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Effects of Motivation, ACT/SAT, GPA, and SES on College Choice for Academically Advanced Students and Other Students

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Abstract

The purpose of this study was to examine the differences in the effects of motivation factors on college choice between academically advanced students and other students. College choice ranged from no college, two-year college, four-year college, moderately selective four-year college, and highly selective four-year college. Restricted data from the nationally representative Education Longitudinal Study (ELS) of 2002 were used for the analysis. Using the ELS questions, 8 motivation constructs (general intrinsic motivation, math intrinsic motivation, reading Intrinsic motivation, extrinsic motivation, general academic self-efficacy, math self-efficacy, English self-efficacy, and educational expectation) were developed. Structural equation modeling was used to investigate the direct and indirect effects of the factors on college choice. The results indicated that although ACT/SAT scores, followed by GPA, are the most important factors for both academically advanced students' and other students' choices of more selective colleges, their choices are mediated by their intrinsic reading motivation and math self-efficacy. Compared to other students', academically advanced students' extrinsic motivation more negatively affected, while Socio Economic Status (SES) less negatively affected, their choices of more selective colleges. Other students' high general academic self-efficacy and educational expectations positively affected their ACT/SAT scores, GPA, and choices of more selective colleges, which did not affect academically advanced students.

Keywords

college choice, educational expectation, Education Longitudinal Study, extrinsic motivation, institutional choice, college selectivity, intrinsic motivation, self-efficacy

1. Introduction

Many academically qualified students do not pursue higher education (Hanson, 1994). Among high school seniors in 2004, 22% of those who graduated high school or earned General Education Development (GED) equivalent did not enroll at a post-secondary institution by 2006. Bozick and Lauff (2007) found that the percentage of students, who attended any post-secondary institution, and their attendance at a highly or moderately selective post-secondary institution, varies by race and

increases with family income, parental education, and student educational expectations. The benefits associated with more selective post-secondary education include expectations for higher incomes, more fulfilling work environment, better health, longer life, and lower probability of unemployment (Bowen, 1997; McPherson, 1993). In 2005, the median high school graduate income was $28,000, as compared to $65,000 for those with a bachelor's degree or higher (Weinberg, 2004).

2. Factors T0hat Affect College Choice

2.1 College Selectivity

College selectivity is often estimated by average test scores of incoming students on the Scholastic Assessment Test (SAT)[i]/American College Testing (ACT)[ii] (Pascarella et al., 2006). Besides incoming students' ACT/SAT scores, their GPA is also used when ranking colleges and universities (Barron's, 2000; Carnegie, 2009; Morse & Flanigan, 2008). The most widely used college selectivity ranking is the annual report by U.S. News & World Report, which is supposedly based on the quality of undergraduate education (Ehrenberg, 2003). Some studies, however, show little relationship between U.S. News & World Report rankings and good practices or quality of education (National Survey of Student Engagement, 2001; Pascarella et al., 2006). But college and university rankings in the U.S. News & World Report have a big impact on public perception and behavior (Stearns, Potochnick, Moller, & Southworth, 2010). Higher college selectivity is associated with many benefits to students. The benefits of a higher college selectivity include higher levels of stimulation and challenge provided by interactions with other students in and out of classrooms, higher academic expectations and demands from professors (Pascarella et al., 2006), and more distinguished faculty members (Flowers, 2007). More selective institutions also boast higher student retention and graduation rates, and higher institutional expenditures for instructional and academic support (Gransemer-Topf & Schuh, 2006; National Center for Education Statistics, 2006). Higher college selectivity can also lead students to higher educational attainment, productivity, higher-status occupations, higher income (Bowman & Mehay, 2002; Ehrenberg, 2003; Monks, 2000; Thomas, 2000), more advantageous social networks (Davies & Guppy, 1997), better opportunities to cultivate advantageous relationships (Davies & Guppy, 1997), better shopping for high-status marriage partners (Stearns, Potochnick, Moller, & Southworth, 2010), and higher levels of happiness and life satisfaction (Bowen & Bok, 1998).

2.2 Race

African American and Hispanic students are less likely to attend college, less likely to take the ACT/SAT (Kurlaender, 2006), and less likely to have access to selective institutions than Caucasian and Asian American students (Dickerson & Jacobs, 2006; Flowers, 2007; Karen, 2002), all more so for male than female students (Davies & Guppy, 1997; Flowers, 2007). Race influences the type of college a student chooses to attend more than SES and academic achievement (Ordovensky, 1995). However, when controlling for SES and academic achievement, African American students' probability of enrolling in a four-year college or university is 25% higher than that of comparable Caucasian students.

This might be because of African American students perceiving a higher return for attaining a baccalaureate degree, or because of affirmative action programs (Ordovensky, 1995). Thus, controlling for costs, benefits, financial resources, and academic ability, both African American and Hispanic students have a higher probability of college enrollment than Caucasian students have. This indicates that the actual lower enrollment rates may be due to lower levels of test scores, academically focused curricular programs in high school, and educational expectations (Perna, 2000).

2.3 SES

Socio Economic Status (SES) has a greater effect on college choice than race, ethnicity, or gender (Adelman, 2007). When students choose to enroll, low-income students demonstrate high likelihoods of enrolling in community colleges (Kurlaender, 2006). Enrolling in community colleges reduces the probability of attaining a bachelor's degree, even after taking background characteristics, educational expectations, and past academic performance into account (Alfonso, 2006; Brint, 2002; Choy, 2002). Prohibitive costs of selective colleges and universities and different perceptions of opportunities and knowledge of the educational marketplace may also explain this SES inequality in enrollment at institutions with higher selectivity (Davies & Guppy, 1997).

Students from lower-SES backgrounds are likely to attend lower-selectivity institutions and lower-spending institutions, but when they are academically strong, they usually attend more selective and higher spending institutions (Hearn, 1991). Baker and Vélez's (1996) review of the literature from the 1960's to the 1990's found that higher SES allows students greater access to four-year institutions, but the relative importance of SES has decreased while that of academic achievement has increased. After controlling for SES and academic achievement, African American and Hispanic students are more likely to attend college than Caucasian and Asian American students (Alexander, Pallas, & Holupka, 1987). African American and Hispanic Students who took more rigorous coursework attend more prestigious colleges and universities than Caucasian students in less challenging courses, which indicates that SES and racial inequalities mostly occur indirectly due to differences in academic achievement (Stearns, Potochnick, Moller, & Southworth, 2010).

