INFORMATION AND ACCESS: MODELING THE IMPACT OF INFORMATION ON A STUDENT'S PROBABILITY OF ATTENDING COLLEGE

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To my wonderful, long-suffering, and inexhaustibly supportive wife, Annalee, for the trust you have placed in me and the wonderful little spirits that you have given me, that gave each hour of work on this dissertation meaning and purpose

and

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CHAPTER I

INTRODUCTION

In his "Great Society" speech in 1964, Lyndon B. Johnson stated that "poverty must not be a bar to learning, and learning must offer an escape from poverty" (United States Office of the Federal Register, 704-707). In subsequent decades research has shown that returns on postsecondary education can indeed offer the underprivileged opportunities to "escape from poverty". During the intervening decades between Johnson's vision of a "Great Society" and now, the relative value of any postsecondary education, and especially degrees, has been demonstrably revealed. Returns on higher education have been reported to yield greater lifetime earnings (Leslie & Brinkman, 1987; Heller, 1997), better health and psychosocial benefits (Hartog & Oosterbeek, 1998), and greater satisfaction with one's occupation (Mortenson, 2003; Pascarella & Terenzini, 2005).

Determinants for accessing postsecondary education are primarily related to a student's educational expectations (Plank & Jordan, 2001; Kirst & Venezia, 2004; Hossler & Stage, 1992; Eccles, Vida, & Barber, 2004), financial (Hearn, 2001; Heller, 1997; McPherson & Schapiro, 1996; St. John, 2002) and academic preparedness (Kirst & Venezia, 2004; Adelman, 1999; St. John, 2002). These three components serve as the key aspects of a student's postsecondary decision-making process, particularly as it pertains to whether or not they will attend college, and if so, to what type of institution. Research has not shown the impact that information has on access to postsecondary education.

Purpose and Significance

In their college choice model, Hossler and Gallagher (1987) indicate that there are three phases through which students prepare and access postsecondary education. The first stage, termed "predisposition," involves determinants that affect a student's postsecondary educational expectations, including background characteristics (such as gender, ethnicity, and socioeconomic status), academic performance, and the influence of significant others (notably a student's parents). The second stage, called the "search" phase, is articulated as the student's process of considering types of postsecondary institutions to which they will apply. In this phase, students are said to solidify a "choice set" of institutions to which they would potentially like to attend, and begin to pursue an investigation of those institutions. During the final "choice" stage a student selects the institution they will (or would like to) attend, and institutions extend offers to students they would like to matriculate. Information about how much college costs and whether a student will be able to afford college, as well as how a student needs to be prepared academically to attend college plays a significant role throughout this three-phase formulation to attend college.

The purpose of this dissertation is to determine the impact of information, first as it relates to changing educational expectations and academic performance during high school, and finally as it mediates the impact of financial aid awareness and academic preparedness on a student's probability of attending college. In their text *Going to College*, Hossler, Schmit and Vesper (1999) argue that information is utilized to varying degrees and is helpful in different ways during the "predisposition", "search", and "choice" stages of the college decision-making process. The authors study students in

Indiana from ninth grade through their senior year beginning in 1986, in order to better ascertain "the chronological development of the postsecondary plans and aspirations of high school students and the people and experiences that influence these plans" (p. 83).

During the predisposition phase students are interested in learning about career opportunities that match their interests, while their parents are interested in knowing how much college will cost and how the financial aid system works. As the predisposition stage evolves into the search stage (defined as sometime around tenth grade), initially students are still not interested in specific information about individual colleges, but are more fully focusing on information related to their aspirations and to types of postsecondary institutions they might attend, such as two-year versus four-year, and vocational versus academic. As the search stage continues into eleventh grade, students' search for more specific institutional information dramatically increases. They also begin to explore and receive information about college costs and student financial aid. Finally, as they proceed to the "choice" stage in twelfth grade, students begin to send applications to institutions they hope to attend, and make preparation for such plans (Hossler, Schmit, & Vesper, 1999). While these stages are presented as distinct divisions, the processes that define the development of student expectations and postsecondary plans often overlap within the phases as students continue to seek more information and revise their expectations and plans.

Research Questions

Throughout the literature that explores the determinants of college-going, studies have neglected, with few exceptions, to study the role of information and its impact on

accessing postsecondary education. Researchers have explored the notion of social capital (Perna, 2000; McDonough, 1997; Bourdieu & Passeron, 1977), but information nested within this concept has often been broadly conceived without empirically studying the specific types of information which directly influence postsecondary expectations and access. The purpose of this research is to more clearly define through the literature the specific forms of information that directly influence a students' postsecondary choice process and then to test the impact of this information, first on the mediating influences of student expectations and academic preparation and ultimately as it directly impacts postsecondary attainment. Thus, the following three questions are examined:

- How do a student's personal and family background (including parental expectations), academic performance, and reception of college information influence changes in their educational expectations during high school?
- How do a student's personal and family background (including student and parental expectations), academic traits, and reception of college information influence changes in their academic performance during high school?
- How do a student's personal and family background (including personal and parental expectations), academic performance, reception of college information, and the economic environment where a student lives affect their probability of enrolling in various levels of postsecondary education?

This investigation contributes to the research on postsecondary choice processes and the determinants that impact the probability of enrollment in college by offering a new measure for the role of information in this process. Empirical studies on the impact of information within the postsecondary access picture are minimal, largely because of

the lack of data that either identifies information as a variable or that operationalizes it in a framework that is indicative of the postsecondary decision-making process. Through the development of a measure of information received by students that is *exogenous* to the social networks they possess or the schools they attend, this research seeks to indicate the relevance of information that is offered to students regardless of student motivation, background, or condition. This measure is developed through a survey administered to experts in the field of state policies for disseminating postsecondary information. The measure is designed to indicate whether or not students lived in states that provided postsecondary preparatory information to their students, thus impacting the expectations and academic preparations of these students during the predisposition and search phases of the college choice model. Furthermore, when analyzing the impact of financial aid information that students report obtaining during the choice stage, this measure will serve as an instrumental variable in order to separate the possibility that the financial aid information obtained may merely be a proxy for student motivation (unmeasured in the model) and/or the advantages some students may have through profitable social networks.

Overview of Proposal

This introductory chapter articulates a theoretical approach for studying the determinants of students' postsecondary decision-making processes and their access of varying levels of postsecondary education. It identifies an important and understudied aspect within this approach, namely the role of information, with regards to evolving

student expectations, academic preparation and reception of financial aid information, exploring the impact of information on postsecondary educational access.

Chapter two outlines the research literature in the areas of financial aid and academic preparation, while noting subsets within each literature that address the role of information in that field. The chapter then turns to the nexus of these strains of literature and the importance of adopting a holistic approach to the research on postsecondary preparation and access, noting the possibility that information may influence evolving student expectations as well as their academic preparation. Finally, models for postsecondary decision-making are analyzed in a step-wise fashion leading to the "next-step," which is addressed by this dissertation.

Chapter three illustrates a revised conceptual framework based on the "conceptual model of college choice" proposed by Plank and Jordan (2001). The Plank and Jordan framework is itself an adaptation of notable earlier frameworks proposed by Hanson and Litten (1982) and the aforementioned Hossler, Schmit and Vesper (1999). An examination of key aspects of the conceptual framework is presented looking at findings form prior research that provides an indication of some of the results expected in the analysis of the research questions proposed. These key aspects include student background characteristics and attributes, student and parental expectations, measures of academic ability and performance, informational variables dealing with cost of college and financial aid, and economic and policy variables that impact the probability of enrolling in college.

Chapter four details the sample from which the research is drawn. Analysis of missing data is performed and an appropriate technique for addressing missing data is

discussed and explored. Relevant variables are identified and operationalized within the context of the conceptual framework and the models for addressing the research questions are presented. Particular attention is given to the development of the previously mentioned state-level informational measure, while the necessity of an instrumental variable is examined and its viability is tested.

Chapter five presents the statistical analyses and results of the research. A discussion is provided with attention to important findings. Finally, chapter six provides a conclusion where the impact of information on the key mediating measures of educational expectations, academic performance, and ultimately on the outcome of interest, college enrollment in the college access model is determined. Limitations to the study are analyzed and future steps are suggested.

