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Gender, Self-Perception, and Academic Problems in High School

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Abstract

Given the increasing importance of education to socioeconomic attainment and other life course trajectories, early academic struggles can have long-term consequences if not addressed. Analysis of a nationally representative sample with official school transcripts and extensive data on adolescent functioning identified a social psychological pathway in this linkage between external feedback about early struggles and truncated educational trajectories. For girls, class failures absent of diagnosed learning disabilities engendered increasingly negative self-perceptions that, in turn, disrupted math and science course-taking, especially in family and peer contexts in which academic success was prioritized. For boys, diagnosed learning disabilities, regardless of class performance, engendered the same changes in self-perception and the same consequences of these changes for course-taking across family and peer contexts. These results reveal how ability labels and ability-related performance indicators come together to influence the long-term educational prospects of girls and boys attending mainstream schools in which the majority of students do not have learning disabilities or severe academic problems. Keywords: education, learning disability, academic failure, peers, and stigma.

Education is a high-stakes game in modern American society. How young people do in the educational system profoundly affects their transition to young adulthood (e.g., college matriculation, entry to the paid labor force), which, in turn, lays the foundation for adulthood, not just in terms of income but also in relation to health, marriage, and fertility (Jacobs 1996; Kingston et al. 2003; Schneider and Stevenson 1999). Given the tight coupling within these developmental sequelae, classwork, grades, and testing are more than just the mundane, everyday business of adolescence; they are building blocks of the entire life course (Shanahan 2000). Consequently, high school can entail great pressures for performance and conformity, so that any evidence of struggle signals to the self and to the world that one is just not measuring up. In this climate, problems in the learning process can change how young people view themselves and their abilities. These changes can then affect the academic trajectories that are so important to subsequent life course transitions, especially in social contexts in which the standards to which young people must measure up are particularly high (Correll 2001).

Thus, schooling is a profoundly social psychological experience, where risks and rewards are predicated not just on innate abilities and skills but also on the self-concepts that young people

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develop over time and the comparisons that they make to others (Catsambis 1994; Marsh et al. 2005). Importantly, this coupling of social psychological and ability-related advantages exacerbates inequality between the haves and have nots in the educational system. This study investigates the implications for inequality of this phenomenon in depth. Specifically, we match nationally representative data on adolescent adjustment and functioning with detailed educational data from high school transcripts to explore how external labels of academic problems (failing grades, diagnosed learning disabilities) alter the self-perceptions of boys and girls in peer and family contexts with varying levels of academic standards. We then assess the effects of these self-perceptions on course-taking in math and science during the high school years.

This study makes significant contributions to sociological research on two levels. First, it posits a general model of schooling based on the notion that how people view themselves is steeped in how they “stack up” with others in both macro- and micro-level settings. This model can inform research on inequality in domains of conventional achievement across the life course. Second, through this theoretical contribution, this study can inform educational policy on at-risk students by considering the interplay of non-academic factors with academic performance and targeting the match between students and schools, especially given that most students with learning disabilities or other problems attend schools in which they are in the minority.

The Stakes of Education

Today, the stakes of education in the United States are indeed high. Post-secondary matriculation and completion are among the most powerful determinants of socioeconomic attainment, family formation (e.g., marriage), health, and mortality (Kingston et al. 2003; Mirowsky and Ross 2003; Schneider and Stevenson 1999). Consequently, the academic credentials in secondary school that set up opportunities for post-secondary education (e.g., high-level course-work in math and science) take on added relevance to life course trajectories (Adelman 1999). Importantly, the accumulation of these credentials is not solely a function of intellectual competencies. The intricacies of social life and personal development also play a role.

Social and behavioral scientists have cataloged the varied ways that students' educational trajectories are derailed by factors that seemingly have nothing to do with actual aptitude. For example, some students come to think—or their parents and teachers come to think—that they are not capable of doing well in school, regardless of their actual cognitive abilities. When this happens, they often react by disengaging from academic pursuits, avoiding more demanding coursework, and generally underperforming in school. In the end, these self- and other-perceptions, no matter how accurate or inaccurate their foundations, come true (Marsh et al. 2005; Mickelson 1989; Seymour and Hewitt 1997; Wigfield and Eccles 2002). Although a general phenomenon, not all students react the same way. Adolescent girls, for example, seem to be particularly vulnerable (Catsambis 1994; Correll 2001). The main point of this rich literature is that how students, especially girls, see themselves and how they perceive themselves to be evaluated by others can reinforce or even counterbalance their intellectual and cognitive abilities.

Self-Perception Model of Academic Problems

Working from this literature, this study examines the educational experiences of boys and girls who have academic problems in high school and, therefore, are at early risk for truncated rates of educational attainment. The goal is to identify non-academic factors that exacerbate existing academic risks in an era in which even small changes to educational trajectories can have a far-reaching impact on the life course and on society as a whole. The foundation of this study

is a conceptual model integrating two classic theoretical traditions, both of which are concerned with self-concept.

The first tradition is the looking glass self and its various offshoots, which deal with the ways in which the self is socially constructed. Specifically, individuals come to understand themselves through interactions in social systems ranging from the micro level (e.g., significant others) to the meso (e.g., social networks) and macro levels (e.g., the media, general culture). Originally, the looking glass self focused primarily on internalization—how individuals somewhat passively incorporated social feedback into their senses of self (Cooley [1902] 1983). Later, extensions of this basic concept, including the reflected self-appraisal model, better accounted for personal agency. These extensions recognized that individuals may selectively process social feedback, project their own self-views onto others, actively attempt to change or manipulate the feedback that they receive, or engage in both cognitive and behavioral coping strategies to blunt the impact of undesirable feedback (Cast, Stets, and Burke 1999; Felson 1985; Gecas and Burke 1995; Yeung and Martin 2003). Therefore, according to this conceptual tradition, individuals develop their self-concepts in partnership with those around them.

The second tradition is self-enhancement, a component of identity theory and related frameworks. It deals with the effects of the social construction of the self on individual behavior. Self-enhancement refers to the very strong human drive to develop and maintain favorable views of the self. One benefit of this drive is that positive views of the self, even if inaccurate, promote adjustment and, importantly, instill the level of confidence needed to take on and meet new challenges (Baumeister 1998; Sedikides 1993; Taylor 1989). This general model has often been applied specifically to the educational domain (Helmke and van Aken 1995). Students develop academic self-concepts over time, which encompass their perceptions of their intellectual and cognitive skills, talents, deficiencies, and weaknesses. These self-concepts shape future achievement trajectories above and beyond past performance and achievements that might have played a role in their development. They do so by affecting confidence levels and encouraging either avoidance or engagement strategies in school (Marsh et al. 2005; Marsh and Yeung 1997). Therefore, according to this conceptual tradition, socially constructed self-concepts can be resources for or obstacles to future endeavors.

