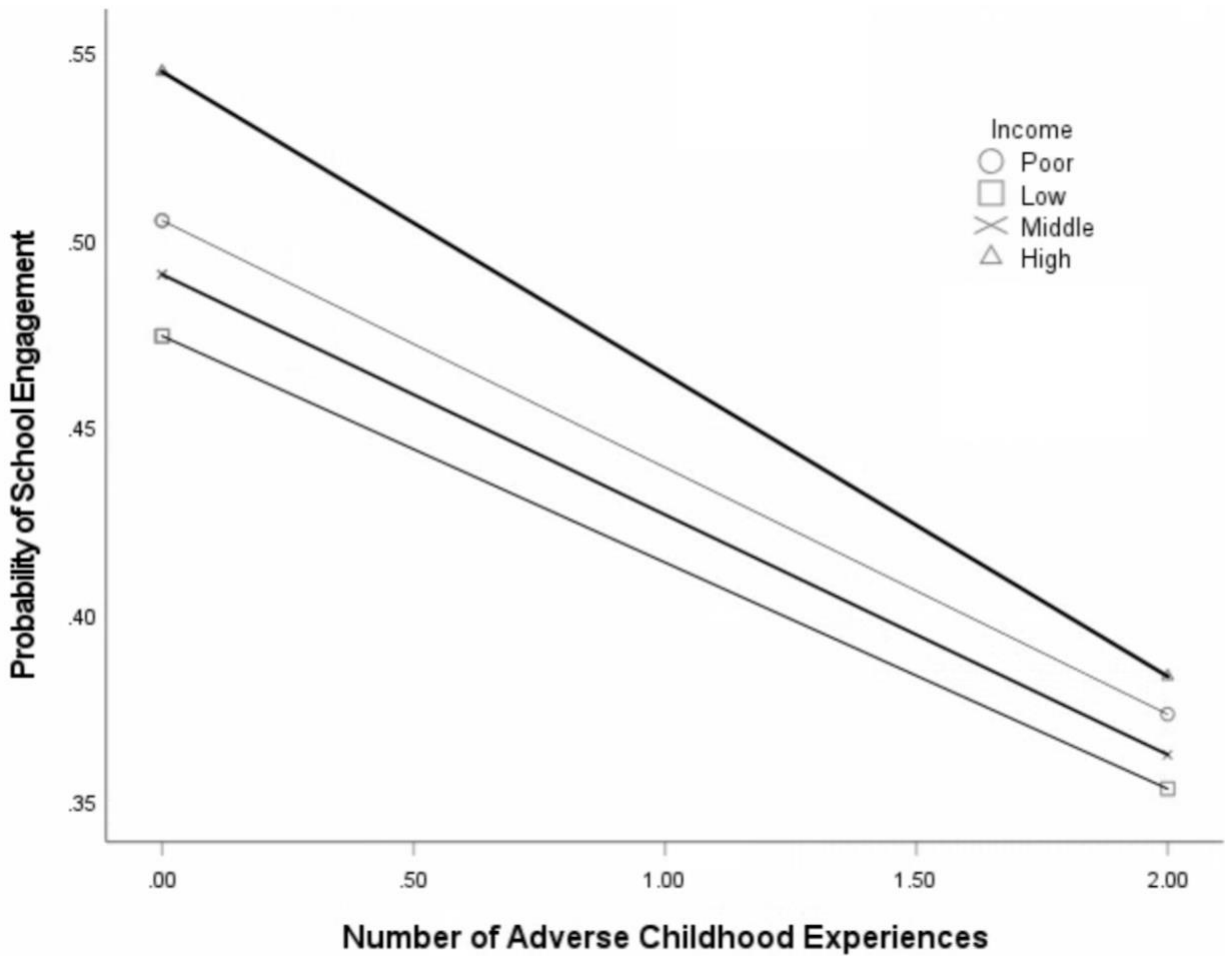
Despite significance at all levels, except below poverty level, number of ACEs was most strongly related to school engagement at low income. In Model 1, the number of ACEs and different levels of income accounted for 4.3% of the variance in school engagement, $\chi^2 (4) = 1007.41$, $p < .001$, Nagelkerke $R^2 = .043$. In Model 2, adding the four interactions of number of ACEs and different levels of income, 4.3% of variance was accounted for, $\chi^2 (7) = 1016.06$, $p < .001$, Nagelkerke $R^2 = .043$. Overall, with the addition of moderator values, there was a change in $\Delta\chi^2 (3) = 8.65$, $p = .034$.

