

Academic Predictors of Mental Health Problems Among Adolescents in Grades 7 through 12

The prevalence of mental health disorders has increased steadily in the United States over the past few decades.¹ Amid this general decline of mental health, studies show that many young children and adolescents are suffering from mental illnesses, specifically depression and anxiety.² Students with mental illnesses, including depression and anxiety, have been found to experience lower academic outcomes than students without mental health issues.³ As such, it is not surprising that the prevalence of mental health disorders has increased while academic achievement in the nation has simultaneously declined.⁴ In the United States, 20 percent of school-aged children experience severely debilitating mental health problems at some point in their lives,⁵ and some states have reported that their graduation rate is as low as 68 percent.⁶ In response, school-based mental health treatments have begun to rectify not only the behavioral symptoms, but also the academic symptoms of mental health issues.⁷ In addition to mental health symptoms, these behavioral treatments have sought to address students' academic struggles, such as lower grades, academic performance, and other measures of educational outcomes.⁸

This research study aims to examine the circumstances in which a student with a mental health issue displays academic struggles by exploring the likelihood that the poor academic performance could be an indicator of mental health conditions. Specifically, the study investigates whether academic struggles can be used to predict the display of symptoms of mental health issues, while controlling for the effect of children's demographic characteristics, including gender, grade level, and race. To provide background, this study begins with a literature review.

Common Mental Health Symptoms: Depression and Anxiety

The documented high prevalence of severe mental health problems in children and adolescents⁹ corresponds to high rates of depression and anxiety.¹⁰ Depression and anxiety are among the psychological characteristics that research has shown can impact the academic outcomes of school-aged children.¹¹ Research has indicated that both depression and anxiety are highly prevalent among children, and are both commonly displayed with comorbidity among children.¹² A study by Kristine Amlund Hagen et al.¹³ found that among students between the ages of thirteen and eighteen, approximately 40 percent suffered from a mental health disorder, also noting comorbidity in mental health conditions to be commonly experienced among that age group. There is a wide range of symptoms of mental health issues related not only to behaviors, but also to academic performance, including lowered IQs and declining grade point averages.¹⁴ This illustrates the importance of considering that a student's academic struggles could be related to a mental health disorder, and reinforces the need to consider that poor academic functioning could be an indicator of mental health issues.

Mental Health and Academic Outcomes

Academic achievement is critical during childhood and adolescence,¹⁵ and mental health is a key developmental factor related to the educational success of adolescents.¹⁶ As mental health problems have increased in the nation over the past few decades, there has been an increase of research on effective methods of improving mental health.¹⁷ As such, many of these studies have focused primarily on the improvement of children's academic functioning related to their enhanced mental health,¹⁸ reflective of the literature that has linked childhood academic achievement to child mental health.¹⁹

Studies have shown that both depression and anxiety have a negative impact on students' academic success.²⁰ Conversely, a study by Susana Marques et al.²¹ found that a positive and hopeful outlook—as opposed to depressive thoughts or rumination—was also positively related to academic success.²² These findings heavily imply that students who experience depression, low levels of life satisfaction, or negative thoughts, are more likely to have negative academic outcomes than students who do not experience these adverse issues related to behavioral health.²³ Furthermore, the prevalence of mental health disorders has increased steadily over the past few decades,²⁴ and more children who are suffering from mental health issues are possibly at risk for negative impacts to their academic functioning. As depression and anxiety are psychological issues that studies have shown can impact the academic outcomes of school-aged children,²⁵ existing literature suggests that students with mental health issues are represented among the students who are reported to suffer from academic issues at a higher rate than those without mental health problems.

Academic Performance

Good mental health among students is, itself, a beneficial outcome for students.²⁶ A higher level of mental health is also advantageous to students because of its long-term benefits on many other outcomes related to their futures, including improved long-term academic achievement, vocational outcomes, and other socioeconomic factors, in addition to increased educational attainment.²⁷ Research has investigated the relationship between mental health and academic performance in school-aged children, finding that their mental health problems are likely to be related to poor educational performance, including lowered grades, reading difficulties, repeating a grade, and learning delays.²⁸ Additional studies have otherwise found positive correlations between mental health and educational performance in children,²⁹ such as

an association between good mental health and high grades in writing, spelling, and reading.³⁰ These studies that display the relationship between mental health and academic achievement have demonstrated the need for further exploration of methods to identify students in need of mental health treatment through the observation of their academic performance.

