Academic Resilience among Low SES High School Students

Anne K. Driscoll

University of California, Davis

Background

Most work on minority and disadvantaged students, who are at higher risk of sub-optimal academic outcomes than their peers, focuses on the determinants of this underachievement. While this is useful work, it is also instructive and complementary to concentrate on the factors and processes that lead to successful outcomes among students at risk for failure. For a host of reasons, low-income students are at higher risk of not graduating from high school than their more advantaged peers. Poverty is harmful to the physical, socioemotional and cognitive well-being of children and adolescents.

Students from families with incomes in the bottom quintile are six times more likely to drop out of high school than students whose family incomes place them in the top quintile (U.S. Department of Education, 2004). Yet, many manage to accomplish this feat, demonstrating academic resilience in the face of an array of obstacles.

Nevertheless, those living in poverty are more exposed to family turmoil, less stimulating home environments and lower quality schools than non-poor children (Evans, 2004). Yet, not all students from low-income families are at risk for academic failure as poor children vary on a variety of other factors linked to academic outcomes. Poverty increases the odds of such failure but more proximal risks play an important role as well. This study examines the factors that promote academic resilience among poor students thus focusing on students who are at relatively high risk for academic failure.

Resilience can be thought of as competence in the face of significant challenges to achievement or development (Masten & Coatsworth, 1995). Thus, the construct of resilience combines two dimensions; the first is exposure to adversity or risk, the second is positive

reactions or adaptation to this exposure. Resilient individuals demonstrate competence in the face of risks or adversities that much work has shown to be associated with negative outcomes. Thus, only individuals who must overcome challenges to achieve or become competent can be termed resilient. Those who have positive outcomes or achievements but did not need to overcome barriers or challenges to achieve these outcomes are competent but cannot be considered resilient.

Protective factors interact with sources of risk. Under conditions of high risk, protective factors reduce the probability of negative outcomes when risks are high; under conditions of low risk, there is no association between the protective factors and outcomes. (For example, students from middle-class families with educated parents, a low-risk environment for school failure, may not benefit from interventions designed to lower the risk of dropout because the original risk was low to begin with. But students from low-income families whose parents are not high school graduates themselves may benefit from such interventions.)

The concept of resiliency used here draws upon past work in the area that conceives of resiliency not as an individual trait or characteristic but as a dynamic process in the lives of people facing adversity or significant challenges (Luthar, Cicchetti & Becker, 2000). This process consists of the interaction of risk and protective factors that range from the individual to the social (Prelow & Loukas, 2003). In particular, the focus of this inquiry is on the interaction of individuals' attributes with their environment.

Resilience-promoting factors are located in three concentric areas of young people's lives. The first level is the individual's own attributes; the second is family qualities and environment. The third area includes people and systems external to the individual and the family, such as schools, neighborhoods and communities and supportive individuals in these

areas (Garmezy, 1985, 1991; Luthar, Cicchetti & Becker, 2000; Werner, 1995). Both risk and resilience factors may be static (e.g., gender or race/ethnicity) or on-going (e.g., poverty, family conflict or parental support) (Compas, Hinden & Gearhardt, 1995).

Resilience is viewed as the outcome of interactions of two key sets of components: 1) individual attributes, and 2) external resources and supports upon which youth can draw. This process can be accurately represented as the interplay between individual traits and external factors such as family environment and peer and teacher attributes. Teens with high levels of resiliency, comprised of both the individual ability to cope and to take advantage of resources, and the presence of those resources, are predicted to have better outcomes than teens with lower levels of resiliency.

At the level of the individual, a number of characteristics have been found to be associated with resilience. High intellectual function has been shown to be associated with positive outcomes among at-risk youth, particularly academic outcomes (Garmezy, 1991; Masten & Coatsworth, 1998; Werner, 1995). Students who perform well in class and attain high test scores are more likely to remain in school, graduate and go on to higher education than students who do poorly in class and struggle academically.