CHAPTER II

LITERATURE REVIEW

The social consciousness of the 1960s and early 1970s fomented a new direction in American higher education, as legislation began to more consistently target needy students in helping them access postsecondary education. The Higher Education Act (HEA) in 1965 consolidated the National Defense Student Loan Program and the College Work-Study Program while creating the Educational Opportunity Grant Program (later termed the Pell grant) and the Guaranteed Student Loan Program (ultimately becoming the Federal Stafford Loan Program). Subsequent reauthorizations and amendments to the HEA during the past three decades have revealed an evolving paradigm regarding access and opportunity for higher education. The purpose of this chapter is to analyze the two strands of research regarding access to higher education, financial aid and academic preparation, while discovering their complementarities and divergences.

Both the financial aid and academic preparation literatures focus on the gap that exists between the poor and the non-poor in order to determine how to close the inequity to which President Johnson alluded. While assembling a more complete access picture the research turns to the nexus of the financial aid and academic preparation. This leads to a critical discussion of the impact of how cost of education and financial aid information affect a student's educational expectations and academic performance in high school. Next, the shortcomings of the literatures regarding the important role of information on a student's postsecondary expectations and access are set forth. Finally,

this chapter considers a developing framework for modeling a student's postsecondary decision-making process and its relative determinants based on prior empirical research.

Financial Aid Research

Research on financial aid and its relationship to college access focuses on the costs of postsecondary education and on returns from that schooling. Studies structure the postsecondary decision-making process within an economic framework which presumes the actor to make rational decisions based on what appears most economically advantageous. Various studies focus on the influence of tuition versus aid, or on the impact of student loans versus educational grants. Other research aims to understand the influence of merit-based versus need-based aid on the types of students that choose to attend college. Overall, regardless of particular focus, financial aid research articulates that the determinants of a student's postsecondary decision primarily hinge on how much postsecondary education will cost and how much this education will be worth.

Much of the early literature analyzing the impact of financial aid on access (primarily among the poor) was conducted by economists positing theories of student price response. Researchers sought to understand the impact of, for example, a $100 increase in tuition on the probability of enrollment. Meta-analyses of these studies performed by Leslie and Brinkman (1987) found on average that each $100 increase in tuition resulted in 0.7 percentage point decrease in postsecondary participation amongst 18–24 year olds. An updated meta-analysis by Heller (1997) discovered a similar finding, a $100 increase in tuition resulted in a drop in enrollment between 0.50 and 1.0 percentage points. Heller noted, however, that as the research was based on tuition data

from the 1970s and 1980s, because today's tuition levels are much higher the effects of incremental raises in tuition may be greater. In both analyses Leslie and Brinkman (1987) and Heller (1997) indicated that econometric models did not always easily predict the impact of financial aid, as individuals could not always be presumed to act as "rational" agents. In particular, some students were discouraged by the growing "sticker price" of attending college, even though the actual cost of attending may be the same (see Mumper, 1996).

Additional research indicated that students reacted differently to financial aid in the form of grants versus loans, according to their particular economic background. St. John & Starkey (1995) took an alternative approach to the traditional "net-price" analysis of the relationship between prices and enrollment. Instead of only looking at a single net price and its influence on the probability of enrollment, the authors also analyzed a set of prices and subsidies and their separate influences on the likelihood of students persisting in college (using data from the National Postsecondary Education Student Aid Survey of 1986–87), assuming each type of price or subsidy to be of equal importance in the likelihood of enrollment. St. John and Starkey discovered that delineating the net price into a set of prices and subsidies indicated that grant aid was negatively associated with persistence among low-income students, a decline of 0.10 percent for each additional $100 in grant aid. The authors explained that federal grant aid was cut during the time this population attended college, and the level of grant aid compared to tuition was not sufficient to encourage persistence among those in need. Furthermore, growing reliance on work-study loans was associated with a decline in predicted persistence among low-income students by approximately 0.35 percent per $100 increase in work-study loans

(St. John & Starkey, 1995). This research illustrates the complexities of analyzing financial aid and its impact on access to higher education.

The complexity grew with shifts in focus and policy at the federal level. In 1978 the government passed the Middle Income Student Assistance Act (MISAA) marking an expansion of aid opportunities to middle and upper-middle income students. This act revealed the beginning of a growing trend to foster financial aid through student and family loan programs. Whereas MISAA initially offered grants as well, these grants were ultimately repealed. Pell grants continued to grow in their award size as well, but even as they still play a vital role in financing higher education access among lower-income individuals, the federal loan programs have grown to a much greater size and have enlarged the federal government's focus to include the middle-class as well as the poor (Gladieux & King, 1999). Much of this shift toward federal loans occurred because of a pronounced policy shift under the Reagan administration (McPherson & Schapiro, 1996). While there exists some argument over whether or not the "access gap" between whites and minorities and between the poor and the rich shrank during the financial aid policy of the 1960s and 1970s, there is evidence that beginning in the 1980s the access gap has been growing. Analyzing American Freshman Survey data from 1979 and 1989, McPherson and Schapiro (1991) find that the share of postsecondary enrollment among below middle-income students fell by 2 percentage points, the middle-income share fell by 1 percentage point, and therefore, the above middle-income share rose by 3 percent.

The following decade saw the addition of two new financial aid policies. The first innovation began in Georgia in 1993, with the Helping Outstanding Pupils Educationally (HOPE) scholarship. This marked the beginning of a broader shift in many states

(predominantly southern) toward more merit-based and less need-based financial aid. Between 1993 and 2002, twelve states had developed merit-based scholarship programs that do not use need as a determining factor in granting aid (Heller, 2002). This major policy shift has sparked an ongoing debate over the virtues of merit-based versus need-based policies. In a collection of papers sponsored by The Civil Rights Project out of Harvard University, state merit-based aid programs are critiqued for the negative social consequences that appear to curtail access for the poor and minorities in favor of those students who already possess social privileges that allow greater access for postsecondary education (Heller, 2002). Heller cites a report entitled "Access Denied" from the Advisory Committee on Student Financial Assistance (2001). In this report, the committee indicates average unmet need by institution type and family income level. Among four-year institution enrollees in public schools, low-income families' average unmet need was $3800, middle-class families' need was $2250 and high-income families unmet need was $400. In public two-year institutions, the average unmet need was $3200, $1650 and $100, for the same groups respectively (p.11). In his introduction to the Civil Rights Project Report, Heller (2002) states that in each chapter the authors (including Susan Dynarski and Bridget Terry Long) find that "state merit scholarships are being awarded disproportionately to populations of students who have the highest college participation rates" (p. 21).

Creech and Davis (1999) took a more measured analysis of the competing values of merit-based versus need-based aid in their brief history of these two programs. Noting the trends leading up to the atmosphere of aid in the late 1990s, they suggest that policymakers who regard access the highest priority are dedicated to channeling

resources through need-based aid to the poor so that they might have access to some form of postsecondary education. Policymakers who prize choice as the top priority determine that merit-based aid allows students more flexibility in determining the institution they would like to attend, increasing the likelihood of completion of degree in these institutions. Furthermore, the new merit-based aid programs are considerably transparent in the requirements set forth to receive the aid, and it is believed that such transparency will motivate better preparation for college as students strive to access the scholarships. There are obvious advantages and disadvantages to both forms of aid, and there is a growing belief that it is increasingly difficult to tackle both policy concerns at the same time, as most states have very limited and dwindling funds.

The second major policy innovation of the 1990s took place at the federal level, and was very much connected to the early popularity and success of the merit-based HOPE scholarship program in Georgia. The Tax Relief Act of 1997 introduced a new form of financial aid for college students, and more particularly for their families. The Act established two forms of tax credits, the Hope Tax Credit established for students in their first two years of undergraduate studies, and the Lifelong Learning Tax Credit, established for all students, including graduate students, after the Hope Tax Credit eligibility has been exhausted. This major policy addition signaled a growing focus on providing aid to middle-class families and appeared in step with the growing merit-based aid focus on benefiting the same socioeconomic groups. Much of the literature that reviews the impact of these two policy changes does so without agenda, but focuses on who is being helped and the impact that merit-based aid and tax credits are having on access and choice.

