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Socioeconomic Context and Emotional-Behavioral Achievement Links: Concurrent and Prospective Associations Among Low- and High-Income Youth

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Abstract

Temporal associations in the relationship between emotional-behavioral difficulty and academic achievement were explored in 2 samples followed from 6th through 8th grade. The first sample comprised 280 students entering an economically disadvantaged urban middle school and the second comprised 318 students entering an affluent suburban middle school. Among disadvantaged youth, emotional indices were concurrently associated with poorer achievement while prospective associations between substance use and achievement were evident. For privileged adolescents, only a significant concurrent relationship emerged between social anxiety and achievement, although nonsignificant trends in the data suggest other, albeit weak, associations. The findings are discussed in terms of similarities and differences in these temporal associations across 2 samples representing extremes of the socioeconomic continuum.

Contextual factors, measured as early as the pre-school years, have been found to influence the attitudes and beliefs that shape how a child interacts with his or her environment, and eventually influence continuity and discontinuity in patterns of behaving over time (Huesmann, Dubow, Eron, & Boxer, 2006; Magnuson, Duncan, & Kalil, 2006; Wigfield & Eccles, 2000). Given the salience of context in shaping development, it is important to more fully understand not just how developmental outcomes are shaped by contextual factors, but more importantly how *associations* between constructs vary over time as a function of context. School achievement is a critical area of competence among youth, and a salient developmental task that has been associated with mental wellbeing (Eccles, Roeser, Vida, Fredricks, & Wigfield, 2006). More specifically, academic difficulties assessed as early as the kindergarten (Morgan, Farkas, & Wu, 2009) and 1st grade years (Morgan, Farkas, Tufis, & Sperling, 2008), have been associated with later internalizing and externalizing behavior problems.

Recent research evidence has begun to mount regarding the importance of contextual influences in explicating the relationship between emotional distress, delinquency, substance use, and achievement (Ansary & Luthar, 2009; Luthar & Ansary, 2005). To date, however,

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studies have only explored these associations among older adolescents. As Ansary and Luthar (2009) exhort, much would be gained from exploring these contextual disparities in temporal associations within a younger cohort—before emotional-behavioral achievement difficulties are likely to become ingrained. As such, youth transitioning to middle school was the target population in the present study because this developmental phase is characterized by: (1) a solidifying of beliefs and attitudes that lay the foundation for future experiences (Huesmann et al., 2006); (2) increased self-awareness, an emerging ability to plan ahead, as well as a focus on academic skill building (Eccles, 1999); and (3) an increase in the salience of out-of-home contexts such as school, extracurricular activities, and peers (Magnuson et al., 2006).

Consistent with the theoretical framework underpinning earlier work exploring contextual disparities in these associations (e.g., Ansary & Luthar, 2009; Luthar & Ansary, 2005), Bronfenbrenner's bioecological model of human development (Bronfenbrenner & Morris, 2006) posits that an individual's genetic predispositions interact with proximal microsystemic factors (e.g., family, home, and school contexts), as well as more distal forces at the exo-systemic (e.g., neighborhood characteristics), and macrosystemic (e.g., cultural contexts associated with socioeconomic status, ethnicity, etc.) levels in shaping adjustment across various domains. Thus, this model provides a beneficial foundation from which to understand how these associations may differ for youth in low- versus high-income settings.

Given this backdrop, the current study sought to explore concurrent and prospective associations between emotional distress, delinquency, substance use, and achievement separately for low- and high-income youth followed from 6th through 8th grade. Because we are interested in concurrent and prospective links explored from a developmentally sensitive perspective, our review of the literature makes note of temporal associations although we recognize, as Roeser, Eccles, and Strobel (1998) do, the reciprocal nature of these relationships.

Academic Competence and Emotional Distress

Although temporal links between internalizing distress and academic achievement are still somewhat ambiguous, there is stronger research evidence suggesting that poor academic achievement presages internalizing distress. In a longitudinal study spanning 20 years, Masten et al. (2005) concluded that earlier academic difficulties, assessed between the ages of 8 and 12, significantly predicted later internalizing distress while the effects in the opposite direction (e.g., internalizing distress preceding later academic achievement) were not found. Other studies assessing late adolescents, ages 15 – 18, also corroborate this temporal sequence (Lewinsohn et al., 1994; Pelkonen, Marttunen, & Aro, 2003). In all likelihood, and as suggested by Eccles, Wigfield, and Schiefele (1998), poor academic performance leads to anxiety and diminished feelings of self-worth and, in turn, can evince depression and school disengagement. Contrary to this strong evidence are several studies that have concluded that internalizing distress precedes academic problems (Kessler, Foster, Saunders, & Stang, 1995; Woodward & Fergusson, 2001). Still other evidence suggests that internalizing distress *alone* does not evince compromised academic functioning however it may in the presence of externalizing problems: this was found among early adolescents (Roeser et al., 1998), as well as in a sample of affluent high school youth followed from 10th to 12th grade (Ansary & Luthar, 2009). Hence, given these inconsistencies, the field is far from understanding temporal associations regarding emotional distress – achievement links in a clear and cogent manner.

Academic Achievement and Behavioral Difficulties

Although it is evident that bidirectional relationships between these constructs exist (Ansary & Luthar, 2009), debate remains over which comes first—whether problem behaviors portend school failure or whether it is the converse, with academic failure resulting in youth turning toward risky problem behaviors. A plethora of research suggests that poor academic achievement precedes delinquency (Lipsey & Derzon, 1998), as well as engagement or changes in substance use among early adolescents (Griffin, Botvin, Doyle, Diaz, & Epstein, 1999) as well as among middle to late adolescents (Bryant, Schulenberg, Bachman, O'Malley, & Johnston, 2000; Schulenberg, Bachman, O'Malley, & Johnston, 1994). Conversely, just as many studies claim that among both early and late adolescents externalizing behaviors precede poor academic performance (Ellickson, Bui, Bell, & McGuigan, 1998; Newcomb & Bentler, 1988; Newcomb et al., 2002). Identifying a clear temporal sequence across the various stages of adolescence has been elusive, and thus we review each of these associations separately.

Contradictions in the literature pertaining to delinquency-achievement links are evident with some studies, suggesting that academic underachievement precedes conduct-disordered behaviors across adolescence (Lipsey & Derzon, 1998; Loeber & Farrington, 2000) while other research suggests the opposite temporal sequence (Fergusson & Horwood, 1995; Moffitt, Caspi, Rutter, & Silva, 2001). Likewise, what little evidence exists regarding contextual disparities is also at odds. While one study found that delinquency significantly increases the likelihood of dropping out of high school for only middle- and upper-income youth ages 14 – 17, and not impoverished youth (Hannon, 2003), another found that the association between delinquency and achievement was identical across *both* contexts (Luthar & Ansary, 2005). Although the finding was modest in magnitude, this latter study found that delinquency significantly explained 2% of the variability in achievement for *both* high- and low-income youth. The disparity in findings between these two studies may result from their very different measures of academic underachievement, namely dropout in the former and grade point average in the latter.