Table 3*Moderating Role of Income on Adverse Childhood Experiences Predicting School Engagement*

Predictor	Model 1					Model 2				
	<i>b</i>	<i>Wald</i> χ^2	<i>p</i>	<i>Odds Ratio</i>	<i>Odds Ratio</i> <i>CI</i>	<i>b</i>	<i>Wald</i> χ^2	<i>p</i>	<i>Odds Ratio</i>	<i>Odds Ratio</i> <i>CI</i>
Constant	0.16	71.92	<.001	1.17		0.18	79.52	<.001	1.20	
Number of ACEs	-0.28	725.99	<.001	0.76	[0.74, 0.77]	-0.33	272.80	<.001	0.72	[0.69, 0.75]
Below poverty level	-0.13	9.76	<.001	0.88	[0.82, 0.95]	-0.16	10.49	.001	0.85	[0.77, 0.94]
Low Income	-0.23	45.21	<.001	0.79	[0.74, 0.85]	-0.28	46.94	<.001	0.75	[0.70, 0.82]
Middle Income	-0.18	43.92	<.001	0.83	[0.79, 0.88]	-0.22	46.11	<.001	0.81	[0.76, 0.86]
High Income		66.53	<.001				72.26	<.001		
Below poverty level*ACEs						.058	3.31	.069	1.06	[.99, 1.13]
Low Income*ACEs						.077	6.83	.009	1.08	[1.02, 1.14]
Middle Income*ACEs						.064	5.65	.017	1.07	[1.01, 1.12]
High Income*ACEs							8.56	.036		

Figure 3

Probability of School Engagement Across Federal Poverty Level (FPL)



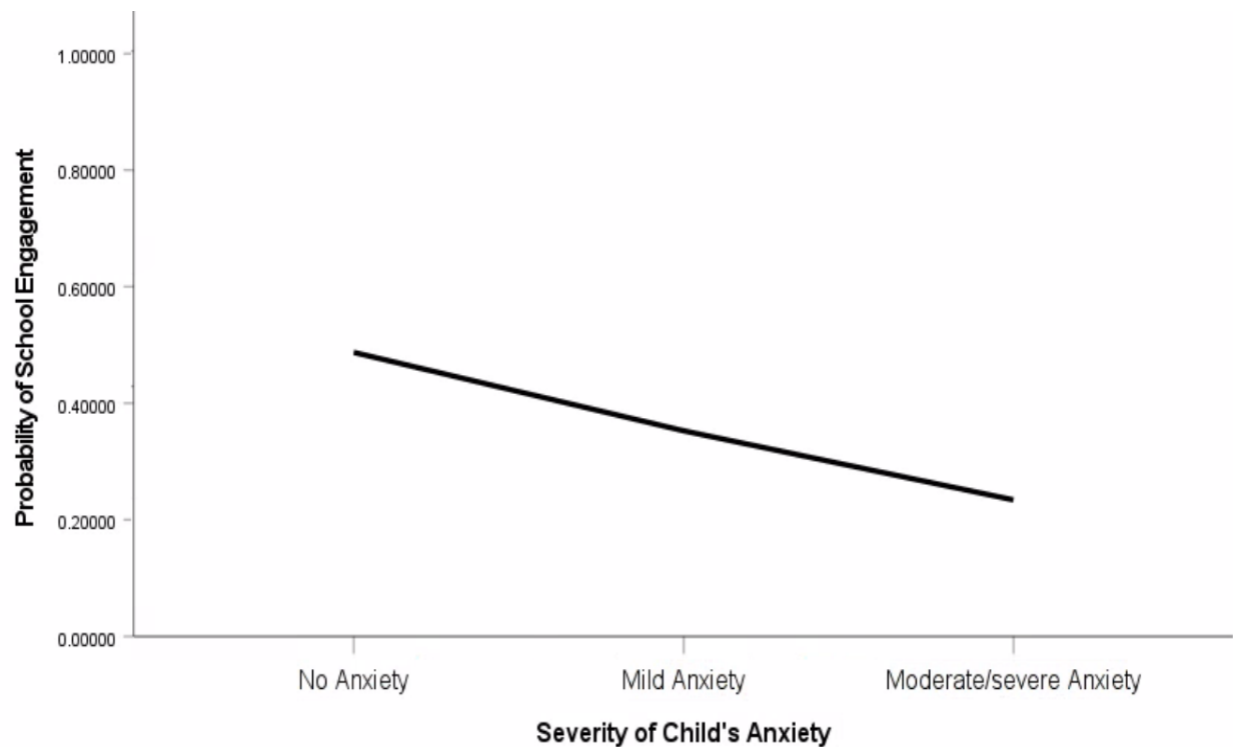
Note: SPSS PROCESS v4.2 pulls at the 6th, 50th, and 84th percentiles of Adverse Childhood Experiences when calculating probability. This graph does not display the entirety of ACEs variable.