Academic Engagement

It has been found that many mental health conditions can be dependable predictors for many outcomes, including those related to academics,³¹ as studies have shown that many school-aged children exhibiting externalized behavioral problems, like behavioral outbursts, also demonstrate internalized problems that manifest in classrooms, such as failure to pay attention , and a lack of motivation to participate in lessons.³² Additionally, higher levels of school engagement, such as focusing and participating in classes, have been found to be a strong predictor of academic achievement, and have also been found to be predictors of lower symptoms of depression.³³ The implication of these findings is that good academic performance is related to good mental health through the modification of academic engagement. However, few studies have examined whether poor academic outcomes can be predicted by mental health issues, without the added variable of school engagement.

Declines in academic performance, such as the inability to pay attention in class, or lack of preparation, can lead to the subsequent decline of grades and are commonly understood to be related to mental health disorders. However, these usually must be severe and must be displayed over a long period of time before considered to be so.³⁴ Moreover, these symptoms may lead to academic decline, but the academic decline itself is not commonly noticed as an indicator of mental health issues. Therefore, it is important to explore other variables that could be related to

mental health issues, such as academic performance, to better identify students in need of mental health services.

Traditionally, the mental health field has focused on behavioral and medical pathologies related to mental illness, such as schizophrenia, depression or anxiety, rather than conducting research on the symptoms of mental health problems that are neither behavioral or medical,³⁵ such as indicators of academic success.³⁶ In more recent years, more studies have begun to explore the connection between mental health issues and academic symptoms, including academic performance. These studies show evidence that schools that integrate mental health support services with education improve academic performance.³⁷ For example, empirical studies have found that social emotional learning (SEL) programs—in which students learn to manage emotions³⁸—are among the supports that should be integrated in education settings. SEL has been found in these studies to significantly improve conduct problems and levels of emotional distress,³⁹ which directly relates to classroom performance and the impact that emotional difficulties (including anxiety and depression) were discovered to have on lowered academic performance.⁴⁰ Studies that have measured the effectiveness of SEL programming have found that SEL programs improved students' academic performance by 11 percent.⁴¹

While studies have also explored whether good mental health predicted an improvement of academic outcomes, and found that while good mental health was a significant predictor of academic performance,⁴² few studies have explored whether the inverse can be considered, and a student's academic struggles could be a predictor of mental health problems.

The Current Study

To address the visible gap in literature that investigates the predictive relationship between academics and mental health by using mental health as a predictor variable while

examining academic-related outcome variables, the current study aims to explore whether poor academics can be used as a predictor of mental health issues, because of its previously established correlation with mental health symptoms. Thus, this research study will seek to answer the following question: Controlling for demographic characteristics, including grade level, gender and race, do behavioral symptoms significantly predict the academic performance among adolescent students in the United States?

Methods

This study used secondary data, obtained from the National Longitudinal Study of Adolescent to Adult Health (Add Health) dataset. Add Health is a longitudinal study of a nationally representative sample of adolescents in grades 7 through 12 during the 1994 to 1995 school year, which enables the study of behaviors in students, and the exploration of how those behaviors are related to various outcomes, including academic achievement.⁴³

Participants

The participants in the original study are a sample of 6,504 adolescents, who were in grades 7 through 12, attending middle schools or high schools in the U.S. during the 1994-1995 school year. The current study used a sample size of 6503, as one participant who declined to answer questions in the original study was removed. Close to 49 percent of the student participants were male and approximately 51 percent were female. The most represented grade of the study among participants was 10th grade, with 17.6 percent of participants (17.9 percent of males and 17.3 percent of females), and the least represented grade was 7th grade, with 15.1 percent of participants (15 percent males and 15.11 percent females). The sample of the current study showed a similar representation of participants across all grades. The reported race of the

majority of the participants was white, as over half the respondents identified as white (57.7 percent of males and 57.2 percent of females)