Academic Achievement and Substance Use

As was seen for delinquency-achievement associations, the evidence regarding substance use and achievement is also contradictory. These inconsistencies speak to the complicated nature of the associations between substance use and achievement. For instance, variable-based studies have found that cigarette use shares a unique association with poor achievement among early adolescents (Andrews & Duncan, 1997; Ellickson et al., 1998) and late adolescents (Luthar & Ansary, 2005), while other evidence using person-based techniques suggests that it is only when cigarettes are used concomitantly with marijuana that poorer achievement emerges (Ansary & Luthar, 2009). Regarding alcohol consumption and academic achievement among older adolescents, some studies suggest that there is no significant association between the two (Bryant & Zimmerman, 2002; Luthar & Ansary, 2005), while others have found alcohol use to be associated with increased dropout rates (Zimmerman & Schmeelk-Cone, 2003). Yet others have found alcohol use to be associated with high school achievement and plans for college (Newcomb & Bentler, 1988; Schulenberg et al., 1994).

Explaining substance use-achievement links vis-à-vis socioeconomic context is vital given the greater propensity for substance use among affluent adolescents as compared with their more disadvantaged counterparts. This finding has been amply documented during early adolescence (Ennett, Flewelling, Lindrooth, & Norton, 1997; Lucas & Gilham, 1995) as well as during the high school years (Falck, Siegal, Wang, & Carlson, 1999; Luthar &

D'Avanzo, 1999; Skager & Fisher, 1989), and has been found to persist even after accounting for emotional-behavioral difficulties (Luthar & D'Avanzo, 1999). Interestingly, more fine-grained evidence suggests that family socioeconomic status, assessed in middle adolescence, *alone* may not influence substance use by the transition to adulthood (see Bryant, Schulenberg, O'Malley, Bachman, & Johnston, 2003), but rather it is the relative affluence of community and school settings which have been found to influence patterns of use.

In addition to broad differences in drug use across both milieus, evidence also suggests that contextual disparities exist between high- and low-income youth when assessing the relationship between substance use and achievement. Within a cross-sectional study assessing youth at both extremes of the socioeconomic continuum, cigarette use was significantly associated with poorer achievement among privileged youth but not among their disadvantaged counterparts (Luthar & Ansary, 2005). Within a different economically advantaged sample of late adolescents, this time using person-based analyses, Ansary and Luthar (2009) found cigarette and alcohol use alone was not associated with poorer achievement, but adolescents who used cannabis (and by default also used cigarettes and alcohol) performed as poorly in school as multiproblem youth (i.e., those reporting high levels of depression, anxiety, substance use, and delinquency). Taken together, these findings suggest that within privileged settings, engaging in cigarette and alcohol use alone may not compromise achievement, whereas the addition of marijuana to one's drug repertoire may.

With regards to earlier achievement predicting to later substance use, several findings have emerged, suggesting that in low-income environments achievement is protective against substance use among both early adolescents (Ludden & Eccles, 2007) as well as high schoolers (Bryant & Zimmerman, 2002), whereas the same was not found for youth from more privileged settings. In fact, Ludden and Eccles (2007) found that high-achieving early adolescents from affluent backgrounds were at *increased* risk for substance use. Moreover, privileged teens putting forth high effort academically but only achieving average grades were found to be at risk for increases in cigarette use over time (Ansary & Luthar, 2009). Thus, given this growing body of evidence reflecting contextual disparities in substance use – achievement links, these associations were included in the present investigation.

Overview of the Current Study

The current investigation sought to explore links between these constructs within both samples of youth followed from 6th through 8th grade. Emotional distress was comprised of three indices (negative mood, physiological anxiety, and social anxiety), while problem behaviors were represented by markers of delinquent behavior and substance use was represented by use of cigarettes and alcohol. Academic competence was measured in terms of grades across four subjects: English, social studies, science, and math.

Given previous findings, within both groups, we expected 6th grade achievement to be associated with emotional distress concurrently and prospectively but not in the opposite direction. We also expected to find that, among affluent youth and to a lesser extent within the low-income sample, our measures of delinquency and substance use would be both concurrently and prospectively negatively associated with academic competence. We also expected significant links in the opposite temporal direction, with poor achievement at 6th grade predicting—both concurrently and prospectively—to changes in delinquency and substance use over time. In light of our review of the literature, we believe that these associations, especially those pertaining to delinquency and substance use and achievement, will be stronger for affluent as compared with impoverished youth. Following the suggestion

of Steinberg and Fletcher (1998), we conducted analyses separately for each group, as it was anticipated that the processes would be different based on context.

METHOD

Participants

Data collected on the two cohorts were part of a larger longitudinal study that began during the 1998 – 1999 school year (see Becker & Luthar, 2007; Luthar & Latendresse, 2002). The affluent suburban sample was a cohort of 318 students (48.43% girls) entering middle school in an economically prosperous suburban community in the northeastern United States. The sample was comprised predominantly of Caucasian youth with only 7% of the sample reporting being of ethnic minority heritage (<2% were African American and Hispanic, 3% Asian, and 2% other). The low-income sample was a cohort of 280 students (52.14% female) entering middle school in an economically disadvantaged urban community also in the northeastern United States. The sample was comprised predominantly of ethnic minority youth (31% African American, 48% Hispanic, 20% Caucasian, and 1% other). Socioeconomic status was determined based on median annual income for each town as well as the percentage of students receiving free or reduced lunches. According to the United States Census Bureau's (2000) census, the median family income was US\$125,381 in the privileged suburban community and US\$27,388 for the disadvantaged urban community. As for students who qualified for free- or low-cost lunch, 3% of students in the affluent sample and 79% of students in the disadvantaged sample were eligible.

Measures

Negative mood—The Negative Mood scale from the Children's Depression Inventory (Kovacs, 1992) was used to measure severity of depressive affect as students began middle school. This self-report measure requires that respondents choose among three statements representing different degrees of depressive symptoms. The 27 items yield scale scores representing five dimensions of depression: (a) negative mood, (b) anhedonia, (c) interpersonal difficulties, (d) negative self-esteem, and (e) instrumental ineffectiveness. The Negative Mood scale was selected for use in this study as a marker of depressive affect as it represents the primary factor derived from the 27 items that comprise the inventory (Kovacs, 1992). Additionally, within these samples, this scale also correlated less than the total score with the other measures of emotional distress included in the present study. Scores on this scale can range from 0 to 12 with higher scores representing more depressive affect. This measure has demonstrated acceptable reliability and validity (e.g., see Craighead, Curry, & Hardi, 1995; Kovacs, 1992). Over the three school years, coefficient α for the measure ranged from .65 to .69 within the high-income sample and .66 – .71 within the low-income sample.