The model derived from these two traditions is presented in Figure 1. It has four main paths. Path A captures the social construction of the academic self-concept. A good deal of research has reported that external feedback about academic aptitude (e.g., grades, test scores, teacher and parent evaluations) is a powerful determinant of later academic self-concepts (Helmke and van Aken 1995; Marsh et al. 2005; Marsh and Yeung 1997; Wigfield and Eccles 2002). This study focuses on two key forms of such feedback. Being failed by a teacher is proximate feedback because it arises from a sustained relationship in a primary institutional setting. Being diagnosed with a learning disability by a specialist is more distal because it comes from an adult to whom the student may or may not be strongly tied and who may or may not be part of the school. Both indicate the potential for future academic problems in a seemingly objective, official way, which is important because feedback that appears to be subjective can be more easily processed in a self-serving way by its recipient (Felson 1985). Consequently, these two kinds of feedback are likely to be internalized into the academic self-concept, leading students to downgrade their perceptions of their own intelligence.

Of course, given the almost innate tendency for individuals to preserve positive self-concepts, internalizing negative external feedback into the academic self-concept is likely to be a last resort after more agentic responses have failed (Baumeister 1998; Cast et al. 1999; Yeung and Martin 2003). According to path B, the process of internalization captured by path A is likely to occur only among young people who are not able to find ways to mitigate the impact of

negative external feedback relevant to their academic self-concepts. These externalizing (as opposed to internalizing) responses include reducing the value placed on the academic domain of achievement (e.g., avoiding and disidentifying with school, downplaying parents' expectations) or identifying alternative domains of achievement (e.g., delinquency). In other words, some students will maintain a stable perception of their own intelligence despite seemingly objective evidence to the contrary because they reject, rationalize, or obscure that evidence.

Once the academic self-concept has been socially constructed, it has consequences for future academic progress. If students who receive negative external feedback about their academic aptitude internalize this feedback by reducing their perceptions of their own intelligence (path A), then they will lose some of the confidence and self-assurance necessary to face the challenges presented by school (path C). This study uses course-taking in math and science to capture such potential consequences of internalization. High-level course-taking credits in secondary school are crucial to future educational and occupational attainment, but they are also intellectually demanding and somewhat scary to students (Schneider, Swanson, and Riegle-Crumb 1998; Xie and Shauman 2003). Thus, students who, for whatever valid or invalid reason, do not think that they are "good enough," will make decisions about their coursework to avoid failure. This tendency appears to be especially pronounced in math and science relative to other areas of the general curriculum (Marsh and Yeung 1997). Although avoiding high-level math and science in this situation may be understandable from a self-protective or self-enhancing standpoint, it can have disastrous long-term consequences (Catsambis 1994).

Finally, path D adds an important qualifier, one dealing with the potential cross-context variability in the internalization of negative external feedback. Both of the theoretical traditions on which this conceptual model is based recognize that the prevailing social standards by which individuals judge themselves can powerfully determine how they respond to external feedback. In other words, the same kind of external feedback might not have the same meaning to two individuals in separate contexts with different standards of success (Baumeister 1998; Gecas and Burke 1995). Internalizing responses to failing grades or a disability diagnosis should, therefore, vary in intensity across interpersonal contexts with different standards for academic performance. Given the primary contexts of adolescence (Dornbusch 1989), such responses will be most pronounced among students in academically-oriented peer networks and among those in families headed by well-educated parents.

Bringing together these four paths, the conceptual model of this study contends that external markers of academic struggle will lead students to downgrade their own abilities, which, in a self-fulfilling prophecy, further disrupts their education. Thus, internalizing responses to negative feedback actually compound the risks of early struggles generating such feedback, making even less likely the possibility that they can be overcome. This phenomenon will hold in the American student population as a whole, but it will be particularly strong in local contexts (e.g., peer group, family) in which academic success is prioritized.

Gender and the Socially Constructed Self

Like so many social phenomena, the processes in this conceptual model are highly gendered. In other words, the paths in Figure 1 are unlikely to be equivalent for boys and girls. A key aim of this study is to explore this lack of equivalence in depth.

First, path A in Figure 1 should be stronger for girls, path B for boys. In general, the "good student" role is a more important part of girls' self-concepts than boys', and so they are more likely to be troubled by feedback that places this valued component of their self-concepts at risk. Boys are not unaffected by such feedback, but they are much more likely to reject or ignore it than to let it breed self-doubt (Correll 2001; Mickelson 1989; Wigfield and Eccles

2002). This pattern is the adolescent version of the common finding that the internalization (as opposed to externalization) of negative feedback is more likely to occur among individuals in relatively low-status positions in society, including women (Cast et al. 1999; Yeung and Martin 2003).

Second, path C will be stronger for girls. Past research (e.g., Catsambis 1994; Correll 2001) has consistently documented sharp gender differences in the role of perceived ability in course-taking decisions and in academic achievement. In general, negative perceptions of skill and ability pose greater risks for girls than boys, regardless of whether these perceptions are accurate or inaccurate.

Third, path D will also likely be stronger for girls than boys. The reason for this gender difference transcends the realm of education. In general, girls tend to be more socially oriented than boys, not just in terms of their behavior but also in terms of their own self-concepts (Gilligan 1982). Essentially, girls are more ingrained in and reactive to social ties and networks, especially close personal relationships, and are more likely to draw on social evaluations, whether real or perceived, when evaluating themselves (Fagot 1994; Giordano 2003; Huston and Alvarez 1990; Martin 1996). Thus, external markers of academic struggle may be especially prone to internalization if they put girls out of step with those closest to them, including their peers and their parents. The same is likely true for boys, but to a lesser degree.

Methods

Data Source

This study tested its conceptual model with a new and unique data source—the combination of a leading national survey of American adolescents (the National Longitudinal Study of Adolescent Health, or Add Health) and a linked collection of high school transcripts (the Adolescent Health and Academic Achievement Study, or AHAA) (Muller 2001). Add Health is a nationally representative sample of seventh through twelfth graders in 1995 (Harris et al. 2003). With a stratified sampling design, Add Health selected 80 high schools based on region, urbanicity, sector, racial composition, and size and then 32 middle schools that fed into any of the 80 high schools that did not contain seventh and/or eighth grades. These feeder schools were selected with a probability proportional to their student contribution to their high schools. During the 1994–95 academic year, nearly all students in these 132 schools completed the in-school survey, a paper and pencil questionnaire designed to create a sampling frame for later rounds of data collection. Of these 90,118 students, a subgroup selected evenly across high school—feeder school pairs participated in the in-home interview between April and December 1995 (Wave I, $N = 20,745$), with additional data collected from school administrators and parents. Attempts were then made to follow up with all non-senior Wave I respondents between April and September 1996 (Wave II, $N = 14,738$). Finally, attempts were made to follow up all with Wave I respondents, including seniors, between August 2001 and April 2002 (Wave III, $N = 15,197$). Approximately 77 percent of the original Wave I sample participated in Wave III.

