

Changes in Stress and Psychological Adjustment During the Transition to High School Among Freshmen in an Accelerated Curriculum

Journal of Advanced Academics

24(3) 195–218

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DOI: 10.1177/1932202X13496090

joaa.sagepub.com



Shannon M. Suldo¹ and Elizabeth Shaunessy-Dedrick¹

Abstract

This study determined whether participation in an accelerated curriculum (specifically, the International Baccalaureate [IB] program) upon entry to high school is associated with increases in stress and/or associated with psychological problems. Data from self-report questionnaires were collected at two time points (summer after eighth grade, fall of ninth grade) from 134 freshmen entering three high schools. Results indicate that ninth-grade students in the IB program reported more perceived stress than students in general education, at levels higher than what was present before the students began high school. Despite this increase in stress, the psychological functioning (life satisfaction, psychopathology, and social anxiety) of IB students was statistically similar or superior to the mental health indicators reported by their peers in general education. The main effects of time, gender, and academic program are also discussed in the context of prior research on students' adjustment during the transition to high school.

Keywords

stress, life satisfaction, psychopathology, International Baccalaureate program, high school freshman, school transition

¹University of South Florida, Tampa, FL, USA

Corresponding Author:

Shannon M. Suldo, Department of Psychological and Social Foundations, University of South Florida, 4202 East Fowler Avenue, EDU 105, Tampa, FL 33620, USA.

Email: suldo@usf.edu

School transitions can be a tumultuous experience for some adolescents, marked by declines in mental health and school functioning (Roeser, Eccles, & Strobel, 1998). For other students, moving to a new setting is a positive experience (Barone, Aguirre-Deandreis, & Trickett, 1991; Roeser et al., 1998). Though the majority of relevant literature has focused on transitions during elementary school, from elementary to middle school, and during middle school, much less is known about the transition from middle school to high school (Benner, 2011). Students transitioning to high school face more difficult coursework, a different organizational structure, new peers, more students, and different expectations from teachers and administrators. Students who transition from middle school to an accelerated high school curriculum, such as the International Baccalaureate (IB) Diploma program, may face additional academic challenges than peers pursuing a typical high school curriculum, particularly with respect to performance expectations in multiple advanced classes, preparation for end-of-course exams, and service to the community, all of which are components of IB.

Findings from prior research of high school students in IB programs indicate these learners perceive greater stress than general education classmates (Suldo & Shaunessy-Dedrick, in press; Shaunessy, Suldo, Hardesty, & Shaffer, 2006; Suldo, Shaunessy, & Hardesty, 2008). Prior research has established that students who incur low levels of perceived stress earn higher grades and advance further in school than peers with higher levels of perceived stress (Schmeelk-Cone & Zimmerman, 2003). Conversely, students who experience stressful life events have an increased risk for poorer academic performance (Cunningham, Hurley, Foney, & Hayes, 2002) and are more likely to drop out of school (Hess & Copeland, 2001). Aside from academic challenges, perceived stress and psychopathology (including depression, suicide, and substance abuse) have been positively correlated in previous empirical research (Liu & Tein, 2005; Meadows, Brown, & Elder, 2006; Roberts, Roberts, & Chan, 2009, respectively). Similarly, stressful life events are inversely associated with positive indicators of mental health, including life satisfaction (McKnight, Huebner, & Suldo, 2002). The majority of research on associations between stress and student functioning has examined at-risk youth, with students who are high-achieving or pursuing accelerated coursework largely underexamined. Because of the elevated stress associated with participation in accelerated coursework, including IB classes (Suldo & Shaunessy-Dedrick, in press), and the aforementioned associations between stress and poor outcomes, IB students may also be at risk for deleterious social-emotional functioning. To date, there are no published empirical examinations documenting stress and mental health (e.g., general psychopathology, anxiety, life satisfaction) specific to students entering an IB program in high school. To set the stage for such a study, we describe the unique academic context of IB, including the social-emotional functioning of IB students. A review of extant literature on transition to high school for all students follows. These literatures inform expectations about the likely transition experiences, in terms of stress and psychological outcomes, of IB students relative to students in general education.

An Accelerated Curriculum: The International Baccalaureate Diploma Program

Schools have sought to increase the participation and achievement of high school students in accelerated curricular programs in response to efforts to address high school accountability, the need for more challenging high school curricula, college preparation, and increased student access to advanced coursework (Klopfenstein & Thomas, 2009). The IB program was developed in the late 1960s to provide high school juniors and seniors a comprehensive, internationally recognized program of study based on a curriculum that emphasizes content depth, metacognitive thinking, global understanding, interpersonal and communication skills, and service to the community in preparation for successful academic and workplace outcomes (International Baccalaureate Organization [IBO], 2013c). The IB philosophy considers the multidimensional nature of a well-rounded, civically minded, globally conscious learner, and aims to cultivate such student characteristics through a host of long-term (often multiyear) courses and end-of-course exams. Students are also expected to allocate considerable time outside of the classroom to community-service activities. In addition, students spend approximately 40 hr developing a 4,000-word essay for external review for which they may earn up to 3 of the required 45 points needed to attain the IB Diploma (Conner, 2009). The IB Diploma program, designed for students of ages 16 to 19, is offered in 2,401 schools worldwide, including 757 schools in the United States (IBO, 2013d). As a state-level example, IB coursework is offered at 77 Florida high schools accredited by the IBO, including 68 public high schools (IBO, 2013b). Many colleges recognize the IB Diploma and award college credits accordingly, while others award additional weight in college application decisions for IB Diploma completers or by end-of-course exam scores. For instance, at some institutions of higher learning, students who graduate from an IB Diploma program may begin college at public universities with sophomore standing (IBO, 2013a).

High schools that grant IB Diplomas often offer a Pre-IB curriculum to 9th- and 10th-grade students (Mayer, 2008), followed by the 2-year IB Diploma curriculum for 11th- and 12th-grade students. In Florida, for example, there are 27 courses designated as Pre-IB spanning all major academic areas, several foreign languages, and fine arts (Florida Department of Education, 2012). The Middle Years Program (MYP) is a recommended curriculum for preparing students for success in the IB Diploma program, though it is less widely offered than the Diploma program. In Florida, the MYP is offered in 49 public and 9 private schools (IBO, 2013b). Designed for students of ages 11 to 16, the philosophy undergirding the MYP is the development of globally aware students who think critically and engage with their communities through service. The MYP is offered in some schools as an alternative to the Pre-IB coursework. In sum, states like Florida that offer the IB Diploma often provide a 4-year IB experience; incoming freshmen who desire an IB curriculum and meet their school's IB-specific entrance requirements would participate in either Pre-IB or MYP courses until the formal IB Diploma courses begin in the 11th grade.