Anxiety—The Revised Children's Manifest Anxiety Scale (Reynolds & Richmond, 1985) was used to measure severity of two types of anxiety as students began middle school. This self-report measure requires that respondents indicate whether each of 37 statements is generally *true* or *false* for them. The 37 items yield subscale scores representing three dimensions of anxiety: (a) social anxiety, (b) worry, and (c) physiological manifestations of anxiety; however, in this study only the subscales representing social anxiety and physiological manifestations of anxiety were used. Scores on these subscales can range from 0 to 7 for the measure of social anxiety and 0 to 10 for the measure of physiological distress, with higher scores representing more emotional distress. For the high-income sample, coefficients α ranged from .65 to .70 across the 3 years for the subscale representing physiological anxiety, and they ranged from .71 to .76 for the subscale representing social anxiety. For the low-income sample, coefficients of internal reliability ranged from .66 to .

.71 across the 3 years for the subscale representing physiological anxiety, and they ranged from .71 to .74 for the subscale representing social anxiety.

Delinquent behavior—The Self-Report Delinquency Checklist (Elliot, Dunford, & Huizinga, 1987) was used to measure frequency of delinquent behavior. This 38-item, self-report measure requires that respondents rate how often they engaged in both less and more serious forms of illegal behavior over the course of the previous year, using a 4-point ordinal scale that ranges from 0 = *never* to 3 = *very often*. Items are summed to create a total score reflecting severity of delinquent behavior over the course of the previous year. In this study, 5 items representing delinquent behavior directly related to substance use were omitted in computation of the total score to avoid a spurious correlation with the measure of substance use. Consequently, total scores had a possible range of 0 representing no involvement in any delinquent activity to 99 representing frequent involvement in all types of delinquent activity. The reliability and validity of the instrument have been documented by several researchers (e.g., see Huizinga & Elliot, 1986), and the instrument has been used extensively in large-scale surveys of adolescents (e.g., see Loeber et al., 2001). Furthermore, several studies have documented the general accuracy of self-report measures of delinquency (Jolliffe et al., 2003; Thornberry & Krohn, 2000). Across the 3 years, coefficients α for the measure ranged from .89 to .92 within the affluent sample and .89 to .93 within the disadvantaged sample.

Substance use—The substance use grid from the Monitoring the Future Survey (Johnston, O'Malley, Bachman, & Schulenberg, 2010) was used to measure frequency of cigarette and alcohol use over the course of the previous year as students entered middle school. This self-report instrument requires that respondents rate the frequency of their substance use along a 7-point ordinal scale ranging from 0 = *never* to 6 = *40+ times*. For this study, the ordinal ratings were converted to a frequency count representing a lower-bound estimate of the number of occasions (0 – 40) each student had used cigarettes and alcohol over the course of the past year. Because the ordinal categories represent estimates of frequency of use in the form of number of times used in the past year, we converted them to a lower-bound count of days that each substance was used. Like most count data, these frequency counts approximated a negative binomial distribution that could be analyzed using the same statistical approach that was used to analyze the other variables representing symptom or behavioral counts (physiological anxiety, social anxiety, and delinquent behavior) and symptom severity (negative mood) with similar distributions. Use of cigarettes and alcohol were considered in this study because they are the most commonly used drugs of abuse among middle school students (Johnston et al., 2010). Given the very low rates of marijuana use in our sample, we were not able to include this variable for analysis in the current investigation. The reliability and validity of this approach to collecting information about the substance use of adolescents have been documented repeatedly in a school-based survey done annually with a nationally representative sample of middle and high school students (Johnston et al., 2010).

Grade-point average—For both schools, a simple grade-point average was used to document the academic performance of each student during the semester in which annual data collections took place within each school. For the high-income sample, this was the third of four marking periods for the year. For the low-income sample, this was the first of four marking periods for the year. This grade-point average was computed using grades in four courses representing the traditional academic domains of: (a) English, (b) mathematics, (c) science, and (d) social studies. Each grade in these core academic subjects was assigned a grade-point value of 0 = *F* to 12 = *A+*, and the four grades were averaged to produce a grade-point average for the marking period. Across the three school years, coefficients α for

this index ranged from .78 to .89 for the high-income suburban sample and .83 to .86 for the low-income urban sample.

Procedure

This study was completed over the course of three successive school years. All students entering either school as a member of the 6th grade cohort were invited to participate. Informed consent for participation was secured in writing from a legal guardian of each child via mail. Informed assent was also obtained in writing from students before data collection began. The research protocol was approved by the principal of each school, the local board of education, and the institutional review board for the Yale University School of Medicine.

Across school years, data were collected in a similar manner. Students completed the battery of measures over the span of two 45-minute class meetings and all measures were administered in a group setting. Questions were read aloud in order to minimize participant differences in reading ability. In order to track participants over time, each student was assigned an otherwise meaningless identification code and only the research team had access to the master list linking the identifying code with specific students. As incentive for participation, at Times 1 and 2, a US\$3 gift was given to students for their involvement. At Time 3, students were given US\$5 for participation as well as the opportunity to win three monetary prizes in the sum of US\$50, US\$100, and US\$150 through a drawing.

Data Analysis

Generalized estimating equations were used to analyze the longitudinal data in this study due to the correlation of repeated measurements over time (for discussions, see Burton, Gurrin, & Sly, 1998; Liang & Zeger, 1993; Zeger & Liang, 1986; Zeger, Liang, & Albert, 1988). Generalized estimating equations represent an extension of the generalized linear model that use a simple correction to estimates of standard errors to account for the correlated nature of measurements collected repeatedly from the same individual over time. Generalized estimating equations also provide a general framework for the consistent analysis of continuous, count, ordinal, multinomial, and binary variables using all available data through specification of the exponential distribution the dependent variable approximates (e.g., normal, Poisson, negative binomial, gamma, multinomial, binary), a link function that indicates how the dependent variable is related to the independent variable (e.g., identity, log, logit, probit), and the structure of the correlation matrix (e.g., exchangeable, autoregressive, independent) for the repeated measurements (for further discussion, see Hardin & Hilbe, 2003).

For this study, the GENMOD procedure available in SAS (SAS Institute, 2004) was used to fit generalized estimating equations. Because there was interest in statistical modeling of relationships within socioeconomic context and data were not collected within the two schools at the same point in the school year, the statistical analyses were conducted separately for each school. To balance risk for a Type 1 versus Type 2 error in a series of statistical analyses done with conceptually distinct but low to moderately correlated dependent variables, parameter estimates with p -values $<.01$ were taken as statistically significant, and parameter estimates with p -values $>.01$ and $<.05$ were taken as nonsignificant trends in the data worthy of mention. Four clusters of statistical analyses were done.