AHAA, launched in 2001, added detailed educational data to Add Health respondents (see Muller 2001). During the Wave III In-Home Interview, Add Health sample members completed a high school transcript release form, and approximately 91 percent authorized study personnel to collect their official school transcript from the last schools they had attended. Westat then collected transcripts for approximately 13,000 young people.

The sample for the present study was constructed by applying five selection filters to the Wave I sample. Table 1 provides mean statistics for each stage of the sample selection process. The first filter limited the sample to all ninth and tenth graders in Wave I because the transcript

data only covered the high school years, and because the early grades of high school represent the only period in which we can be sure that the AHAA end-of-school course levels (described shortly) came after the Add Health Wave I survey. The second filter limited the sample to the Wave I respondents who also participated in Waves II and III. Next, because some measures in this study required parent- and transcript-reported data, the third and fourth filters excluded adolescents who did not have a parent interviewed at Wave I and/or did not have a transcript collected. Finally, the fifth filter excluded respondents who were not assigned a valid sampling weight, those weights being necessary to ensure representativeness by accounting for the unequal probability of selection into the Add Health sample (Chantala and Tabor 1999). As seen in Table 1, these filters led to slight overrepresentation of white girls with college-educated parents and good grades in the study sample ($n = 3,324$). Although certainly not negligible, these biases were balanced by the necessity of each selection filter.

Measures

Course-taking—Because mathematics enrollment in American secondary education is largely standardized into a hierarchy of less to more demanding classes, the AHAA transcripts allow the creation of longitudinal sequences of math course-taking similar to work done on the National Educational Longitudinal Study (see Schiller and Hunt 2001; Schneider et al. 1998). The AHAA team assigned classification of secondary school courses (CSSC) codes to each math class appearing on a transcript using the standard taxonomy created for all National Center of Education Statistics data sets and then collapsed these codes into ten hierarchically-ordered categories (0 = no math, 1 = remedial math, 2 = general math, 3 = pre-algebra, 4 = algebra I, 5 = geometry, 6 = algebra II, 7 = advanced math, including algebra III, statistics and probability, and pure math, 8 = pre-calculus, 9 = calculus). This same procedure was followed for science (1 = basic/remedial science, 2 = general/earth science, 3 = biology I, 4 = chemistry I, 5 = advanced science, such as biology II or chemistry II, 6 = physics).

Values on the cumulative, end-of-school sequences indicate the highest level of math or science taken by the end of high school (Riegle-Crumb et al. 2005). Values on these sequences in ninth grade indicate students' course position at the start of high school (ninth grade). Transcripts also allowed the calculation of grades (on a standard four point scale) in math and science coursework during ninth grade. Table 2 presents the descriptive statistics for the academic measures, as well as for all other study variables, for the full sample and by gender.

Self-perceptions—In Wave I and Wave II, students assessed their intelligence relative to others their age (1 = moderately below average, 5 = extremely above average). The difference between these two versions of the same scale measured the change—either increase or decrease—in perceived intelligence between Wave I and Wave II.

External academic markers—This study considered two separate but related markers of potential academic problems. First, for Wave I, we created an index of academic failure capturing the ratio between the number of classes failed in that year to the number of classes taken. Second, parents reported (1 = yes, 0 = no) at Wave I whether the student had ever been diagnosed with a learning disability.

Recognizing that the experience of being diagnosed as learning disabled, whether in the recent or distant past, will differ qualitatively depending on actual academic performance in the high-stakes curricula of secondary school, we collapsed these two variables together. Because, by far, the most important distinction on the failure index was between students who had never failed a course and those who had failed at least one (those who failed one tended to fail many), we first dichotomized the failure index (1 = failed at least one course in the last year, 0 = passed all courses in the last year) and then cross-tabulated it with the disability variable to create four

mutually exclusive dummy variables: both markers of academic problems, learning disability only, failure only, and no markers of academic problems.

Of note is that the parent report of disability diagnosis occurred at the Wave I in-home interview and did not specify the timing of the diagnosis. Thus, unlike the course failures captured in the failure index, the diagnosis could have preceded Wave I. Indeed, it could have preceded Wave I by many years. For this reason, the academic group variables are best thought of as course failure (or success) in the context of a diagnosed disability (or no such disability).

Social context—For the family context, this study measured the highest level of parents' educational attainment in the family. In Wave I, custodial parents reported the years of schooling completed by themselves and their partners. We recoded these measures into five basic categories (1 = less than high school, 2 = high school graduate, 3 = some college, 4 = college graduate, 5 = graduate education). Network techniques allowed the assessment of the peer context. In Add Health's in-school survey, adolescents could nominate a maximum of five female and five male friends. Because the in-school survey was a near census of each school, the characteristics of most nominated friends can be measured directly from those friends themselves (for more on network studies in Add Health, see Cavanagh 2004; Haynie 2001; Moody 2001). Thus, individual-level measures can be averaged across all friends nominated by each adolescent in the sample to create peer measures. To create an individual-level measure for aggregation, we averaged three items, all converted to z-scores: academic achievement (a standard four point grade point average based on self-reported grades in math, science, social studies, and English), educational aspirations (students' ratings, on a scale of 1 to 5, of how much they want to go to college), and enrollment in math and science classes (1 = enrolled in either or both, 0 = enrolled in neither). We refer to the final peer measure—the mean of this individual-level measure for all nominated friends—as friends' academic press because it is akin to measures in the educational literature gauging the emphasis on and pressure for achievement, or academic press, in schools (see Shouse 1996).¹

Adolescent characteristics—To measure potential externalizing responses to academic markers, we calculated Wave I and Wave II versions of four variables and then took the change score (Wave II minus Wave I) for each. First, school attachment consisted of the mean of three items ($\alpha = .77$): the extent to which adolescents agreed that, in the past school year, they felt close to people at their schools, a part of their schools, and happy to be at their schools (1 = strongly disagree, 5 = strongly agree). Second, truancy was the count of how often, in the past year, the student skipped school (0 = 0; 1 = 1–2; 2 = 3–5; 3 = 6–9; 4 = 10+ days). Third, delinquency consisted of the sum of whether or not, in the past year, students had painted graffiti, damaged others' property, lied to parents about where they had been, taken something without paying, driven a car without the owner's permission, stolen something worth more than \$50, stolen something worth less than \$50, or broken into a building to take something ($\alpha = .75$). Fourth, students reported, separately for each parent, the degree to which they felt close to that parent, felt that parent was warm, felt that they communicated well with that parent, and were satisfied with their relationships with that parent. We averaged the responses (ranging from 1 to 5) for each parent. The final construct for parent-adolescent closeness was the mean of the maternal and paternal constructs ($\alpha = .88$) if information was not missing for both parents; otherwise the score for the non-missing parent served as the value.