In her analysis of the impact of the Georgia Hope Scholarship, Dynarski (2000) finds that the merit-based aid increased attendance rates among all 18–19 year olds by 7.0 to 7.9 percentage points. However, the research indicates that the increased attendance was differential between upper- and lower-income families. Upper-income families' attendance rates increased by 11.4 percent, while lower-income families did not see a relative rise in attendance. Dynarski cautions, however, that the evidence she found may be biased as it was analyzed on a non-randomly selected sub-sample (2000). Long's (2003) research on the impact of the 1997 federal Hope and Lifelong Learning Tax Credits on postsecondary attendance indicated that, because of the structure of aid in the form of tax credits, families with incomes between $30,000 and $75,000 were benefited the most. Lower-income level families realized little benefit from the credits because they possessed very little tax liability. Furthermore, because of the lag between paying for college, and receiving tax credits (which would take place at a minimum several months after enrollment), it would not solve concerns of initial affordability. Finally, Long discovered that there was no evidence of increased enrollment among eligible students, which was the stated intention of the act.

The current climate of financial aid policy is a complicated mixture of the aid aimed at improving access for the disadvantaged taking a decidedly diminished focus to the growing and overwhelming shift in policy towards aid aimed at benefiting middle-class families as well as aid based on merit. While much of the literature is focused on the ethics and efficacy of these several policies, remarkably little has been written regarding the importance of the fruits of these policies being understood and made available to the families and students that they seek to benefit.

Financial Aid Information

Few studies on financial aid have moved beyond an analysis of the impact that such aid would have on the students and families that it targets. Indeed one of the weaknesses of the financial aid policy literature is its lack of meaningfully addressing how information regarding financial aid is successfully disseminated to those who might most benefit from it. This section focuses on some of the few texts that have alluded to the importance of financial aid information and its role in the postsecondary access and persistence puzzle.

In an analysis of human capital and investing in higher education, Paulsen (2001) discovered that lower-income students were far less knowledgeable about the return on investment for baccalaureate degree holders and stated that this implies inequity in the way in which information about higher education opportunities and outcomes are conveyed. Building on Becker's model (1993) of the demand and supply of human capital, Paulsen states that as long as the marginal benefit of increased education (synonymous in this instance with human capital) is greater than the marginal costs, rational decision-makers would choose increased education. Investment in human capital comes from varying sources, some of which are free such as federal grants or relatively cheap, such as subsidized loans, and others that are more expensive, such as unsubsidized loans. The more investments that are cheap or free that students can acquire, the greater their marginal benefits will be on using those investments towards developing human capital. Paulsen indicates that there is great need for policies that convey appropriate and accurate information to disadvantaged students and their families regarding the average earnings of college graduates as well as information concerning loans and grants that

might influence the choice of investment in higher education. These students can increase their marginal benefits from investing in human capital with relatively little initial investment, if they know the relative worth of increased human capital and the availability of sources for free (need-based grants) or cheap (subsidized loans) investment capital.

In a recent chapter on postsecondary access, Hearn (2001) pointed to what has been learned since Hansen's controversial 1982 paper that questioned the worth of financial aid. Hearn made several key points that are on the periphery of the brunt of financial aid research, but that may be central to its success in increasing access. First he stated that much of the enrollment gap may be explained by social and cultural factors that are not addressed by financial aid policy. Hearn suggested that financial aid access may play out in special ways that are unique to lower-income families and that "the financial aid system has become more complex and difficult to understand" (446). Citing several researchers in the field, Hearn stated that many researchers see "information as an antidote to the problems of income-based gaps in enrollment. Indeed leading analysts of access-related policies have long endorsed making understandable, accurate information on aid and tuition more widely available to young people in elementary and secondary schools" (455).

In their research about the major factors that influence the decisions students and families make regarding college, Hossler, Schmit and Vesper (1999) are the most detailed in their suggestion of the type of information that students and families need regarding financial aid as well as when they need it. Their research revealed that by ninth grade parents are already interested in financial aid, although they are not yet so interested as to

delve into all of the details. The authors suggested that this is the prime time to provide them with information regarding college costs and available financial aid, as well as the connections between a college education and its relationship to the labor market. The authors argued that the possibility of making a greater investment in counseling as early as seventh-grade could raise the aspirations of many students. There is a distinct possibility, however, that they will not be ready to receive such information, and the authors recommend this as a prime area for research.

Finally, in his text *The Price of Admission*, Kane (1999) suggested that the information problem for low-income families may be two-fold. First of all many families are simply unaware of what is available in the form of aid. He stated that their "borrowing limits may not be the only constraints on families' ability to finance a college education. There may be substantial costs of simply learning what types of aid are available" (95). Secondly, for those that may be aware of some types of aid available, the complexities for filling out such applications can be an insurmountable obstacle, especially for those that are unsure of how much aid is available and believe that they simply cannot afford a college education. Kane further indicated that the source of the problem is unclear. Is it merely that the lack of ability to pay for college is the source for the growing gap between low-income and others, or is lack of information regarding financial aid programs and/or understanding of how to apply for such aid the root cause? Kane suggested "an option potentially less costly than raising aid limits would be invest more in marketing the aid programs to students, particularly those who are most likely to be unable to choose the kind of aid they need and navigate the application system" (127). Kane reiterated this option at the conclusion of his text. "Those who are hesitant about

enrolling, those whose behavior the financial aid programs are presumably intended to affect, are less likely to know about available aid programs. Rather than raising the financial aid program generosity, simply lowering the barriers to application may have larger effects on these students without spending additional resources on other students" (141).

Academic Preparation

The second strand of literature and its research frames access to postsecondary education in the light of student ability and preparation. This research tends to set aside notions of the cost of education, focusing instead on student background, coursework, performance in school, aspirations, and family and other influences. Research from this literature suggests that the determinants of access are predominantly related to indications of how a student performs and prepares for postsecondary education, in contrast to the financial aid research that centers on the influence of educational costs and return on investment.

This sphere of research gained considerable momentum as the Department of Education began to turn away from the focus on financial aid and towards a study of student characteristics of preparation and ambition. With the beginning of the National Education Longitudinal Study of 1988 (NELS:88/94), researchers at the National Center for Education Statistics began to turn their interest to what was termed the "pipeline to college" (National Center for Education Statistics, 1997). They used the NELS:88/94 dataset to analyze key aspects of a students' preparation for postsecondary education. First researchers noted that the data revealed differences between tenth grade students

that had aspirations to attend college and those that did not. The next step of analysis looked at the level to which students were prepared academically for college, encompassing a composite measure consisting of class rank, ACT/SAT scores, high school grades and composite standardized reading and math tests that all students took with the survey. Following that, researchers looked specifically at the entrance exams and the college application. Finally researchers focused on enrollment in a postsecondary institution. Notably there was no information in this "pipeline to college" process about financial aid and its role in enrollment or persistence. There was an implicit belief among some analysts that while the differences that existed between "at-risk" students and students in the pipeline were still associated with differences in socioeconomic status, this gap could be addressed by focusing on aspects of academic preparation.

Analyses in the academic preparation literature often focus not only on access to postsecondary education but also pay considerable attention to factors that influence the completion of a postsecondary degree. In his text *Answers in the Toolbox*, Adelman (1999) argued that high school curriculum is of primary importance in preparing for baccalaureate completion. Adelman stated that "opportunity to learn" is of primary concern, but that this opportunity is of no value if students do not take advantage of it. In order to better quantify the quality of coursework taken, Adelman re-created an "academic intensity" variable form the High School and Beyond (HS&B) data set[1], and compares it to the variable for academic coursework found in the dataset. Adelman's conceptualization of academic intensity is arguably more accurate, creating gradations of intensity that account for remedial classes in English and math, and accounting for high math coursework (anything above Algebra 2), which the HS&B created variable does not

[1] For more information on the data set see http://nces.ed.gov/surveys/hsb/

account for. Adleman's research implies that if bachelor's degree attainment is the goal, our focus should be on helping students fill their non-school hours with as much curricular content as possible. In a logistic regression analysis, Adelman discovered that one's high school curriculum/academic intensity is the most important factor in earning a bachelor's degree by age 30. Including only students with positive values on academic intensity (or curriculum), standardized test scores, and class rank/GPA, and including only these three variables in the analysis, Adelman found all three to be statistically significant, and weighting their comparative odds ratios, found academic intensity to account for 41% of the weight, test scores to account for 30.5% and class rank/GPA to account for 28.5% of the weight. Finally, Adelman found that the composite factors of high school curriculum, test scores, and class rank revealed a steeper curve toward postsecondary degree completion than did socioeconomic status, while admitting that the two have a "modestly strong" correlation of 0.368.

