ABSTRACT

Title of Document:	RACIAL/ETHNIC DIFFERENCES IN DEPRESSION DURING THE TRANSITION TO HIGH SCHOOL: FINDINGS FROM THE NATIONAL LONGITUDINAL STUDY OF ADOLESCENT TO ADULT HEALTH
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This study investigates racial/ethnic differences in the change in depressive symptoms during the transition to high school. Weighted multivariable linear regression was used to assess the change in depressive symptoms from eighth grade to ninth grade using data from Wave I and Wave II of the National Longitudinal Study of Adolescent to Adult Health (Add Health). Analyses revealed that non-Hispanic Black adolescents had a significantly greater increase in depressive symptoms compared to non-Hispanic White adolescents ($b = 1.39$, $p < 0.01$). Moreover, biracial/multiracial adolescents showed the greatest increase in depressive symptoms compared to non-Hispanic Whites; however this was not statistically significant ($b = 2.38$, $p = 0.15$). These findings suggest that the transition to high school is a difficult period in psychological adjustment, particularly for non-Hispanic Black and biracial/multiracial adolescents. Furthermore, these findings highlight the need for more research

concerning racial identity development and the mental health of biracial/multiracial populations.

RACIAL/ETHNIC DIFFERENCES IN DEPRESSION DURING THE TRANSITION TO HIGH SCHOOL: FINDINGS FROM THE NATIONAL LONGITUDINAL STUDY OF ADOLESCENT TO ADULT HEALTH

By

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Dedication

To my parents for their love, hard work, and support throughout my life. Thank you for providing me with all the opportunities you did not have.

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Table of Contents

List of Tables

Chapter 1: Introduction

Rates of depression are markedly higher in adolescence than in childhood.[1] About 11% of adolescents have a depressive disorder by the age of 18.[2] Although adolescent development and the risk of depression are significantly shaped by the social environment, very few studies focus on the transition to high school. This transition appears to be a highly stressful period in adolescence, in part due to the changes that occur to peer and teacher relationships.[3,4] Previous research has found that students transitioning to high school experience declines in grades,[4,5] decreased attendance,[6–8] poorer self-esteem,[4] and increases in substance abuse and suicide ideation.[5] Moreover, the average age at onset of the first depressive episode in high school is 14.9 years, the typical age of a high school freshman.[9]

Previous research suggests that Native American, Hispanic, Black, and Asian adolescents have higher rates of internalizing disorders than White adolescents.[10] However, relatively little is known about racial differences in psychological functioning specifically in the context of the high school transition. It is important to understand how this transition contributes to poor mental health outcomes in minority youth.

Chapter 2: Background

Literature Review

The few studies that have investigated the psychological effects of transitioning to high school have excluded biracial/multiracial individuals and have lacked racial/ethnic and socioeconomic diversity. Newman et al.[3] found that ninth graders experience more depressive symptoms and lower levels of school belonging than eighth graders.[3] Likewise, Barber et al.[4] found that compared to their reports from the previous year, ninth graders reported less liking of school, lower support from teachers and principals, less classroom autonomy, less involvement in school activities, lower self-esteem, and higher symptoms of depression.[4] A study assessing psychological functioning during the transition to high school using a diverse racial/ethnic sample of adolescents found that Asian and Black students reported more loneliness immediately following the transition to high school, and that Black students perceived less school belonging compared to White students. Moreover, biracial and multiethnic youth experienced decreased feelings of belonging after the transition compared to their same-ethnicity peers.[6]

There is a limited amount of research on the mental health of biracial/multiracial populations.[11,12] Current research suggests that biracial/multiracial youth may be more vulnerable to internalizing problems than other racial/ethnic groups.[13] In a study examining the relationship between ethnic identity and mental health outcomes among a predominately high school population, Fisher et al.[14] found that multiracial youth had significantly higher levels of

depressive symptoms than their Black and White counterparts. Consequently, biracial/multiracial adolescents may be more vulnerable to depressive symptoms than other racial/ethnic groups during the transition to high school.