Table 1
Characteristics of Sample by Gender

	Male n=3,147 (%)	Female n=3,356 (%)
Grade (N, percent)		
7th grade	472 (15)	507 (15.11)
8th grade	475 (15.09)	517 (15.41)
9th grade	540 (17.16)	567 (16.9)
10th grade	562 (17.86)	582 (17.34)
11th grade	578 (18.37)	544 (16.21)
12th grade	447 (14.20)	546 (16.27)
Missing	73 (2.32)	93 (2.77)
Total	3147 (100)	3356 (100)
Race (N, percent)		
White	1815 (57.67)	1921 (57.24)
African American	734 (23.32)	785 (23.39)
American Indian	95 (3.02)	129 (3.84)
Asian	132 (4.19)	126 (3.75)
Hispanic	171 (5.43)	164 (4.89)
Other	197 (6.26)	228 (6.79)
Missing	3 (0.1)	3 (0.09)
Total	3147 (100)	3356 (100)

Procedure

Data collection in the original study occurred between September 1994 and December 1995 and included an in-school questionnaire. Before proceeding with the secondary data analysis, all variables chosen for the study were screened for missing values and outliers, with IBM SPSS Frequencies, Explore, Plot, Missing Value Analysis tests. A frequency analysis was run on the variables intended for use in the present study, and no outliers or extreme cases were found. The skewness and kurtosis of the variables in use were found to be within the normal range. All missing values in the dataset amounted to less than 5 percent of the total cases. As

missing values were found to be consistent with the dependent variables, the missing values were attributed to chance, and not to a pattern that would confound the data. It was determined that each entire case of missing values did not need to be removed because they would not substantially skew the power of the statistical analysis; the missing value were labeled as “missing,” and the cases remained in the study for analysis.

Measures

Variables

The aim of this research study was to identify the significance of academic achievement in predicting mental wellness among school-aged children in middle school and high school. Mental wellness measures served as dependent variables, and measures of academic outcomes served as the independent variables for this study. To better understand the relationship between mental health and academic performance, the study controlled for demographic variables such as grade level, gender and race.

Dependent Variables: Anxiety and Depression

As studies have shown that both depression and anxiety all have an impact on students' academic success,⁴⁴ the dependent variable for this study was mental health, which was measured in the original data set by numerous variables, including anxiety and depression. In the current study, student mental health was examined by participants' levels of anxiety and depression. Depression was operationally defined as how often a student felt depressed, and anxiety was operationalized as how often a student reported feeling fearful. Both variables were ordinal variables, measured on a scale of from “rarely/never” (1) to “sometimes” (2), to “most of the time” (3), to “all of the time” (4).

In the current study, a bivariate analysis was conducted to determine whether there exists a significant association between the two variables. Participants' scores on both of those measures were highly correlated, with higher scores of anxiety indicated more frequent instances of depression ($r = .545, p < .001$).

Independent Variables: Academics

The independent variables in the current study were related to academic outcomes, which were measured in the original data set by four variables, including GPA, trouble paying attention in school, trouble completing homework assignments and likelihood of attending college. The first variable was a continuous variable that measured how often the participants had trouble paying attention in school since the school year began. The second variable measured how often the participants had trouble completing homework since the school year began. For both of these variables, four response options were possible, ranging from zero (0) to four (4), with 0 indicating "never having trouble" and 4 indicating "having trouble every day." In the current study, the variables were recoded to be measured on a scale ranging from one (1) to five (5), with (1) indicating "never," (2) to "just a few times," (3), indicating about one a week, (4) indicating "almost every day" and (5) indicating every day."

The third independent variable was a continuous variable that measured how likely the participants were to attend college. For this variable, five response options were possible, ranging from one (1) to five (5), with 1 indicating a low likelihood of attending college and 5 indicating a high likelihood. The fourth independent variable was a continuous variable that measured students' GPA. Students' grades in four subjects, including English/Language Arts, Math, History/Social Studies, and Science were available in the original dataset. In the original dataset, the value of one (1) represented the highest grade of A and four (4) represented the

lowest grade of D. In the current study, the measures were reverse-coded so that higher values would indicate a higher GPA. A score of four (4) represented a grade of A, a score of three (3) represented the grade of B, a score of two (2) represented the grade of C, and a score of one (1) represented the grade of D. After reverse coding, a new variable was created to include the range of all values between whole numbers, and the average GPA was calculated for the current study.