Anxiety and School Engagement

According to Table 4, the full model fit with interactions of anxiety and income fit better than a null model with only an intercept, $\chi^2(4) = 879.19$, $p < .001$, Nagelkerke $R^2 = .037$. The likelihood of school engagement decreased as severity of anxiety increased, with the odds of having anxiety increasing 0.56 times for each 1 unit decrease in school engagement (Figure 4).

Figure 4

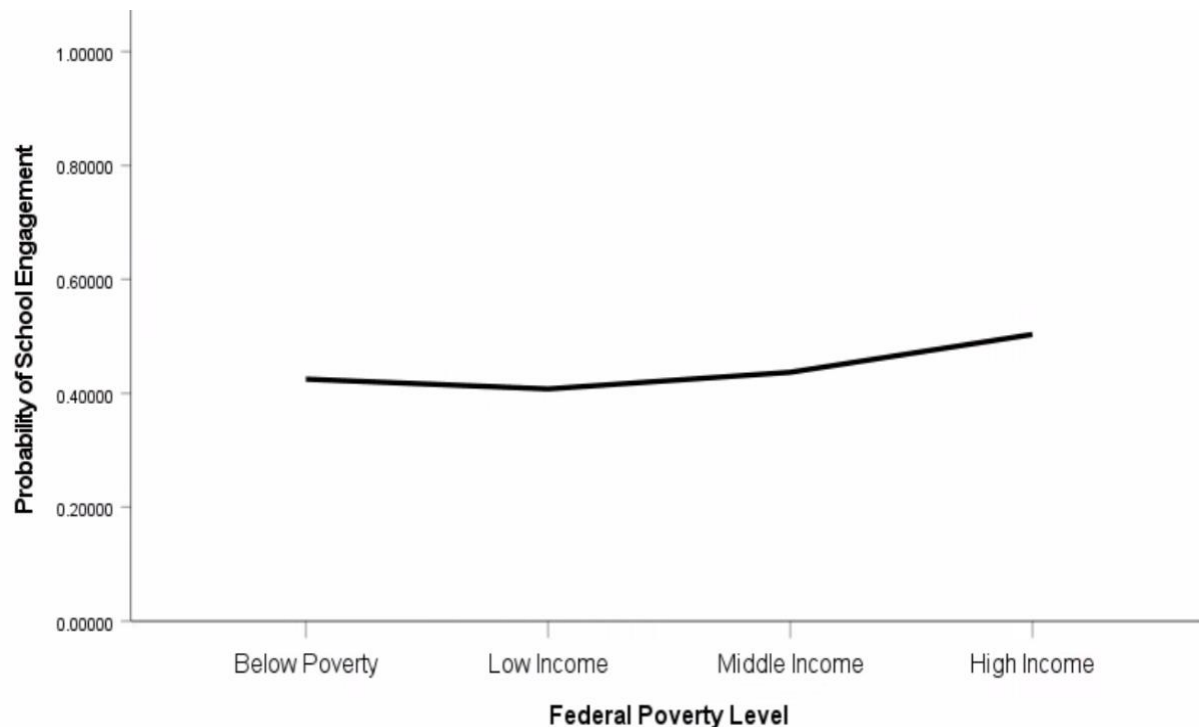
Probability of School Engagement Across Severity of Anxiety



Controlling for anxiety, the odds of school engagement differed as a function of income (Figure 5). Youth at below poverty level had odds of school engagement that were 0.74 times lower than youth with high income. Youth with low income had odds of school engagement that were 0.69 times lower than those youth of high income. Finally, youth with middle income odds of school engagement were 0.77 times lower than those youth with high income.