Previous research has found that racial identity status is associated with depressive symptoms among minorities.[15–17] According to the social identity theory, a sense of belonging to a group and the attitudes that accompany a sense of group membership facilitate positive identity development and can promote positive mental health outcomes.[18] Roberts et al.[19] identified two stages in racial identity development – exploration and affirmation. During exploration, individuals learn about and become involved in their ethnic group.[19] Affirmation involves commitment and a sense of belonging to an ethnic group, including a sense of pride and positive feelings about the group.[19] Affirmation and belonging have been associated with fewer depressive symptoms among minorities.[16] However, the complex nature of racial identity development for biracial/multiracial youth may increase their vulnerability to depression compared to other minority groups.[11,14,20] Previous research suggests that biracial/multiracial adolescents experience more exploration and less affirmation than their Black and White peers.[14] High levels of exploration are associated with more mental health issues.[14] Therefore, biracial/multiracial adolescents may lack the psychological protective factors observed when one has affirmed their racial/ethnic group membership.[15]

Current Study and Hypothesis

This study examines racial/ethnic differences in depression during the transition to high school using a nationally representative sample. In addition, the influence of other sociodemographic characteristics on the change in depressive symptoms during the transition were examined. Consistent with prior research, it was hypothesized that minority adolescents would experience a greater increase in depressive symptoms during the transition to high school compared to non-Hispanic White adolescents.

Chapter 3: Methods

Sample

The study used restricted Wave I and Wave II in-home interview data from the National Longitudinal Study of Adolescent to Adult Health (Add Health),[21] a nationally representative, school-based sample of 20,745 adolescents in grades 7 through 12 during the 1994-1995 academic year. The study population consisted of a stratified, random sample of all high schools in the United States. Schools were eligible to participate if they included an eleventh grade and had at least 30 students enrolled. A feeder school, defined as a school that sent graduates to the high school and that included a seventh grade, were also recruited from the community. The high schools were stratified into 80 clusters according to region, urbanicity, school size, school type, and racial composition. The study oversampled for adolescents of Chinese, Cuban, and Puerto Rican ethnicity and Blacks from well-educated families.

The first wave of in-home interviews occurred between April and December of 1995. The sample consisted of 10,600 male (51%) and 10,145 female (49%) adolescents ranging in age from 12 to 19 years old. The second wave of data collection occurred one year after Wave I between April and August of 1996. Almost 15,000 of the same adolescents completed the Wave II in-home interviews. The current study included 1,805 adolescents who completed in-home interviews during both waves of data collection, and who were in eighth grade during Wave I and in ninth grade during Wave II. Of the 1,805 adolescents, 3 adolescents were excluded

from analyses due to the low sample size for their age categories (one 12 year old and two 17 year olds). The final analytic sample consisted of 1,802 adolescents.

Human Subjects

Add Health was approved by the University of North Carolina School of Public Health Institutional Review Board. The current study was determined to be exempt from human subjects review by the University of Maryland, College Park Institutional Review Board.

Measures

Depressive Symptoms

Depressive symptoms were assessed using the 19-item Center for Epidemiologic Studies-Depression scale (CES-D)[22] in both Waves I and II. Respondents were asked how often during the past week they experienced feelings of distress (e.g., sadness, depression, and fatigue). Responses ranged from 0 (never or rarely) to 3 (most of the time or all of the time), and the items were summed to create a composite score. To determine the change in depressive symptoms from Wave I to Wave II, a CES-D change score was created by subtracting the depression score at Wave II from the depression score at Wave I. A negative score reflects a decrease in depressive symptoms, whereas a positive score reflects an increase in depressive symptoms. The CES-D has been validated for use in adolescent populations.[23,24]

Race/Ethnicity

Race/ethnicity was categorized based on self-identified membership as: (1) non-Hispanic White; (2) non-Hispanic Black or African American; (3) non-Hispanic Asian or Pacific Islander; (4) Hispanic or Latino; and (5) Other. The "Other" group includes adolescents who self-identified as Native American (n = 8), biracial or multiracial (n = 101), and other (n = 14). Non-Hispanic Whites were used as the reference group.

Potential Confounding Variables

Age, sex, family socioeconomic status (SES), family structure, depression at Wave I, and the time-lapse since Wave I interview were considered potential confounders. Age was determined by subtracting the date of the interview from the date of birth. Sex was determined by the Wave I in-home interviewer. The highest level of parent-reported education at Wave I was used to capture family SES. This measure was divided into three categories: (1) high school education or less; (2) some college; and (3) college graduate and professional training beyond a four-year college or university. Information regarding the highest level of parent-reported education was missing from 161 participants. Consequently, these participants were included in the "missing" category. Family structure was constructed based on Wave I questions regarding the respondents' relationship to the adults in their household. The variable was collapsed into the following five categories: (1) two biological parents; (2) two parents; (3) single mother; (4) single father; and (5) other (i.e., any household without members classified as "mother" or "father"). Due to the difference in length for the data collection periods, the lapse of time between the interview waves was considered

a confounder. Wave I interviews were conducted between April and December of 1995, while Wave II interviews were conducted between April and August of 1996. Therefore, some adolescents may have had more or less time for depressive symptoms to develop compared to others. Time-lapse was determined by subtracting the Wave II interview date from the Wave I interview date.