Social–Emotional and Classroom Context of IB

The rigorous IB entrance criteria and program requirements attract students who are highly motivated and achievement oriented (Shaunessy, Suldo, & Friedrich, 2011). The IB context is further distinguished by its cohort model, in which relatively small groups of students pursuing the same academic goal (i.e., attainment of the IB diploma) are grouped together throughout their high school years. Each cohort develops idiosyncratic norms for appropriate behavior and expectations; Conner (2009) describes this *cohort culture* as influenced by peers' actions and attitudes, and reinforced by teacher comments. Conner's research suggests that differences in IB students' levels of academic engagement are largely attributable to the cohort culture experienced by a given student; more engaged learners tend to be from cohorts with enthusiastic students who inspire by example, while disengagement in learning is rampant among students whose cohort leaders complain often and put forth minimal effort.

The unique academic and social contexts inherent to the IB program have prompted some comparative studies of mean levels of stress and social–emotional functioning of students in IB in relation to their general education peers. Case in point, prior research of 320 students (including 102 in ninth grade) in IB or general education at a single high school indicated that IB students perceived higher levels of stress (Suldo et al., 2008). Despite this elevated stress, the IB students experienced similar or superior school functioning and social–emotional wellness to their classmates in general education (Shaunessy et al., 2006). Specifically, IB students reported more positive perceptions of school climate, greater confidence in academic abilities, and exhibited behaviors that are associated with positive school outcomes, including higher grade point averages, greater school attendance, and few in-school behavioral problems. IB students from this sample also reported similar levels of life satisfaction and internalizing problems as general education peers. Furthermore, the students in general education indicated more externalizing symptoms of psychopathology, more affiliations with negative peers, and higher levels of social problems than IB students.

In a more recent cross-sectional study, Suldo and Shaunessy-Dedrick (in press) found similar results with respect to stress and mental health levels of students in general education versus accelerated curricula, albeit with a more diverse sample that included 480 9th- to 12th-grade students in one of three curricula (Advanced Placement [AP], IB, and general education) at four high schools. After controlling for between-group differences in personality and family socioeconomic status (SES), students in AP and IB had significantly higher levels of stress than their peers in general education. However, the AP and IB students did not manifest deleterious social–emotional or academic outcomes in relation to their general education peers, contrary to research that generally supports stress predicts increases in mental health problems, particularly internalizing symptoms of distress (Grant, Compas, Thurm, McMahon, & Gipson, 2004). In fact, the students in AP and IB reported comparable or greater psychological functioning compared with that reported by their peers in general education. Academic functioning, including grades and school behavior, was exceptionally high. IB students, in particular, reported high perceptions of the school climate, in line with prior

research by Matthews and Kitchen (2007), which indicated that advanced students attending programs within schools place great value on daily interactions with like-ability peers who share similar interests and academic motivation.

These cross-sectional studies establish that IB students are likely to experience more stress than typical high school students. It is unknown if those differences exist before entry to high school (for instance, IB students have elevated stress throughout youth due to parental or personal achievement pressures) or appear after introduction to the unique academic and social context of the high school IB curriculum. It is also unknown if the intact social-emotional outcomes, and superior academic functioning, evidenced by high school IB students are even better before entry to high school. For instance, it is possible that the similarities in mental health (despite differences in stress) reflect discrepant starting points, with IB students regressing to the mean. Longitudinal studies are necessary to determine whether changes in stress and mental health across time (e.g., middle to high school) are comparable across students in different curriculum groups.

Transition to High School

The period of transition from middle school to high school has long been recognized as a critical period in adolescent development (Blyth, Simmons, & Carlton-Ford, 1983). Multiple studies of high school transitions have noted academic declines experienced by freshmen (Benner & Graham, 2009; Roeser, Eccles, & Freedman-Doan, 1999). Roeser and colleagues assert that the period of transition to high school may be especially challenging given students' exposure to several new contexts simultaneously, including schools with different organizational schema; increased academic expectations associated with passing high school and earning a diploma; different relationships with high school teachers than middle school educators; larger, more complex peer networks in high schools; and social status changes in moving from the oldest cohort of learners at middle school to the youngest cohort among high school classmates (Roeser et al., 1998). These co-occurring challenges, termed "environmental stressors," can have a deleterious effect on students' mental health and school functioning. Peer relationships and academic issues account for transitioning high school students' primary sources of stress (Newman, Lohman, Newman, Myers, & Smith, 2000). Some students may also experience other stressors, such as major life events (i.e., death of a family member, parental divorce, trauma), which further increase a learner's risk for diminished emotional or academic functioning.

Some students' transition to high school may be at particularly elevated risk due to intrapersonal features (i.e., demographic and personality characteristics) or environmental circumstances related to the peer or school context. As an example of the latter, Blyth et al. (1983) posit that for students transitioning to high school, the negative effects of the transition may be diminished based on the status of the new school. For students entering such schools, their relegation to the lowest rung of the social structure is "more tolerable than if the new school is seen as merely an intermediate and less prestigious step toward adulthood" (Blyth et al., 1983, p. 106). High school feeder patterns, or

pathways, emerged as a predictor of academic outcomes in a study of 2,679 students transitioning from middle to high school (Langengcamp, 2009). Specifically, high-achieving students who entered a high school where few middle school classmates went, such as a magnet program, were at greater risk for lower grade point average than high-achieving peers who attended high schools where the majority of middle school classmates attended. Langengcamp noted that while her study controlled for residential mobility and family structure changes, other stressors, such as cumulative stress, which were not addressed through the study, might also explain students' academic declines in the first year of high school. Another example of a school context predictor pertains to the grade levels included at each school level. Case in point, Blyth et al. (1983) found that girls who attended K-8 schools had higher self-esteem following transition to high school than girls who had attended K-5 and a middle school—thus experiencing two school changes. Students' selection of friendship circles also appears to contribute to adjustment during transitions, as evidenced by longitudinal research documenting that when students enter a new school, they tend to make friends with students who have similar levels of depression (Goodwin, Mrug, Borch, & Cillessen, 2012). Although selection of friends with more depressive symptom was associated with a contagion effect during middle school, this effect was not found significant in high school, indicating that older students may be less susceptible to peer influence (Goodwin et al., 2012).

Intrapersonal factors that place students at greater risk for experiencing adjustment problems during transitions include high levels of valuing social relationships (Blyth et al., 1983), achievement orientation (Little & Garber, 2004), and self-criticism (Leadbeater, Blatt, & Quinlan, 1995). In keeping with earlier work suggesting that girls may experience greater transitional difficulties than boys (Simmons, Rosenberg, & Rosenberg, 1973), Little and Garber's (2004) study of 129 transitioning high school students indicated that girls with particularly high interpersonal orientation were more likely to experience stressors related to peers, and these stressors were associated with depressive symptoms.