2.4 ACT/SAT

Admission to selective institutions is mainly based on high school GPA and ACT/SAT scores. Almost 90% of four-year institutions require either the SAT or the ACT (Breland, Maxey, Gernand, Cumming, & Trapani, 2002). Four-year institutions tend to place considerably more importance on test scores than two-year institutions do, and highly selective institutions tend to weigh test scores more heavily in the admission decision than less selective ones do (Hawkins & Lautz, 2007). Breland et al. (2002) and Hawkins and Lautz (2007) found that ACT/SAT scores are the second most important factor in the admissions decision, after high school GPA.

Recent studies examined ACT/SAT scores' relationship to the theoretical factor of *g* that is a latent construct representing variance common to many cognitive tests. The factor loadings indicated that SAT (Coyle & Pillow, 2008; Frey & Detterman, 2004), and ACT (Coyle & Pillow, 2008; Koenig, Frey,

& Detterman, 2008) scores are highly related to g, which is also highly related to IQ. Thus, the theoretical conceptualization of ACT/SAT as indicators of academic *ability* is consistent with the theoretical framework of the present study, primarily to distinguish them from the academic *achievement* variable of GPA.

2.5 Motivation Factors

There are only a few studies that investigated factors that influence college choice among academically advanced students. Kim (2009) found that students' own interests (36%) and family environment such as parental expectations (31%) or a family job (19%) are the most important factors influencing advanced students' college choice. Additionally, expected income or motivation for success (8%) is an important influencing factor. Similarly, Cannon and Broyles (2006) found that the most important factors influencing advanced students' college choice are their career goals, learning opportunities, self-motivation, earning potential, and their mother's expectation. On the other hand, Griffith and Rask (2007) found that college rankings based on selectivity are the most important factor influencing advanced students' college choice.

For students in general, academic achievement determines who can enroll in college, yet SES and motivation play a major role in determining where students enroll. For advanced students, the relative strength of the individual factors influencing college choice might be different than that of other students. Determining the contribution of variables like motivation for advanced students' college choice is crucial to understanding their decision-making processes and further, to achieve an educational system that promotes equity rather than the systematic perpetuation of dominance based on SES.

2.5.1 Motivation

Motivation is the driving force that causes people to achieve goals and is a key factor in learning as well as in achievement (Brophy, 2004). Social cognitive theory stresses that people are motivated in multiple ways, and that understanding how and why people are motivated is important. One of the main assumptions of social cognitive theory is that motivation is contextual. Thus, not only are people motivated in multiple ways, but also their motivation varies according to the situation or context of the task. This means that motivation is a situationally sensitive construct and changeable (Bandura, 1997; Schunk, Pintrich, & Meece, 2008). Therefore, understanding various motivation factors that affect advanced students can be helpful to encourage them. The motivation factors for advanced students' achieving the goal of post-secondary education can be made up of many factors including: Extrinsic motivation, Intrinsic motivation, Self-efficacy, and Educational Expectation.

Intrinsic motivation is engaging in actions for their own sake without coercion, whereas Extrinsic motivation is engaging in actions for external rewards, in which the activity is a means to an end (Schunk et al., 2008). Ryan and Deci's self-determination theory (2000) illustrates Intrinsic motivation on one end, Extrinsic motivation in the middle, and Amotivation on the other end: on the Intrinsic motivation end of the continuum, an activity is pursued because of an inherent desire for learning or

interest. Within the Extrinsic motivation area of the continuum, activities are engaged in to avoid punishment, gain rewards, or to prove self-worth through achievement. On the Amotivation end of the continuum, there is no perceived connection between effort and goals. This theory embraces the idea that motivation springs from self-interest, and that achievement-related behaviors are based on their perceived amount of self-determination in pursuing their goal (Ryan & Deci, 2000).

Previous research has concluded that Intrinsic motivation can foster students' learning and achievement better than Extrinsic motivation (Schunk et al., 2008). Extrinsic motivation is positively related to students' reading frequency (Wigfield & Guthrie, 1997), but after controlling for Intrinsic motivation it is negatively related to students' amount of reading (Wang & Guthrie, 2004). Additionally, Extrinsic motivation is negatively related to text comprehension (Wang & Guthrie, 2004) and to students' reading achievement (Law, 2008). This is because extrinsically motivated students exert only the minimum behavioral and cognitive effort they need to do in order to achieve an academic goal (Lei, 2010). However, Extrinsic motivation and Intrinsic motivation are not always mutually exclusive (Hidi & Harackiewicz, 2000; Lepper, Corpus, & Lyengar, 2005). Both Extrinsic motivation and Intrinsic motivation can coexist in one effort, as students can strive for good grades and a feeling of mastering a subject matter (Ormrod, 2008). In addition, both of them can also exist sequentially because students can start learning for external rewards, but later can internalize the value and importance of learning in itself (Ryan & Deci, 2000). Thus, a combination of both Extrinsic motivation and Intrinsic motivation can be more beneficial to learning than either Extrinsic motivation or Intrinsic motivation alone (Guthrie, Wigfield, Metsala, & Cox, 1999; Wang & Guthrie, 2004).

2.5.2 Self-Efficacy

Research has shown that Self-efficacy is positively related to academic performance (Bong, 2001; Lane, Lane, & Kyprianou, 2004; Richardson, 2007). Self-efficacy is different from self-esteem in that Self-efficacy is one's self-perceived ability (proven by experience) to successfully perform a specific task, and self-esteem is one's sense of self-worth (Bandura, 1997). Self-efficacy is also different from confidence in that confidence is one's belief that does not necessarily specify what the certainty is about (Bandura, 1977). Self-efficacy is directly related to achievement in that if students have low self-efficacy and perceive that a particular task is too difficult, then they will not be very motivated to perform the task because they foresee failure (Bandura, 1991a). Thus, self-efficacy influences students' choices, effort, and persistence because: students with low self-efficacy tend to put in less effort or give up in difficult situations than students with high self-efficacy (Bandura, 1983, 1986, 1989, 1991b); adopt a surface approach to studying, whereas students with high self-efficacy tend to adopt a deep or strategic approach (Prat-Sala & Redford, 2010); and set lower goals, persevere less, and be less committed to the goals than students with high Self-efficacy (Bandura, 1983, 1986, 1989, 1991b), which might affect their college choice.