Resilient children, those who scored in the healthy range on measures of emotional well-being and mental health in the face of negative life events and chronic strains, had more self esteem than their less resilient counterparts (Buckner, Mezzacappa & Beardslee, 2003; Masten & Coatsworth, 1998). Self esteem is also negatively associated with the propensity to initiate risky health behaviors among adolescents; resilient teens had higher self esteem than non-resilient teens (Rouse, Ingersoll & Orr, 1998).

A sense of control over the events and direction of one's life is associated with positive outcomes in a variety of domains, including psychosocial and academic domains. Individuals with an internal locus of control, that is, those who believe that they have control over their lives, are more likely to be able to overcome adversity and exhibit healthy development and positive outcomes than youth who believe that their fate is largely at the mercy of external forces (Masten & Coatsworth, 1998; Schunk, 1989, 1991; Werner, 1989; 1995; Zimmerman, 1995).

Research has linked an internal locus of control to academic resilience (Rouse, 2001). For example, a more internal locus of control was positively associated with subsequent academic achievement among middle and high school students (Connell, Spencer & Aber, 1994). An internal locus of control may affect academic achievement via a higher motivation to learn due to a belief in the ability of knowledge to be useful and persisting with schoolwork in the belief that one's own efforts will pay off. Middle school students with low reading levels but an internal locus of control were more likely to attain high proficiency in reading by their senior year than those more apt to view events and situations as outside their control (Capella & Weinstein, 2001). Poor African American and Latino students with a higher cognitive self-concept exhibit higher academic resilience in the form of class grades than those who had less firm beliefs in their own ability, the level of environmental support they had, their control over their chances of success and the importance of doing well in school (Gordon, 1995; 1996).

A number of other individual characteristics related to academic experiences have been examined to determine which are related to academic resilience, that is, academic persistence and high achievement and attainment in the face of obstacles. Low-income, minority students categorized as resilient by virtue of their positive academic outcomes were more academically engaged in class than those who had poor grades and failed to graduate. These resilient students

were also more likely to work hard, do more homework, less likely to skip class, be late or get in trouble in class than their non-resilient peers (Finn & Rock, 1997). Other forms of school engagement also predict positive outcomes. Students with low grades and educational expectations who participated in school activities were more likely to exhibit raised expectations and grades over time than those who did not take part in school-related activities (Catterall, 1998). In contrast, students labeled at-risk for academic failure because of low reading grades in eighth grade who were involved in extracurricular activities were no more likely to have improved their reading proficiency by senior year than those who did not participate in such activities (Capella & Weinstein, 2001).

Students with high educational expectations are less likely to be off-track academically, that is to earn low grades, be held back a grade or be suspended or expelled (Crosnoe & Elder, 2004). School-related behaviors and educational aspirations expectations are significantly associated with students' academic performance (Chang & Le, 2005).

Students who feel more comfortable in school have more positive outcomes than those who feel as if they do not belong. Among Mexican American high school students, those with high grades had a greater sense of belonging to their school than did students with failing grades (Gonzalez & Padilla, 1997).

Factors and conditions at the family and school levels also serve as resources upon which young people can draw to overcome obstacles to academic achievement. At the family level, parents' attitudes and actions influence their children's academic outcomes. Analyses of British adolescents suggested that socially advantaged youth benefited most from protective factors such as their own aspirations, their parents' involvement and teachers' expectations (Schoon, Parsons & Sacker, 2004). However, high parental educational expectations were more protective against

poor academic performance for disadvantaged youth than more advantaged teens suggesting that not all factors shown to be protective for general populations of young people are similarly protective for high-risk youth. Among Latino students in the U.S., level of parental academic involvement is positively associated with higher math and reading scores net of background and demographic factors (Eamon, 2005). Similarly maternal support is positively associated with grades among high school students (Kenny, Gallagher, Alvarez-Salvat & Silsby, 2002). Just as positive parental factors are associated with positive academic outcomes, youth who have poor relationships with their parents are more likely to experience poor academic adjustment (Crosnoe & Elder, 2004). For at least some students, those who are engaged in school receive greater parental support, a factor that further increases their odds of educational success than those who show more disaffected behavior patterns in school (Connell, Spencer & Aber, 1994). Such a pattern suggests that relationships between at least some individual traits and positive outcomes are moderated by factors at the family and, possibly, school and community levels.