The role of gender in determining which students may appear at risk on entry to high school should be considered in the context of gender differences in adolescent stress and mental health throughout youth; this literature indicates mixed findings and age effects. Some studies suggest girls may have more deleterious developmental trajectories in adolescence, with higher levels of depression (Hankin et al., 1998), somatic complaints coupled with emotional distress (Chung, Elias, & Schneider, 1998), and perceived stress (Wiklund, Malmgren-Olsson, Öhman, Bergström, & Fjellman-Wiklund, 2012). Other research has found girls experience greater symptoms of depression in middle school (seventh and eighth grade) but not high school (Goodwin et al., 2012; Wiklund et al., 2012). De Wit, Karioja, Rye, and Shain (2011) surveyed 2,616 freshmen at three time points (fall and spring ninth grade, fall tenth grade) and found that although boys experienced more favorable mental health (higher self-esteem, lower depression) than girls at the beginning of ninth grade, these gender differences had narrowed by tenth grade. The combined sample indicated declines in

boys' and girls' self-esteem (along with declines in connectedness to teachers and peers), and increases in students' levels of depression and social anxiety.

De Wit and colleagues (2011) also found that while greater social support from peers and teachers was associated with better self-esteem and less depression, results were mixed with regard to predictors of social anxiety. Declines in classmate support co-occurred with increases in social anxiety as expected, but students who reported higher classmate support at the beginning of high school were the most likely to incur increases in social anxiety over the next year. Furthermore, greater perceptions of teacher support at the start of high school co-occurred with elevated social anxiety. The researchers interpreted this unexpected finding to suggest that "having supportive classmates and teachers fosters a heightened sense of awareness of personal fears because of what students perceive to be attention to their individual feelings and needs" (p. 567). Given that IB students may experience closer relationships with teachers and classmates, they may be at particular at risk for elevations in social anxiety relative to students in general education. This notion is currently untested, in line with the paucity of research addressing the specific experiences of students entering high school programs dedicated to preparing ninth-grade students for college-level courses. While there has been an increase of research related to the social-emotional functioning of students in IB programs (Suldo & Shaunessy-Dedrick, *in press*; Shaunessy et al., 2006; Suldo et al., 2008; Suldo, Shaunessy, Thalji, Michalowski, & Shaffer, 2009), no published studies have yet examined these students prior to their entry in IB coursework.

Purpose of the Current Study

The current study examined the pre-existing levels of stress, mental health problems, and psychological wellness (i.e., life satisfaction) of students who matriculate into high school through an IB-track program of study or general education curricula. In light of prior research establishing that high school students in college-level courses such as IB perceive greater stress (Suldo & Shaunessy-Dedrick, *in press*; Suldo et al., 2008), we attempted to determine whether students who enter IB programs start with higher stress in comparison with their incoming ninth-grade peers pursuing general education curricula (i.e., stress is present at baseline), or if instead, the elevated stress may be associated with participation in the curriculum. Therefore, we assessed a subset of incoming freshmen prior to entry, and a semester into, their respective curriculum.

Students' social-emotional functioning was assessed via multiple indicators of psychopathology and subjective well-being, consistent with current conceptualizations of complete mental health (Suldo & Shaffer, 2008). Regarding psychopathology, we examined levels of general internalizing and externalizing symptoms. We also administered a narrowband measure of anxiety in line with research that demonstrates elevated symptoms of anxiety in adolescents often co-occur with stress associated with academic demands (e.g., stress related to school performance, attendance, interactions with teachers; Byrne, Davenport, & Mazanov, 2007). We examined a particular form of anxiety (i.e., social concerns) in light of De Wit and colleagues' (2011) finding that students who experience elevated support from classmates and teachers (as may be the

Table 1. Demographic Characteristics of Participants by School and Curriculum Group.

Variable	School A				School B		School C				Total	
	GE		IB		IB		IB		Total IB		sample	
	(n = 22)		(n = 45)		(n = 34)		(n = 33)		(N = 112)		(N = 134)	
	n	%	n	%	n	%	n	%	n	%	n	%
Gender												
Male	6	27.27	20	44.44	15	45.45	9	26.47	44	39.29	50	37.31
Female	16	72.73	25	55.56	18	54.55	25	73.53	68	60.71	84	62.69
Ethnicity												
African American	5	22.73	3	6.67	7	21.21	1	2.94	11	9.82	16	11.94
Asian			2	4.44	3	9.09			5	4.46	5	3.73
Hispanic/Latino	4	18.18	3	6.67	4	12.12	4	11.76	11	9.82	15	11.19
Multiracial	2	9.09	3	6.67	2	6.06			5	4.46	7	5.22
Other	1	4.55					2	5.88	2	1.79	3	2.24
Native American							1	2.94	1	.89	1	.75
White	10	45.45	34	75.56	17	51.52	26	76.47	77	68.75	87	64.93
Socioeconomic status ^a												
FRL	11	50	9	20	3	9.09	6	18.18	18	16.22	29	21.80
No FRL	11	50	36	80	30	90.91	27	81.82	93	83.78	104	78.20

Note. GE = General Education. IB = International Baccalaureate.
^aFRL represents qualifying for Free or Reduced-Price school meals.

case in the IB program) are at risk for elevations on social anxiety. Regarding well-being, we examined students’ global life satisfaction, an indicator of wellness and a key construct within positive psychology (Proctor, Linley, & Maltby, 2009).

Method

Participants

A total of 134 students from three public high schools in a southeastern state participated. Schools A and B were regular education high schools (in a medium-size city and a rural community, respectively) with IB programs offered to a subset of students in a school-within-a-school model. School C was a magnet school (in a metropolitan area) with an IB program and three other rigorous curricula (i.e., math/science/engineering, computer science, and interdisciplinary studies). Most participants were from School A: 45 students entered the IB program, and a comparison sample of 22 peers entered the education program. Only students entering IB participated from School B (*n* = 34) and School C (*n* = 33).

At the time of the initial summer data collection, participants were ages 13 to 15 (*M* = 14.43, *SD* = .42). Average age increased to 14.82 (*SD* = .42) during the fall follow-up data collection. Demographic features for the combined sample, by curriculum group, and by school are presented in Table 1. A series of chi-square analyses

indicated that the IB and general education groups were statistically similar with regard to gender, $\chi^2(df=1) = 1.13, p = .29, V = -.09$, and proportion of students identifying as African American, Hispanic, and White, $\chi^2(df=2) = 5.32, p = .07, V = .21$. However, there was a greater proportion of students with low SES (i.e., eligible for free or reduced-price school lunch) in the general education group, $\chi^2(df=1) = 12.29, p < .001, V = .30$.

Measures

Perceived Stress Scale (PSS). The complete PSS (Cohen, Kamarck, & Mermelstein, 1983) is a 14-item measure of perceived global stress. Given our interest in defining stress in line with the psychological model's conceptualization, we administered a 6-item version of the PSS that consists of the negatively worded items that reflect perceived distress, specifically capturing "overall feelings of general distress stemming from perceptions of overwhelming and uncontrollable life circumstances" (Lavoie & Douglas, 2012). Using a 5-point scale ranging from 1 (*never*) to 5 (*very often*), respondents indicated how many times in the last month that they had, for example, "found that you could not cope with all the things that you had to do," and "felt nervous and 'stressed'" (p. 54). In prior research with high school students, the 6-item PSS demonstrated strong internal consistency ($\alpha = .91$) and convergent validity through large correlations with indicators of students' mental health (Suldo et al., 2008). In the current study, $\alpha = .89$ at Time 1 and Time 2.