¹Of note is that approximately 15 percent of the sample was missing on this measure, mostly because they nominated no friends or their nominated friends were out of school. Consequently, the sample mean for friends' academic press was imputed for this group, and a binary marker designating imputation was included in all analyses in which the friends' press variable was used. Only rarely did this marker predict the outcome (as a main effect or as part of an interaction term), suggesting that any bias introduced by imputation was minimal. This finding echoes past network research with Add Health (Crosnoe and Needham 2004).

Two other adolescent characteristics could only be measured with data from the in-school survey: athletic status (1 = student reported participating in at least 1 of 14 school sports programs in the past year, 0 = no such participation) and extracurricular participation (a count of whether the student had participated in leadership, social, academic, performing arts, and other school clubs in the past year). These items were not asked in two waves, and so change scores between the in-school survey and Wave II could not be calculated. Thus, we could only control for the baseline level of athletic status and extracurricular participation in multivariate analyses, not their changes over time. All of these adolescent characteristics were based on past Add Health research (Crosnoe and Needham 2004; Moody, 2001; Resnick et al. 1997).

Sociodemographic control variables—Four Wave I factors tap demographic variability: grade level, race/ethnicity (dummy variables for white, African American, Hispanic American, Asian American, other), immigrant status (dummy variables for first, second, and third-plus generations, based on students' reports of the birthplaces of themselves and their parents), and family structure (1 = two biological parents, 0 = other family form).

Plan of Analyses

To analyze our conceptual model of this study, we estimated a path model with two endogenous variables. The first, change in perceived intelligence between Wave I and Wave II, was predicted by the set of academic group dummy variables (with the no academic markers group as the reference), the sociodemographic controls, the adolescent characteristics (including their cross-wave change scores to account for non-internalizing responses to academic markers), and the Wave I version of perceived intelligence (to calculate the baseline level of perceived intelligence from which any change over time occurred). Generally, positive coefficients for variables predicting this endogenous variable indicate an increase in perceived intelligence, negative values indicate a decrease. The second endogenous variable in the path model, math course-taking, was predicted by the same set of independent variables, including the baseline (ninth grade) level of the outcome as well as math grades in ninth grade (to control for performance within course levels). We then re-estimated this path model with two sets of interaction terms—each academic group dummy variable interacted with friends' academic press, each academic group dummy variable interacted with parent education—as predictors of change in perceived intelligence between Wave I and Wave II.

Results from the first iteration of the model revealed the extent to which receipt of failing grades, with and without a diagnosed learning disability, was followed by reductions in perceived intelligence over the next year and whether any such reduction led to lower math course-taking levels by the end of high school. Results from the second iteration revealed the extent to which the crucial linkage between academic group and reduction in perceived intelligence varied across different family and peer contexts. We then re-estimated both iterations of this path model, with level of science course-taking by the end of high school as the second endogenous variable and prior controls for ninth grade course level and grades in science. All models were estimated with structural equation modeling in Mplus (Muthen and Muthen 2002). This package allowed the estimation of missing data with full information maximum likelihood, sample weighting, and the correction of the school-based clustering of Add Health (see Chantala and Tabor 1997).

Results

General Comparison of Four Types of Students

What kinds of students have ever been diagnosed with a learning disability, what kinds of students fail classes, and what is the difference between students with diagnosed learning disabilities who pass and who fail? To answer these questions, this study estimated the average

sociodemographic characteristics of each of the four academic groups (Table 3). The vast majority of the sample had never been diagnosed with a learning disability. Among these students, the current norm was to pass all classes. A much smaller minority had been given such a diagnosis at some point in their lives, and, among these students, failing a class in the past year was slightly more common than passing all classes.

Girls were much less likely than boys to have ever been diagnosed with a learning disability or to have recently failed classes, but group differences were not limited to gender. Whites were more likely to have been diagnosed with a learning disability than their peers from minority race/ethnic populations, but, having been diagnosed, were more likely to pass their classes. Disability diagnoses also became more common across immigrant generations. Students from two-parent families were more likely to be passing their classes, regardless of ever having been diagnosed as learning disabled or not. Thus, learning disabilities were diagnosed more often among boys from more advantaged demographic populations, and, within these same populations, these past diagnoses did not couple as strongly with current class failure.

External Academic Markers, Self-Perception, and Girls' Math Course-Taking

The conceptual model organizing this study contends that external markers of academic problems lead to changes in academic self-concept that, in turn, disrupt course-taking patterns. Table 4 presents the results of a path analysis designed to determine whether these expectations did, in fact, hold when considering math course-taking.

Before describing the results in Table 4, we should note two findings from preliminary analyses. When we estimated the path model for the full sample, gender did not predict change in perceived intelligence between Waves I and II. Thus, girls and boys did not differ in their over-time patterns of perceived intelligence once their baseline levels of perceived intelligence were taken into account. At the same time, gender (female) did predict higher-level end-of-school math course-taking. This finding, which echoes the bivariate patterns seen back in Table 2, appears to contradict historical patterns of gender differences in math, but it actually conforms to the most up-to-date findings from national-level studies suggesting that girls have caught up with boys, and in some cases even surpassed them, in this subject area (Xie and Shauman 2003).

Turning to Table 4, the first panel contains the results of the path model for girls. Recall that the norm in the full sample was for both girls and boys to increase their perceived intelligence over time. Girls in the failure only group demonstrated a statistically significant *decrease* in perceived intelligence between Waves I and II ($b = -.18, p < .01$) compared to girls in the reference group (no academic markers), net of the other factors in the model². Moreover, the coefficients for both the academic markers group and the disability only group were not significant, and test statistics revealed that the coefficient for the failure only group differed significantly from those of the other groups. As for math course-taking, girls with neither recent class failures nor a previously diagnosed disability demonstrated higher persistence in the math curriculum, net of the other factors in the model, than girls in the other three groups.

Next, both Wave I perceived intelligence and *increase* in perceived intelligence between Wave I and II predicted higher levels of math course-taking by the end of school ($b = .18, p < .001$ for baseline perceived intelligence; $b = .09, p < .001$ for increase in perceived intelligence). Thus, the failure only group was the one academic group of girls that significantly predicted

²Of the externalizing responses, change in truancy and delinquency, as well as base levels of athletic participation, extracurricular participation, truancy, school attachment, delinquency, and closeness to parents, differed by academic group. In general, the key distinction was between students who had failed a class versus those who had not.

both change in perceived intelligence between Wave I and Wave II and math course-taking after Wave II. Consequently, the only possible mediating pathway for perceived intelligence between Wave I academic marker group and end-of-high school math course-taking was: failure only $\rightarrow$ decrease in perceived intelligence $\rightarrow$ decrease in math course-taking. To assess this pathway, we compared the results of the full path model in Table 4 to an alternate specification of that model that did not contain the change score for perceived intelligence (not shown). This comparison revealed that the inclusion of the change score for perceived intelligence reduced the main effect of failure only on end-of-school math course-taking by approximately 10 percent.