At the school level, both teachers' interactions with students and students' interactions with their peers can serve as sources of support upon which students who face various obstacles can draw. Students with supportive teachers are less likely to experience various academic setbacks such as low grades, being suspended or expelled or repeating a grade. They are also less likely to skip school or fail to do their homework (Crosnoe & Elder, 2004). Students whose peers emphasize the value of education are more likely to be academically successful than their counterparts (Fuligni, 1997; Gonzalez, Cauce, Friedman & Mason, 1996).

This study examines a longitudinal sample of low-income students whose poverty status suggests that they are more likely to fail than more advantaged youth. We look at the relationships between high school students' individual resources and whether they graduated

from high school and whether these relationships are moderated by external sources of support. This paper takes a variable-focused approach to examining academic resilience among students who face the challenge of being raised in low-income families; academic resilience is defined as graduating from high school on time. Variable-focused strategies are useful for identifying relationships between risk and protective factors and for identifying the processes related to resiliency. A great deal of past research has focused on ascertaining the predictors of resilience; the next steps have been to focus on the mechanisms of how these factors promote or hinder resiliency, for whom and under what conditions or situations. Enhancing our understanding of the processes involved in building and sustaining resiliency will improve our ability to design and implement interventions for children and youth facing adversity.

This work on resilience draws upon the understanding that individuals who display resiliency do not fit the profile found by main effects models. Main effects models document the relationship between positive traits and environments and positive outcomes (and vice versa). Interaction models focus on individuals with different patterns, particularly those with negative inputs and positive outcomes and compare them to those with negative inputs and poor outcomes. Thus, interactions are the most valuable and distinguishing feature of resilience research (Roosa, 2000).

In addition, interaction models build upon previous research which focused on identifying individual and external attributes that are part of resilience by examining how factors at different levels interact with each other as well as the various results found for interactions of various factors. Interpreting these patterns leads to insights on the mechanisms through which various factors promote or hinder resilience.

The research questions addressed in this study are:

1. Which individual-level factors are predictors of high school graduation among low SES students?
2. What forms/sources of external support are predictors of high school graduation among low SES students?
3. Which of the significant associations between individual factors and high school graduation are moderated by external support and which types of support moderate these associations?

Data and Methods

Data

The data used in this project are from the National Education Longitudinal Study of 1988 (NELS:88). A nationally representative sample of eighth-grade schools and students was selected in 1988 using a two-stage stratified probability design. Schools were the primary sampling unit and students were the secondary sampling unit; 24,599 students from 1,057 schools participated in the base year interview. Students were reinterviewed in 1990, 1992 and 1994 (National Center for Education Statistics (NCES), 1994). Those with mental or physical disabilities which prevented them from filling out the questionnaires were not included nor were students whose command of English was insufficient to complete the questionnaires and tests. Latinos and African Americans were oversampled, resulting in sufficient numbers for analysis.

In the base year of 1988, students and a parent were interviewed. Demographic information, such as race/ethnicity, family structure, size and income, and parental education, was collected at this point. In addition, students were asked about their educational expectations. Students were followed through 1994 when they were asked whether they had graduated from high school and the timing of their graduation. The longitudinal design of the data set allows researchers to follow teens from middle school until past high school and to draw causal conclusions because timing of events, attitudes and perceptions are known.

Variables

High school graduation. On-time graduation from high school is the outcome of interest and serves as a measure of academic resilience.

Three sets of individual factors are examined: academic performance (math test scores, reading test scores, GPA), academic attitudes (school engagement, attitude towards school, preparedness, educational expectations), and psychosocial factors (locus of control, self worth, optimism). External sources of support examined are: parental educational expectations, support for their child's education, communication with their child about school, involvement in their child's education and autonomy granted, teacher support and peers' attitudes towards education. Students were the source of all information and all variables were measured when students were high school sophomores.