Academic Preparation Information

While Adelman's research determined the importance of helping students, parents of students, and secondary institutions understand the pivotal importance of high school curricular preparation and rigor, he did not provide analysis on how to most effectively provide this information to these groups. Among the academic preparation literature, which is not as voluminous as the financial aid literature, but which has gained greater interest since the early 1990s, very little of the research investigates the nature of how to best provide students with the information they need to know.

One notable exception to this inattention to information is the Bridge Project out of Stanford University (Kirst & Venezia, 2004). This six-year study focused explicitly on the disconnect between K-12 and higher education policy. Over the course of this project the authors focused on the K-16 reform in six states: California, Texas, Oregon, Illinois, Georgia and Maryland. The overarching concern of the project was to address how the lack of coordination between the K-12 and higher education systems is impacting student access postsecondary education. The focus of this project is to reform the current secularized approach to education by instituting broader K-16 collaboration within states, creating an integrated system. The authors state, "in this way, information could flow more freely back and forth, providing students, teachers, parents, and counselors with better (and earlier) information about the academic expectations for students entering college" (3).

Kirst and Venezia note that the disconnect in policy is most apparent in four critical areas. First, "the content between the exit exams that high schools require and college admission and placement tests differs, leading to understandable confusion about what students really need to know in order to succeed in college" (15). The authors point to a report from the Education Trust (1999) that indicates that state high school graduation exams are most typically not aligned with exams used for college admissions or for placement into college-level courses. Furthermore, Kirst and Venezia note "data from the National Association of System Heads (NASH, 2000) indicates that only ten states have high school graduation requirements in English aligned with college admission requirements, and only two states have the two requirements aligned in math" (p. 16). This lack of alignment on what students need to be able to know and do often

leads to enormous levels of remediation as students begin their postsecondary education. Heavy loads of remedial coursework create a heavy burden at the institutional level, sapping resources that many financially strapped community colleges and state schools can ill afford. Furthermore, as unprepared students discover that they are often one year into college coursework while showing little advancement toward degree, resolves to persist toward degree are greatly diminished.

The second critical area deals with student assumptions that what they do in high school does not matter, and that open access institutions will essentially allow them to start over again. This belief is often most manifested in students taking an easy course load during the senior year, as many colleges do not take grades from their senior coursework due to the fact that students apply during their senior year. A national survey indicates that first-year college students were more disengaged during their senior year of high school and spent less time on studying and homework then ever before (see Cooperative Institutional Research Program, 2002). This miscalculation is another contributing factor to high remedial education for these students, leading once again to early dropout. Of particular concern are K-12 policies that only require 3 years of Math and English and often only two years of Science, leading to a common choice among high school seniors to take electives rather than continue with upper division Math and English courses. This lost year can exact a heavy toll on postsecondary preparation.

The third apparent area of this disconnect of policies is segmentation of education. Many existing policies simply perpetuate the belief that the two systems of education are relatively independent and unrelated (Kirst, 2001). Such a belief impairs efforts towards alignment between sectors and most deeply affects the student, the one

player in the educational policy that is under the impression that there is a more or less seamless connection of K-16 purpose and policy.

Fourth, and perhaps most importantly for the overall purposes of this research, this disconnect is most pronounced in its revelation of low college knowledge among middle- and low-income students. The more disadvantaged the circumstances of the student, the less likely they are to know what is required in terms of grades, competencies, entrance exams, financial aid, and the process of applying to colleges. The summative findings of the six case studies (from the six states mentioned earlier) of the project were that inadequate college resources and college admissions information and a closely related lack of college counseling for all students created even more of a difficulty for students that came from disadvantaged backgrounds. Better alignment of policy and cooperation between K-12 and higher education institutions could be an integral step in solving the apparent inequities found in K-12 institutions, where fewer academic counseling and curricular opportunities "could close off opportunities to college for some students and lead to inadequate preparation for others" (301).

Ultimately the Bridge Project sets an agenda for resolving this chasm between K-12 and higher education policy. This disconnect is paramount to policy drift, wherein the inability to create a cohesive policy that is based on the success of students in both high school and college has led to growing gaps between the haves and the have-nots, while exacerbating the mounting problem of inadequate preparation and ultimately early drop-out among ill-prepared students. While the Bridge Project cursorily addresses the lack of student and parent knowledge regarding tuition costs (often overestimating the costs of college), the Project's primary focus tends to policy alignment targeted at curricular

coordination and preparation in order to ensure academic success and completion in postsecondary institutions. This focus on alignment is essential in helping to remedy the shortcomings associated with non-completion in postsecondary education, but provides only half of the answer to the access question, where the role of costs and financial aid play an equally important role.

The Nexus of Financial Aid and Academic Preparation Literature

While these two distinct strands of research indicate the separate but equally pivotal roles of financial aid and academic preparation, it is a small body of literature that considers the importance of both elements in students' potential for accessing and succeeding in postsecondary studies. Hossler, Schmit and Vesper's *Going to College* (1999) indicates an approach to the combined importance of financial aid and academic preparation information. As their study focused on the decision-making process of students and families, the purpose of their study was to ascertain what students need to know and when they are most apt to use that information in the college preparation and selection process. The authors comment that "given the importance of the college decision, it is surprising that students and parents are not offered more assistance in making it. Although a profusion of college guidebooks and rating guides have been published in recent years, these books are not designed to help students and their families move through the various stages of the decision-making process" (4).

Hossler, Schmit and Vesper's (1999) study articulates the informational needs for both academic preparation and financial aid in each stage of the decision-making process, as well as how students and families are likely to use this information. While

their study addresses where students tend to get their information, they do not derive a theoretical hypothesis for addressing concerns of weak information channels, especially among disadvantaged students. Thus, their contribution to this nexus of information streams is important in establishing a timeline for the types of information that are sought and used in the decision-making process, while leaving the next step, which attempts to address ways of resolving the problem of under-informed students and families in their process of accessing and choosing colleges, relatively unaddressed.

Perhaps the most application-based empirically driven study regarding the role of information on student access and persistence comes from Avery and Kane's analysis of the Boston COACH Program (2004). The College Opportunity and Career Help (COACH) program paired mentoring students from Harvard University with students in three inner-city public high schools in Boston to help high school seniors with their college preparation plans through both the college and financial aid application processes. The authors' study compared students from these inner-city schools with students from a suburban school who ranked among the top in the state in English and Math performance and where an average of 90% of each graduating class was enrolled in a four-year college within a year of graduation. The authors discovered five important hurdles that needed to be cleared in order for students to attend a four-year college: (1) graduate from high school, (2) have a strong enough GPA for admission, (3) register to take the SAT, (4) take the SAT, and (5) complete and submit an application to the college or university (p. 367).

Avery and Kane's (2004) analysis indicated that approximately 95% of the COACH students graduated from high school, compared to 99.6% of the comparison

school. However, only 39% of COACH students that graduated from high school had a 3.0 or higher GPA. Of these students, 88% of them registered and took the SAT, and applied for and entered a four-year college. However, among the other 61% of students with a GPA lower than 3.0, only 20% of these students took the SAT, and applied for and entered a four-year college. In comparison, 81% of the suburban school students obtained at least a 3.0 GPA, and 96% of these students accomplished all of the steps and entered a four-year college. Of the 19% of these students that had a GPA lower than 3.0, 71% of these still cleared all of the other hurdles and entered a four-year college. One possible reason for the discrepancy in comparative enrollment in four-year colleges among students with a GPA below 3.0, is the likelihood that the grading standards are not the same. The authors offer evidence of this possibility by indicating that 86% of tenth graders in the suburban school scored at "advanced" or "proficient" levels on the state standardized tests in Math and English, while only 11% of tenth graders at the COACH schools scored "advanced" or "proficient" scores.

A major assessment of the study was the importance of providing accurate information on tuition, financial aid, and wages of college graduates. This information helped many academically prepared disadvantaged students clear an important hurdle in their decision process of applying to four-year institutions. More particularly they note the relative lack of current research on the student earning expectations in economic models and its impact on their decision to enroll in school. The authors caution, however, that "it is possible that the relationship between perceived economic gain from a college degree and the decision to go to college is muted by outside factors—in particular, the ability to pay for college now" (383). The authors point out that a survey

measuring students perceptions of ability to pay for college indicates that only 37% of COACH students believe they can pay for college, whereas 76% of the students from the comparison suburban school said that they would be able to pay for college. Approximately 52% of COACH students thought that "maybe" they could pay for college compared to 22.4% of the suburban school students, and 11.4% said they could not, where only 1.3% of the suburban students answered in the negative. This caution highlights the importance of accurate information on tuition and aid, and how it may impact enrollment decisions among qualified, but disadvantaged students.