Student Life Satisfaction Scale (SLSS). Global life satisfaction was selected to represent students' positive mental health, specifically their overall subjective well-being. On the SLSS (Huebner, 1991), students indicate their agreement with seven items (e.g., My life is going well, I have a good life) using a 6-point scale from 1 (*strongly disagree*) to 6 (*strongly agree*). After reverse-scoring two items, higher mean scores represent greater life satisfaction. Good internal consistency has been obtained in prior research of high school students that included youth from an IB program ($\alpha = .88$; Suldo et al., 2008). Huebner (1991) reports high test-retest reliability (.74 after 1 to 2 weeks) and support for convergent validity via strong associations ($r > .50$) with multiple other self-report measures of youth subjective well-being. In the current study, $\alpha = .85$ and .91 at Time 1 and Time 2, respectively.

Youth Self-Report (YSR) of the Achenbach System of Empirically Based Assessment. The YSR (Achenbach & Rescorla, 2001) is a 112-item self-report measure of multiple types of psychopathology developed for use with youth ages 11 to 18. In the current study, the 31- and 32-item composites for internalizing problems (comprised all items in the Anxious/Depressed, Somatic Complaints, Withdrawn/Depressed subscales) and externalizing problems (comprised all items in the Aggressive Behavior and Rule-Breaking Behavior subscales), respectively, were analyzed. Reliability and validity of the YSR are well established (see Achenbach & Rescorla, 2001). In the current study, $\alpha = .87$ and .86 (Time 1) and .91 and .89 (Time 2) for internalizing and externalizing, respectively.

Multidimensional Anxiety Scale for Children (MASC). The MASC (March, Parker, Sullivan, Stallings, & Conners, 1997) is a 39-item self-report measure of anxiety symptoms developed for use with youth ages 8 to 18. Students rate the degree to which they experience each problem, ranging from 0 (*never true about me*) to 3 (*often true about me*). The MASC yields a Total Anxiety Scale score that sums symptoms endorsed across four scales: Social Anxiety, Physical Symptoms, Harm Avoidance, and Separation Anxiety. In line with the focus of the current study, we analyzed the 9-item Social Anxiety Scale, which reflects fears about humiliation/rejection (e.g., worry about being viewed negatively by peers) and performance (e.g., feeling shy, becoming nervous before/during public performances). The manual provides strong support for the internal consistency and test–retest reliability of the Social Anxiety Scale ($\alpha = .83$ to $.84$ among 12- to 15-year-olds; $r = .83$ across a 3-month interval). Regarding convergent and divergent validity, among a large sample of adolescents ages 12 to 18, the Social Anxiety Scale yielded stronger correlations with scales assessing similar constructs (i.e., Social Phobia and Worry/Oversensitivity) from other well-established narrowband measures of anxiety ($r = .70$ to $.72$) than with depression ($r = .59$; Muris, Merckelbach, Ollendick, King, & Bogie, 2002). In the current study, $\alpha = .86$ and $.88$ at Time 1 and Time 2, respectively, for social anxiety.

Procedures

Permission to conduct this study was received from the Division of Research Integrity and Compliance at the authors' university, as well as from Departments of Assessment and Research of the three participating school districts. Participants were drawn from a larger study of the school and social–emotional functioning of 480 students in Grades 9 to 12, which examined the functioning of students approximately midway through the academic school year (see Suldo & Shaunessy-Dedrick, in press). Whereas the aforementioned study presents a cross-sectional snapshot of students' functioning, the current manuscript conveys results from an earlier phase of the project that involved baseline assessment of the stress and psychological functioning of a subset of incoming freshmen prior to commencing high school. Specifically, 134 of the IB and general education students participated in data collection the summer prior to their freshman year in an effort to assess changes that occur in students' stress and mental health over time during their transition to high school.

To recruit incoming freshmen for the two-wave study, the university researchers described the study to parents and students during high school orientation meetings held during the summer, and requested written parent permission for student participation in the two waves of the project. Students with consent and assent to participate were immediately administered a battery of baseline measures (specifically, the PSS, YSR, SLSS, and MASC). Because attendance was not taken at these school-sponsored orientation meetings, the response rate of participation is unknown; thus, the subsample of students should be considered a convenience sample of youth entering high school. Shortly before the winter break (toward the end of the fall semester), students were called in large groups to a private location (e.g., auditorium, cafeteria) and completed the measures again. At both time points, to guard against order effects and

maintain confidential completion of measures, survey packets were varied by the order in which measures were presented. Students sitting near one another were provided different versions of the packet. Trained research assistants were on hand to answer student questions and to check completed packets for errors and inadvertently skipped questions.

Overview of Analysis Plan

All analyses were conducted using SAS version 9.2. To maximize power during examinations of outcomes associated with membership in a particular curriculum group, we planned to collapse IB participants from the three schools into a single IB group ($N = 112$), to be compared with the general education group ($N = 22$) for all statistical tests, but only in the event that preliminary analyses indicated that levels of student adjustment across time were statistically similar between the three IB samples. To further assess similarity of trends between IB students entering different schools, the figures that depict mean levels of outcomes over time by curriculum group break out the combined IB sample into the three school subsamples.

Demographic variables associated with differences in (a) proportions of students in the curriculum group and (b) mean levels of an outcome were included as between-group factors in mixed-model analyses of variance (ANOVA) analyses for the given outcome. These mixed-model ANOVAs specified curriculum group as the between-subjects factor, time of assessment as the repeated measures (within-subjects) factor, and continuous demographic variables (i.e., SES) as a covariate when indicated. The repeated-measure design permitted us to determine whether membership in one of the two curriculum groups was related to changes in perceived stress and/or psychological outcomes (i.e., global life satisfaction, composite externalizing psychopathology, composite internalizing psychopathology, social anxiety) between Time 1 (summer) and Time 2 (fall). Significant Curriculum Group \times Time interactions indicated student change on a given outcome differed as a function of the curriculum group, after controlling for covariates. Interpretation of significant interaction terms was facilitated by graphing group means on the outcome and examining pairwise comparisons of mean slope for each group.

The main effects were examined to detect for overall differences between curriculum groups (collapsed across time points), or between time points (collapsed across curriculum groups). To determine whether curriculum groups differed on stress or psychological functioning at baseline or end of the first semester, pairwise comparisons of adjusted group means at Time 1 and Time 2 were conducted, which controlled for between-group differences in indicated covariates. Alpha was set at .05 to determine statistical significance for a given analysis.