Bringing together the results for the two endogenous variables in the path model for girls, therefore, failing a class in ninth or tenth grade *without* ever having been diagnosed with a learning disability was followed by a reduction in perceived intelligence over the subsequent school year. This reduction was, in turn, followed by lower attainment on the math sequence by the end of high school. This chain of events accounted for a small but significant portion of the lower overall math attainment of girls who early in high school had failed classes.

External Academic Markers, Self-Perception, and Boys' Math Course-Taking

For boys, the second panel in Table 4 reveals that those who had been diagnosed with a learning disability at some point before Wave I, regardless of their class record during the school year corresponding to Wave I, posted greater decreases in perceived intelligence between Waves I and II than boys who had passed all of their classes and had not ever been diagnosed with a learning disability ($b = .26, p < .10$ for both academic markers group; $b = .30, p < .05$ for learning disability only group). Test statistics indicated that the two groups characterized by a past diagnosis of learning disability did not significantly differ from each other in terms of their changes in perceived intelligence between Waves I and II. The two groups characterized by the absence of any type of learning disability also did not significantly differ from each other. The two disability groups, however, *did* differ significantly from the two non-disability groups, suggesting that a previously diagnosed disability in and of itself is an important predictor of boys' decreases in perceived intelligence.

The Wave I academic groups also differed on the level of math reached by the end of high school. The rank ordering (from lowest to highest math course-taking level) was: boys who had ever been diagnosed with a learning disability and who had failed a class in the last year ($b = -.78, p < .001$), boys who had ever been diagnosed with a learning disability and who had passed all of their recent classes ($b = -.65, p < .001$), boys who did not have a learning disability but failed at least one class in the past year ($b = -.31, p < .001$), and finally boys who had never been diagnosed with a learning disability and did not have a recent record of failure. Furthermore, Wave I perceived intelligence and change in perceived intelligence between Waves I and II also predicted the end-of-school math course-taking level of boys ($b = .31, p < .001$ for Wave I; $b = .20, p < .001$ for cross-wave change). Higher levels of and increases in perceived intelligence were associated with more advanced math course-taking.

According to these results, the only significant mediating pathway for perceived intelligence between Wave I academic marker group and end-of-high school math course-taking was: past diagnosis of learning disability with or without current failure $\rightarrow$ decrease in perceived intelligence $\rightarrow$ decrease in math course-taking. Adding the change score to the full path model and then subtracting it indicated that this change score accounted for approximately 20 percent of the association between membership in the both academic markers group and end-of-school math course-taking and of the association between membership in the learning disability only group and end-of-school math course-taking.

For boys, therefore, having ever been diagnosed with a learning disability, *regardless* of academic performance during ninth or tenth grade, was followed by a reduction in perceived intelligence over the subsequent school year. This reduction was, in turn, followed by lower attainment on the math sequence by the end of high school. Unlike girls, having ever been diagnosed with a learning disability was more important than failing classes during high school. Also compared to girls, the role of change in perceived intelligence as a mediator between early academic markers and later math course-taking was slightly stronger.

Importance of Social Contexts

The results presented so far reveal that, for both girls and boys, receiving some academic feedback about potential academic problems can disrupt course-taking over time, in part, because it leads young people to downgrade their own intelligence. Recall, however, that a key part of the conceptual model of this study was that the trigger in this pathway—the link between feedback and self-perception—would likely vary across peer groups and families differing in their standards of academic success. To test this possibility, we re-estimated the full path models in Table 4, including interaction terms between the academic groups and friends' academic press and then between the academic groups and parent education.

The only significant interaction terms were found among girls. Table 5 contains partial results from these model extensions for girls (coefficients for the *other* predictors of change in perceived intelligence between Waves I and II are not shown, coefficients for *all* predictors of end-of-school math course-taking are not shown). In both cases, the social context variable significantly interacted with the failure only category once all of the other independent variables were taken into account ($b = -.35, p < .001$ for failure only $\times$ friends' academic press in Model 1; $b = -.13, p < .05$ for failure only $\times$ parents' education in Model 2). Thus, among girls, the only academic group that significantly predicted change in perceived intelligence between Wave I and Wave II was also the only academic group that interacted with the social context variables.

To better understand these interactions, we calculated the predicted change in perceived intelligence for girls in the failure only category who fell one standard deviation above and below the mean on the two contextual measures and girls in the reference category (no academic markers) who fell one standard deviation above and below the mean on the two contextual measures. In both cases, all other variables in the model were held to their sample means. Figure 2 presents the predicted odds from the peer model.

In general, girls demonstrated increases in perceived intelligence between Wave I and Wave II. The one exception to this rule was the group of girls who failed a class (absent a past diagnosis of learning disability) at Wave I and were members of peer groups characterized by high levels of academic press. These girls demonstrated a decrease in perceived intelligence during this period. Another way of looking at this pattern is to compare, within academic groups, girls with academically oriented peers to those with less academically oriented peers. Among girls with no diagnosed learning disability in the past and without a current record of class failure, those who posted the biggest increase in perceived intelligence over time were those who were members of academically-oriented peer groups. Among girls who had a recent record of failure but who had never been diagnosed with a learning disability, those with less academically oriented peers *increased* their perceived intelligence over time, but those with more academically oriented peers *decreased* their perceived intelligence over time.

A similar pattern held for the family model (not shown in Figure 2), except that the girls in the failure only, high parent education category (the fourth bar) did not demonstrate a decrease in perceived intelligence over time but instead demonstrated no increase (while girls in the other

three categories demonstrated increases). In both cases, therefore, the conclusion is the same: failure of a class was most problematic for girls' self-perceptions in high-pressure social contexts.

A Consideration of Science Course-Taking

As a final step, we re-estimated these same path models—one full path model each for girls and boys, two interaction models each for girls and boys—with a new course-taking outcome: highest level of science taken by the end of high school. The results of these models essentially replicated the results of the math models presented in Tables 4 and 5. Consequently, they are not presented here. This similarity between the math and science models boosts confidence in the accuracy of our results.

Conclusions

As the economy has changed, so too has the opportunity structure of education. As the opportunity structure of education has changed, so too has the societal inequality related to educational attainment. On one hand, high school graduation does not afford the economic and social opportunities that it once did, and so inequalities between the “stayers” and the “leavers” have widened considerably. Consequently, figuring out the reasons why early risks for low educational attainment do indeed translate into lower preparation for post-secondary schooling is an important goal of sociological research.