Statistical Analysis

In all analyses, survey commands were used to account for the complex sample design of Add Health, and sampling weights were applied to make the data representative of the national population. Dummy variables were created for the categorical variables (i.e., age, sex, race/ethnicity, family structure, and family SES). Univariate analysis was performed to determine the frequency of respondents for each variable and the mean change in depressive symptoms for each group (Table 1). Analysis of Variance (ANOVA) or t-tests were used to assess whether there was a statistically significant difference in the mean depression scores by sample characteristics (Table 1).

Weighted multivariable linear regression was used to predict the change in depressive symptoms from Wave I to Wave II for each racial/ethnic group. Model 1 adjusted for depressive symptoms at Wave I and the time-lapse between interviews (Table 2). Model 2 adjusted for sex and age in addition to the Model 1 confounding variables (Table 2). Model 3 added family variables – family structure and parental education. All analyses were performed using SAS version 9.3.[25]

Chapter 4: Results

Sample Characteristics

The sample was predominately non-Hispanic White (67.2%), followed by non-Hispanic Black (14.1%), Latino (10.4%), "Other" (5.6%), and non-Hispanic Asian/Pacific Islander (2.6%) adolescents. Additional sample characteristics are shown in Table 1. The mean baseline depression score at Wave I for the total sample was 14.6 (standard error [SE] = 0.21). Overall, adolescents experienced a 0.69 (SE = 0.24) unit increase in depressive symptoms during the transition to high school. Bivariate analyses revealed significant differences in both mean baseline depressive symptoms and the mean change in depressive symptoms by participant sex, age, and family structure.

Racial/Ethnic Differences in Depressive Symptoms

Mean baseline levels of depressive symptoms differed by race/ethnicity ($p < 0.01$), but no significant racial/ethnic differences were observed for the mean change in depressive symptoms ($p = 0.25$). Non-Hispanic Black (mean [M] = 15.41; SE = 0.39), Latino (M = 15.33; SE = 1.18), and "Other" (M = 15.17; SE = 0.59) adolescents had higher mean baseline levels of depressive symptoms compared to non-Hispanic Asian/Pacific Islander (M = 14.16; SE = 0.73) and non-Hispanic White (M = 14.21; SE = 0.19) adolescents. Adolescents comprising the "Other" racial/ethnic group, particularly biracial and multiracial adolescents, experienced the greatest

increase in mean depressive symptoms (M = 2.29; SE = 1.63), followed by non-Hispanic Black adolescents (M = 1.29; SE = 0.44).

Multivariable regression models predicting the change in depressive symptoms are presented in Table 2. The findings for racial/ethnic differences in depressive symptoms were consistent across all three adjusted models. When adjusting for all confounding variables (Model 3), non-Hispanic Black adolescents (b = 1.39; $p < 0.01$) had a significantly greater increase in depressive symptoms compared to non-Hispanic White adolescents. Moreover, those of "Other" race (b = 2.38; SE = 1.63), particularly biracial/multiracial adolescents, had the greatest increase in depressive symptoms compared to non-Hispanic Whites; however, this association was not statistically significant ($p = 0.15$).

In Model 3, those 14 years (b = 1.07; $p < 0.05$) and 15 years (b = 1.40; $p < 0.05$) of age had significantly greater increases in depressive mood compared to those 13 years of age. Parental education was a significant predictor of the change in depressive symptoms ($p < 0.05$) with lower parental education being associated with a greater increase in depressive mood (high school education or less: b = 0.77; $p < 0.05$); some college: (b = 0.93; $p < 0.05$) compared to higher levels of parental education. Females (b = 1.74; $p < 0.001$) also had a significantly greater increases in depressive mood compared to males.

Sensitivity Analysis

Sensitivity analysis revealed that biracial/multiracial adolescents (n = 101) experienced a greater increase in depressive symptoms. Combining this group with

Native American (n = 8) and Other adolescents (n = 14) did not result in substantively different conclusions, but it did result in a slight decrease in the effect estimates (not shown).