Academic performance. Math and reading test scores are from standardized tests administered for the NELS:88 interview. Grade point average (GPA) was the mean of students' grades in four

core courses: English, math, science and history in sophomore year. Grades for each course ranged from 0.5 (below D) to 4.0 (A).

Academic attitudes. School engagement consists of a four-item scale that measured students' willingness/eagerness to participate in the learning process. Students were asked whether it was okay to work hard for good grades, whether it was okay to ask challenging questions, whether it was okay to solve problems with new ideas and whether it was okay to help other students with their homework. Cronbach's alpha for this scale was 0.62.

Attitudes towards school was captured via a three-item scale that measured students' assessment of how interesting they found their classes, how much satisfaction they felt in doing what was expected of them in class and how much they thought their teachers cared and expected them to succeed in school. Cronbach's alpha for this scale was 0.74.

Preparation for class was measured via a three-item scale that assessed how often students reported arriving in class with pencil and paper, with their textbooks and with their homework completed. Cronbach's alpha for this measure was 0.70.

Students' educational expectations for the future were measured via a variable that combined two measures: how far students expected to go in school and the timing of their plans. The first item asked students whether they expected to not go beyond high school, go to college but not earn a B.A., earn a B.A., or go beyond a four-year degree. The second item asked students if they planned to go to college immediately after high school, after one or more years after high school or not at all. Students who planned to enroll in college immediately after high school *and* who expected to at least earn a bachelor's degree comprised one category, those who either expected to wait one or more years to enroll in college *or* had lower educational

expectations (that is, did not expect to earn a B.A.) made up a second category. Those who had no plans to go to college made up the third category.

Psychosocial factors. Self worth was measured using an NCES-constructed scale comprised of seven items: "I feel good about myself", "I feel I am a person of worth, the equal of other people", "I feel useless at times" "On the whole, I am satisfied with myself", "I am able to things as well as most other people", "At times, I think I am no good at all" and "I feel I do not have much to be proud of".

Locus of control was also measured using an NCES-constructed scale consisting of six items: "I don't have enough control over the direction my life is taking", "In my life, good luck is more important than hard work for success", "Every time I try to get ahead, something or somebody stops me", "My plans hardly ever work out, so planning only makes me unhappy", "When I make plans, I am almost certain I can make them work" and "Chance and luck are very important for what happens in my life".

Students' level of optimism about their futures was measured via a scale comprised of 12 items, each asking students their chances of outcomes such as having a job that pays well, being respected in one's community, having a happy family life and owning a home. Responses ranged from 1 (very low) to 5 (very high). The Cronbach's alpha for this scale was 0.89.

Parental factors. Parental support for their child's education was measured via a four-item scale. The items were: how often parents check their child's homework, how often they help with homework, how often they give privileges for good grades and how often they limit privileges for poor grades. Cronbach's alpha for this scale was 0.75. Degree of parental communication

with their child about school was measured using a five-item scale. Items asked how often students discussed with their parents school courses, school activities, things studied in class, grades, plans and preparation for the SAT or ACT, and going to college. Chronbach's alpha for this scale was 0.78. Level of parental involvement was measured by asking students how often their parents attended school meetings, attended school events and acted as a school volunteer. Cronbach's alpha for this three-item scale was 0.68. The level of autonomy students said their parents granted them was measured via a scale consisting of questions asked of students about who decides about various topics – parents only, student only or both. The items are: how late the student can stay out, the friends the student spends time with, which classes the student takes, if the student can take a job, the age at which the student can leave school, how the student spends his/her own money, whether the student can date, whether the student can go out for school sports, whether the student can be in school activities, and whether the student should go to college. Cronbach's alpha for the items in this scale is 0.79. Students were asked how far their parents expected them to go in school. Those who reported that either parent expected them to graduate from college were classified as having parents with high educational expectations; all others were labeled as having parents with low expectations for them.