This study pursued this general goal by designing and testing a conceptual model of the role of social feedback and self-perception in the high school academic pathways that have received much attention from sociologists of education. This model contended that external feedback on ability and performance affects self-perceptions about ability, especially in contexts in which success is prioritized, and that, in turn, self-perceptions affect decisions to persist up and through the institutional structure. By combining the educational data of AHA with the adolescence data of Add Health, this study found support for this general model in high school. This conceptual model had several pieces, and so we will break down these pieces one at a time.

First, girls and boys both adjusted their self-perceptions according to external feedback about their academic ability, but the kind of feedback that was internalized differed by gender. Girls adjusted their self-perceptions downward after failing a class but *only* if they had *never* been diagnosed with a learning disability. Thus, what seems to matter to girls is direct, personal, and negative feedback from the people in their lives, in this case their teachers, about their actual performance. The more relational aspect of this internalization process echoes past research demonstrating that the looking glass self and related models better capture the experiences of women than men (Cast et al. 1999). A diagnosed learning disability appears to be something of a qualifier to course failure. Having been diagnosed as such, even if it was in the far in the past, girls can attribute poor performance to something other than their internal aptitude, which protects their academic self-competence from the negative evaluations of teachers. Girls who have never had such a diagnosis do not have this protection. For them, bad grades are more likely to be construed as evidence that they are not smart enough to do well.

On the other hand, boys who had ever been diagnosed with learning disabilities demonstrated declining levels of perceived intelligence over time *regardless* of their current academic performance. What seems to matter to boys, therefore, is more impersonal labeling removed from classroom settings. This pattern suggests a status-oriented internalization process—above and beyond other externalizing responses (e.g., delinquency, truancy)—for boys that adds an important nuance to those previous findings about gender, social comparison, and looking glass processes.

Second, adjustments to perceived intelligence in the face of negative feedback had academic consequences for girls and boys. Girls who failed classes, regardless of a past diagnosis of a learning disability, reached lower levels of two important curricula by the end of high school in part because of their tendency to adjust their perceived intelligence downward. Boys who had ever been diagnosed with a learning disability, regardless of their current record of failing or passing, also had lower advancement through these curricula. In both cases, the tendency to adjust perceived intelligence downward after receiving gender-differentiated forms of negative feedback helped to explain these truncated math and science trajectories. Yes, many obvious factors come to mind when thinking about why class failures and learning disabilities on one hand would be associated with lower-level course-taking on the other, but the results of this study demonstrate that a self-enhancement process (or, really, its reverse) contributes to these associations. When students internalize negative feedback into their own academic self-concepts, they lose resources that are very important to academic success: confidence, motivation, and self-belief. Independent of prior experiences or abilities, these resources help students meet the risks and/or challenges of enrolling in demanding but rewarding classes like trigonometry and chemistry II and, more than that, to keep going in math and science even in lower-level classes.

Stepping back for a moment from gendered pathways between external feedback to math and science course-taking, a specific set of results deserve further comment. Not surprisingly, students who had ever been diagnosed with learning disabilities did not advance as far in math and science curricula than their peers who had never been diagnosed as such, even when their prior academic performance was taken into account. More surprisingly, students who had been diagnosed with learning disabilities in the past but who had no recent record of class failure advanced less far than students who had never been diagnosed with learning disabilities and who had such a record. A possible explanation for this finding is that parents and teachers are unlikely to push such students towards advanced coursework, perhaps anticipating that they cannot handle the more intense competition in advanced courses (Catsambis 1994). Alternatively, these students may be segregated into special education programs in which they can achieve passing grades but receive less exposure to rewarding curricula. In both cases, passing grades, even good grades, do not necessarily imply preparation for college or work.

Third, girls, but not boys, were more likely to make such academically consequential adjustments to their perceived intelligence in intimate contexts with high academic standards. For most girls, having academically oriented peers and well-educated parents was a boon to their academic self-concepts, but, for girls who had failed classes absent of a diagnosed learning disability, living in these contexts was associated with a decrease (or no increase) in perceived intelligence. Echoing a theme introduced already in this discussion, girls were especially sensitive to the feedback coming from their more intimate contexts. They felt particularly bad about their performance when it did not measure up with the standards put in place by their peers and family and, again, when they did not have a convincingly legitimate rationale, like a disability, for their poor performance. Boys showed no special sensitivity to their more intimate contexts. They were similarly affected by negative feedback, regardless of what their peers and parents were like. Once again, the internalization of the looking glass self appears to involve more proximate social comparison for girls and a more general or distal one for boys.

All together, the findings of this study suggest how social psychological phenomena contribute to the translation of early academic risks into the accumulation of fewer academic credentials. In doing so, it contributes to sociological research by applying classic theory to the specific domain of high school life, connecting micro-level interactions to macro-level inequalities, and linking individual agency to social influence. At the same time, it draws on multi-source, multi-level, longitudinal data that allow better consideration of cross-domain variability,

within-population heterogeneity, and change over time, all of which are important methodological concerns for research on the social construction of the self and its consequences (Yeung and Martin 2003). In these ways, this research suggests public applications of sociological research. For example, this research demonstrates that retention strategies aimed at at-risk students must account for how they interpret and internalize feedback information and how they engage in processes of social comparison. It also identifies specific subsets of the general at-risk population that require special attention (e.g., girls who fail classes, boys with learning disabilities) and points to mentoring and support as mechanisms for keeping all students in the math and science pipeline.

Given the importance of these issues, this study should be built on in the future. One way to do so would be to correct its limitations. One major limitation is that our measure of learning disability did not elaborate on the kind of diagnosis being made, the person making the diagnosis, or the timing of the diagnosis. Without such information, this study cannot assess whether, for example, the apparently greater significance of learning disabilities for boys than girls is a function of the former having more severe disabilities than girls or having different types of behaviors leading to diagnosis (e.g., misbehavior for boys). As another example, this study could not differentiate between contemporaneous diagnoses affecting academic self-concepts during high school and past diagnoses having lagged effects once the high-stakes curricula of high school start. Moreover, this study had no information on test scores that could assess the ability level of students in math and science independently of courses taken or grades received. Thus, the observed effects of disability diagnoses could have arisen because of systematic differences in cognitive ability that co-occur with learning disabilities.

These measurement shortcomings, we argue, are one tradeoff, at present, of studying the social side of schooling on the national level. National educational data sets that contain extensive information on abilities and disabilities often include only those students with disabilities who attend special education schools. Furthermore, they rarely contain rich measures of non-educational aspects of adolescent life (e.g., peer contexts, non-academic behavior). On the other hand, more general data sets on adolescence do not contain rich educational measures. How students function both academically and socially in mainstream schools in which they are in the minority is an important but understudied issue that we have addressed here. Until these larger data issues can be resolved, however, the necessary extensions to and corrections of this study will have to be made below the national level, including in qualitative work.