Missing data—In the first cluster of statistical analyses, descriptive statistics and a series of generalized linear analyses were used to characterize the pattern and potential significance of missing data. Patterns of missing data were examined both across and within

the three waves of data collection. A series of generalized linear analyses was used to compare students who provided data during each year of middle school with those who did not. In this series of statistical analyses, measures of grade-point average, emotional distress, delinquency, and substance abuse obtained during 6th grade served as the dependent variables. Because the variable most closely approximated a normal distribution, grade-point average was entered as the dependent variable with specification of a normal distribution and identity link function. Because the variables most closely approximated a negative binomial distribution, the markers of emotional-behavioral difficulty were entered as dependent variables with specification of a negative binomial distribution and a log link function.

Gender differences in psychosocial adjustment over time—In the second group of statistical analyses, a series of generalized estimating equations was used to examine gender differences in psychosocial adjustment across the 3 years of middle school. In this series of statistical analyses, gender and grade were entered as the independent variables, and grade-point average and the six markers of emotional-behavioral difficulty were entered as the dependent variables. Grade-point average was entered into the statistical analysis with specification of a normal distribution, an identity link function, and an autoregressive pattern of correlation across the three measurements. The six markers of emotional-behavioral difficulty were entered into the statistical analysis with specification of a negative binomial distribution, a log link function, and an autoregressive pattern of correlation across the three measurements. Grade was coded continuously such that the intercept in the statistical model represented the average value of the dependent variable for the sample during 6th grade and the slope represented the rate of change in the dependent variable per year as students moved from 6th to 8th grade. Gender differences in both the intercept and the rate of change were tested for statistical significance.

Prediction of academic performance by emotional-behavioral difficulty—A series of generalized estimating equations was also used to examine the prediction of academic performance over time by markers of emotional-behavioral difficulty evident during the first year of middle school. In this series of statistical analyses, gender was entered as a covariate, the six markers of emotional-behavioral difficulty obtained during 6th grade were entered as the predictors, and grade was entered as the independent variable representing time. Grade-point average was again entered as the dependent variable with specification of a normal distribution, an identity link function, and an autoregressive pattern of correlation across the three measurements. Grade was again coded such that the intercept in the statistical model represented grade-point average during 6th grade and the slope represented the average rate of change in grade-point average per year as students moved from 6th to 8th grade. Both concurrent and prospective relationships between each marker of emotional-behavioral difficulty and grade-point average were tested for statistical significance.

Prediction of emotional-behavioral difficulty by academic performance—

Finally, a series of generalized estimating equations was used to examine prediction of emotional-behavioral difficulty over time by academic performance during the first year of middle school. In this series of statistical analyses, gender was again entered as a covariate, grade-point average for 6th grade was entered as the predictor, and grade was entered as the independent variable representing time. The six markers of emotional-behavioral difficulty were entered as the dependent variable with specification of a negative binomial distribution, a log link function, and an autoregressive pattern of correlation across the three measurements. Grade was again coded such that the intercept in the statistical model represented the average value of the dependent variable during 6th grade and the slope

represented the average rate of change in the dependent variable per year as students moved from 6th to 8th grade. Both concurrent and prospective relationships between grade-point average and each marker of emotional-behavioral difficulty were tested for statistical significance.

RESULTS

Missing Data

Within the high-income sample, 256 of the 318 students (80.50%) who began the study provided data during each year of middle school, 43 students (10.38%) provided data during 2 years, and 29 students (9.12%) only provided data during the first year. When compared with students who provided complete data, students with only partial data earned relatively poorer grades during 6th grade and reported greater use of alcohol as they began middle school, estimate (SE) = -0.79 (0.23), χ^2 (1 , $N = 318$) = 11.59 , $p < .001$ and estimate (SE) = 0.85 (0.31), χ^2 (1 , $N = 314$) = 7.53 , $p < .01$ respectively.

Within the low-income sample, 189 of the 280 students (67.50%) who began the study provided data during each year of middle school, 57 students (20.36%) provided data during 2 years, and 34 students (12.14%) only provided data during the first year. When compared with students who provided complete data, students with only partial data had relatively poorer grades during 6th grade, and they reported elevated levels of negative mood and greater use of both cigarettes and alcohol as they began middle school, estimate (SE) = -1.22 (0.33), χ^2 (1 , $N = 280$) = 13.33 , $p < .001$, estimate (SE) = 0.33 (0.12), χ^2 (1 , $N = 279$) = 6.99 , $p < .01$, estimate (SE) = 1.14 (0.28), χ^2 (1 , $N = 276$) = 15.89 , $p < .001$, and estimate (SE) = 0.74 (0.24), χ^2 (1 , $N = 278$) = 9.28 , $p < .01$, respectively. When students provided data during a specific wave, there were very few missing measurements within either the high-income (0.46%–2.83%) or the low-income (0.56%–1.43%) sample.

Gender Differences in Psychosocial Adjustment

Descriptive statistics for the variables of interest are presented in Table 1 by school, grade, and gender. Results of the generalized estimating equations done to test for gender differences in the three markers of emotional difficulty are summarized in Table 2. As noted, there was only one statistically significant gender difference in emotional difficulty involving change in negative mood within the high-income sample. Although no gender differences were evident at 6th grade, males declined in negative mood during middle school while females demonstrated no significant change. Additionally, there was a nonsignificant trend for boys to report more social anxiety during 6th grade; however, this declined over time in comparison to girls. Likewise, within the disadvantaged sample, there was a similar but nonsignificant trend, with males declining in physiological anxiety over time as compared with females.

Results of the generalized estimating equations done to test for gender differences in delinquent behavior and substance use are summarized in Table 3. Within the high-income sample, as noted, there were statistically significant gender differences in delinquent behavior with boys demonstrating significantly more involvement in deviant acts during 6th grade with no significant change over time. Gender differences were also evident in the use of alcohol, with boys demonstrating more frequent use of alcohol during 6th grade as compared with girls. High-income females increased in alcohol consumption over time as compared with their male counterparts. Alternatively there was a nonsignificant trend suggesting that females decreased cigarette use over time as compared with males.

In contrast, within the low-income sample, no gender differences in delinquency were evident. Regarding substance use, a statistically significant gender difference involving the

use of cigarettes emerged with girls demonstrating significantly higher use than boys during 6th grade but a similar pattern of increase over time for both boys and girls was seen. Likewise, alcohol use followed a similar pattern, although this was a nonsignificant trend.

Finally, results of the generalized estimating equations done to test for gender differences in academic performance during middle school are summarized in Table 4. As noted, boys had, on average, a significantly lower grade-point average during 6th grade within both schools. There was also a statistically significant decline in grade-point average for boys and girls within both schools with no significant gender difference in the magnitude of the decline. There was, however, a nonsignificant trend toward a steeper decline for boys than girls within the high-income school.