Control Variables

To better understand the relationship between mental health and academic performance, this study controlled for three demographic variables, grade level, gender, and race, to examine their effects on the dependent variables and to determine whether any relationship found between the independent and dependent variables could exist without of the effect of the control variables. Grade level was measured as a continuous variable with six response options: Grade 7 through 12. Gender was measured as a nominal variable, with two response options: Male or female. Race was measured as a nominal variable with six response options: White, African-American, Asian, American Indian, Hispanic or other.

Data Analysis

The current study used multiple regression analysis as the main analytic method to use multiple independent variables related to academic outcomes by building two models that enable the study to predict mental health issues. Variance inflation factor (VIF) for focus, GPA, and completing assignments were calculated to assess for multicollinearity. In both analyses, tolerance for depression and anxiety were less than 1.0, and VIF was approximately 1.0. This assessment indicated that the independent variables were not closely related to each other to the point of confounding data. Following that analysis, a regression model consisting of five blocks was used to determine the unique contribution of each variable added into each block. To

ascertain how strongly all academic variables predicted the mental health struggles of students, two separate hierarchical multiple regression analyses were conducted to estimate a regression model that best predicts the anxiety and depression of students in grades 7-12, based on seven factors: academic focus, assignment completion, likelihood of attending college, GPA, grade level, gender, and race.

In the first analysis, the dependent variable was depression, using the variable “feeling depressed” from the original study. In the second analysis, the dependent variable was anxiety, using the variable “feeling fearful” from the original study. In both analyses, the four independent variables were the four measures of academic outcomes from the dataset: GPA, trouble focusing in class, likelihood of attending college and trouble turning in assignments. Both analyses consisted of five blocks, and the control variables were entered in the first block so that their effects would be ruled out before examining the effects of the independent variables in order to create a model that would best predict the levels of academic achievement among students. In the second block, GPA was added to the model. In the third block, focus was added. In the fourth block, likelihood of attending college was added, and in the fifth block, trouble completing assignments was added.

Results

Descriptive Analyses

With a possible range of 1-4, participants scored an average of 1.5 on depression, indicating that they sometimes or rarely have feelings of depression ($M = 1.5$, $SD = .75$, range: 3). With a possible range of 1-4, participants scored an average of 1.3 on anxiety, indicating that they sometimes or rarely have feelings of anxiety ($M = 1.3$, $SD = .57$, range: 3). With a possible

range of 1-5, participants scored an average of 4.2 on likelihood of attending college, indicating that participants are generally likely to attend college ($M = 4.16$, $SD = 1.16$, range: 4).

Students reported generally average GPAs, with an mean reported GPA of 2.8 (a C+, or just below a B) ($M = 2.8$, $SD = .77$, range: 3). With a possible range of 1-5, students also reported having problems focusing in class close to a few times a week ($M = 2.7$, $SD = 1.37$, range: 4), and having problems completing homework assignments close to a few times a week ($M = 2.8$, $SD = 1.34$, range: 4). From these descriptive analyses, it appears that the sample generally had relatively average grades, experienced periodic academic difficulties, and experienced mental health issues occasionally.

Bivariate Correlations

A bivariate correlation analysis was run on all variables, to ascertain their relationship to each other, as a high correlation to each other could confound the study by making it less clear which of the independent variables actually has a significant effect on the dependent variables. As the correlation coefficients were all less than 0.8, multicollinearity is not a concern in the current study.

Additionally, an analysis of the Pearson correlation between variables revealed that academic issues were negatively correlated to GPA. Students who had higher GPAs, had experienced less frequent problems focusing in class and turning in assignments, and were more likely to attend college ($r = -.242$, $p = .01$; $r = -.344$, $p = .01$; $r = .380$, $p = .01$). GPA was also negatively related to depression and anxiety, as students who reported higher frequencies of depression and anxiety had lower GPAs ($r = -.128$, $p = .01$; $r = -.092$, $p = .01$). Finally, depression and anxiety were found to be positively correlated, as students who reported higher frequencies of depression also reported higher frequencies of anxiety ($r = .350$, $p = .01$) (Table 2).