2.5.3 Educational Expectations

Educational Expectations are created by assessing the value of education in terms of abilities, past academic performance, ambition, and family situation (Andres, Adamuti-Trache, Yoon, Pidgeon, & Thomsen, 2007; Looker, 1997; McClelland, 1990). Parent educational Expectations influence their children's achievement in the same school year as well as years later (e.g., Bandura, Barbaranelli, Caprara, & Pastorelli, 1996, 2001; Keith et al., 1993; Thompson, Alexander, & Entwistle, 1988; Zhan, 2006). Parent Expectations influence their children's Expectations (Bandura et al., 2001; Kirk, Lewis-Moss, Nilsen, & Colvin, 2011; Esters, 2007; Froiland, Peterson, & Davison, 2013; Perna, 2000; Rutchick, Smyth, Lopoo, & Dusek, 2009; Wood, Kaplan, & McLoyd, 2007), which, in turn, influence their academic achievement (Froiland et al., 2013; Liu, Cheng, Chen, & Wu, 2009). Educational Expectations are often formed early (Eccles, Vida, & Barber, 2004). Early parent Expectations such as those in preschool (Raty & Kasanen, 2010) or kindergarten (Froiland et al., 2013) have long lasting effects on children's achievement many years later. Further, parent SES (Andres et al., 2007; Raty & Kasanen, 2010) and children's previous academic achievement (Zhang, Haddad, Torres, & Chen, 2011) influence parent Expectations. Parent Expectations are an important factor in determining college choice (Esters, 2007; Hossler & Stage, 1992; Perna, 2000). For example, students who have consistently indicated a desire to obtain a bachelor's degree tend to begin their post-secondary education at a four-year institution rather than at a community college (Kurlaender, 2006).

2.6 The Purpose and Research Questions of the Study

The purpose of this study was to examine how Extrinsic motivation, Intrinsic motivation, Self-efficacy, and expectation affect academically advanced students' decisions (compared to other students') regarding college choice compared to the effects of SES, academic *ability* (ACT/SAT scores), and academic *achievement* (GPA).

The research questions were:

1) How well do the measurement models for the proposed ELS items represent the hypothesized latent motivation variables fit the data?

2) How well do the structural models with or without SAT/GPA fit the data?

3) To what degree is college choice explained by motivation factors and SES with or without SAT/GPA?

4) Are the measurement and structural relationships invariant across academically advanced students and other students?

5) How much direct or indirect influence do motivation factors have on Choice compared to SES, ACT/SAT, and GPA for academically advanced students and other students?

3. Method

3.1 Data

The data for this study was from the nationally representative Education Longitudinal Study: 2002 (ELS: 2002), conducted by the National Center for Education Statistics (NCES), through the use of a Restricted Data Use License. The Institutes for Education Statistics, Data Security Office granted the license based upon the proposal for this study.

The sampling design of the ELS: 2002 involved a multistage, stratified cluster sample of students of 752 public, Catholic, and other private schools. There are four major data components of ELS: 2002, including a) base-year, b) first follow-up, c) high school transcript data, and d) second follow-up: e) in the spring of 2002, 15,362 high school sophomores completed the base-year questionnaire; f) the first follow-up took place in the spring of 2004, when most sample members were seniors in high school and 15,000 participated; g) one year after most sample members had graduated from high schools, transcripts were requested for all sample members who participated in at least one of the first two phases. At least one transcript was collected for 14,900 students; and h) the second follow-up took place in 2006, approximately two years after most sample members had graduated from high school, and 14,200 participated in the second follow-up (Ingels et al., 2007). The participants in this study ranged in age from 20 to 21.

Because there were many students who did not take SAT or ACT, missing values were deleted listwise resulting in 5,015 students, which included 2,723 (54.3%) female and 2,292 (45.7%) male. Participants' racial makeup for both academically advanced students and other students are presented in Table 1.

Table 1. Gender and Race/Ethnicity Frequency (*f*) and Percent for Total, Academically Advanced Students (AP), and Other Students

		Total (N=5,015) *f* (%)	AP (n=1,042) *f* (%)	Other (n=3,973) *f* (%)
Gender	Female	2723 (54.3)	600 (57.6)	2123 (53.4)
	Male	2292 (45.7)	442 (42.4)	1850 (46.6)
Race/Ethnicity	African American	417 (8.3)	44 (4.2)	373 (9.4)
	Asian	481 (9.6)	225 (21.6)	256 (6.4)
	Caucasian	3425 (68.3)	639 (61.3)	2786 (70.1)
	Hispanic	443 (8.8)	87 (8.3)	356 (9.0)
	More than one race	214 (4.3)	43 (4.1)	171 (4.3)
	Other*	35 (0.7)	4 (0.4)	31 (0.8)

Note. * American Indian/Alaskan Native and Native Hawaiian/Pacific Islander students were combined into the Other category because cell sizes in the Academically advanced students group dropped below the threshold mandated by NCES.

Academically advanced students in this study are defined as those who a) ever participated in their school district's gifted program, advanced placement program, or international baccalaureate program, or b) had been enrolled in three or more classes in advanced placement or international baccalaureate courses. This is similar to the procedures for identifying gifted students followed in Renzulli and Park's (2000) study. Based on the criteria above, 1,042 (20.8%) students were identified as academically advanced students, and 3,973 (79.2%) students were identified as other students.

According to the ELS variable classifications, SES is a composite of the five equally weighted, standardized components of family income, father's education, mother's education, father's occupation, and mother's occupation.

Using the ELS questions, constructs of Intrinsic motivation (General Intrinsic [1 question], Math Intrinsic [3 questions], Reading Intrinsic [3 questions]) Extrinsic motivation [5 questions], self-efficacy (General self-efficacy, Math self-efficacy, and English self-efficacy [5 questions each]), and educational Expectation [1 question to the student, to the student's mother, and to the student's father] were developed in this study. The college choice variable is based upon the selectivity of each student's first attended post-secondary institution (if any) within two years of his or her high school graduation. Choice was coded one through five: 1=No college; 2=two-year college; 3=four-year college; 4=Moderately selective four-year college; and 5=Highly selective four-year college. ACT/SAT scores were from a composite variable in the ELS data file, in which each student's highest SAT or ACT score was created as a value based on the SAT metric by converting the ACT scores if the ACT was the student's highest score.

3.1.1 Extrinsic Motivation

Extrinsic motivation consists of the following items: "learns skills for job in school; education is important to get a job later; studies to get a good grade; studies to increase job opportunities; studies to ensure financial security". These five items were chosen as indicators of Extrinsic motivation because each item asks the student about the importance of external rewards associated with academic success.

3.1.2 Intrinsic Motivation

Intrinsic motivation in this study includes Math Intrinsic motivation, Reading Intrinsic motivation, and General intrinsic motivation. General intrinsic motivation is "classes are interesting and challenging". Math Intrinsic motivation consists of the following items: "math is important; gets totally absorbed in math; thinks math is fun". Reading Intrinsic motivation consists of the following items: "reads in spare time; gets totally absorbed in reading; thinks reading is fun". These items were chosen as indicators of Intrinsic motivation because each item asks the student about their inherent desire, interest, and/or enjoyment of content.