Chapter 5: Discussion

Racial/Ethnic Differences in Depression

The primary goal of this study was to investigate the racial/ethnic differences in the change in depressive symptoms during the transition to high school. Adolescents of "Other" race showed the greatest increase in depressive symptoms, followed by non-Hispanic Blacks. The finding that biracial/multiracial adolescents have higher levels of depressive symptoms compared to their same-ethnicity peers is consistent with previous research.[14] Although the magnitude of the change in depressive symptoms was greatest among those of "Other" race/ethnicity, and specifically among biracial/multiracial adolescents, it was not statistically different from non-Hispanic Whites. While the magnitude of the change in depressive symptoms for non-Hispanic Blacks was smaller, it was significantly greater than non-Hispanic Whites. The lack of a statistically significant effect for "Other" race and biracial/multiracial participants, despite the high magnitude due in part to large standard errors, suggests the need for larger sample sizes and additional research into the mental health of biracial/multiracial adolescents. Furthermore, the biracial/multiracial group may need to be disaggregated.

Findings from this research suggest that non-Hispanic Black and biracial/multiracial adolescents may have the most difficult psychological adjustment to the high school environment. The complex nature of racial/ethnic identity for biracial/multiracial individuals may be a contributing factor to the increase in depressive symptoms during the transition to high school. Previous research into

racial identity development suggests that adolescents are actively exploring their racial identity during this period.[14,15] The uncertainty concerning racial identity has been associated with higher levels of anxiety and depression for Black and biracial/multiracial youth.[14,15] Moreover, distress resulting from peer and educational discrimination has been linked to lower self-esteem and depressive symptomology among high school students.[26,27] Consequently, the increase in depressive symptoms may indicate that non-Hispanic Black and biracial/multiracial youth struggle to develop their racial identity during this period and may be experiencing an increase in racial discrimination during the transition to high school.

Sociodemographic Characteristics as Risk Factors for Depressive Symptoms

Findings from this study support previous research that sex, age, and family SES are risk factors for adolescent depression.[9,28–30] The results of this study support that female adolescents may be more susceptible to stress than males, and are therefore at a greater risk of depressive symptoms during the transition to high school.[30] In addition, previous research has found that females experience more challenges in early adolescence than males, such as negative body image, which has been associated with depression in female adolescents.[31] Furthermore, adolescents who were 14 years old or 15 years old during Wave I were more likely to have an increase in depressive symptoms, which is consistent with previous research that found the average age for the first depressive episode in high school was 14.9 years of age.[9] Low levels of parental education were also found to be associated with depression during the transition to high school, which supports previous findings that

low SES is associated with greater emotional distress and the onset of depression.[28,32]

Limitations

Although this study contributes valuable knowledge to the existing research on adolescent depression, some limitations should be noted. First, the effect of school racial composition on the change in depressive symptoms could not be accurately assessed as this variable was not collected in Wave II. Studies concerning school racial composition and depressive symptoms have found that Black and Hispanic adolescents in predominately White high schools are at a greater risk of depression and Asian adolescents in predominately minority high schools are at an increased risk for depression.[33] However, one study found that school racial diversity did not influence depressive symptoms among biracial/multiracial youth.[14] Second, the CES-D does not assess the full range of depressive symptoms (e.g., suicidality). Therefore, it can only be used as an indicator of depressive symptoms, not as a diagnosis of depression. Third, depressive symptoms are only captured towards the end of the ninth grade school year, instead of throughout the academic year, which may not fully capture the effect of this transition on depressive mood. However, despite these limitations, this study has the potential to guide future research on the racial/ethnic differences in adolescent depression.

Chapter 6: Conclusion

Non-Hispanic Black and biracial/multiracial adolescents appear to have the most difficult psychological adjustment to the transition to high school. A strong, positive connection to one's ethnic group has been found to buffer the effects of racial discrimination on school achievement and depressive symptoms.[34,35] Future research should explore the role of racial identity and racial stress in relation to depressive symptoms during the transition to high school. Community programs and activities that foster positive messages about ethnic identities may be helpful in reducing the negative academic, emotional, and behavioral outcomes associated with the high school transition.[14,15,17] The large increase in depressive symptoms for the biracial/multiracial adolescents highlights the need for more research into the social factors contributing to the mental health outcomes for these populations.