Figure 5

Probability of School Engagement Across Federal Poverty Level Controlling for Anxiety



Income Moderation

Table 4, Model 2 showed no significance between severity of anxiety at each level of income. When analyzing simple effects, there was no interaction.

Table 4

Moderating Role of Income on Anxiety Predicting School Engagement

Predictor	Model 1					Model 2				
	<i>b</i>	<i>Wald</i> χ^2	<i>p</i>	<i>Odds Ratio</i>	<i>Odds Ratio</i> <i>CI</i>	<i>b</i>	<i>Wald</i> χ^2	<i>p</i>	<i>Odds Ratio</i>	<i>Odds Ratio</i> <i>CI</i>
Constant	0.68	455.60	<.001	1.98		.634	202.17	<.001	1.89	
Anxiety Severity	-0.56	610.38	<.001	0.57	[0.55, 0.60]	-0.51	223.19	<.001	0.60	[0.56, 0.64]
Below poverty level	-0.30	56.53	<.001	0.74	[0.70, 0.80]	-0.16	2.87	.090	0.85	[0.70, 1.03]
Low Income	-0.37	120.35	<.001	0.69	[0.64, 0.74]	-0.25	8.52	.004	0.78	[0.66, 0.92]
Middle Income	-0.27	93.90	<.001	0.77	[0.73, 0.81]	-0.22	10.10	.001	0.80	[0.70, 0.92]
High Income		174.69	<.001				14.22	.003		
Below poverty level*Anxiety						-.110	2.15	.142	0.90	[.77, 1.04]
Low Income*Anxiety						-.104	2.42	.120	0.90	[0.79, 1.03]
Middle Income*Anxiety						-.038	0.49	.484	0.96	[0.87, 1.07]
High Income*Anxiety							3.70	.296		

CHAPTER IV: DISCUSSION

The purpose of this study was to determine whether socioeconomic status moderates the relationship of number of ACEs or anxiety severity influencing the likelihood of school engagement. Key findings suggest school engagement is impacted by all the study variables. First, the number of ACEs do predict the likelihood of how engaged an adolescent is in the school system (Aim 1a). Furthermore, youth with low income experience a stronger likelihood of decreased school engagement levels with increasing number of ACEs compared to youth with higher-incomes (Aim 2a). With the population of youth of below poverty line status consisting of only 10% of our sample, this may have skewed the results of representing no significance at 95% confidence level. It is important to note that although we may not be seeing as great of an effect across other incomes, we are still seeing an impact on engagement levels, which could be a result of social, cultural, or even neighborhood factors.

The study also found a relationship between severity of anxiety, income level, and school engagement (Finding 1b). Adolescents with no anxiety were more likely to be engaged in school than their peers with mild to moderate/severe levels of anxiety. When removing the impact of anxiety, high-income students were more likely to be engaged in the classroom whereas low income students were least likely to be engaged. However, students at below poverty level did not demonstrate a clear relationship between anxiety and school engagement, perhaps because only 14% of the sample endorsed anxiety. With a larger sample of children with anxiety (e.g., a clinic-based rather than population-based sample), we may be able to better detect whether there is a moderating role of income on the relationship between anxiety and school engagement. Ultimately, this study demonstrates that trauma and anxiety weaken school engagement, and, in

some instances, income can create a stronger relationship among trauma or anxiety and school engagement. This provides evidence for researchers and practitioners that there are multiple variables that contribute to a student's engagement within the classroom. Trauma does impact students at each income level, but the impact appears greater for those from low-income families.

The present study contributes to growing literature showing that trauma and anxiety impact a student's engagement level. This research confirmed what previous literature suggested in that as the number of traumatic experiences increase, the risk of physical and mental impairments increase (Chang et al., 2019; Hughes et al., 2017). Bethell and colleagues (2014) found higher number of ACEs reflect lower engagement levels. Our research has confirmed findings in that ACEs do play a role on a youth's mental state and inhibits them from being fully engaged in school. It also contributes to literature that suggests income level impacts the relationship between ACEs and school engagement. Previous literature found that low income students have more difficulty being academically engaged due to ACE-related factors (e.g neighborhood violence, parental divorce, greater risk of family conflict). This was represented in our research through the likelihood of school engagement being lower than that of both medium and high income.