One weakness of the COACH intervention appeared to be that the help was provided too late in the process of preparing to attend college. While students from the three high schools possessed similar aspirations of college attendance with those from the suburban comparison school, there still existed a large discrepancy between actual enrollment among COACH program participants (33% of participants) and students form the suburban school (91% of students). Much of this discrepancy could be attributed to inadequate college preparation up to the point of their senior year. Indeed, as noted 62% of the students in the inner-city schools did not possess at least a 3.0 GPA at the beginning of their senior year, creating a significant hurdle to accessing four-year institutions. For the 62 (of 162 in the study) students that had managed to clear this hurdle, the COACH program appeared to offer meaningful assistance in the college application process, while also helping students register and take college entrance exams. The authors reveal that 92% of these students registered for the SAT, 79% took the SAT, 68% applied to a four-year college, and 60% enrolled in a four-year college.

In a policy issue report from the Indiana Education Policy Center, St. John (2002) notes these two competing strands of research and their inadequacy in singularly meeting the whole need of the student. Akin to disjunction between K-12 and higher education policy has been the apparent division between the two bodies of literature that address the complete picture of postsecondary access and achievement. St. John notes the shift in research towards academic preparation motivated by the Department of Education's agenda, and proposes the "balanced access model" (9). Where financial aid addresses the ability to afford access to postsecondary institutions and academic preparation addresses the need to be qualified to succeed in the academically rigorous environment of postsecondary institutions, St. John proposes a "reconstructed pipeline." This Balanced Access Model "expands the logic of the NCES model to include the role of family finances" (9). This new model proposes the following stepwise analyses:

- Family background and income influence students expectations and plans;
- Student expectations and plans influence course taking in high school;
- Taking college preparatory courses in high school influences students to take college entrance exams and to apply for college;
- Planning for college, taking preparatory courses in high school, and applying for college influence college enrollment (and destination). (ibid)

St. John's balanced model suggests that the role of finances is not exogenous to the decisions toward academic preparation, and that families and students make curricular decisions in high school based upon a perception that college will be to expensive and/or will not yield a meaningful rate of return.

St. John's (2002) contribution to the nexus of the financial aid and academic preparation literatures is extremely valuable. The Balanced Access Model indicates the necessity of studying the impact of low information on student expectations and academic preparations for college. That is, the role of financial aid information is not only important in establishing access to postsecondary education, but is also often the driver for decisions made in the realm of academic preparation. This hypothesis has been termed by some research (Trusty & Niles, 2004; Trusty, 2000) as unrealized potential or "talent loss," where the lack of information (both in terms of financial and academic preparation) for students that excel in the late grades of middle school undermines their expectations to go to college, as they are often neither economically nor academically prepared, despite revealing an initial ability to succeed in school.

In their text *The Ambitious Generation*, Schneider and Stevenson (1999) articulated the heightened ambition of most high school students to pursue postsecondary education. The authors speak to the importance of aligned ambitions, or educational expectations that are commensurate with occupational aspirations. Some students seem to have a very clear understanding of the postsecondary education they will need to obtain in order to work in the field they have chosen, while others underestimate the level of education that will be required for the chosen occupation. This highlights a broader disconnect of information regarding postsecondary education, and points the way to a more fundamental concern over the lack of information needed to access and succeed in postsecondary education. Kirst and Venezia (2004) argue that "clear signals about necessary preparation and standards for postsecondary education will have a positive

impact on motivation… [and] students who receive the information will have a better sense of how to prepare for the next educational level" (p. 289).

Researching the Available Data on Information

Notwithstanding the latest contributions in the literature that have articulated the importance of taking a holistic approach to college access and persistence, no studies have focused on existing institutional helps in the secondary schools and their impact on preparing students for accessing and succeeding in postsecondary institutions. Galdieux and Swail (1999) presciently articulate much of the motivation behind interventions such as the COACH program. They argue that financial aid is simply not enough, and that "we need to direct outreach to more of the current generation through intervention programs that make a difference in the lives of young, disadvantaged kids early in their schooling, widening their horizons and encouraging them to stay in school, study hard, take the right courses, and keep their options open" (190). While their policy suggestion is commendable, it seems that they are overlooking some current avenues of information and help in secondary schools and their potential influence on the student decision-making and preparation processes.

A logical next-step in the literature is an empirical study of existing informational help and services dedicated to assisting students as they access postsecondary education. Most public high schools have in place some form of assistance in filling out college applications, college financial aid applications, visiting colleges and speaking with college representatives. Prior studies have sought to encapsulate these elements in the convenient persona of high school counselors. While much of the delivery of the

information and help may take place through these counselors, it is important to identify the impact of these informational components connected to postsecondary preparation and access from the myriad of other duties that counselors may perform.

McDonough (1997) has studied the importance of receiving help and information towards college preparation and access, but has done so with a focus on how social class and school organizations create the environment under which students process their decisions. Empirical research in this area is scarce, and as such identifies an important gap in the postsecondary decision-making literature. Research concerning informational help in preparing both academically and financially to access postsecondary education could fuse the two strands of postsecondary access literature in a holistic approach gauging the collective impact of preparatory information and assistance towards higher education success.

This review of the literature thus far has explicated distinct approaches to studying the determinants that influence the postsecondary decision-making process. Research focusing on the influence of economic factors, such as costs of and returns on education, have highlighted the importance of college tuition and financial aid. Studies centered on the impact of student academic preparation and performance have noted the role that background characteristics, coursework and other academic measures have on postsecondary access. Having canvassed these elements of the literature concerning academic preparation and financial aid, it is essential to determine the manner in which researchers have empirically modeled the student access to postsecondary education picture and its evolution. Given the combination of elements involved in the decision-making process of postsecondary plans, this section begins with a suggestion from the

highly regarded economist Charles Manski and follows the progressive modeling decisions of subsequent researchers in the field.

Progressive Modeling of Postsecondary Decision-Making and Access

In his chapter "Adolescent Econometricians: How do youth infer the returns to schooling?" Manski (1993) sought to move the pendulum of econometric studies towards a more realistic model for the formulation of expectation assumptions among potential postsecondary students. Prior economic studies regarding postsecondary decisions presumed homogeneity among all students in the formation of their expectations, utilizing all of the same information (with the assumption that all had equal access to this information) and using this information in a uniform way. Manski's research suggests the importance of making explicit the assumptions of expectation formation when modeling postsecondary decision-making processes of high school students.

Noting two particular problems with the prevailing economic studies, Manski argued that "there is no evidence that prevailing expectation assumptions are correct nor reason to think that misspecifying expectations is innocuous" (p. 44). The thrust of Manski's proposal is that just as econometricians do not measure educational productivity in a homogenous fashion; it is irrational to posit that all youth form their expectations about returns on schooling in the same way. "Youth and econometricians may possess different data on realized outcomes, may have different knowledge of the economy, and may process their information in different ways" (p. 45). This leads Masnki to determine that "if youth form their expectations in anything like the manner that econometricians study the returns to schooling, then prevailing expectation

assumptions cannot be correct" (p. 54). Ultimately, Manski concluded that traditional econometric models are not sufficient in addressing the role of choice and expectations among high school-aged students and their aspirations for postsecondary education. "Decisions under uncertainty reflect the interplay of preferences, expectations, and opportunities" (p. 55). Manski proposed that the only solution is to turn to reliable subjective data that, in concert with choice data, may address this complexity of "preferences, expectations, and opportunities." Incorporating this proposition, my research suggests that a holistic approach to understanding the postsecondary decision-making process should include reliable measures of student characteristics and performance as well as measures of information that may influence expectations and opportunities.

In a subsequent article Dominitz and Manski (1996) sought to elicit "reliable subjective data" of student expectations of returns to schooling through a computer-administered personal interview (CAPI). The authors designed a computer-based survey that elicited earnings expectations from students who either attended high school or were undergraduates attending college. Students were asked to about their expected earnings between the age of 30 and 40 under two scenarios, whether or not they went on to college (for high school students) or whether or not they continued beyond the current semester (for college students). It was with a high level of sophistication that Manski felt that the assumptions of expectations might be allayed in favor of reliable data on students' actual expectations for returns on schooling.