Teacher support. The level of support that students perceive from their teachers was measured using a five item scale. Students were asked to respond to the following statements: the teaching is good, teachers are interested in students, when I work hard teachers praise my effort, in class, I often feel "put down" by teachers (reverse-coded), and most teachers really listen to what I have to say. Cronbach's alpha for this scale was 0.74.

Peer attitudes towards school. Students were asked how important the following were to the friends they hang out with: attend classes regularly, study, get good grades, finish high school, and continue one's education beyond high school. Cronbach's alpha for this five-item scale was 0.84.

Parental factors, teacher support and peer school attitudes are the variables in the multivariate analyses that modify the relationships between the individual-level factors and the odds of graduating from high school. To ease the interpretation of the results, these external variables were dichotomized to create two levels which could then be compared.

Sample Description

The sample includes all white, African American and Mexican-origin students who attended public schools as eighth graders who lived in families whose incomes were at or below the poverty line when they were in eighth grade.

Table 1 presents basic demographics of the sample. The study sample contains a slightly higher percentage of females than males. Just under half (47.1%) of the sample is non-Latino white, one-third (34.1%) is African American and almost one in five (18.8%) is of Mexican origin. Only two in five (41.5%) lived with both their parents in eighth grade and three in ten (30.6%) had parents with less than a high school education.

Three in four (76.0%) public school students living in poverty as eighth graders went on to graduate from high school on schedule (Table 1). (In comparison, 88.8 percent of other students graduated from high school, a statistically significantly higher percentage.) Among students at risk for low educational attainment due to living in poverty, other demographic factors are not associated with high school graduation.

Table 1. Sample Demographics and Associations with High School Graduation

	% of Sample	% Graduated from High School
Sex		
Male	46.8	75.9
Female	53.2	75.9
Race/Ethnicity		
White	47.1	75.7
African American	34.1	75.9
Mexican	18.8	77.0
Live with both parents		
Yes	41.5	77.8
No	58.5	74.8
Parental education		
Less than high school	30.6	73.4
High school graduate	26.8	76.9
Beyond high school	42.6	77.3
Total		76.0

Analyses

Descriptive analyses compared individual-level factors across students who graduated from high school and those who did not. Multivariate logistic regression models were used to predict the odds of graduating from high school. Each included interaction terms in which individual-level factors were interacted with external factors to assess whether the relationships between the individual-level variables and the odds of high school graduation were moderated by parental, teacher and peer variables. All multivariate models contain controls for sex, race/ethnicity, family structure and parental education.

Results

Descriptive Results

Table 2 presents the mean values for the individual-level factors of students who graduated from high school and those who did not. In each case, the mean value of those who graduated was significantly higher than for those who did not.

Table 2. Associations between Individual Factors and High School Graduation

	Graduated from High School	
Mean values	Yes	No
Academic Performance		
GPA*** (0.5-4.0)	2.74	2.18
Math score*** (32-70)	46.8	43.4
Reading score*** (31-69)	46.2	42.0
Academic Orientation		
Prepared for class** (2-12)	9.66	9.13
Positive school attitude* (1-12)	8.57	8.23
Engagement in school* (0-4)	3.72	3.57
Educational expectations*** (%)		
Start college immediately, earn B.A.	93.8	6.2
Delay college/less than B.A.	75.7	24.3
No college plans	66.3	33.7
Psychosocial Factors		
Locus of control*** (-2.66 – 1.43)	-0.05	-0.28
Self worth* (-2.95 – 1.34)	0.02	-0.11
Optimism*** (1-5)	3.98	3.81

$^{+}p < 0.1$; $*p < 0.05$; $**p < 0.01$; $***p < 0.001$

Multivariate Results

The relationships between both math and reading scores and the odds of graduating from high school are moderated by level of teacher support (Table 3). For each one unit increase in math scores, the odds of graduating increased 5% more for students with higher perceived support from teachers than for those with lower support. Similarly, the chances of graduating increased 6% more with each one unit increase in reading scores for those with higher teacher support than those with less support. Thus, students with high math and reading scores are better able to benefit from teacher support than those with lower scores.