In terms of grade point average, girls in the high-income sample began middle school with a grade-point average roughly equivalent to a B+, and their grade-point average deteriorated an average of almost one full grade-point to approximately a B over the next 2 years. Likewise, boys in this sample began middle school with a grade-point average roughly equivalent to a B, and their grade-point average deteriorated more than a full grade point to a B – over the next 2 years. In parallel, girls in the low-income sample began middle school with a grade-point average roughly equivalent to a C+, and they presented with an average decline of approximately two full grade-points to a C – over the next 2 years. Boys in the low-income sample began middle school with a grade-point average roughly equivalent to a C, and they also presented with a decline of almost two full grade points to a D+ over the next 2 years.

Emotional-Behavioral Difficulty Predicting to Achievement Trajectory Over Time

Results of generalized estimating equations done to test for prospective relationships between different markers of emotional-behavioral difficulty evident during 6th grade, and academic performance over time, after allowance for the potential influence of gender, are summarized in Table 5. Regarding the high-income sample, as noted earlier, there was a statistically significant concurrent relationship between social anxiety and academic performance in 6th grade; however, no significant prospective link between social anxiety during 6th grade and change in achievement over time emerged. Although no other statistically significant concurrent or prospective relationships involving emotional-behavioral difficulty and academic performance were evident, there were nonsignificant trends in the data reflecting (a) a negative concurrent relationship between negative mood and achievement at 6th grade, and (b) a prospective relationship between cigarette use and grades indicating that the use of cigarettes at 6th grade was related to *increases* in achievement over time.

For the low-income sample, as can be seen in Table 5, there were, after allowance for the potential influence of gender, statistically significant concurrent relationships between all three forms of emotional distress—negative mood, physiological anxiety, and social anxiety—and poorer academic performance during 6th grade, but no significant prospective links to achievement over time. There was a nonsignificant trend for social anxiety to be associated with an improvement in grades over time. Although there were no significant concurrent relationships during 6th grade, use of both cigarettes and alcohol during 6th grade was associated with significant declines in academic performance over time.

Achievement Predicting to Emotional-Behavioral Difficulty Over Time

Results of generalized estimating equations done to test for prospective relationships between academic performance during 6th grade and emotional-behavioral difficulty over time, after allowance for the potential influence of gender, are summarized in Table 6. For

the high-income sample, as mentioned earlier, there was again a statistically significant concurrent relationship between social anxiety and academic performance in 6th grade; however, there was not a statistically significant relationship between academic performance during 6th grade and change in social anxiety over time. There were no other statistically significant concurrent or prospective relationships involving academic performance and emotional-behavioral difficulty within this sample. There were, however, nonsignificant trends in the data reflecting: (a) a negative concurrent relationship between academic achievement and negative mood during 6th grade; (b) a negative concurrent relationship between academic achievement and use of alcohol during 6th grade; and (c) a negative prospective relationship between academic achievement in 6th grade and the rate of change in physiological anxiety over time.

Regarding the low-income sample, as noted earlier in Table 6, there were, after allowance for the potential influence of gender, again significant negative concurrent relationships between academic performance and the three forms of emotional distress during 6th grade. There were no statistically significant prospective relationships between academic performance during 6th grade and change in emotional-behavioral difficulty. There were, however, nonsignificant trends in the data reflecting (a) a negative concurrent relationship between academic achievement and use of cigarettes during 6th grade, and (b) a negative prospective relationship between academic achievement during 6th grade and the rate of change in use of alcohol.

DISCUSSION

Findings garnered from the two sets of analyses examining opposite temporal sequences in emotional-behavioral-achievement associations in the present investigation shed new light on the ongoing debate regarding these temporal associations. Concomitantly, while we acknowledge the limitation of utilizing one school to represent each of the socioeconomic extremes, these results contribute to the nascent literature exploring contextual similarities and disparities at the two extremes of the socioeconomic continuum, this time illustrating what these associations may look like in an age group that has, as of yet, not been explored. Because we used a very conservative approach to analysis, making it likely that we have underreported the strength of these relationships, here we discuss both significant as well as noteworthy nonsignificant trends in the data.

Similarities Across Low- and High-Income Youth

Two findings emerged identically across both samples. The first concerns the negative concurrent association between social anxiety and achievement. This is not altogether surprising as evidence suggests that socially anxious youth tend to also suffer disruptions in the academic realm (Beidel, 1991; Last, Hersen, Kazdin, Orvaschel, & Perrin, 1991) as they may be fearful of asking questions in the classroom, as well as of interacting with their teachers and peers. Certainly, future work on anxiety-achievement links will need to assess the various forms of anxiety separately, as opposed to combining them into an overall composite, as is typically done in analyses.

The second finding obtained similarly across the two samples was most surprising: Delinquency-achievement associations, tested in both directions, were not significant. While evidence suggests that delinquency may have a stronger bearing on the academic failure of middle to late adolescents living in affluent as compared with low-income environs (Hannon, 2003), our findings on youth entering middle school do not support this notion. This may be due to the extremely low incidence of self-reported deviant acts in this study. While the potential range for this measure was 0 – 99, both samples averaged only about six occasions on which they engaged in delinquent activities over the previous year. Thus,

although an abundance of evidence supports delinquency-achievement links throughout adolescence (Hinshaw, 1992; Loeber & Farrington, 2000; Moffitt et al., 2001), there was not enough engagement in deviant acts, in this sample, for the association to be borne out.

Affluent Youth: A Seemingly Protected Group

At first blush, findings from our high-income sample suggest remarkable and long-term protection from spillover from emotional-behavioral disturbances onto achievement and vice versa. As noted earlier, only social anxiety showed significant concurrent inverse associations with achievement.

Findings from nonsignificant trends in the data do, however, depict a slightly different picture. First, a concurrent marginally significant negative association between depressed mood and achievement at 6th grade emerged and this finding may have been driven by a subset of privileged youth manifesting distress across emotional as well as behavioral realms. This is likely to be the case, in light of already mentioned evidence pertaining to affluent high schoolers that suggests depressed mood in isolation has no influence on achievement but it may in the presence of externalizing problems (Ansary & Luthar, 2009). Second, a nonsignificant trend worthy of mention is the negative prospective association between 6th grade achievement and increases in physiological anxiety from 6th through 8th grade. Although this relatively weak finding requires replication, it contributes to the nascent literature suggesting that academic underperformance, in the context of pressures to achieve, may be particularly distressing (Luthar & Latendresse, 2002; Luthar & Sexton, 2004).