Dominitz and Manski's experiment included high school juniors and seniors and college freshman form and near Madison, Wisconsin. Most of the participants were

suburban, middle-class students. Of the 110 participants surveyed, 71 were high school juniors (and a few seniors) and the other 39 were college undergraduates. The authors asked students to compare what they believed their future earnings would be at age 30 and then at age 40, first unconditioned on education, then conditioned on not receiving a bachelor's degree and finally conditioned on obtaining a bachelor's degree. Categorizing their responses in empirical quantiles for analysis, they found that while there was significant within-group variation in participant responses to earnings expectations, there was a shared belief that a bachelor's degree brings greater earnings and those earnings grow at a steeper rate between the ages of 30 and 40 than do the earnings of non-degree holders. For example, the median quantile of responses conditioned on a high school diploma held an average expectation of changed earnings between age 30 and 40 of $5500 while their changed expectations conditioned on a bachelor's degree were approximately $11,000. The authors found that unconditional earnings expectations were very similar to bachelor's degree expectations, presumably because participants expected to obtain a bachelor's degree by age 30. While such data seems more reliable than traditional econometric models that assumed homogeneity in expectation assumptions, (revealing variance both within and between students), subsequent researchers moved further in a direction towards more subjective data that might explain the student access model, beyond economic expectations on returns to schooling.

Orazem and Tesfatsion added a level of complexity to the expectations model by introducing "effort" as a variable of import that is correlated with how much students perceive that their parents have received in return for their schooling (1997). In their theoretical exploration of a revised model of human capital investment, the authors

suggested that, through study of overlapping generations economy, tax efforts that aim for egalitarian redistribution of wealth would not necessarily benefit human capital development in youth. Orazem and Tefatsion indicate that earlier research has offered two explanations for why family background has an independent effect on human capital investment. First, the education of one's children can be a consumed good, and wealthier families may choose to invest more comparatively in this good than poorer families. Alternatively, the difference in investment in children's education may have little to do with choice but with the constraints of not having readily fungible assets to purchase this good. The authors indicated, however, that the trend over the past century has seen poverty decrease suggesting that the gap of investment between the poor and the wealthy should be closing.

Consequently, Orazem and Tesfatsion offer an additional hypothesis that might explain the positive correlation between parent-child lifetime incomes. "Children condition their expectations of returns to schooling on their parents' return to schooling. If true, then egalitarian transfers of income to poorer families may bias downward children's expected returns to schooling and reduce children's incentives to invest effort in schooling" (p. 14). In other words, adding disposable economic resources to poorer families in order to increase development of human capital in the younger generation yields only minimal returns. The authors proceeded to propose econometric models that are possibilities of what they call the "dynamic properties of the Basic Economy".

But Orazem and Tesfatsion make a greater contribution in explicating potential nuances in the decision-making processes of adolescents and postsecondary educational opportunities. The authors essentially indicate the necessity of a variable that can indicate

the impact of family background, specifically levels of education and perceived returns on that education as demonstrated through parental employment, on student decisions for going to college. They come to this conclusion because researchers have consistently discovered high correlations between parents and children's lifetime earnings, but these findings are contrary to human capital investment theory that would suggest that the "rational" decision would be to make an investment in postsecondary education.

Earlier theories (Taubman, 1989) have suggested that the reason for the discrepancy between high- and low-income investment in human capital may be because it is a response to a consumption good of parents, and children form higher income families value the good much more. A second theory (ibid) suggests that poorer families do not make the investment because they have constrained resources for investment. Orazem and Tesfatsion offer an alternative hypothesis based on their revised theoretical econometric modeling, suggesting that children condition their expectations on returns to schooling based on their parent's return to schooling. This hypothesized model finds greater credence because redistributing resources to poorer school districts has had little effect on human capital investment (Betts, 1996).

Most importantly, however, Orazem and Tesfatsion's theory adds to Dominitz and Manski's initial step of expectations modeling and reveals additional reliable subjective data in understanding student decision-making and the role of information when determining postsecondary plans. To be sure, a measure of socioeconomic status had been employed earlier than Orazem and Tesfatsion's proposal, but the authors offer strong theory that bridges basic econometric models of expectations and decision-making with much of the psycho-social literature that takes up this question.

In his article "Trends in Black-White Differences in Educational Expectations: 1980–92," Morgan (1996) indicates that there are two complementary theories at play that contribute to our understanding of decisions of enrollment among high school graduates. Status-attainment theory suggests that educational attainment is connected to the values and encouragement transmitted to students by significant others and helps to explain the development of aspirations of students. Alternatively, resource-constraint theory moderates student aspirations with perceived realistic expectations for enrolling in postsecondary education based on the direct costs of investment. Morgan determined to study differences between blacks and whites in their expectations for education over the span indicated in his title, a follow-up to Hauser and Anderson's (1991) study that spanned from the mid-1970s to the mid-1980s. Merging data from two NCES data bases, High School and Beyond and NELS 88, Morgan utilized variables that asked students about their education expectations both in their sophomore and senior years. Among the determinants that Morgan included in his OLS regression analysis were what students reported as the educational expectations that "significant others" (parents, counselor, teachers, friends, etc.) had for them regarding college.

The author also sought to control for socioeconomic background and "cognitive skill" as measured through a composite standardized test given in the survey. Morgan introduced some important additional variables into his modeling process for educational expectations. In Morgan's first model (1996, p. 310) he does not include the measures of SES, cognitive skill or "significant others' influence" and the resultant R^2 is very low at (.026) for Sophomores and (.064) for the Senior cohort. However, when the author included these variables in a subsequent model, the R^2 increased to (.416) and (.457)

respectively. Including these additional explanatory variables reduced the impact of race among the Sophomore cohort (coefficient shifted from -.582 to -.425) but increased the impact among the Senior cohort (coefficient changed from -.036 and not statistically significant to -.158 and statistically significant). Furthermore, as would be expected, students with a higher socioeconomic status (although Morgan does not declare the metric of growth in his model) expect to attend .5 years of schooling more than a student with average SES.

While Morgan found no impact of the cognitive skill variable for the 1992 cohorts, among the 1982 cohorts the impact of cognitive skill was statistically significant and had a meaningful effect size of nearly ¾ year (.738 among sophomores and .624 among seniors). Morgan also discovered that influence of significant others was negative and statistically significant in its impact on students aspirations for college attendance (-.324 among sophomores and -.283 among seniors) whereas it was strong and statistically significant among the 1982 cohorts (.941 among sophomores and .937 among seniors). This reveals a shift of the influence of one's significant others on a student's aspirations for postsecondary education of nearly 1 ¼ years of expected attendance during this ten year span.

While the influence of "significant others" may have some explanatory value, this major impact in ten years time indicates that this particular variable may be capturing some other influences and is perhaps too great a departure from Manski's *reliable* subjective data. This seems especially to be the case when leaving out such important variables as the labor market aspects that must have played a role in student decision-making and educational expectations, as well as the direct costs (tuition) of attending

college. Morgan's measure for cognitive skill, however, seems to be an important factor to consider in controlling for the influence of academic preparedness on one's educational aspirations and expectations even though it appeared not to be meaningful in the model for the 1992 cohorts. Overall, Morgan reports an R^2 measure of 0.316, indicating a relatively modest goodness of fit with which to compare subsequent models.

Beattie's (2002) response to Manski's original question of adolescent econometrician's is to extend his suggestion for reliable social data into a realm that includes race and ethnicity along with SES, mapped upon an econometric model that includes variables of per capita income, unemployment rate, university cost, and returns to education, which reveal choice in the decision of whether or not to pursue postsecondary schooling. Beattie also considers Manski's primary variable of the student's expected education, while additionally desiring to control for student birth order and marital status to control for social factors that others had discovered had an impact on postsecondary enrollment decisions.

This extension, using one of the same data sets (High School and Beyond) as Morgan, utilizes similar data while also including measures on the labor-market and cost of schooling that seem inherently necessary when seeking to parse out the heterogeneity of the postsecondary decision-making process among high school students. Furthermore, Beattie separately modeled important interactions between race and returns to education, socioeconomic status, returns to education and cost of education, and test scores (cognitive skills) and returns to education, and finds statistically significant results for young men. The most significant variables (in terms of effect size and statistical significance) included in the author's models are state level variables of returns to

postsecondary schooling, per capita income and university cost, as well as individual-level variables of socioeconomic status, expected education and whether they were married and/or had children. Importantly, however, Beattie's interaction terms, while significant, very minimally increase the variance explained in her models. The base model, with no interactions has a Pseudo R^2 of 0.355, while the subsequent additive models are 0.355 and 0.356, with the final model containing all of the interaction terms having an R^2 of 0.358. This indicates that while the author discovered interesting interactions that were statistically significant, such interaction terms did not meaningfully explain much more of the variance.