Results

Preliminary Analyses

We examined for any relationships between student demographic characteristics (SES, gender, ethnicity) and outcomes. A composite SES variable was created by

summing three standardized indicators: eligible for free or reduced-price school lunch (reverse-scored), highest educational level completed by mother, and highest educational level completed by father. SES was unrelated ($p > .05$) to perceived stress and externalizing symptoms at either time point, and unrelated to social anxiety and internalizing symptoms at Time 2. SES was associated with slightly higher levels of global life satisfaction ($r = .23$ and $.18$ at Times 1 and 2, respectively), reduced internalizing symptoms at Time 1 ($r = -.19$), and reduced social anxiety at Time 1 ($r = -.22$). Because of the aforementioned curriculum group differences in an indicator of SES (i.e., free/reduced-price school lunch), any main effects of curriculum group on life satisfaction, or initial symptoms of general internalizing distress or social anxiety, may be in part influenced by group differences in SES.

With regard to gender differences, girls reported more stress at Times 1 and 2, $t(132) = -3.00, p = .003, d = .54$ and $t(132) = -2.68, p = .008, d = .48$, respectively; lower life satisfaction at Time 1, $t(132) = 3.32, p = .001, d = .59$; more internalizing symptoms at Times 1 and 2, $t(132) = -4.27, p < .001, d = .76$ and $t(131) = -4.00, p < .001, d = .72$, respectively; and more social anxiety symptoms at Times 1 and 2, $t(132) = -3.13, p = .002, d = .56$ and $t(132) = -3.46, p < .001, d = .62$, respectively. No mean differences between gender were found on externalizing symptoms at Times 1 or 2, $t(132) = -1.27, p = .21, d = .23$ and $t(132) = -0.97, p = .33, d = .17$, respectively; or global life satisfaction at Time 2, $t(132) = 1.54, p = .13, d = .28$. Because curriculum group samples were statistically similar in terms of gender composition, any effects of curriculum group on outcomes are unlikely to be influenced by these gender differences.

Group differences in outcomes by race/ethnicity were limited to the three ethnic groups with sample sizes more than 10 (African American, $n = 16$; Hispanic, $n = 15$; White, $n = 87$); data from students identifying as American Indian ($n = 1$), Asian ($n = 5$), multiracial ($n = 7$), and other race ($n = 3$) were omitted from these analyses. The three ethnic groups did not differ on perceived stress at either Time 1, $F(2, 115) = 1.81, p = .17, \eta^2 = .03$ or Time 2, $F(2, 115) = 2.25, p = .11, \eta^2 = .04$; global life satisfaction at Time 1, $F(2, 115) = 0.19, p = .83, \eta^2 = .003$ or Time 2, $F(2, 115) = 1.52, p = .22, \eta^2 = .03$; internalizing symptoms at Time 1, $F(2, 115) = 2.51, p = .09, \eta^2 = .04$ or Time 2, $F(2, 114) = 0.64, p = .53, \eta^2 = .01$; externalizing symptoms at Time 1, $F(2, 115) = 2.89, p = .06, \eta^2 = .05$ or Time 2, $F(2, 115) = 2.07, p = .13, \eta^2 = .03$; or social anxiety symptoms at Time 1, $F(2, 115) = 0.54, p = .58, \eta^2 = .009$ or Time 2, $F(2, 115) = 0.13, p = .87, \eta^2 = .002$. Because curriculum group samples were statistically similar in terms of representation of students from different ethnic groups, and no outcomes evidenced mean differences as a function of ethnic group, any effects of curriculum group on outcomes are unlikely to be influenced by student ethnicity/race.

We ran exploratory analyses to determine whether IB students from different schools experienced similar trends in terms of stress and psychological adjustment across time. Only the 112 IB students were included in this series of mixed-model ANOVAs, which specified school as the between-subjects factor, time of assessment as the repeated measures factor, and SES as a covariate for the outcomes identified above (life satisfaction, internalizing psychopathology, and social anxiety). The

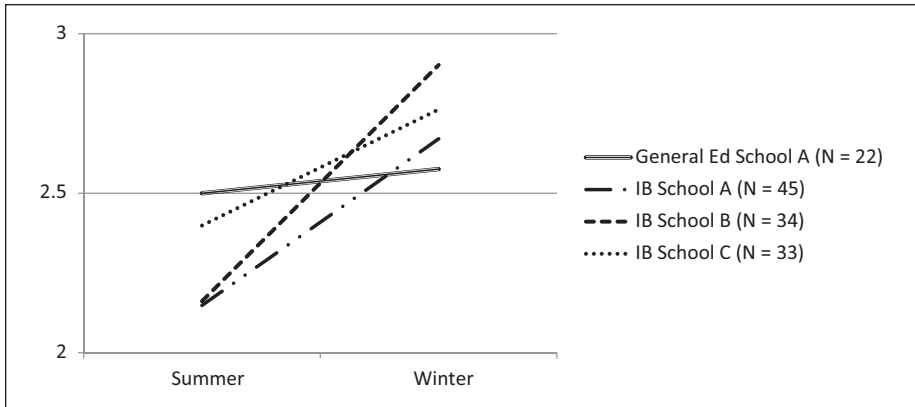


Figure 1. Change in mean perceived stress across time by the school and curriculum group.

School \times Time Interaction was not significant for perceived stress, $F(2, 109) = 1.80$, $p = .17$; life satisfaction, $F(2, 108) = 0.02$, $p = .98$; internalizing psychopathology, $F(2, 107) = 1.72$, $p = .18$; externalizing psychopathology, $F(2, 109) = 0.78$, $p = .46$; or social anxiety, $F(2, 108) = 0.40$, $p = .67$. These findings provide empirical support for the equivalence of groups of IB students entering different schools in terms of adjustment across the transition. Thus, the IB students from all three schools were combined into a single IB group for subsequent statistical analyses.

Curriculum Group Differences in Perceived Stress Across Time

Results were analyzed with a mixed-model ANOVA with repeated measures on one factor; no covariates were included because no demographic variables were associated with differences in curriculum group and perceived stress. The Curriculum Group \times Time Interaction was significant, $F(1, 132) = 4.99$, $p = .03$, $d^1 = .49$. Specifically, the perceived stress scores of students in the IB group (slope = .54) increased at a significantly faster rate ($p = .03$) than the general education group (slope = .08). Figure 1 depicts mean levels of perceived stress over time, and breaks out the IB sample into the three schools from which students were drawn. Visual examination of subgroup means illustrate how the increase in stress incurred by IB students was similar across schools.

The main effect for time was also statistically significant, $F(1, 132) = 8.76$, $p = .004$, $d^2 = .32$ but not the main effect of group (IB vs. general education), $F(1, 132) = 0.04$, $p = .84$, $d^3 = .04$. As depicted in Figure 1, the effect of time reflects increases in perceived stress from baseline/summer (Time 1) to fall (Time 2), although as aforementioned, this effect is driven by the increases in the IB group. The mean perceived stress scores by the curriculum group at each time point are included in Table 2. Although the mean differences between IB and general education students were not

Table 2. Mean Levels of Stress and Psychological Functioning by Time and Group.