Table 2
Bivariate Correlations of Variables

Measure	1	2	3	4	5	6
1. GPA						
2. Trouble Focusing	-.242*					
3. Anxiety	-.092*	.124*				
4. Depression	-.128*	.157*	.350*			
5. Trouble Completing Assignments	-.344*	.545*	.126*	.146*		
6. Likelihood of Attending College	.380*	-.152*	-.087*	-.120*	-.175*	

*p = .01

Multiple Regression Analysis

Two stepwise multiple regression analyses were conducted to estimate a regression model that best predicts levels of depression and anxiety among 7-12th graders based on seven factors: race, gender, grade level, trouble focusing in class, likelihood of attending college, trouble completing assignments and GPA.

Analysis 1: Anxiety

When control variables were entered at the first step, there was a correlation between all of them (gender, grade level and race) and anxiety $r = .118, p = .000$. Gender, grade level and race contributed to 1.4 percent of the variance in anxiety. With a Beta of 0.81, focus emerged as the strongest academic predictor of anxiety, accounting for 1.3 percent of the variance in anxiety ($p = .000$). Assignment completion emerged as the next strongest academic predictor, accounting for 0.3 percent of the variance in anxiety ($\beta = .067, p = .000$). Likelihood of attending college was the next strongest predictor of anxiety, accounting for 0.3 percent of the variable in anxiety ($\beta = -.060, p = .000$). The weakest academic predictor of anxiety was GPA, accounting for only 1 percent of the variance in anxiety ($\beta = -.037, p = .10$). Grade level did not appear to be a significant predictor of anxiety. The results revealed that a significant amount of total variation

in anxiety could be predicted by six of the seven variables ($F = 39.39, p = .000$). Overall, the model explains 4.2 percent of the variance in anxiety ($R = .21$) (Table 3). These results indicated that more frequent feelings of anxiety is a function of higher difficulty with academic outcomes. Higher frequencies of difficulty focusing in class, more frequent problems completing assignments, lower likelihood of attending college, and lower GPAs predict higher frequencies of feelings of anxiety among students.

Table 3

Results of Multiple Regression Analysis – Predictors of Anxiety (Academic Outcomes)

Factor	R	R ²	β	<i>t</i>	F
GPA	.153	.023	-.037**	-2.59	37.46*
Trouble Focusing	.191	.036	.081*	5.42	47.01*
Assignment Completion	.198	.039	.067*	4.36	42.56*
Likelihood of Attending College	.206	.042	-.060*	-4.27	39.39*

* $p = .000$

** $p = .10$

Analysis 2: Depression

When control variables were entered at the first step, there was a correlation between all of them (gender, grade level and race) and depression ($r = .173, p = .000$). Gender, grade level and race contributed to 3 percent of the variance in depression. With a Beta of .106, focus emerged as the strongest academic predictor of depression ($p = .000$), accounting for 1.9 percent of the variance in depression. Likelihood of attending college emerged as the next strongest academic predictor of depression ($\beta = -.083, p = .000$), accounting for 0.6 percent of the variance in depression. GPA was the next strongest predictor of depression ($\beta = -.072, p = .000$), accounting for 2.2 percent of the variance in depression. Assignment completion was the next strongest predictor of depression, accounting for 0.3 percent of the variance in depression ($\beta = -.066, p = .000$). The results revealed that a significant amount of total variation in depression could be

predicted by all of the seven factors ($F = 76.64, p = .000$). Overall, the model explains 0.6 percent of the variance in depression ($R=.28$) (Table 4). These results indicated that higher frequency of depression is a function of higher difficulty with academic outcomes. Higher frequencies of having difficulty focusing in class, lower likelihood attending college, lower GPAs and more frequent problems with assignment completion predicted more frequent feelings of depression among students.