These interactions suggest how the heterogeneity of decision-making plays out among students of different racial/ethnic and socioeconomic background. While Beattie's modeling proffers instructive elements on how to extend Manski's original work into a sphere that identifies interactions between econometric elements and justifiable social background data, the decision-making process is still absent variables that indicate a more complete knowledge of the differential information that adolescents may possess when making postsecondary decisions.

In her study of racial differences in decisions for postsecondary enrollment, Perna (2000) offers an additional piece of the decision-making process. Perna, like Beattie began with considerations of basic econometric models and shares the concern that such models do not identify critical differences among students that go beyond suppositions of perfect labor-market information that leads to assumptions of homogeneous decision making. Perna keys in on this weakness, noting that such assumptions "exceed an individual's information processing capacities" (p. 118) and that "to manage cognitive

decision-making demands, individuals adopt such strategies as satisficing and bounded rationality" (p. 119). Perna is alluding here to a theory developed by Simon (1956; 1982) that suggests that a model for rational human behavior must be conditioned on social constraints that indicate that one is limited in time, available information, and resources, to make the "most rational" decision. Instead individuals tend to make decisions based on what seems best given the limited resources (time and information, for example) they have at their behest, and therefore knowingly make a satisfactory choice, if not the "best" choice.

To address these concerns Perna suggested that such econometric models must include ways of measuring social and cultural capital that might indicate differences in expectations and decision-making among high school students. The author constructs her meaning of cultural capital through Bourdieu and Passeron's (1977), that it is "the system of factors derived from one's own parents that defines an individual's class status (p. 119). Her articulation of social capital, adopted from Coleman (1988), is that it can be conceptualized as information-sharing channels. Perna seeks to operationalize social and cultural capital broadly and collectively. The author indicated that one manner in which social and cultural capital may influence the decision-making process is through "the provision of knowledge and information about college" (pp.125–126), and included high-school quality (measured by the percent of students that went on to a four-year college the year prior) and high-school desegregation (measured by percent-level of minority students) as "measures of information availability" (p. 126). Furthermore, Perna included high-school location and region as possible determinants of available information because of the relative concentration of colleges and historically-black colleges, while

also indicating the school-type (public versus private) has often revealed a difference in college attendance (higher for private school students).

Perna also suggested that social and cultural capital together signify the values associated with higher education. Measures of this concept of social and cultural capital include a student's educational expectations, parental encouragement and involvement in education, as well as the parents' level of and encouragement for education. The author also included encouragement from peers and from teachers or counselors, as well as any help received in applying for college (essays, financial aid and college applications) and tools used to prepare for college entrance exams. While the collection of variables representing social and cultural capital are extensive, together they still suggest a narrow interpretation or operationalization of the notions of social and cultural capital as put forward by Bourdieu and Passeron (1977) and as adapted by McDonough (1997), erring on the side of econometric theory.

Still, the author's operationalization of these concepts appears persuasive, and adds an important lost element, that of the role of information, into modeling the process of decision-making. Perna also offered a more delineated measure of the cost of schooling by including variables for grants and loans, although dichotomously coded according to the likelihood that a student might have received such help, rather than assigned a value based on the average grant or loan received by like students, along with the customary variable measuring the impact of tuition and fees. Furthermore, she included a student's academic program (dichotomously coded to whether they took rigorous academic coursework, thus losing some richness as to a more developed categorical explanation of curricular program) together with their test scores (cognitive

skills) in order to more fully articulate and control for academic preparation or ability. As noted, her inclusion of social and cultural capital variables include student expectations for college going, perceptions of encouragement towards college, as well as information regarding whether they received help with college requirements and help with taking college entrance exams.

Perna's findings focus on her most fully articulated model that includes race and sex, costs and benefits, ability and the aforementioned variables that are proxies for social and cultural capital. The Pseudo R^2 for the final model is 0.327 and it correctly classifies 76% of those who enrolled in a 4-year college (the dependent variable) and correctly classifies 82% of those who did not enroll (p. 132). Since Perna's research interest lie in the differences between a White, African American, and Hispanic student's decision to enroll in 4-year colleges, she isolates the sample (drawn from the National Educational Longitudinal Study 1988-1994) into these three races, resulting in a Pseudo R^2 for White students of 0.358, for African Americans of 0.322 and less explanatory value in her model for Hispanic students of 0.243 (p. 134).

Results for the probability of a student enrolling in a 4-year college given the model fit of the entire sample indicates that academic preparation has a strong positive impact as do students' expectations for baccalaureate and advanced degrees. Test prep tools also reflected a positive impact on likelihood of enrollment, although it is possible that this variable is a proxy for how well students performed on a college entrance exam (i.e. SAT). Family income was statistically significant only among White students (but was not substantial with a delta-p of 0.021), but parent's education level (delta-p of 0.058), and mother's expectations for bachelor's degree (0.137) and advanced degree

(0.106) were statistically significant for the entire sample. Peer encouragement did not play a role, but some of the traditional economic factors, such as unemployment rate (-0.028), tuition and fees (0.004), and loans (-0.057) were statistically significant, although there impact was small.

One of the concerns in expanding an econometric model in order to discover explanations for differences among students of different backgrounds moves back to the premise that Manski suggested from his paper on adolescent econometricians. While Manski issues a call for including social data, it was tempered with an indication that such data must be reliable and not so subjective that it could be considered a weakness in a model towards more refined explanations. Repositioning our lens through this injunction of reliable subjective data, it is important to note that variables which indicate a student's actions and stated expectations, as opposed to subjective student beliefs of what their peers and/or teachers and counselors think or feel, are considered more reliable, even though the latter variables are in keeping with the framework of social and cultural capital within which Perna is operating. Measures of parental expectations for postsecondary education would be equally weak if they were merely measures of what the students think their parents expect, as opposed to being measured by direct responses from parents. Variables that indicate the information that students received in the process of making decisions to go to college appear more reliable (with regards to it being a direct of measure of the decision-maker's aspirations) than variables that indicate perceptions of encouragement.

Yet, while the study includes these important variables measuring information and assistance that students may use when applying for college, the model lacks a level of

sophistication that the data offer, namely a delineation of the types of informational help that students receive, which may have contributed to this variable not possessing statistical significance in the model. There are two distinct aspects at work in the postsecondary decision-making processes of high school students. The first facet is whether or not they are academically prepared to be able to enroll in college and extend their education, and the second is whether or not they perceive they can afford the costs of education. These two distinct aspects must be parsed out when studying the explanatory role of information in a heterogeneous decision-making process. This research simply dichotomized whether students received help with all college requirements or none.

Thus, while this study (Perna, 2000) introduces important new explanatory aspects in the decision-making process, the measures should be more clearly delineated to reflect to two-pronged aspect of postsecondary decision-making, that of academic and financial preparation, while also studying the important interactions that such information might have upon students with a diversity of backgrounds. Still, it is critical to include in the approach a measure of the student's expectations for pursuing postsecondary education, as this is likely to impact the findings related to financial and academic preparation. Such a measure does not seek to encompass the often nebulously articulated social and cultural capital, rather it serves to indicate directly the stated expectations of postsecondary plans.

Finally, none of the aforementioned articles account for the potential of the reception of information being endogenous with unmeasured student characteristics, such as a student's motivation to attend college. An endogenous change is defined as a change

that comes from within the model (such as student motivation) and is explained by the model itself, and not by some external factor (such as information). Several authors (Kirst & Venezia, 2004; Hossler, Schmit & Vesper, 1999; Galdieux & Swail, 1999) have articulated that clear college preparation information is key to student preparation for, and access to, postsecondary education. Previous research that has modeled the role of information on postsecondary access has suggested that information has a direct causal influence on a student's probability of enrolling in college (see Perna, 2000).

However, information here is treated as being received at the end of a student's high school career, when varying levels and types of college preparation information (such as financial aid and academic preparation information) are likely often received earlier in a student's high school career. This concern hearkens back to St. John's (2002) "Balanced Access Model" and posits that a student's access to information at different times of their secondary school tenure may confound their preparations and/or expectations to access postsecondary education. This problem highlights the importance of first focusing on the role of information and other determinants and their impact on the mediating factors of educational expectations and academic performance in the postsecondary choice model.