3.1.3 Self-Efficacy

Self-efficacy is represented by three latent constructs: Math Self-efficacy, English Self-efficacy, and General Self-efficacy with five items per construct. Math Self-efficacy consists of the following items: "can do excellent job on math tests; can understand difficult math texts; can understand difficult math

class; can do excellent job on math assignments; can master math class skills". English Self-efficacy consists of the following items: "can understand difficult English texts; can understand difficult English class; can do excellent job on English assignments; can do excellent job on English tests; can master skills in English class". General Self-efficacy consists of the following items: "can learn something really hard; remembers most important things when studies; can get no bad grades if decides to; can get no problems wrong if decides to; can learn something well if wants to". These items were chosen as indicators of Math self-efficacy, English self-efficacy, or General self-efficacy because each item asks the student about their perceived ability to achieve specific tasks of academic success.

3.1.4 Expectation

ELS 2002 data from the 2004 senior class shows a trend that indicates a relationship between their educational Expectation in the 10th grade and their level of academic attainment two years after their anticipated high school graduation. Of the students whose Expectation was "high school or less", 26.2% were enrolled in a post-secondary institution. Of the students whose Expectation was "some college", 48.7% were enrolled in a post-secondary institution. Of the students whose Expectation was "bachelor's degree", 75.1% were enrolled in a post-secondary institution. Of the students whose Expectation was "graduate/professional degree", 85.7% were enrolled in a post-secondary institution (Bozick & Lauff, 2007). These percentages indicate a jump in post-secondary enrollment when the students' 10th grade Expectation was bachelor's degree or higher. In addition, they also indicate that of the students whose Expectation was "don't know", 55.4% were still enrolled in a post-secondary institution. In the present study also, over 50% of the students who indicated "don't know" were enrolled in a post-secondary institution. Thus, in order to clarify the rank of "don't know", the Expectation variable was recoded: 1="Less than high school graduation", 2="GED or other equivalency only", 3="High school graduation only", 4="Don't know", 5="Attend or complete 2-year college/school", 6="Attend college, 4-year degree incomplete", 7="Graduate from college", 8="Obtain Master's degree or equivalent", and 9="Obtain PhD, MD, or other advanced degree". The Expectation variable was calculated as a mean of student's, father's, and mother's educational expectations. This was because a) not all students reported all of the three Expectation, and b) studies have shown that student expectations are mainly influenced by their parent expectations.

3.2 Data Analysis

3.2.1 Structural Equation Modeling

Structural Equation Modeling (SEM) was conducted using AMOS (version 17) software (Arbuckle, 2008). SEM was selected as a statistical methodology for this study because of its several advantages over regression modeling (Bollen & Long, 1993; Byrne, 2010; Kline, 1998). Some of the advantages are as follows: it allows for complex theoretical structures that include multiple constructs to be tested; for studying multiple independent and mediator variables by examining both their direct and indirect effects; for providing more robust estimates by comparing alternative models to evaluate relative model fit, rather than being susceptible to error of interpretation by misspecification as in regression; and for

better model visualization through its graphical modeling interface (Bollen & Long, 1993; Byrne, 2010; Kline, 1998).

3.2.2 Assumptions and Estimation Method

Multivariate normality is a common assumption in SEM (Kline, 1998). The values of univariate and multivariate skewness and kurtosis were examined to determine whether each variable was normally distributed. No values of the skewness and kurtosis were greater than |1.0|. Data was also screened for outliers; there were two outliers, but no corrective action was taken because there were no differences in results when the outliers were removed. When the multivariate normality assumption is met, the Maximum Likelihood (ML) parameter estimates are asymptotically efficient, and the associated ML test statistic is asymptotically chi-square distributed and converges to its chi-square distribution quickly so that a chi-square approximation works well starting at medium sample sizes (Salvalei, 2008). Because the data met the multivariate normality assumption and there is a large sample size (N=5,015), ML estimation was used for all of the analyses.

3.2.3 Measurement Models

The first part of this study was to validate the measurement models. A Confirmatory Factor Analysis (CFA) of the measurement model allows researchers to evaluate whether all items on a particular scale represent the same latent construct (Byrne, 2010). CFAs were conducted to test the fit of the proposed measurement models.

Twenty-six ELS items were entered into the measurement models as multiple indicators to estimate the latent constructs. Items were recoded to ensure a common directionality. Three measurement models were hypothesized: extrinsic motivation was represented by one latent construct with five items. Intrinsic motivation was represented by two latent constructs of Math Intrinsic motivation and Reading Intrinsic motivation with three items per construct, and General Intrinsic motivation represented by a single observed item from the data set. Self-efficacy was represented by three latent constructs of Math self-efficacy, English self-efficacy, and General self-efficacy with five items per construct. The factor loadings from Extrinsic motivation to “learns skills for job in school”; from Math Intrinsic motivation to “math is fun”; from Reading Intrinsic motivation to “reads in spare time”; from General Self-efficacy to “can learn something well if wants to”; from Math Self-efficacy to “can understand difficult math texts”; and from English Self-efficacy to “can do an excellent job on English tests” were set to 1.0 to scale each of the latent constructs.

3.2.4 Structural Models

The second part of this study was to fit structural models. A structural model provides maximum likelihood estimates of all identified model parameters and evaluates the degree to which the model reproduces the observed variance-covariance matrix based on a chi-square goodness of fit statistic (Hoyle, 1995). Two hypothesized full models that included structural and measurement models were evaluated. The first full model that included ACT/SAT and GPA (SAT/GPA Model), suggested that the latent variables of Extrinsic motivation and Intrinsic Motivation, self-efficacy, and SES directly

influenced Expectation, GPA, and ACT/SAT, and also directly and indirectly influenced Choice. Additionally, Expectation directly influenced GPA and ACT/SAT and directly and indirectly influenced Choice. GPA directly influenced ACT/SAT and directly and indirectly influenced Choice. Finally, ACT/SAT directly influenced Choice.

In order to examine the unique contribution of Extrinsic motivation and Intrinsic motivation, self-efficacy, and Expectation to Choice, compared to SES, a second model that did not include ACT/SAT and GPA (Non-SAT/GPA Model) was proposed. According to this model, Extrinsic motivation and Intrinsic motivation, Self-efficacy, and SES directly influenced Expectation and directly and indirectly influenced Choice.