Outcome	Time 1 (summer)				Time 2 (late fall)			
	IB		GE		IB		GE	
	M	SD	M	SD	M	SD	M	SD
Stress	2.23	.90	2.50	1.20	2.77	1.00	2.57	.86
Life satisfaction	4.69 (4.68)	.86	4.00 (4.10)	.81	4.43 (4.42)	.98	3.81 (3.90)	1.19
Internalizing	9.11 (9.33)	6.82	12.77 (12.04)	7.99	11.55 (11.64)	9.37	12.27 (11.80)	8.00
Externalizing	8.18	5.72	11.77	7.39	9.94	7.43	13.95	8.48
Social anxiety	10.21 (10.42)	6.03	11.86 (10.80)	7.29	9.73 (9.80)	6.38	9.00 (8.65)	5.80

Note. Adjusted means presented in parentheses for those outcomes affected by covariate SES. GE = General Education. IB = International Baccalaureate.

significantly different at Time 1 ($p = .22$) or Time 2 ($p = .40$), the absolute value of the direction of the differences (IB students had lower mean perceived stress at Time 1 but higher mean perceived stress at Time 2) drove the aforementioned significant group by time interaction.

Curriculum Group Differences in Psychological Outcomes Across Time

Life satisfaction. Results were analyzed with mixed-model ANOVA, with repeated measures on one factor, and the composite SES variable entered as a covariate. The Group \times Time Interaction was not significant, $F(1, 131) = 0.11, p = .74, d^1 = .07$. Specifically, the slope of the life satisfaction scores for the general education group (slope = $-.20$) was not significantly different ($p = .74$) from the IB group (slope = $-.26$). However, this analysis revealed significant main effects for group (IB vs. general education), $F(1, 131) = 6.38, p = .01, d^3 = .64$ and time, $F(1, 131) = 6.90, p = .01, d^2 = .27$. As depicted in Figure 2, unadjusted life satisfaction scores mid-freshman year (fall; Time 2) were significantly lower than the scores observed at baseline (summer; Time 1), and life satisfaction was highest among the IB students throughout the study. As shown in Table 2, IB and general education students had significantly different levels of life satisfaction (adjusted means) at Time 1 ($p = .01$) and Time 2 ($p = .045$).

Internalizing psychopathology. Results were analyzed with a mixed-model ANOVA with repeated measures on one factor, and the composite SES variable entered as a covariate. The Group \times Time Interaction was not significant, $F(1, 130) = 2.32, p = .13, d^1 = .36$. There were also no significant main effects for group (IB vs. general education), $F(1, 130) = 0.60, p = .44, d^3 = .20$, or time, $F(1, 130) = 1.64, p = .20, d^2 = .15$. As depicted by the unadjusted means presented in Figure 3, the possible influence of the curriculum group on internalizing symptoms is negligible. Specifically, the slope of the internalizing symptoms for the general education students (slope = $-.24$) was

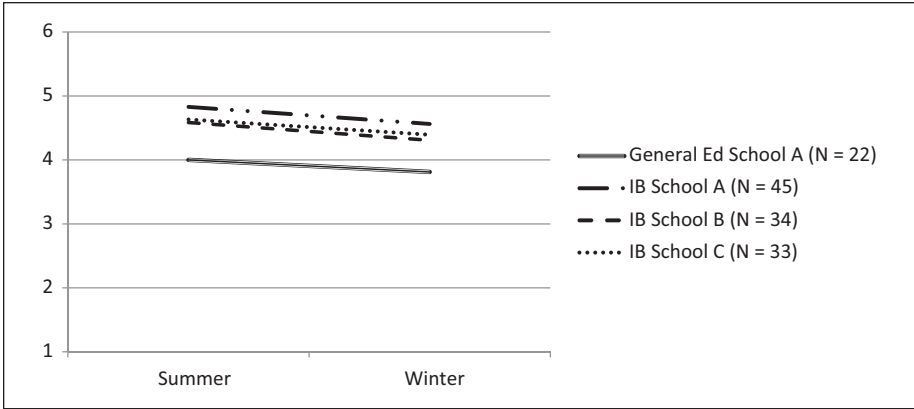


Figure 2. Change in mean global life satisfaction across time by the school and curriculum group.

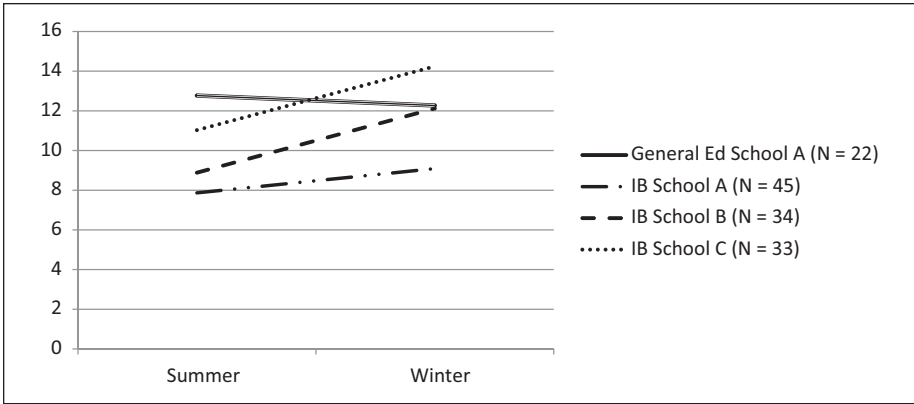


Figure 3. Change in mean internalizing psychopathology across time by the school and curriculum group.

not significantly different ($p = .13$) from the IB group (slope = 2.31). As shown in Table 2, IB and general education students had statistically similar levels of internalizing symptoms (adjusted means) at Time 1 ($p = .12$) and Time 2 ($p = .94$).

Externalizing psychopathology. Results were analyzed with a mixed-model ANOVA with repeated measures on one factor; no covariates were included because no demographic variables were associated with differences in curriculum group and externalizing symptoms. The Group \times Time Interaction was not significant, $F(1, 132) = 0.10$, $p = .75$, $d^1 = .07$. Specifically, the slope of the externalizing symptoms for the general education students (slope = 2.18) was not significantly different ($p = .75$) from the IB group (slope = 1.76). However, this analysis indicated significant main effects for group (IB vs. general education), $F(1, 132) = 6.80$, $p = .01$, $d^3 = .63$, and time,

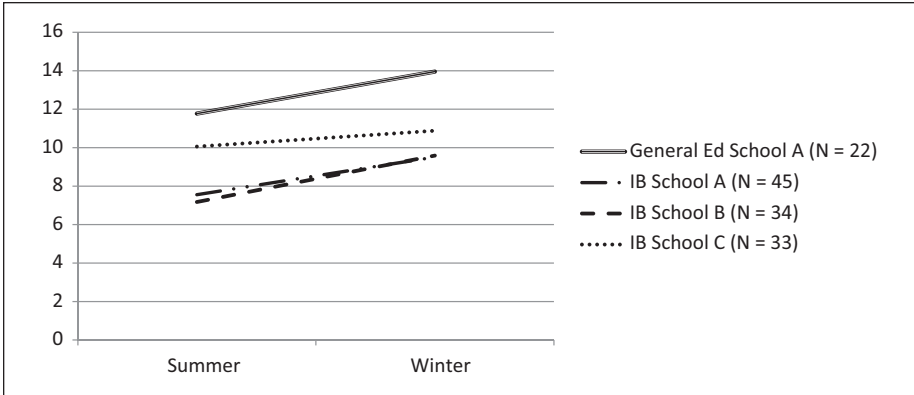


Figure 4. Change in mean externalizing psychopathology across time by the school and curriculum group.