Our findings regarding substance use – achievement links also add substantively to an evolving understanding of these processes occurring within the lives of affluent suburban youth. Unexpectedly, cigarette and alcohol use did not significantly predict to achievement within this young sample. This finding does, however, concur with our earlier work on affluent youth attending high school, because cigarette and alcohol use alone did not confer risk for poorer achievement, but deficits in achievement were only found among individuals using cigarettes, alcohol, and marijuana concomitantly (Ansary & Luthar, 2009). Whereas a good deal of evidence has identified cigarette use as the single strongest drug predictor of academic underachievement (Bryant & Zimmerman, 2002; Ellickson et al., 1998; Luthar & Ansary, 2005; Newcomb et al., 2002), other results suggest that this finding may be driven by a subgroup of youth engaging in marijuana, cigarette, and alcohol use concurrently (Ansary & Luthar, 2009). Unfortunately, as mentioned previously, marijuana use in the current sample was so low that we could not include the variable in our analyses; hopefully future work explores this remarkable finding further.

Interestingly, a positive prospective trend between cigarette use and improvements in achievement from 6th through 8th grade did emerge suggesting that high-achieving affluent adolescents may be at greater risk for later substance use, and this concurs with emerging work on these associations (Ansary & Luthar, 2009; Ludden & Eccles, 2007). Still, although these are marginally significant findings, it is unclear whether youth from privileged environments are reacting to pressures to achieve by engaging in cigarette use as a mode of stress relief, or whether cigarette use may be seen as a way for high-achieving youth to appear “cool” (Luthar & Ansary, 2005). Thus, achievement pressures are likely to mediate if not moderate these associations among relatively advantaged youth.

Economically Disadvantaged Urban Youth: At Risk for Cross-Domain Disturbances

Whereas youth attending middle school in relative affluence appear somewhat protected from disturbances from either realm affecting the other, this finding did not materialize for

urban impoverished youth. All three indicators of emotional distress—negative mood, social anxiety, and physiological anxiety—were linked with poorer achievement at baseline. Additionally, there was a nonsignificant prospective association with social anxiety at 6th grade predicting to improvements in grades by 8th grade.

In large part, links between emotional distress and underachievement are likely to be related to the poorer quality of schools characteristic of disadvantaged neighborhoods, including safety problems and lack of resources such as remedial and advanced courses, as well as inadequately trained teachers (Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2006). Additionally, schools in disadvantaged urban neighborhoods have been found to have a lower collective efficacy, the belief held by teachers and administrators that all students can achieve (Stipek, 2002; see also Hauser-Cram, Warfield, Stadler, & Sirin, 2006). Concordantly, racial discrimination by peers and teachers has been found to evince school disengagement and decrements in grades, as well as increases in depression and anger over time (Eccles, 2004).

In a related vein, the work of Ogbu and colleagues suggests that, in response to racism, many ethnic minority youth adopt a peer culture devaluing academic application, as it is seen as a characteristic of the dominant group from which they are trying to separate themselves (Fordham & Ogbu, 1986; Macleod, 1991; Ogbu, 1991). Thus, the nonsignificant trend in the data reflecting a prospective relationship between social anxiety and improved grades over time may be explained within the milieu of urban poverty, where many youth who excel academically are less valued socially. Taken together, the stacking of myriad risk factors in disadvantaged schools and neighborhoods may feed back on the child's view of his or her own academic capabilities, in turn diminishing feelings of self-worth and intensifying internalizing distress (Wigfield et al., 2006).

Our findings regarding low-income youth and substance use – achievement links added to a contextually sensitive understanding of these associations, as significant prospective associations between both cigarette and alcohol use and decreased academic performance over time emerged. Furthermore, in tests assessing the opposite temporal sequence (e.g., achievement predicting to later emotional-behavioral difficulties), noteworthy non-significant trends emerged with a concurrent negative association between achievement and cigarette use at 6th grade, along with significant negative prospective links between achievement and alcohol use. Cumulatively, these findings suggest that, generally speaking, a *bi-directional long-term* association between achievement and cigarette and alcohol use may occur among impoverished middle school-aged youth. Since Luthar and Ansary (2005) explored these associations concurrently at 10th grade, and found no association between the two constructs, it is unknown whether prospective substance use –achievement associations might exist in an older sample of adolescents.

Précis of Contextual Differences in Temporal Associations and Future Directions

Cumulatively, the findings of the current investigation indicate contextual disparities in these associations. On the surface, affluent youth appeared relatively buffered from difficulties in one domain crossing to the other. However, and in light of our conservative approach, the nonsignificant trends in the data do suggest the presence of cross-domain links that warrant further evaluation. Given converging findings concerning affluent late adolescents' greater risk for substance use, as well as links between drug use and achievement that are not evident in low-income late adolescents (Luthar & Ansary, 2005; see also Ansary & Luthar 2009), further person-based research is necessary to explore what exactly occurs among privileged youth during the transition from middle to high school, especially drug using and multiproblem youth.

In contrast, the findings from our disadvantaged middle school-aged sample depicts an entirely different picture, characterized by risk. These findings parallel those of Ludden and Eccles (2007), who found low achievement to be a risk factor for substance use in low- but not high-income settings. Unique to the low-income sample were concurrent emotional distress and achievement links at 6th grade as well as prospective associations, emerging largely in both directions, when considering substance use – achievement associations. Specifically, substance use appears to exert a stronger long-term negative influence on achievement than the opposite temporal sequence, but *long-term bi-directional* associations between substance use and achievement are likely, given our consideration of nonsignificant trends. Taken together, these findings suggest greater risk for transference of distress from one domain to another, with potentially long-term effects for substance use links to achievement. Future longitudinal research examining these associations within impoverished urban youth is warranted, as the only work to date exploring these associations is cross-sectional and indicates that substance use has no bearing on achievement among these youth (Luthar & Ansary, 2005). At a deeper level future research is also necessary to more comprehensively understand how the proximal microsystemic—and, just as important, the more distal exosystemic and macrosystemic—forces unique to each socioeconomic group may factor in these associations.

Limitations

Several limitations require consideration in the current investigation. First, only one school was used to represent each socioeconomic setting, which limits the generalizability of these findings in elucidating universal and context-specific themes in links between emotional distress, problem behaviors, and achievement. In a similar vein, ethnic differences in these associations could not be assessed, given that one school per context and socioeconomic strata was utilized. Furthermore, in the affluent sample, the predominance of Caucasian youth precluded any examination of ethnic differences within this context. A replication of the current investigation with samples derived from several schools representative of each context would be beneficial to explore the strength of the findings as well as to disentangle the effects of ethnic differences from those of socioeconomic disparities.

Another set of limitations could have potentially dampened the strength of associations obtained. First, because missing data were more prevalent among poorer performing youth, as well as those reporting high levels of distress, it is likely that we have underreported the strength of associations, particularly those of a prospective nature. This may be especially true for the findings pertaining to the low-income sample, as missing data across the three waves were more prevalent for this group. Additionally, as noted earlier, we used a particularly conservative approach to statistical testing in relatively small samples. For this reason, we interpreted marginally significant findings, as all tests were evaluated at the $p < .01$ level. Moreover, although at acceptable levels, the relatively low reliability of the Negative Mood scale is grounds for concern, and may have caused us to underreport the associations between depression and achievement.