3.2.5 Multiple Group Analyses across Academically Advanced Students and Other Students

The third part of this study was to examine whether the measurement and structural relationships were invariant across academically advanced students and other students. Measurement invariance across academically advanced students and other students was assessed using multiple-group procedures in which sets of parameters were sequentially constrained in a series of hierarchically nested models. A statistically significant increase in χ^2 values between adjacent models indicated that the cross-group invariance constraints resulted in a statistically significantly worse fit. This was taken as an indication that the constrained parameters were not invariant. In addition to χ^2 difference tests, Cheung and Rensvold's (2002) suggestion that a difference of CFI less than or equal to .01 is an indication of invariance was also followed. The first model in this sequence was one in which all model parameters were allowed to vary across groups. In the second model, factor loadings were constrained to be equal across groups. The third model added the constraint of factor variances and covariance equality across groups to Model 2. The fourth model added the constraint of β equality across groups to Model 3. The fifth model added the constraint of structural means equality across groups to Model 4. The final model added the constraint of structural variances and covariance equality across groups to Model 5.

3.2.6 Direct and Indirect Effects

Standardized indirect effects are determined by multiplying the pair of structural paths from independent variables to dependent variables. Bootstrapping is used to test the significance of the indirect effects (Shrout & Bolger, 2002). Bootstrapping is a preferred method for testing indirect effects in mediation analyses because it provides asymmetric confidence intervals around the estimate (Mallinckrodt, Abraham, Wei, & Russell, 2006). For this study, 10,000 samples were bootstrapped to generate empirically based 95% bias-corrected confidence intervals for the unstandardized indirect effects. Using bias-corrected confidence intervals is preferred to percentile confidence intervals because bias-corrected confidence intervals produce more accurate values (Arbuckle & Wothke, 1999). For statistical significance tests, considering the large sample size and multiple tests of statistical significance on the same data of the present study, a conservative statistical criterion (p<.001) was used to protect against Type I error.

4. Results

4.1 Measurement Models

At the outset, reliability analysis was utilized to collapse variables into an Extrinsic motivation construct, two Intrinsic motivation constructs, and three self-efficacy constructs. Alphas for all constructs ranged from .83 to .93. The three measurement models were tested: model Extrinsic motivation with a latent variable; Model Intrinsic motivation with the two latent variables of Math Intrinsic motivation and Reading Intrinsic motivation and the observed variable General Intrinsic motivation; and Model self-efficacy with the three latent variables of General self-efficacy, Math Self-efficacy, and English Self-efficacy. As Table 2 shows, the results indicated that all of the three models fit the data well. Because CFA supported that each model fit the data well, and because the hypothesized constructs measure discrete, single latent variables, the results provided support for subsequent SEM (Kline, 1998).

Table 2. Fit Indices for the Hypothesized Measurement Models

Model	χ^2	*df*	RMSEA	CFI	TLI
EM	23.50*	4	.031	.998	.994
IM	81.52*	8	.043	.995	.986
SE	762.92*	81	.041	.987	.983
Recommended cutoffs (Hu & Bentler, 1999)			≤.06	≥.95	≥.95

Note. RMSEA=Root Mean Square Error of Approximation; CFI=Comparative Fit Index; TLI=Tucker-Lewis Fit Index (Non-Normed Fit Index).

* p<.001.

EM=Extrinsic motivation; IM=Intrinsic motivation; SE= Self-efficacy.

4.2 Structural Models

The two hypothesized structural models, a model with ACT/SAT and GPA (SAT/GPA Model) and a model without ACT/SAT and GPA (Non-SAT/GPA Model), were tested. As Table 3 shows, χ^2 statistics were statistically significant for both of the models, possibly suggesting poor fits. However, the low values of RMSEA and high values of CFI and TLI indicated both models fit well with the data. A χ^2 difference was computed to test the difference in fit between the two models. Table 3 shows fit indices for each model as well as differences in χ^2 and CFI between the two models. The χ^2 difference was statistically significant, suggesting that the Non-SAT/GPA Model was a better fit than the SAT/GPA Model. However, because χ^2 difference tests could be influenced by the large sample size, a difference of CFI was considered. The difference in CFI between the two models was .001, indicating that both of the models fit well with the data.

Table 3. Fit Indices for the Hypothesized Structural Models and Model Comparison

Full Model	χ^2	*Df*	RMSEA	CFI	TLI	$\Delta\chi^2$	Δdf	ΔCFI†
1.w/ SAT & GPA	3853.13*	405	.041	.963	.954	277.55*	60	.001
2. w/o SAT & GPA	3575.58*	365	.042	.962	.955	Cutoff (Cheung & Rensvold, 2002) ΔCFI≤.01		
Cutoffs (Hu & Bentler, 1999)			≤.06	≥.95	≥.95			

Note. RMSEA=Root Mean Square Error of Approximation; CFI=Comparative Fit Index; TLI=Tucker-Lewis Fit Index (Non-Normed Fit Index).

* p<.001.

† indicates comparisons between the two models.

As Table 4 shows, the R^2 values indicated that 60% of the Choice variances were explained by the SAT/GPA Model, whereas 24% of the variances were explained by the Non-SAT/GPA Model, which suggests that the SAT/GPA Model was a better model. Although the Non-SAT/GPA Model did not represent the data as completely as the SAT/GPA Model did, it still explained a considerable amount of the Choice variances (24%).

Table 4. Variances Explained for Educational Expectation (EXP), ACT/SAT, GPA, and College Choice by the SAT/GPA Model and the None-SAT/GPA Model

Criterion	SAT/GPA Model	None-SAT/GPA Model
EXP	10.6%*	10.6%*
GPA	23.3%*	--
ACT/SAT	47.1%*	--
College Choice	59.8%*	24.1%*

Note. * p≤.001.

4.3 Multiple Group Analyses across Academically Advanced Students and Other Students

Separate covariance matrices for academically advanced students (n=1,042) and other students (n=3,973) were used as input for the multiple group analyses. χ^2 values and difference tests, and values of other fit indices for the series of analyses are shown in Table 5.

The model comparisons resulted in statistically significant χ^2 differences for the analyses in which the factor loadings, factor variances and covariance, β, structural means, and structural variances and covariance were constrained to be equal across groups. This indicated that factor variances and covariance, β, structural means, and structural variances and covariance were statistically significantly different across the two groups. When a comparison between models was made, in addition to χ^2 difference tests, the results showed that the difference of CFI for β was .011, which is an indication of non-invariance between the two groups' variances and covariance (Cheung & Rensvold, 2002). These

differences across academically advanced students and other students for the SAT/GPA Model were further examined. As Table 8 shows, 25.1% of the Choice variances for academically advanced students and 58.9% of the Choice variances for other students were explained by the model. The model explained Choice variances for academically advanced students much less than those for other students, indicating that there might be some other variables left out of this model that explain Choice variances for academically advanced students.