Table 4
Results of Multiple Regression Analysis – Predictors of Depression (Academic Outcomes)

Factor	R	R ²	β	<i>t</i>	F
GPA	0.227	0.051	-0.070*	-5.19	84.19*
Trouble Focusing	0.266	0.071	0.077*	7.62	94.54*
Assignment Completion	0.271	0.074	0.046*	4.93	82.36*
Likelihood of Attending College	0.282	0.079	-0.054*	-6.265	76.63*

* $p = .000$

Discussion

The results of this study show that academic performance can be used as an indicator of mental health issues, specifically anxiety and depression. As such, using measures of academic outcomes would be beneficial for the development of prevention efforts among educators, to use students' displays of academic struggles as a signal of mental health problems before they cause students to experience further academic decline. Additionally, because schools are a natural setting for mental health prevention practices,⁴⁵ this study makes further implications about the need for increased support of school-based mental health services. As school-based behavioral interventions have been shown to effectively reduce student anxiety and depression,⁴⁶ the findings of this study imply that more support is needed for the development and implementation of school-based mental health services inside school settings.

The implications of this study related to the importance of mental health services in schools also lead to policy implications. The findings of this study showing that academic outcomes can predict behavioral issues imply that support of policy that calls for social emotional learning (SEL) programming in school districts is necessary to improve students' academic outcomes by addressing the emotional and behavioral factors that can affect learning and other educational outcomes.

Trauma exposure is associated with the high rate of behavioral health problems, and several studies have shown a high prevalence of mental health problems among traumatized children.⁴⁷ Children with traumatic experiences are more likely to have higher rates of mental health diagnoses, and are less likely to be engaged in school and more likely to repeat a grade.⁴⁸ Additionally, children who have been traumatized are more likely to repeat a grade, display lower reading scores, and are less than half as likely to graduate from high school than students who do not display trauma symptoms.⁴⁹ As common trauma symptoms including anxiety, depression, and dropping out of school, can be both academic and behavioral in nature,⁵⁰ the findings of this study uncover the need to consider that a student's display of mental health issues through poor academic performance could be an indicator of an underlying trauma history. Therefore, the findings of this study further imply a need for trauma-informed school practices. It is important for school support staff to understand that children affected by trauma are often mislabeled with attention deficit disorder, conduct disorder, oppositional-defiant disorder, and other issues, thus preventing effective trauma-focused mental health interventions from being appropriately applied to students who need them.⁵¹

Limitations and Suggestions for Future Research

There are a number of limitations of this current study. First, there is a lack of prior research on the ability of academic issues to predict mental health problems, which limits the scope of the current study. More prior research in this area could have facilitated the expansion of the focus of the present study, perhaps guided by past findings of conditions that are more likely to be related to trauma and academic issues. Second, the original data set, while extremely valuable, provided limited access to useful data. The mental health variables provided included only two variables related to mental health (i.e. depression and anxiety). More factors that would have measured the copious symptoms of mental health issues, including lack of motivation, social isolation, insomnia, fatigue, or suicidal thoughts, would have been helpful to provide a better understanding of the impact of these mental health issues on academic performance. Additionally, more academic variables to predict academic issues, such as likelihood of graduating from high school, would have also been beneficial in the exploration of the predictive relationship between academics and mental health problems.

Conclusion

As the predictive relationship between mental illness and academic achievement is rarely examined, despite the reported disproportionate display of poor academic performance among students with mental illness, this study addressed that research gap, and found that academics can be considered significant predictors of mental health problems, specifically low grades and difficulty paying attention in class. By predicting which students are more likely to have anxiety or depression, based academic indicators, educators could be better able to identify students in need of mental health treatment, not just by behavior but by academic outcomes. Failure to explore the predictive relationship between mental health and academic outcomes may prevent

the development and creation of school-based mental health treatments that could ameliorate mental health symptoms while simultaneously improving academic achievement among students who experience mental illness. Therefore, it is imperative to begin to consider poor academic performance as an indicator of underlying mental health issues that could be predicted by poor academics, thus increasing the number of students who might be in need of mental health services. This study illustrates the importance of enabling educators to consider good academic outcomes as a function of good mental health.

ENDNOTES

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