This research also confirmed what previous literature suggests about anxiety and school engagement. Anxiety can have a negative impact on school engagement (Mazzone et al., 2007; Cagiran & Souturk, 2021). Our research found as anxiety levels increased, school engagement decreased. Previous literature also suggested that low income communities are at greater risk of developing anxiety that can in turn impact school engagement, however the current study did not find evidence to support this (Vine et al, 2012).

Implications

The present study has practical implications for those who work with youth, such as school faculty or practitioners in clinical settings that work with youth (e.g., psychologists and healthcare providers). Anxiety, trauma, and income all play a role in a youth's overall engagement. The proper prevention efforts targeting anxiety and trauma could alleviate the exacerbating effect of decreased engagement. With present research reflecting a stronger relationship between ACEs and school engagement across all income levels, especially in low income communities, schools should aim to create a more trauma informed environment for students. Creating family school partnerships, being culturally responsive, engaging the community, creating a physically appealing school climate, and having a space for the youth to “escape” their stress are a few ways schools can strive to ensure their school is trauma informed (Herrenkohl, Hong, & Verbrugge, 2019). Existing literature has also found trauma informed programs that utilizes cognitive behavioral therapy and mindfulness strategies to be successful in emotional regulation and executive functioning for those students who have experienced trauma (Mendelson et al., 2015; Dombo, Sabatino, & Oxford University Press. 2019). Programs that integrate mindfulness and cognitive behavioral strategies can also decrease anxiety levels. This type of program can be structured as a small group intervention or classroom wide intervention. Providing low-cost services, such as therapy or mobile medical clinics, within low-income communities is one way practitioners can reach the population and address a variety of mental health concerns including both traumatic stress and anxiety.

Limitations and Future Directions

Results of this study should be considered within the context of several limitations. The dataset did not cover all potential ACEs a child could experience but excluded indicators of child

abuse and neglect. Future research should strive to include both child abuse and neglect within their research because they are the leading drivers of poor health outcomes (Merrick et al., 2017). Results are based on parent's self-report and may be over- or under-reported by willingness to represent certain elements, such as whether youth has experienced trauma or has anxiety. Additionally, despite the national scope of this survey, this study had limited diversity in population. There was a higher population of middle and high income that completed the survey and a limited amount of diversity amongst the races, when compared to the US Census data. Data reflects that although percentages of races is similar to US Census data, Black individuals were underrepresented. A final limitation is that the analysis did not analyze resiliency or protective factors in relation to school engagement and should be considered as a variable when assessing the extent of disengagement across income levels.

Future research could investigate whether culture may serve as a moderator in assessing the likelihood of anxiety or trauma impairing engagement levels. Additionally, analyzing the impact of the COVID-19 pandemic on youth income level, anxiety, and trauma may influence the projection of school engagement levels. For example, the Coronavirus pandemic has played a detrimental role in the low income community which caused the gap between the below poverty level and high income to grow substantially larger. Beyond government assistance, for low income communities during the pandemic, support from family and friends was nearly impossible due to their own job loss or financial security (Sanno & Mammen, 2022). Additional research has found mental health concerns to rise at an astonishing rate of 25.6% or 76.2 million cases of anxiety between years of 2020 and 2021, primarily due to the COVID-19 pandemic (Mellis, 2021). There has also been a higher prevalence of Post-Traumatic Stress Disorder (PTSD) at a rate of 23.8% in individuals with COVID-19 and amongst the general population

(Wathelet et al., 2021). With this statistic increasing, school engagement levels may become further impacted and thus the need for school-based interventions, such as integrating more trauma informed strategies in schools, enabling mindfulness strategies, and integrating cognitive behavior supports, may be beneficial for prevention efforts of school disengagement.

CHAPTER V: CONCLUSION

School engagement plays a pivotal role in a student's success within the school system. Many factors can impede school engagement, but this study analyzed the effects of trauma, anxiety, and income. The results indicated both trauma and anxiety have a negative impact on school engagement. Additionally, results found that income can impact the likelihood of school engagement levels when examining the relationship with trauma and anxiety. Low income students are experiencing lower engagement levels when trauma is involved, in comparison to middle and high income students. Results suggest the need for additional school wide interventions targeting anxiety and trauma within all populations, especially within low income. Future directions can focus on covering a wider range of ACEs, analyze the impact of trauma and anxiety post COVID-19 pandemic, use culture as a moderator, or analyze the effect of protective and resiliency factors on the relationships studied.

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