Table 5. Model Comparisons between Academically Advanced Students (n=1,042) and Other Students (n=3,973)

Model	χ^2	*df*	RMSEA	CFI	TLI	$\Delta\chi^2$†	Δdf†	ΔCFI†
1. Unconstrained	4121.60*	810	.029	.962	.954	-	-	-
2. Factor loading	4237.86*	854	.028	.961	.955	116.26*	44	.001
3. Model2 + factor variance & covariance	5067.12*	884	.031	.952	.946	829.26*	30	.009
4. Models2-3 + regression weight	6052.35*	898	.034	.941	.935	985.23*	14	.011
5. Models2-4+ structural mean	6359.33*	900	.035	.938	.931	306.99*	2	.003
6. Models 2-5+ structural variance & covariance	6541.29*	924	.035	.936	.931	181.96*	24	.002

Note. † indicates comparisons are to the previous model, 1 with 2, 2 with 3, and so on.

* p<.001.

4.4 ACT/SAT's Direct Effects on College Choice

As Table 6 and Figure 1 show, ACT/SAT significantly influenced Choice more than any other variables in this study did for both academically advanced students (direct effect β=.40) and other students (direct effect β=.65). As Table 8 shows, 40.8% of the ACT/SAT variances for academically advanced students and 41.0% of the ACT/SAT variances for other students were explained by the model.

Table 6. Standardized Direct Effects of Various Factors on College Choice, ACT/SAT, GPA, and Educational Expectation for Academically Advanced Students (AAS) and Other Students

		Direct Effects (β)							
		College Choice		ACT/SAT		GPA		EXP	
Predictor		AAS	Other	AAS	Other	AAS	Other	AAS	Other
EM		.09	.05	-.14*	-.05	.12	≈0	.02	.03
IM	GIM	.04	.03	-.06	-.02	≈0	.03	.01	.01
	MIM	-.01	≈0	.05	-.02	.04	-.06	.03	-.02

	RIM	-.03	-.04	.13*	.04	.14*	.13*	.08	.09*
SE	GSE	-.11	≈0	.09	.11*	.17	.25*	.07	.10
	MSE	-.04	-.01	.09	.01	.16*	.20*	.04	.04
	ESE	.06	-.01	.06	.02	-.12	-.07	.02	.02
SES		.09	10*	.25*	.25*	.19*	.17*	.25	.22*
EXP		.02	.06*	.03	.13*	.05	.09*	-	-
GPA		.11	.09*	.43*	.45*	-	-	-	-
ACT/SAT		.40*	.65*	-	-	-	-	-	-

Note. * p<.001. EM=Extrinsic motivation; IM=Intrinsic motivation; GIM=General Intrinsic motivation; RIM=Reading Intrinsic motivation; MIM= Math Intrinsic motivation; SE= Self-efficacy; GSE=General academic Self-efficacy; MSE=Math Self-efficacy; ESE=English self-efficacy; EXP=Educational expectation.

As Tables 5 and 6, and Figure 1 show, ACT/SAT was significantly *directly* influenced by GPA, SES, Extrinsic motivation, and Intrinsic motivation for academically advanced students: GPA (β=.43), SES (β=.25), Extrinsic motivation (β=-.14), and Intrinsic motivation (RIM [β=.13]); and *indirectly* influenced by SES, Intrinsic motivation, Self-efficacy for academically advanced students: SES (β=.09), Intrinsic motivation (Reading Intrinsic motivation [β=.06]), and Self-efficacy (Math Self-efficacy [β=.07]).

As Tables 5 and 6 show, ACT/SAT was significantly *directly* influenced by GPA, SES, Expectation, and Self-efficacy for other students: GPA (β=.45), SES (β=.25), Expectation (β=.13), and Self-efficacy (GSE [β=.11]), and *indirectly* influenced by SES, Intrinsic motivation, Expectation, and Self-efficacy for other students: SES (β=.11), Intrinsic motivation (RIM [β=.07]), Expectation (β=.04), and Self-efficacy (General Self-efficacy [β=.13]) & Math Self-efficacy [β=.10]).

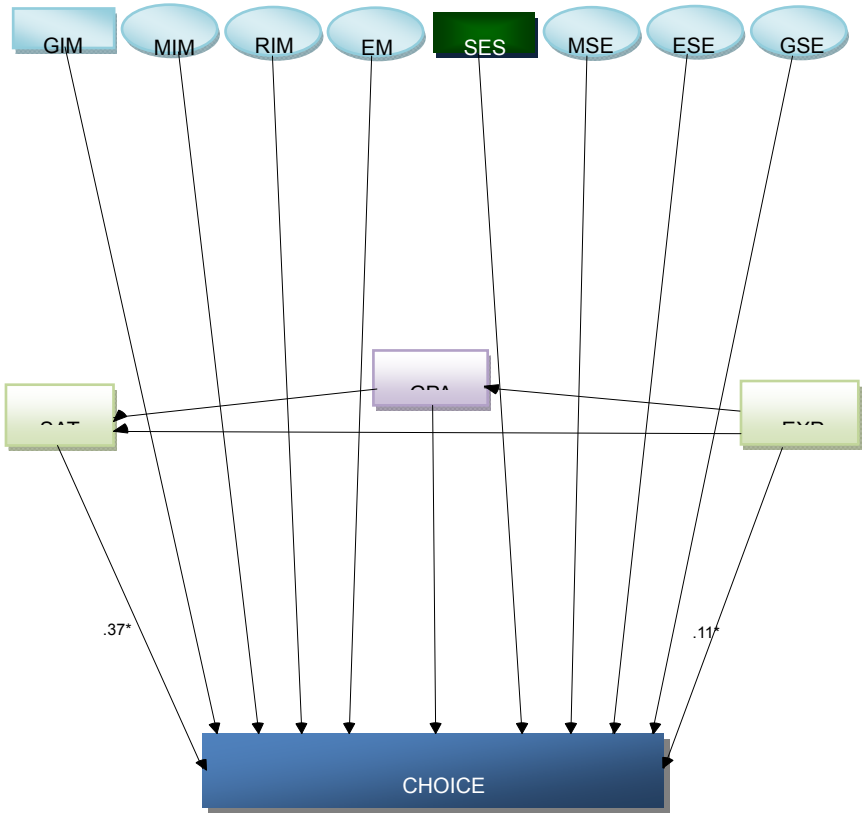

Figure 1. Relationships among Motivation Factors (EM, IM, SE, EXP), GPA, ACT/SAT, and SES and *β* Values for Predicting College Choice for Academically Advanced Students

Note. * $p \leq .001$. C=College choice; EXP=educational Expectation; EM=Extrinsic motivation; IM=Intrinsic motivation; GIM=General Intrinsic motivation; RIM=Reading Intrinsic motivation; MIM=Math Intrinsic motivation; SE=Self-efficacy; GSE=General academic Self-efficacy; MSE=Math Self-efficacy; ESE=English Self-efficacy; SAT=ACT/SAT.