Table 3. Odds of High School Graduation:
Significant Interactions between Academic Performance and External Factors

	Odds Ratio: High vs. Low External Factor
Reading score	
Teacher support	1.05^{+}
Math score	
Peer attitudes toward school	1.06*
Talk with parents about school	1.05^{++}
Teacher support	1.06*
GPA	
Talk with parents about school	1.95*

$^{++}p < 0.2$; $^{+}p < 0.1$; *p < 0.05; **p < 0.01; ***p < 0.001

The relationships between both math scores and grades and the likelihood of finishing high school are moderated by how often students talk to their parents about school. For each one-unit increase in math scores the odds of graduating increase by 5% more for students who discuss school with their parents often than for those who talk to their parents less often. With each one letter increase in GPA, the odds of graduating increase almost twice as much for students who talk with their parents about school often as for those who discuss school less frequently with their parents. That is, students with high math scores and GPAs were better able to "convert" frequent discussion with their parents into higher odds of graduating from high school than those with lower scores and grades.

The relationship between math scores and the odds of graduating from high school is moderated by peers' attitudes towards school. Each incremental increase in math scores is associated with a 6% higher chance of graduating among students whose peers value education more highly than for those whose peers have less positive attitudes towards school.

Table 4. Odds of High School Graduation:
Significant Interactions between Psychosocial and External Factors

	Odds Ratio: High vs. Low External Factor
Locus of control	
Parental involvement in education	2.27*
Peer attitudes towards school	2.09*
Teacher support	3.13***
Self worth	
Talk with parents about school .1994	1.46^{++}
Optimism	
Talk with parents about school .1662	1.72^{++}

$^{++}p < 0.2$; $^{+}p < 0.1$; *p < 0.05; **p < 0.01; ***p < 0.001

The relationship between locus of control and the likelihood of finishing high school is moderated by parental, peer and teacher influences (Table 4). For each one-unit increase in locus of control the odds of graduating increase more than twice as much for students who experience high levels of parental involvement as for those whose parents are less involved in their education. A similar pattern was found for peer attitudes towards school: for each increase in locus of control the odds of graduating increased twice as much for students whose peers had positive opinions of school as for those whose peers had more negative attitudes towards school. For students who perceived their teachers as very supportive, each increase in locus of control was associated with an increase in the odds of graduating that was more than three times that for those who experienced less support from teachers.

The relationships between both self worth and optimism and the chances of graduating from high school are moderated by how often students talk to their parents about school at a marginally statistically significant level. Each incremental increase in self worth is associated with a 46% greater increase in the odds of graduation for students who frequently discuss school with their parents than for those who talk about school with their parents less often while each

increase in level of optimism is associated with a 72% greater increase in the odds of finishing school for those who have frequent conversations with their parents than those who do not.

Table 5. Odds of High School Graduation:
Significant Interactions between Academic Orientation and External Factors

	Odds Ratio: High vs. Low External Factor
Attitude towards education	
Parental expectations	1.23^{+}
Parent support	0.80*
Teacher support	1.26^{+}
Engagement	
Activities with parents	1.51^{+}
Teacher support	2.16*
Parent support	0.57*
Prepared for class	
Teacher support .1622	1.15^{++}
Activities with parents .1064	1.18^{+}
Educational expectations	
Parental involvement in education	1.65^{+}
Parental educational expectations	1.76*
Talk with parents about school	2.09***
Parental monitoring	1.42^{+}
Peer attitudes towards school	1.51^{+}

$^{++}p < 0.2$; $^{+}p < 0.1$; *p < 0.05; **p < 0.01; ***p < 0.001

The relationships between various measures of academic orientation and the odds of graduating from high school were moderated by external factors. The relationship between a positive attitude towards education and the likelihood of finishing high school is moderated by parental and teacher support and parental expectations (Table 5). For each one-unit increase in the attitudes scale, the odds of graduating increase by 23 percent more for students whose parents have high expectations for their educational futures as for those whose parents have lower expectations. Teacher support and parental support appear to function in different directions as moderators of the relationship between school attitudes and high school graduation. As school

attitudes become more positive, those with high parental support are less likely to graduate than those with less support form parents; the reverse pattern was found for teacher support.