In parallel, the remaining flaws of the current investigation concern our measurements. The first pertains to our use of grade point average as the sole indicator of academic achievement. Standardized measures of achievement would have been beneficial in our comparisons across the two samples; however, these were unavailable. Furthermore, academic grades for the high-income sample were collected during the third quarter of the academic year, while those of the low-income sample were collected during the first quarter. Although unavoidable, this discrepancy in time may have introduced some minor differences between the groups due to maturation.

Last, despite evidence confirming the accuracy of self-reports in the measurement of delinquency and substance use (Jolliffe et al., 2003) as well as their use in large-scale often-cited studies (Johnston et al., 2010; Loeber et al., 2001), the exclusive reliance on them in the current study is a limitation. Multiple informants, including parent, teacher, and peer reports would have strengthened the veracity of our findings.

Conclusion

Notwithstanding these limitations, the current investigation yields promising insights regarding emotional-behavioral achievement associations within two samples representing the extremes of the socioeconomic continuum. Regarding the high-income sample, intriguing suggestions from this research appear, such as the lack of significant associations between substance use predicting to later achievement, as well as the counter-intuitive trend between cigarette use and improved academic performance over time. Concerning disadvantaged early adolescents, these findings insinuate that achievement may be particularly vulnerable to emotional disturbances in the short term and perhaps, more importantly, substance use in the long term. Future research is necessary to tease apart these associations further within larger and more diverse samples of youth representative of these disparate settings. Only then can useful interventions—tailored to the unique needs of youth in each context—be designed and implemented.

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TABLE 1
Descriptive Statistics for Emotional Distress, Delinquency, Substance Use, and Academic Performance Over Time by School, Grade, and Gender

	Suburban						Urban					
	6th Grade			7th Grade			8th Grade			6th Grade		
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Negative mood												
Girls	2.04	1.91	2.01	2.03	2.30	2.24	2.55	2.54	2.74	2.36	2.38	2.07
Boys	2.19	2.22	1.88	1.92	1.46	1.67	2.20	2.01	2.04	1.97	1.53	1.91
Physiological anxiety												
Girls	2.80	2.08	2.59	2.10	2.73	2.31	4.20	2.52	4.09	2.51	3.52	2.29
Boys	2.86	2.29	2.62	2.09	2.46	2.04	3.82	2.58	3.16	2.41	2.66	1.98
Social anxiety												
Girls	1.72	1.71	1.64	1.84	1.82	1.95	2.62	2.13	2.85	2.08	2.48	2.03
Boys	2.12	1.94	1.92	1.76	1.72	1.84	2.74	2.15	2.39	2.02	2.27	1.90
Delinquency												
Girls	2.97	4.19	3.77	4.92	6.60	7.86	5.73	7.42	9.80	11.69	10.29	11.34
Boys	8.96	11.32	9.21	11.46	9.49	9.19	6.17	8.35	10.77	11.69	11.10	12.47
Cigarette use												
Girls	0.10	0.57	0.24	1.02	1.13	5.12	0.39	1.96	1.62	4.79	1.37	3.98
Boys	0.47	3.27	0.33	0.98	0.71	2.81	0.12	0.62	0.21	0.52	0.41	1.11
Alcohol use												
Girls	0.23	0.76	0.30	0.73	2.07	5.23	0.70	3.42	1.68	5.58	2.61	6.51
Boys	1.37	4.40	1.14	2.65	1.64	4.38	0.25	0.61	1.14	4.00	1.86	5.34
Grades												
Girls	9.35	1.63	8.62	2.21	8.73	2.08	6.51	2.63	5.12	2.81	4.81	3.13
Boys	8.61	1.61	7.64	2.50	7.43	2.45	5.48	2.63	4.12	2.91	3.75	2.86

Note. For the high-income school, $N = 318$ students. Because of missing data, the sample for specific measures ranges from 318 students with 863 observations to 315 students with 854 observations. For the low-income school, $N = 280$ students. Because of missing data, the sample for specific measures ranges from 280 students with 715 observations to 280 students with 711 observations.

TABLE 2

Results of Generalized Estimating Equations Done to Test for Gender Differences in Emotional Distress Over Time by School

School Gender	Estimate (SE)		
	Negative Mood	Physiological Anxiety	Social Anxiety
Suburban			
Girls			
Intercept	0.07 (0.08) **	1.02 (0.06) **	0.53 (0.08) **
Rate of change	0.07 (0.05)	-0.01 (0.03)	0.40 (0.05)
Boys			
Intercept	0.80 (0.08) **	1.06 (0.06) **	0.75 (0.07) **
Rate of change	-0.19 (0.05) **	-0.08 (0.04) †	-0.10 (0.04) †
Gender difference			
Intercept	0.10 (0.11)	0.04 (0.08)	0.22 (0.10) †
Rate of change	-0.27 (0.07) **	-0.07 (0.05)	-0.14 (0.06) †
Urban			
Girls			
Intercept	0.95 (0.08) **	1.44 (0.05) **	0.97 (0.07) **
Rate of change	-0.01 (0.05)	-0.06 (0.03)	-0.00 (0.04)
Boys			
Intercept	0.79 (0.08) **	1.34 (0.06) **	1.00 (0.07) **
Rate of change	-0.14 (0.06) †	-0.18 (0.04) **	-0.09 (0.04) †
Gender difference			
Intercept	-0.16 (0.11)	-0.10 (0.08)	0.03 (0.09)
Rate of change	-0.13 (0.07)	-0.12 (0.05) †	-0.09 (0.06)

Note. Values represent parameter estimates (*SE*) derived from generalized estimating equations done with specification of a negative binomial distribution and a log link function. For the high-income school, $N = 318$ students. Because of missing data, the sample for specific measures ranges from 316 students with 855 observations (Negative Mood) to 315 students with 854 observations (Physiological Anxiety and Social Anxiety). For the low-income school, $N = 280$ students. Because of missing data, the sample for specific measures ranges from 280 students with 714 observations (Negative Mood) to 280 students with 713 observations (Physiological Anxiety and Social Anxiety). To balance the risk of Type I versus Type II error, only parameter estimates with p -values $< .01$ were considered statistically significant. Parameter estimates with p -values $< .05$ but $> .01$ were considered nonsignificant trends in the data worthy of mention.