Overall, the results of this study delineate how the social experiences and psychological adjustment of young people shape their educational futures. For both girls and boys, developing valuable analytical skills, getting into college, and getting through college are extremely important for their long-term socioeconomic viability, and so ensuring that those having early troubles still persist is a necessary step in efforts to address socioeconomic inequality. As in so many things, the social and psychological domains are important parts of this equation for *both* boys and girls. How young people feel about themselves and how these feelings develop, therefore, are individual circumstances that underlie large-scale patterns of inequality.

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Figure 1.
Conceptual Model of Study

Figure 2.
Predicted Levels of Change in Perceived Intelligence for Girls with Different Academic Statuses and Peer Group Associations in High School

Table 1

Descriptive Statistics for Each Stage of the Sample Selection Process

	M (SD)				
	Sample 1 ^a	Sample 2 ^b	Sample 3 ^c	Sample 4 ^d	Sample 5 ^e
Gender (female)	.50 (.50)	.53 (.50)	.53 (.50)	.53 (.50)	.53 (.50)
Parents' educational attainment	2.93 (1.29)	3.00 (1.24)	3.00 (1.24)	3.05 (1.24)	3.05 (1.24)
Non-Latino/a white	.50 (.50)	.51 (.50)	.54 (.50)	.56 (.50)	.56 (.50)
Academic achievement (Wave I)	2.67 (.79)	2.73 (.79)	2.74 (.78)	2.79 (.79)	2.79 (.78)
N	7,587	4,762	4,218	3,512	3,324

Source: Add Health/AHAA

^a All 9th and 10th graders in Wave I.

^b All 9th and 10th graders in Wave I who also participated in Waves II–III.

^c All 9th and 10th graders in Wave I who had a parent interviewed.

^d All 9th and 10th graders in Wave I with an interviewed parent who had a transcript collected.

^e All 9th and 10th graders in Wave I with an interviewed parent and a transcript who had valid sampling weights.

Table 2

Descriptive Statistics for Study Variables, for Full Sample and by Gender

	Full Sample			Girls		Boys	
	M (SD)	Percent		M (SD)	Percent	M (SD)	Percent
Course-taking							
Math level (end-of-school)	6.12 (1.98)	—		6.24 (1.93)	—	5.99 (2.02)	—
Math level (9th grade)	3.61 (1.29)	—		3.69 (1.26)	—	3.55 (1.32)	—
Math grades (9th grade)	2.32 (1.14)	—		2.41 (1.09)	—	2.26 (1.13)	—
Science level (end-of-school)	4.11 (1.28)	—		4.44 (1.22)	—	4.38 (1.34)	—
Science level (9th grade)	2.11 (1.13)	—		2.11 (1.13)	—	2.11 (1.13)	—
Science grades (9th grade)	2.38 (1.17)	—		2.50 (1.14)	—	2.26 (1.19)	—
Self-perception							
Δ perceived intelligence between Waves I & II	.07 (1.06)	—		.07 (1.07)	—	.06 (1.03)	—
Wave I perceived intelligence	3.92 (1.09)	—		3.93 (1.09)	—	3.90 (1.09)	—
Academic groups							
Both academic markers	—	5.57		—	3.31	—	8.08
Learning disability only	—	5.14		—	3.77	—	6.68
Failure only	—	26.65		—	25.11	—	28.37
No academic markers	—	61.64		—	66.95	—	55.72
Missing on disability/failure	—	.99		—	.86	—	1.15
Social context factors							
Friends' academic press	.00 (.69)	—		.02 (.67)	—	-.02 (.71)	—
Parents' educational attainment	3.06 (1.24)	—		3.03 (1.25)	—	3.09 (1.24)	—
Adolescent Characteristics							
Athletic status	—	45.46		—	41.04	—	50.38
Extracurricular participation	.75 (.99)	—		.96 (1.06)	—	.50 (.84)	—
Δ truancy between Waves I & II	.18 (1.14)	—		.16 (1.12)	—	.22 (1.16)	—
Truancy (Wave I)	.50 (1.04)	—		.46 (.99)	—	.53 (1.08)	—
Δ school attachment between Waves I & II	-.09 (.80)	—		-.08 (.83)	—	-.10 (.77)	—
School attachment (Wave I)	3.78 (.83)	—		3.75 (.86)	—	3.81 (.81)	—
Δ delinquency between Waves I & II	-.32 (1.60)	—		-.26 (1.43)	—	-.39 (1.77)	—

	Full Sample			Girls		Boys	
	M (SD)	Percent		M (SD)	Percent	M (SD)	Percent
Delinquency (Wave I)	1.61 (1.76)	—		1.47 (1.61)	—	1.77 (.90)	—
Δ closeness to parents between Waves I & III	−.09 (.53)	—		−.07 (.59)	—	−.11 (.46)	—
Closeness to parents (Wave I)	4.32 (.60)	—		4.24 (.68)	—	4.41 (.50)	—
Sociodemographic Controls							
Grade level	9.51 (.50)	—		9.51 (.50)	—	9.51 (.50)	—
Non-Latino/a white	—	56.02		—	55.59	—	56.49
African American	—	18.92		—	21.23	—	16.35
Asian American	—	5.66		—	4.79	—	6.62
Latino/a	—	16.34		—	15.18	—	17.62
Other race/ethnicity	—	3.04		—	3.14	—	2.93
First generation immigrant	—	7.19		—	6.56	—	7.89
Second generation immigrant	—	13.44		—	12.33	—	14.69
Third-plus generation immigrant	—	79.12		—	81.05	—	76.97
Family structure (two-parent)	—	57.91		—	57.84	—	59.10
N	3,324			1,752		1,572	

Source: Add Health/AHAA

Table 3

Comparison of Four Academic Groups on Selected Sociodemographic Factors

	M (SD)			
	Both Academic Markers	Learning Disability Only	Failure Only	No Academic Markers
Gender (female)	.31 ^c (.47)	.39 ^c (.49)	.50 ^b (.50)	.57 ^a (.49)
Non-Latino/a white	.61 ^a (.49)	.67 ^a (.47)	.47 ^b (.50)	.59 ^b (.49)
African American	.18 ^{ab} (.38)	.14 ^b (.34)	.18 ^{ab} (.38)	.18 ^{ab} (.38)
Asian American	.03 ^b (.16)	.03 ^b (.17)	.04 ^{ab} (.19)	.07 ^a (.25)
Latino/a	.16 ^b (.37)	.12 ^b (.33)	.22 ^a (.42)	.14 ^b (.34)
Other race/ethnicity	.02 (.15)	.04 (.20)	.04 (.19)	.03 (.16)
First generation immigrant	.04 (.19)	.05 (.22)	.06 (.25)	.08 (.26)
Second generation immigrant	.10 ^b (.30)	.09 ^b (.29)	.17 ^a (.37)	.13 ^{ab} (.33)
Third-plus generation immigrant	.85 ^a (.35)	.84 (.37)	.77 ^{ab} (.42)	.80 ^b (.42)
Family structure (two-parent)	.41 ^c (.49)	.57 ^{ab} (.50)	.49 ^b (.50)	.64 ^a (.48)
<i>N</i>	185	171	886	2,049

Source: Add Health/AHAA

Note: Means with different subscripts differ significantly ($p < .01$), as determined by one-way ANOVA, with an “a” representing the highest mean. Approximately 1% of the sample could not be assigned to an academic group.