$F(1, 132) = 9.07, p = .003, d^2 = .33$. As depicted in Figure 4, externalizing symptoms of psychopathology mid-freshman year (fall; Time 2) were significantly higher than the levels observed at baseline (summer; Time 1), and externalizing symptoms were highest among the general education students throughout the study. As shown in Table 2, general education students had higher mean levels of externalizing symptoms at Time 1 ($p = .01$) and Time 2 ($p = .03$).

Social anxiety. Results were analyzed with mixed-model ANOVA, with repeated measures on one factor, and the composite SES variable entered as a covariate. The Group \times Time Interaction was not significant, $F(1, 131) = 1.85, p = .18, d^1 = .24$. Although analysis of the unadjusted means indicated that the social anxiety levels of students in the IB group (slope = -2.48) declined at a slower rate ($p = .03$) than the general education group (slope = -2.86), the possible influence of curriculum group on social anxiety was not significant after considering the influence of SES on symptoms. The main effect of group (IB vs. general education) was not significant, $F(1, 131) = 0.07, p = .79, d^3 = .06$. As shown in Table 2, IB and general education students had statistically similar levels of social anxiety symptoms (adjusted means) at Time 1 ($p = .81$) and Time 2 ($p = .46$). A significant effect was revealed for the main effect of time, $F(1, 131) = 6.33, p = .01, d^2 = .22$. As depicted by the unadjusted means presented in Figure 5, all subgroups of students tended to incur some level of decline in symptoms of social anxiety; the adjusted means suggest students in the two curriculum groups changed at a relatively consistent rate after controlling for the effect of SES.

Discussion

Previous research with high school students in IB and general education programs found that combined samples of IB students in 9th through 12th grades perceived

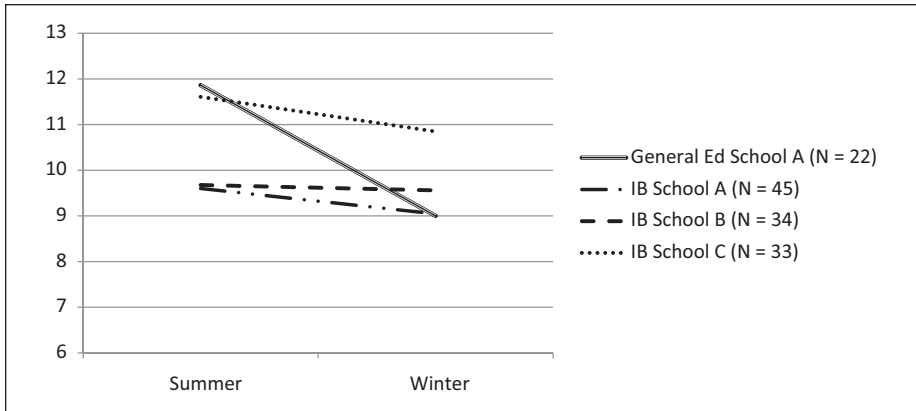


Figure 5. Change in mean social anxiety across time by the school and curriculum group.

significantly higher levels of general stress than their peers in general education (Suldo & Shaunessy-Dedrick, in press; Suldo et al., 2008). Results of the current study confirm this elevated stress is apparent as early as ninth grade, and provide preliminary evidence that stress among IB students is higher than what is present before they begin high school. The similarity in the trend lines obtained from three separate samples of IB students, from three different schools, suggests that IB students' stress is likely to increase whether entering a typical public high school or magnet school for high-achieving students. In contrast, the perceived stress of the sample of freshmen in general education indicated a stable pattern from summer before high school to midyear. Our analytic strategy that considers potential covariates enhances confidence that the increases in IB students' stress are attributable to differences in the academic context, as opposed to being due to student demographic factors like family SES.

Findings in the current study suggest the stress of participating in an accelerated academic program neither diminishes students' life satisfaction nor induces psychopathology. The analysis of students prior to entry into their high school curriculum demonstrated that despite increases in stress, the psychological functioning of students in the IB program did not deteriorate relative to their peers in general education during the same time period (i.e., summer to late fall of freshman year). Furthermore, IB freshmen in the current study evidenced superior mental health on some indicators, including greater life satisfaction and fewer symptoms of externalizing distress at both time points. These results corroborate prior findings from cross-sectional studies that included students in 9th- through 12th-grade levels; those comparisons indicated that IB students exhibited relatively fewer externalizing symptoms of psychopathology (Shaunessy et al., 2006) and received fewer discipline referrals for violations of school rules (Suldo & Shaunessy-Dedrick, in press; Shaunessy et al., 2006). In contrast, those studies did not detect differences in global life satisfaction between students in different curricula, suggesting elevations in life satisfaction may be unique to younger IB students. IB and general education students in the current study experienced similar

levels of internalizing distress at both time points, further illustrating that the increased stress experienced by IB students was not immediately manifested in elevated anxious, depressive, and/or somatic symptoms of psychopathology.

In sum, the primary analyses in the current study found no significant changes in mental health outcomes (global life satisfaction, composite externalizing psychopathology, composite internalizing psychopathology, social anxiety) between curriculum groups, after considering demographic differences in the groups. Thus, despite the increased stress, students in the IB program did not develop more symptoms of emotional distress than their peers in general education during the transition to high school and instead evidenced quite positive psychosocial adjustment. These findings suggest that either IB students have unique resources that allow them to experience academic stress without manifesting compromised emotional functioning, or other positive features of the accelerated curricula serve to facilitate wellness and offset the potential negative impact of stress.

Examinations of main effects of analyses provide insight into change and stability in mental health during the transition to high school. Students in both curriculum groups experienced declines in life satisfaction and increases in externalizing symptoms from summer to mid-freshmen year. These results are consistent with other research documenting linear declines in life satisfaction during the secondary school years, particularly between students in early and middle adolescence (Suldo & Huebner, 2004) and ages 13 and 14 (Goldbeck, Schmitz, Besier, Herschbach, & Henrich, 2007). Similarly, prior studies have documented increases in externalizing problems, such as alcohol use (Jackson & Schulenberg, 2013) and misbehavior at school (Witherspoon & Ennett, 2011), during the development period marking a transition to high school. Students in the current sample did not incur significant increases in internalizing psychopathology, similar to other research that found stability in depressive symptoms from 8th to 9th grade (Goodwin et al., 2012), in contrast to increases in internalizing distress between 9th and 10th grades (De Wit et al., 2011; Goodwin et al., 2012).