4.5 GPA's Direct and Indirect Effects on College Choice

As Table 7 shows, GPA significantly influenced Choice for both academically advanced students (direct effect β=.11 & indirect effect β=.17) and other students (direct effect β=.09 & indirect effect β=.29). As Table 8 shows, 16.3% of the GPA variances for academically advanced students, and 17.3% of the GPA variances for other students were explained by the model.

As Table 6 shows, GPA was significantly directly influenced by SES, self-efficacy, and Intrinsic motivation for academically advanced students: SES (β=.19), self-efficacy (Math self-efficacy [β=.16]) and Intrinsic motivation (Reading Intrinsic motivation [β=.14]).

As Tables 5 and 6 show, GPA was significantly directly influenced by self-efficacy, SES, Intrinsic motivation, and Expectation for other students: self-efficacy (General self-efficacy [β=.25] & Math self-efficacy [β=.20]), SES (β=.17), Intrinsic motivation (Reading Intrinsic motivation [β=.13]), and Expectation (β=.09); and indirectly influenced by SES and Intrinsic motivation for other students: SES (β=.02) and Intrinsic motivation (Reading Intrinsic motivation [β=.01]).

Table 7. Standardized Indirect Effects of Various Factors on College Choice, ACT/SAT, GPA, and Educational Expectations (EXP) for Academically Advanced Students (AAS) and Other Students.

		College Choice		ACT/SAT		GPA	
Predictor		AAS	Other	AAS	Other	AAS	Other
EM		-.02	-.03	.05	.01	≈0	≈0
IM	GIM	-.02	≈0	≈0	.02	≈0	≈0
	MIM	.03	-.04	.02	-.03	≈0	≈0
	RIM	.09*	.09*	.06*	.07*	≈0	.01*
SE	GSE	.09	.19*	.08	.13*	≈0	.01
	MSE	.08*	.09*	.07*	.10*	≈0	≈0
	ESE	-.01	-.01	-.05	-.03	≈0	≈0
SES		.17*	.26*	.09*	.11*	.01	.02*
EXP		.03	.11*	.02	.04*	-	-
GPA		.17*	.29*	-	-	-	-

Note. * p<.001.

EM=Extrinsic motivation; IM=Intrinsic motivation; GIM=General Intrinsic motivation; RIM=Reading Intrinsic motivation; MIM= Math Intrinsic motivation; SE= Self-efficacy; GSE=General academic Self-efficacy; MSE=Math Self-efficacy; and ESE=English Self-efficacy.

4.6 Direct and Indirect Effects of SES Background, Educational Expectation, Self-Efficacy, and Intrinsic Motivation on College Choice

As Tables 5 and 6 show, SES significantly influenced Choice for both academically advanced students (indirect effect β=.17) and other students (direct effect β=.10 & indirect effect β=.26).

As Tables 5 and 6 show, Expectation significantly influenced Choice only for other students (direct effect β=.06 & indirect effect β=.11). As Table 8 shows, 9.2% of the GPA variances for academically advanced students and 8.6% of the GPA variances for other students were explained by the model.

As Table 7 shows, Math Self-efficacy significantly indirectly influenced Choice for both academically advanced students (indirect effect β=.08) and other students (indirect effect β=.09). General Self-efficacy significantly indirectly influenced Choice only for other students (indirect effect β=.19).

As Table 7 shows, Reading Intrinsic motivation significantly indirectly influenced Choice for both academically advanced students (indirect effect β=.09) and other students (indirect effect β=.09).

Table 8. Variances Explained for Educational Expectation (EXP), ACT/SAT, GPA, and College Choice by the Models for Academically Advanced Students (AAS: n=1,042) and Other Students (n=3,973)

Criterion	AAS	Other
EXP	9.2%*	8.6%*
GPA	16.3%*	17.3%*
ACT/SAT	40.8%*	41.0%*
College Choice	25.1%*	58.9%*

Note. * $p \leq .001$.

5. Discussion

Although it predicts less than the model with GPA and ACT/SAT, the model without GPA and ACT/SAT significantly predicts both academically advanced students and other students' college choice. This indicates the importance of motivation variables when students choose more selective colleges, such as self-efficacy, expectation, intrinsic motivation, and extrinsic motivation.

The model with GPA and ACT/SAT seems to exclude other variables that may help explain college choice for Academically advanced students because only about 25% of their college choice variances are explained by the model, while it explains about 60% of other students' college choice. This might be because, compared to other students' college choice, academically advanced students are less influenced by their SES background, and because they might choose more selective colleges based on the college rankings reported annually by US News & World Report and others (e.g., Griffith & Rask, 2007), which is not included in the analysis model of the present study.

5.1 ACT/SAT's Effects on College Choice

When high school students choose more selective colleges, both academically advanced students and other students, do so primarily based on their ACT/SAT scores. Given that four-year institutions place more importance on test scores than two-year ones, and test scores are weighted more heavily at more selective colleges (Hawkins & Lautz, 2007), it seems natural that students with higher test scores are choosing more selective colleges. This, however, is, inconsistent with previous studies' findings that test scores are not as important as GPA in college admissions (Breland et al., 2002; Hawkins & Lautz, 2007).

The variables in the present study explain students' ACT/SAT scores well by the model, as over 40% of the variances of their test scores. When looking at what influences students' test scores specifically, the results indicate that GPA influences test scores the most for both academically advanced students and other students. The next best predictor for ACT/SAT scores is the SES background of both academically advanced students and other students, which is consistent with previous studies (Sackett, et al, 2009; Zwick, 2002) in finding a positive relationship between ACT/SAT scores and SES. This

might be because students with higher SES background have higher support for their test preparation, or they take ACT/SAT more frequently than those with lower SES background.

Extrinsic motivation influences academically advanced students' ACT/SAT scores negatively, which is consistent with previous studies in that extrinsic motivation is negatively related to students' achievement (Law, 2008; Wang & Guthrie, 2004). However, extrinsic motivation does not influence other students' scores. This might indicate that extrinsic motivation affects students' achievement negatively, especially for advanced students, which is similar to some previous studies' conclusion that intrinsic motivation is better than extrinsic motivation for students' learning and achievement (Law, 2008; Lei, 2010; Schunk et al., 2008; Wang & Guthrie, 2004).