Table 4

Results of Full Path Models Predicting Changes in Perceived Intelligence and End-of-School Math Course-Taking, By Gender

	b Coefficients (SE) for Girls		b Coefficients (SE) for Boys	
	Predicting Δ Perceived Intell. (Wave I–Wave II)	Predicting Final Math	Predicting Δ Perceived Intell. (Wave I–Wave II)	Predicting Final Math
Academic groups				
Both academic markers ^{ab}	-.10 (.19)	-.66* (.29)	-.26 ⁺ (.16)	-.78*** (.18)
Learning disability only	-.16 (.19)	-.72*** (.21)	-.30* (.15)	-.65*** (.17)
Failure only	-.18** (.06)	-.38*** (.10)	-.11 (.07)	-.31*** (.11)
Self-perception				
Δ perceived intelligence between Waves I–II	—	.09** (.04)	—	.20*** (.05)
Wave I perceived intelligence	-.51*** (.03)	.18*** (.04)	-.48*** (.04)	.31*** (.04)
Social context factors				
Friends' academic press ^c	.09* (.04)	.14* (.06)	.04 (.05)	.03 (.07)
Parents' educational attainment	.06** (.02)	.05 ⁺ (.03)	.07* (.03)	.18*** (.04)
Adolescent characteristics				
Athletic status	-.02 (.06)	.09 (.06)	-.06 (.07)	.06 (.08)
Extracurricular participation	.07* (.03)	.06 (.04)	.06 (.04)	.02 (.05)
Δ truancy between Waves I & II	.02 (.03)	-.16*** (.05)	-.06 (.04)	-.07 (.04)
Truancy (Wave I)	.04 (.04)	-.16* (.07)	-.05 (.04)	-.13** (.05)
Δ school attachment between Waves I & II	-.02 (.05)	-.07 ⁺ (.04)	.06 (.04)	.06 (.07)
School attachment (Wave I)	-.03 (.04)	-.01 (.06)	.08 (.05)	.12 (.07)
Δ delinquency between Waves I & II	-.05** (.02)	.04 (.03)	-.01 (.02)	-.01 (.03)
Delinquency (Wave I)	-.04 ⁺ (.02)	.01 (.03)	.02 (.02)	.01 (.03)
Δ closeness to parents between Waves I & II	.14* (.06)	.13 ⁺ (.04)	.01 (.08)	-.06 (.10)
Closeness to parents (Wave I)	.05 (.05)	-.02 (.07)	.01 (.08)	-.20 ⁺ (.11)
Math (9th grade)	—	.80*** (.04)	—	.82*** (.05)
Math grades (9th grade)	—	.51*** (.04)	—	.35***
Sociodemographic controls				
Grade level	-.15** (.05)	.08 (.08)	.04 (.07)	.26** (.09)
African-American ^a	.37*** (.09)	.24 ⁺ (.14)	.25* (.10)	-.01 (.13)
Asian-American	.08 (.15)	.11 (.24)	-.16 (.23)	.07 (.14)
Latino/a	.15 (.10)	.14 (.15)	-.16 (.10)	.22 (.24)
Other race/ethnicity	.09 (.15)	-.09 (.20)	-.21 (.18)	.14 (.20)
Second generation immigrant ^a	.01 (.16)	.22 (.24)	.18 (.18)	-.20 (.28)

	b Coefficients (SE) for Girls		b Coefficients (SE) for Boys	
	Predicting Δ Perceived Intell. (Wave I–Wave II)	Predicting Final Math	Predicting Δ Perceived Intell. (Wave I–Wave II)	Predicting Final Math
Third-plus generation immigrant	.11 (.12)	.03 (.20)	.01 (.16)	–.24 (.25)
Family structure (two-parent)	.03 (.05)	.12 (.08)	.05 (.05)	.14 (.08)
Intercept	3.03*** (.59)	.52 (.81)	1.00 (.69)	–1.13 (1.07)
N	1,603		1,415	

Source: Add Health/AHAA

^a No academic markers was the reference category for the academic group dummy variables, Non-Latino/a white for race/ethnicity, and first generation for immigration status.

^b The fifth variable in the academic groups set of dummy variables, not shown, included those missing data.

^c A binary marker of imputation on friends' academic press included as a control.

⁺ $p < .10$

^{*} $p < .05$

^{**} $p < .01$

^{***} $p < .001$ (two-tailed tests)

Table 5

Partial Results of Full Path Model for Girls, Including Interaction Terms Predicting Change in Perceived Intelligence between Wave I and Wave II

	b Coefficients (SE) for Girls' Δ Perceived Intell.	
	Model 1	Model 2
Academic groups		
Both academic markers ^{ab}	-.19 (.23)	-.47 (.59)
Learning disability only	-.37 (.24)	-.57 (.50)
Failure only	-.20 ^{**} (.08)	.08 ^{**} (.02)
Social context factors		
Friends' academic press ^c	.17 ^{***} (.05)	.07 (.04)
Parents' educational attainment	.06 ^{**} (.02)	.08 ^{***} (.02)
Academic groups $\times$ social context factors		
Both markers $\times$ friends' academic press	.21 (.39)	—
Disability only $\times$ friends' academic press	-.15 (.32)	—
Failure only $\times$ friends' academic press	-.35 ^{***} (.11)	—
Both markers $\times$ parents' educational attainment	—	.09 (.22)
Disability only $\times$ parents' educational attainment	—	.10 (.15)
Failure only $\times$ parents' educational attainment	—	-.13 [*] (.06)
Intercept (Δ perceived intelligence)	3.09 ^{***} (.58)	3.00 ^{***} (.60)
<i>N</i>	1,603	1,603

Source: Add Health/AHAA

^aNo academic markers was the reference category for the academic group dummy variables.

^bThe fifth variable in the academic groups set of dummy variables, not shown, included those missing data.

^cA binary marker of imputation on friends' academic press included as a control.

⁺
 $p < .10$

^{*}
 $p < .05$

^{**}
 $p < .01$

^{***}
 $p < .001$ (two-tailed tests)