In terms of positive changes observed after entry to high school, the levels of social anxiety decreased across time in the current sample. These findings are consistent with research that identified declines in boys' social anxiety following the transition to middle school (Grills-Tauechel, Norton, & Ollendick, 2010), but contrast research that found a significant increase in social anxiety between the spring of 8th grade and fall of 9th grade, followed by a trend for a small but steady decline at subsequent time points in 9th and 10th grades (Benner & Graham, 2009). Discrepant findings may be attributable to differences in sample features, as Benner and Graham followed a large, ethnically diverse sample (e.g., 46% Latino, 21% African American) of students moving from middle to high schools that served low income/working class neighborhoods, while our sample includes predominantly Caucasian students of average to high SES (as indicated by free/reduced-price lunch status). Conversely, it may be the case that anticipation of a new peer group facilitates symptoms of social anxiety for a brief period (for instance, elevations may be most apparent at the start of the school year), but social anxiety decreases as students acclimate to their new social environment.

Future studies that assess students' mental health at multiple intervals before and after transitions would help shed light on such phenomena. Trends in our data suggested that IB students' social anxiety declined at a slower rate than students in general education, but some of these differences are attributable to between-group differences in SES. After statistically controlling for the finding that students with lower family SES (as indicated by school lunch status and parent education level) tended to experience more social anxiety, the small sample sizes did not permit for detection of significant differences in rates of change between the two curriculum groups. Future research with larger samples and thus more power may yield different findings, given prior research finding elevated symptoms of anxiety in adolescents with increased stress (Byrne et al., 2007; O'Connor, Rasmussen, & Hawton, 2010; Schmeelk-Cone & Zimmerman, 2003).

Preliminary analyses in the current study underscored that girls experience greater stress and more internalizing symptoms of mental health problems before and after the transition to high school. These findings are consistent with prior research on gender differences in perceived stress (Wiklund et al., 2012) and internalizing forms of psychopathology (Chung et al., 1998; Hankin et al., 1998), particularly in early ninth grade (De Wit et al., 2011). Incoming freshmen girls may be appropriate candidates for preventative interventions targeting stress management and coping skills, although gender differences may resolve naturally over time (De Wit et al., 2011). Notably, girls in the current study did not appear more at risk of manifesting externalizing symptoms of mental health problems or diminished life satisfaction on entry to high school, consistent with other research finding no significant differences between boys' and girls' global life satisfaction at ages 13 and 14 (Goldbeck et al., 2007).

Limitations and Future Directions

The current study adds to the growing body of research regarding the psychosocial adjustment of students in academically rigorous curricula. Findings warrant replication due to several reasons. First, generalizability of results from the current study is restricted due to limitations of the sample, which is essentially a convenience sample of high school students residing in the southeastern United States. Although the current study did not indicate differences in stress or mental health as a function of student ethnicity/race, it is possible that trajectories and predictors of change are different for some subgroups. Furthermore, due to methodological limitations, participation rates and the representativeness of the sample are unknown for each school. Replication of the current study using a more representative sample of youth obtained using more stringent sampling techniques would enhance confidence in the preliminary findings and conclusions from this study.

Second, the comparison sample of students in general education was less than ideal in terms of size and school diversity. The small sample size necessitated rather large differences in group means to achieve confidence in the reliability of the differences. It is possible that the relatively small sample of general education students that selected to participate is unique in some unknown way (e.g., higher academic motivation and

more parental involvement in school). In future investigations, researchers should consider additional recruitment strategies to increase participation from students in general education. Although locating incoming freshmen in the time prior to high school poses logistic challenges, future studies that include large samples of students entering general education in multiple schools would help enhance confidence in findings obtained from the current preliminary sample of freshmen in general education at one public high school.

Third, this first across-time comparison of IB students' stress and mental health is limited to two time points. Additional research with multiple waves of data collection (e.g., middle school through senior year) may help strengthen or refute conclusions of the current study. Though costly, such future research is necessary to disentangle the relationship between time (i.e., exposure and adjustment to the new educational context) and psychological adjustment in students participating in accelerated curricula during secondary school.

Conclusion

Implications of findings from this study pertain to educational policy relevant to academic programming in schools. First, the current study adds to the growing body of research that supports the notion that participation in accelerated curriculum during high school is not harmful with respect to students' psychological outcomes. Despite experiencing more academic demands and greater stress, the emotional functioning of IB students appears commensurate to that of general education students. Furthermore, because measures of subjective well-being were included in the current study, educators can have more confidence asserting that stress experienced through participating in an accelerated program is not associated with diminished psychological wellness. Actually, findings from the current study further support the notion that participation in an accelerated program is associated with superior mental health on some indicators, including life satisfaction and externalizing psychopathology, even after the potential role of family SES is considered. Taken together, these results suggest that participation in accelerated curricula like IB co-occurs with multiple positive outcomes for freshmen.

Beyond the results specific to differences between IB and general education students, main effects of time and gender identified in the current study confirmed that the transition from middle to high school is often associated with diminished life satisfaction and increased symptoms of some forms of psychopathology (specifically, externalizing behaviors), and that freshmen girls may perceive more stress and experience more mental health problems than boys. Eccles and Roeser assert that school transitions are not accompanied by psychological distress for all students; rather, students can thrive on entry to schools that provide a supportive context and/or are appropriately matched to students' needs (Eccles & Roeser, 2009). Case in point, Salmela-Aro and Tuominen-Soini (2010) documented *increases* in Finnish adolescents' life satisfaction after a transition from general, compulsory education that ends after 9th grade (around age 16) to subsequent elective education in either an academic or vocational track. Future research should focus on identifying how to best facilitate

positive adjustment for all students during their transition to curricula suited to their goals and skills, and track how the unique demands and instructional features of accelerated programs in particular affect students across time.

Acknowledgment

The authors would like to gratefully acknowledge the technical assistance of their colleague Dr. John Ferron who provided guidance regarding the analytic approach used in this study.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported, in part, by the University of South Florida Research Office through the New Researcher Grant Program under Grant Number RO52778 that was awarded to the first author.

Notes

1. $((\text{Adjusted } M \text{ Time 1 IB} - \text{Adjusted } M \text{ Time 2 IB}) - (\text{Adjusted } M \text{ Time 1 GE} - \text{Adjusted } M \text{ Time 2 GE})) / \text{Time 1 Pooled } SD$; where IB = International Baccalaureate and GE = General Education.
2. $((\text{Adjusted } M \text{ across IB and GE at Time 1}) - (\text{Adjusted } M \text{ across IB and GE at Time 2})) / \text{Time 1 Pooled } SD$.
3. $((\text{Adjusted } M \text{ across Time 1 and Time 2 for IB}) - (\text{Adjusted } M \text{ across Time 1 and Time 2 for GE})) / \text{Time 1 Pooled } SD$.

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