Reading intrinsic motivation influences both academically advanced students and other students' ACT/SAT scores, which indicates that love of reading is very important for *all* students to get high scores. This seems natural, as students who are intrinsically motivated to read might acquire more vocabulary, which might better prepare them for their ACT/SAT.

Math self-efficacy also influences both academically advanced students and other students' ACT/SAT, whereas General self-efficacy influences only other students, and not academically advanced students. This indicates that academically advanced students who have confidence in their math ability will do well on ACT/SAT. This might be because students generally perceive math as one of the most difficult subjects. Students' general self-efficacy is not important for academically advanced students, yet is important for other students. This might be because most academically advanced students have high general self-efficacy and earn high scores from most subjects other than math, and thus their ACT/SAT scores are more dependent on their math scores than others. Yet for other students, their ability in other subjects seems to be as important as their math scores.

Educational expectation influences other students' ACT/SAT scores, but not academically advanced students' scores. Students' parents' and their own expectations of future education are important for other students' ACT/SAT scores, but not for academically advanced students. This might be because most academically advanced students already have high expectations for their future education. Educational expectation influences other students' ACT/SAT, which indicates that the higher expectations they have, the higher ACT/SAT scores they get.

5.2 GPA's Effects on College Choice

GPA is the second most influential factor for choosing selective colleges for both academically advanced students and other students. The importance of GPA, though not as important as ACT/SAT scores, is consistent with previous studies, which found GPA is critical in admission decisions (Breland, et al., 2002; Hawkins & Lautz, 2007).

The variables in the present study explain students' GPA well. When looking at what influences students' GPA specifically, the results indicate that academically advanced students' math self-efficacy influences their GPA as much as their SES background does. Other students' both math and general self-efficacy influence their GPA even more than their SES background does. This indicates the

importance of self-efficacy on math for all students for GPA as well as for ACT/SAT. This is consistent with previous studies in that students' self-efficacy on specific tasks is a useful predictor of academic achievement (Bandura, 1997; Bembenutty, 2005; Bong, 2001; Lane & Kyprianou, 2004; Richardson, 2007; Robbins et al., 2004; Schunk et al., 2008). The result also indicates that a student's love of reading is an important predictor not only of GPA but also of ACT/SAT scores. Expectations of future education are important predictors only for other students GPA, not for academically advanced students'.

5.3 SES Backgrounds' Effects on College Choice

The third most influential variable for choosing more selective colleges is students' SES background for both academically advanced students and other students. Students' SES background influences academically advanced students' college choice only indirectly, through their ACT/SAT and GPA, whereas it influences other students' college choice directly and indirectly, through their ACT/SAT, GPA, and Expectation. Compared to other students, no direct influences and less indirect influences of SES on academically advanced students' college choice is consistent with previous findings that although higher SES allows students greater access to four-year institutions, the relative importance of SES decreases as academic achievement increases (Baker & Vélez, 1996). This might be because the effect of SES is mitigated by other factors for academically advanced students, such as scholarships and financial aid.

5.4 Motivation Factors' Effects on College Choice

Reading intrinsic motivation influences academically advanced students' college choice indirectly through ACT/SAT, followed by GPA. Reading Intrinsic motivation influences other students' college choice indirectly through GPA first, ACT/SAT second, and Expectation third. This indicates that student's love of reading is an influential factor for all students' college choice. It also indicates that students' love of reading influences their college choice through ACT/SAT and GPA for *all* students, whereas it influences their college choice through educational expectation only for other students. This might be because most academically advanced students have high educational expectation to begin with.

After ACT/SAT, GPA, and SES, math self-efficacy indirectly influences all students' college choice through ACT/SAT. General self-efficacy influences only other students' college choice indirectly through ACT/SAT.

Educational expectation influences only other students' college choice, which is consistent with previous findings that students with higher expectation are more likely to enroll in post-secondary education (Bozick & Lauff, 2007), and that their level of educational expectation serves as a useful predictor of the selectivity of their chosen institution (Esters, 2007; Hossler & Stage, 1992; Kurlaender, 2006; Perna, 2000). The variables in this study explain students' educational expectation well. Expectation influences other students' college choice directly and indirectly, and mostly indirectly through their ACT/SAT and GPA. As educational expectation increases, their ACT/SAT scores and

GPA increase directly for other students' college choice, but not for academically advanced students.

6. Conclusion

There are commonalities between academically advanced students and other students when choosing more selective colleges. Although ACT/SAT, followed by GPA, are the most important factors for *all* students' college choice, their choice is mediated by their reading intrinsic motivation and math self-efficacy. This indicates that students who have higher love of reading or higher belief in math abilities tend to score higher on ACT/SAT, earn higher GPA, and choose more selective colleges. Their math self-efficacy influences their ACT/SAT scores, while their reading Intrinsic motivation influences both ACT/SAT *and* GPA.

There are also *differences* between academically advanced students and other students when choosing more selective colleges. Academically advanced students are motivated by different factors than other students: a) their college choice is *not* influenced by general self-efficacy, whereas other students' choice is. For academically advanced students, believing that they are good at math is more important than believing that they are doing academically well in general; b) unlike other students, academically advanced students' college choice is *not* influenced by their educational expectations. This might be because students who choose to participate in advanced programs do so because they already have high educational expectations. While they all might want to choose the most selective colleges, their actual choices appear to be based on ACT/SAT and GPA, and possibly based on the college rankings reported by US News & World Report and others; c) compared to other students, academically advanced students' college choice is less influenced by SES. This might be because SES's effect is mitigated by such factors as scholarships and financial aid for them; and d) extrinsic motivation influences academically advanced students' college choice negatively, whereas it does not influence other students' choice. This might indicate that studying hard to only get better grades and better jobs is conducive in neither achieving high ACT/SAT scores nor to high GPA, which might lead to choosing less selective colleges.

The findings that students' high motivation predicts their higher ACT/SAT and GPA, and more selective college choice suggest that extra emphasis on the value of reading for reading's sake, not for recognition or good grades, and extra support for developing their math self-efficacy would boost their ACT/SAT scores, their GPA, and their college choice. Parents and educators should encourage all students to value and appreciate their personal growth and enrichment, as opposed to external rewards. They should also help academically advanced students understand that their socioeconomic status is less relevant to their future success than their reading intrinsic motivation and math self-efficacy. They should also encourage other students' general self-efficacy and educational expectations, in addition to reading intrinsic motivation and math-efficacy.

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[i] The SAT is a standardized test by the College Board for most college admissions in the U.S. It is to assess a student's readiness for college.

[ii] The ACT is also a standardized test by ACT, Inc. for college admissions in the U.S.