Parental support acts similarly as it moderates the relationship between level of engagement in school and the odds of graduation. For each one-unit increase in engagement, the odds of graduating decline by 43 percent among students whose parents offer more support than those whose parents are less supportive. However, among those who engage often in activities with their parents, each increase in school engagement is associated with a 51 percent higher likelihood of graduation compared to those who do not participate in activities with their parents often. Teacher support also moderates the relationship between school engagement and the chances of finishing high school. As level of school engagement increases, the odds of graduating from high school increase for students with high teacher support by more than twice that for students with low levels of support from teachers.

Teacher support also marginally moderates the relationship between class preparedness and graduation. As level of class preparation rises, the odds of graduation increase more for students with supportive teachers than for those without. Participation in activities with parents moderates the relationship between class preparedness and high school graduation in a similar way and at a similar level.

The relationship between students' educational expectations and plans and their odds of graduating from high school is moderated by peer attitudes and several parental factors. As students' expectations and their certainty of their post-secondary planning rose, those whose parents were involved in their education, who had high expectations for them, who talked to their parents about school often and whose behavior was monitored by their parents were more likely

to graduate from high school than those whose parents fell into the complementary categories. In addition, as expectations and certainty rose, students whose peers had more positive attitudes towards school were more likely to graduate than those whose peers placed a lower value on education.

Discussion

This study explores how factors external to low-income school students affect the relationship between their specific individual strengths and their odds of graduating from high school. The findings suggest that the relationships between individual-level factors and the chances of graduating from high school among a sample of low income students vary by the level of external support available to them.

Parent-level factors were particularly likely to affect the associations between students' academic orientation and attitudes and the odds of finishing high school. Interestingly, parental support, as defined here, lowered the odds of high school graduation for each level of student educational attitudes and school engagement. A possible explanation for this finding is that students who, for reasons not measured here, are struggling in school tend to elicit more support from parents in the form of overseeing homework and offering grades-based incentives and disincentives than those who are doing better.

However, each of the other parent-level factors positively moderated the associations between students' academic orientation and attitudes. The results suggests that low-income students benefit from both their parents' specific interest in their education as well as from more general interactions with their parents and that parents are important in enhancing the odds of

academic success among students. More specifically, among students with similar levels of positive academic orientation and behavior, those with positive parental-level factors are more likely to be academically successful than those who lack this source of resilience.

Student-parent communication regarding school also enhanced the likelihood of graduation for students at each level of academic performance. This finding suggests that parents who talk to their children about school can increase the odds of graduation among children with lower grades to a level associated with that of students with higher grades. Students who reported high levels of support from their teachers experienced a similar pattern. Among students with similar reading and math scores, those with supportive teachers had a greater likelihood of graduating than those with less teacher support.

Communication with parents seems to marginally enhance students' odds of graduating at each level of students' self worth and optimism about the future. In contrast, locus of control has been repeatedly shown to be a form of resilience associated with positive academic outcomes. These results suggest that parents, peers and teachers can all enhance the positive role of an internal locus of control on the chances of finishing school above and beyond the main effects relationship between locus of control and high school completion. This pattern suggests that students with an internal locus of control can draw on a variety of external sources of resilience to improve their outcomes. This flexibility would be important to students who do not have access to all three sources of resilience but are able to take advantage of at least one form of external resilience.

These findings suggest that interventions designed to increase high school graduation rates among low-income students would be most likely to be successful if they simultaneously address both individual and external sources of resilience. Future research would be able to

refine the interactions between individual and external sources of resilience and lead to more tailored interventions.