Appendix

Table 1. Characteristics of Analytic Sample (N = 1,802) by Change in Depressive Symptoms from 8th to 9th Grade Among Participants in the National Longitudinal Study of Adolescent to Adult Health, 1995-1996

	n	*%*	*Mean Wave I Depression Scores (SE)*	*Mean Change in Depressive Symptoms (SE)*
Race/Ethnicity[††]				
Asian/Pacific Islander	59	2.62	14.16 (0.73)	0.51 (0.88)
Black	388	14.12	15.41 (0.39)	1.29 (0.44)
Latino	194	10.44	15.33 (1.18)	0.03 (1.48)
Other[a]	123	5.56	15.17 (0.59)	2.29 (1.63)
White	1,038	67.24	14.21 (0.19)	0.55 (0.17)
Sex [†††, ***]				
Female	937	49.04	15.15 (0.30)	1.03 (0.37)
Male	865	50.96	13.97 (0.24)	0.37 (0.28)
Age[b] [†††,**]				
13	353	16.78	14.21 (0.30)	0.14 (0.36)
14	1,193	68.90	14.12 (0.19)	1.15 (0.23)
15	233	13.43	17.09 (0.97)	-0.93 (1.12)
16	23	0.88	15.64 (1.42)	0.16 (1.52)
Family Structure [†††, *]				
Two Biological Parents	988	57.22	14.08 (0.22)	0.66 (0.21)
Two Parents	314	17.98	14.80 (0.37)	0.46 (0.58)
Single Mother	390	19.12	14.72 (0.44)	1.46 (0.38)
Single Father	54	3.02	16.90 (0.84)	2.11 (2.69)
Other[c]	56	2.66	19.18 (4.10)	-4.19 (4.31)
Parental Education				
≤ High School	747	45.60	14.91 (0.37)	0.68 (0.45)
Some College[d]	491	26.98	14.20 (0.31)	1.21 (0.34)
College and Beyond	403	19.12	14.13 (0.26)	0.26 (0.26)
Missing[e]	161	8.30	14.67 (0.48)	0.10 (0.37)
Depression				
Total Sample	1,802	100	14.55 (0.21)	0.69 (0.24)

Note: Table I reports unweighted samples and weighted percents.
Group comparisons for mean Wave I depression scores: ††† $P < 0.001$; †† $P < 0.01$
Group comparisons for mean change in depressive symptoms: *** $P < 0.001$; ** $P < 0.01$; * $P < 0.05$

[a] "Other" racial category includes participants who identified as biracial/multiracial, Native American, or other.
[b] Participants who were 12 years old (n = 1) or 17 years old (n = 2) during Wave I were excluded from analysis due to low sample size.

[c]"Other" family structure type designates any household without members classified as "mother" or "father."
[d]"Some College" also includes business, trade, or vocational school after high school.
[e]Information regarding highest level of parent-reported education was missing from 161 participants.

Table 2. Linear Regression Models Predicting Change in Depression from 8th to 9th Grade Among Participants (N = 1,802) in the National Longitudinal Study of Adolescent to Adult Health, 1995-1996

Variable	Model 1 *b (SE)*	Model 2 *b (SE)*	Model 3 *b (SE)*
Race/Ethnicity			
Asian/Pacific Islander	-0.04 (0.59)	-0.24 (0.66)	-0.04 (0.65)
Black	1.71 (0.32)***	1.65 (0.32)***	1.39 (0.39)**
Latino	0.39 (0.97)	0.27 (1.00)	0.18 (0.95)
Other[a]	2.51 (1.64)	2.64 (1.65)	2.38 (1.63)
White	*Reference*	*Reference*	*Reference*
Sex			
Female		1.70 (0.31)***	1.74 (0.30)***
Male		*Reference*	*Reference*
Age[b]			
13		*Reference*	*Reference*
14		1.16 (0.43)*	1.07 (0.42)*
15		1.51 (0.64)*	1.40 (0.67)*
16		1.01 (1.20)	1.11 (1.10)
Family Structure			
Two Biological Parents			*Reference*
Two Parents			0.13 (0.52)
Single Mother			0.67 (0.42)
Single Father			3.60 (2.51)
Other[c]			-1.41 (1.11)
Parental Education			
≤ High School			0.77 (0.37)*
Some College[d]			0.93 (0.41)*
Missing[e]			0.02 (0.40)
College and Beyond			*Reference*
Depression (Wave I)	-0.78 (0.11)***	-0.80 (0.11)***	-0.80 (0.10)***
Time Lapse	-1.25 (1.03)	-0.56 (1.04)	-0.26 (1.15)

Note: *** $P < 0.001$; ** $P < 0.01$; * $P < .05$.

[a]"Other" racial category includes participants who identified as biracial/multiracial, Native American, or other.

[b]Participants who were 12 years old (n = 1) or 17 years old (n = 2) during Wave I were excluded from analysis due to low sample size.

[c]"Other" family structure type designates any household without members classified as "mother" or "father."

[d]"Some College" also includes business, trade, or vocational school after high school.

[e]Information regarding highest level of parent-reported education was missing from 161 participants.

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