† $p < .05$;

** $p < .001$.

TABLE 3

Results of Generalized Estimating Equations Done to Test for Gender Differences in Delinquent Behavior and Substance Use Over Time by School

School Gender	Estimate (SE)		
	Delinquency	Cigarette Use	Alcohol Use
Suburban			
Girls			
Intercept	1.06 (0.11) **	-2.38 (0.37) **	-1.73 (0.28) **
Rate of change	0.04 (0.08) **	-1.22 (0.17) **	1.16 (0.18) **
Boys			
Intercept	2.19 (0.09) **	-0.88 (0.53)	0.26 (0.24)
Rate of change	0.04 (0.05)	0.20 (0.36)	0.09 (0.17)
Gender difference			
Intercept	1.13 (0.15) **	1.50 (0.65) †	1.99 (0.37) **
Rate of change	-0.35 (0.08) **	-1.02 (0.40) †	-1.07 (0.25) **
Urban			
Girls			
Intercept	1.79 (0.10) **	-0.71 (0.33) †	-0.32 (0.35)
Rate of change	0.31 (0.06) **	0.73 (0.17) **	0.70 (0.21) *
Boys			
Intercept	1.85 (0.11) **	-2.15 (0.39) **	-1.18 (0.23) **
Rate of change	0.36 (0.05) **	0.63 (0.26) †	0.97 (0.15) **
Gender difference			
Intercept	0.06 (0.15)	-1.43 (0.51) **	-0.87 (0.42) †
Rate of change	0.05 (0.07)	0.10 (0.31)	0.28 (0.26)

Note. Values represent parameter estimates (*SE*) derived from generalized estimating equations done with specification of a negative binomial distribution and a log link function. For the high-income school, $N = 318$ students. Because of missing data, the sample for specific measures ranges from 317 students with 848 observations (Delinquency) to 316 students with 853 observations (Alcohol Use). For the low-income school, $N = 280$ students. Because of missing data, the sample for specific measures ranges from 280 students with 712 observations (Alcohol Use) to 280 students with 711 observations (Delinquency and Cigarette Use). To balance the risk of Type I versus Type II error, only parameter estimates with p -values $< .01$ were considered statistically significant. Parameter estimates with p -values $< .05$ but $> .01$ were considered nonsignificant trends in the data worthy of mention.

† $p < .05$;

* $p < .01$;

** $p < .001$.

TABLE 4

Results of Generalized Estimating Equations Done to Test for Gender Differences in Academic Performance Over Time by School

	Suburban	Urban
GPA	Estimate (SE)	Estimate (SE)
Girls		
Intercept	9.32 (0.13) **	6.44 (0.22) **
Rate of change	-0.40 (0.08) **	-0.96 (0.13) **
Boys		
Intercept	8.56 (0.13) **	5.45 (0.23) **
Rate of change	-0.63 (0.08) **	-1.09 (0.13) **
Gender difference		
Intercept	-0.76 (0.18) **	-1.00 (0.31) *
Rate of change	-0.24 (0.11) †	-0.13 (0.19)

Note. Values represent parameter estimates (*SE*) derived from generalized estimating equations done with specification of a normal distribution and an identity link function. For the high-income school, $N = 318$ students with 863 observations. For the low-income school, $N = 280$ students with 715 observations. GPA = Grade-Point Average. To balance the risk of Type I versus Type II error, only parameter estimates with p -values $< .01$ were considered statistically significant. Parameter estimates with p -values $< .05$ but $.01$ were considered nonsignificant trends in the data worthy of mention.

† $p < .05$;

* $p < .01$;

** $p < .001$.

TABLE 5

Results of Generalized Estimating Equations Done to Test for Relationships Involving Emotional-Behavioral Difficulty during 6th Grade and Academic Performance Over Time by School

School Construct	Estimate (SE)				
	Negative Mood	Physiological Anxiety	Social Anxiety	Delinquency	Alcohol Use
Suburban					
Grades					
Intercept	-.11 (0.05) [†]	-.07 (0.04)	-.25 (0.05)**	-.02 (0.01)	.03 (0.03)
Rate of change	.05 (0.03)	.04 (0.02)	.02 (0.03)	-.01 (0.01)	.02 (0.01) [†]
Urban					
Grades					
Intercept	-.18 (0.06)*	-.17 (0.06)*	-.31 (0.07)**	-.04 (.02)	-.13 (0.08)
Rate of change	-.01 (0.05)	.04 (0.04)	.09 (0.05) [†]	-.01 (0.01)	-.13 (0.03)**

Note. Values represent parameter estimates (SE) derived from generalized estimating equations done with specification of a normal distribution and an identity link function. Parameter estimates allow for the potential influence of gender. For the high-income school, $N = 318$ students. Because of missing data, the sample for specific measures ranged from 317 students with 848 observations (Delinquency) to 315 students with 854 observations (Physiological Anxiety and Social Anxiety). For the low-income school, $N = 280$ students. Because of missing data, the sample for specific measures ranged from 280 students with 714 observations (Negative Mood) to 280 students with 712 observations (Delinquency and Cigarette Use). To balance the risk of Type I versus Type II error, only parameter estimates with p -values $< .01$ were considered statistically significant. Parameter estimates with p -values $< .05$ but $.01$ were considered nonsignificant trends in the data worthy of mention.

[†] $p < .05$;

* $p < .01$;

** $p < .001$.

TABLE 6

Results of Generalized Estimating Equations Done to Test for Relationships Involving Academic Performance during 6th Grade and Emotional-Behavioral Difficulty Over Time by School

School Construct	Estimate (SE)				
	Negative Mood	Physiological Anxiety	Social Anxiety	Delinquency	Cigarette Use Alcohol Use
Suburban					
Grades					
Intercept	-.07 (0.03) [†]	-.04 (0.03)	-.15 (0.03)**	-.10 (0.05)	-.01 (0.31)
Rate of Change	-.01 (0.02)	-.03 (0.01) [†]	-.01 (0.02)	-.01 (0.03)	-.17 (0.19)
Urban					
Grades					
Intercept	-.06 (0.02) [*]	-.04 (0.01) [*]	-.08 (0.02)**	-.06 (0.03)	-.19 (0.09) [†]
Rate of Change	-.01 (0.01)	-.01 (0.01)	-.00 (0.01)	-.00 (0.02)	.01 (0.05)
					-.08 (0.04) [†]

Note. Values represent parameter estimates (SE) derived from generalized estimating equations done with specification of a normal distribution and an identity link function. Parameter estimates allow for the potential influence of gender. For the high-income school, $N = 318$ students. Because of missing data, the sample for specific measures ranged from 317 students with 848 observations (Delinquency) to 315 students with 854 observations (Physiological Anxiety and Social Anxiety). For the low-income school, $N = 280$ students. Because of missing data, the sample for specific measures ranged from 280 students with 714 observations (Negative Mood) to 280 students with 712 observations (Delinquency and Cigarette Use). To balance the risk of Type I versus Type II error, only parameter estimates with p -values $< .01$ were considered statistically significant. Parameter estimates with p -values $< .05$ but $.01$ were considered nonsignificant trends in the data worthy of mention.

[†] $p < .05$;

^{*} $p < .01$;

^{**} $p < .001$.