The larger concern, however, is whether a policy intervention targeted at providing information will have a direct causal relationship with postsecondary preparation and access. For example, if a student indicates that they have received financial aid preparation information and it is suggested to have a direct relationship with postsecondary access, it would be interpreted that *X* amount of information has *Y* impact on access. However, say that for many (or perhaps all) students the reception of financial

aid information was in fact really an indication of the students' motivation to go and find and acquire that information. Arguably then, this variable would be partly a measure of the impact of information and partly a measure of student motivation, in which case, part of the finding would be that student motivation has a direct influence on access, which hardly seems noteworthy. Additionally, because student motivation is likely unmeasured, and therefore would be located as part of the error term, the variable for information would be correlated to some degree with the error term, violating a basic statistical assumption. Thus, the hypothesized direct causality of information on postsecondary access may more fully be a proxy measure for unmeasured motivation that is explanatory of internal elements in the model. Therefore, it is crucial to develop an instrument that might help to resolve the potentially endogenous relationship between the financial aid information that a student obtains and unmeasured student motivation so that this important informational variable on financial aid is not merely a reflection of a student's desire to attend college.

Prior literature indicates the necessity of clearly understanding the entire development of the postsecondary decision-making process. Possessing a complete framework that indicates the important determinants in students' decisions to attend college is the design of this research. Grafting together the sometimes disparate research that focuses on elements of the process (e.g., financial aid, academic preparation, educational expectations) and specific moments in the process (i.e., the "choice" or "predisposition" phase of the process) is the subsequent aim of this study. Assembling this complete picture, while specifically adding the role of information into the process, will provide answers to what important factors have an influence on postsecondary access

and its intermediating influencers of academic preparation and educational expectations. The next chapter offers a framework that articulates the evolving nature of the postsecondary decision process and those factors that appear to play a role in this process.

CHAPTER III

CONCEPTUAL FRAMEWORK

Postsecondary decision models have often focused on the final stage of the decision-making process, with little attention paid to earlier determinants that impact the final decision to enroll in college (see Perna, 2000; Beattie, 2002; Morgan, 1996). Others have focused on the earlier stages of the college choice process (Hossler & Stage, 1992; Hamrick & Stage, 2004). Some college choice models have been based on status-attainment theory, while others have had rational-choice and economics at the center of their theory. A few have sought to combine models that focus on both social background and economic determinants in order to develop a more complete picture of the college choice process (Hanson & Litten, 1982; Hossler & Gallagher, 1987).

Hossler and Gallagher present a model that indicates that the decision-making process develops along three somewhat distinct and sequential phases: predisposition, search, and choice (1987). This model is further explicated in Hossler, Schmit and Vesper's text *Going to College* (1999), where the authors analyze each phase of the process using student data from Indiana to indicate particular influences on each stage of the process. The predisposition stage focuses on the development of a student's postsecondary educational expectations, and roughly takes place during the ninth and tenth grades. The search stage involves actions dedicated to preparing for one's postsecondary expectations while also seeking out information that will help them determine their choice, and typically spans tenth and eleventh grades. The final phase, the

choice stage, is the point at which students make their postsecondary decisions, and takes place during the twelfth grade.

While the Hossler and Gallagher model offers a clear sequential process, Hanson and Litten (1982) argue that college decision-making models need to provide more detail of other external influencers on the college choice model, such as sources of information and advice about colleges (i.e., parents, peers, counselors) as well as college characteristics and actions in the application and matriculation process. Hanson and Litten's framework maps well onto Hossler and Gallagher's three-stage phase, and is included in an adapted framework offered by Plank and Jordan (2001) in their "conceptual model of college choice" (see Figure 1). The process then, is that student characteristics and personal attributes as well as high school characteristics and environment and public policy influence a student's educational aspirations or expectations (which would be located in the predisposition stage of Hossler and Gallagher). This, in turn would influence the search process of gathering and processing information, which is also influenced by available information, as well as college characteristics (such as academic/admission policies). Finally this stage would directly influence the choice phase of determination, when a student chooses whether or not to enroll in college, and if so where.

Plank and Jordan (2001) explicitly focus their research and their modeling on the search and choice stages of the framework. They state that the predisposition phase of the model, while being influenced by a collection of background variables, "can be operationalized simply as aspiring to attend college" (p. 954). They suggest that there are two reasons for this determination. First, most students' educational expectations in the

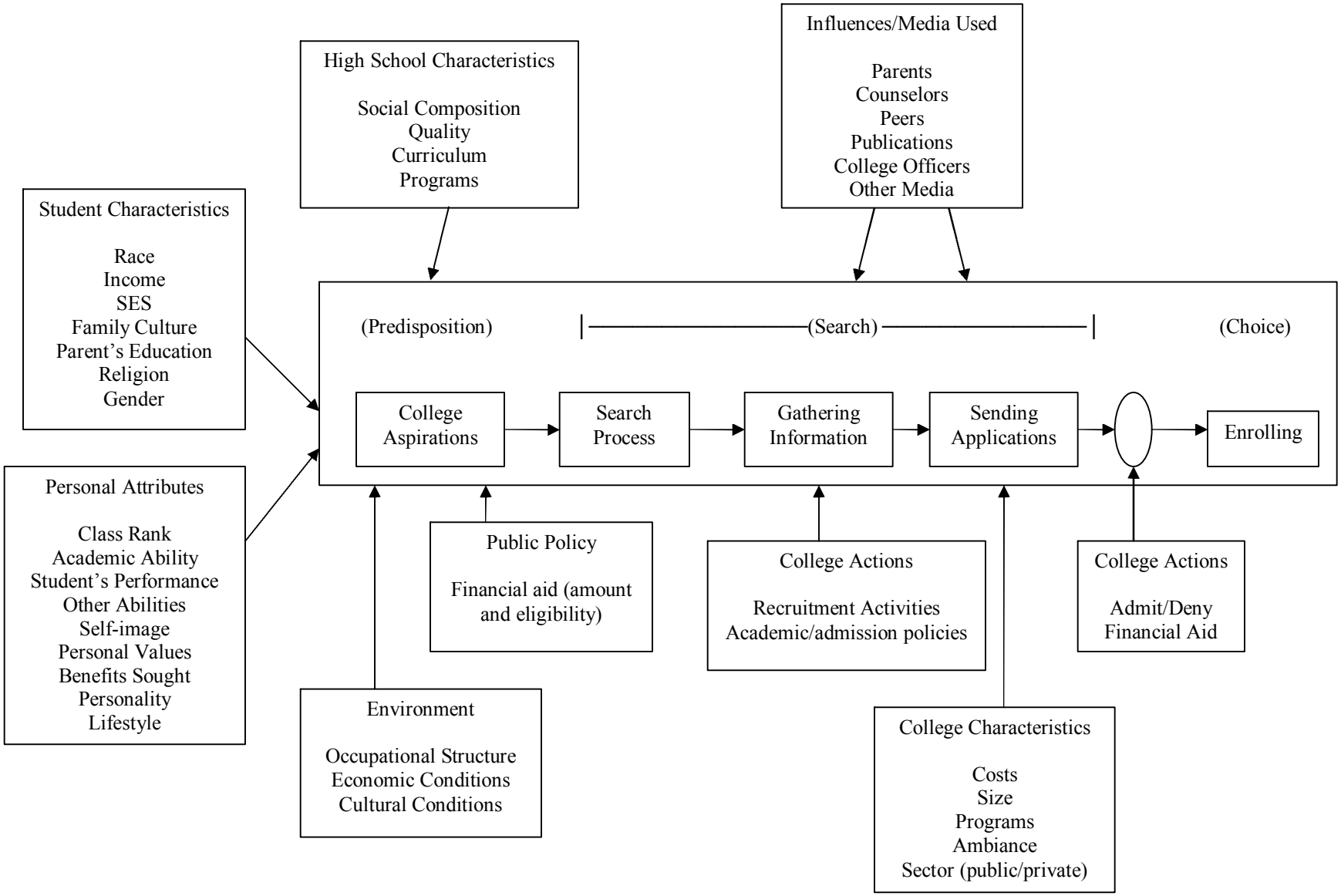


Figure 1. Plank and Jordan's (2001) Conceptual Model of College Choice
Adapted from Hanson and Litten (1982); Hossler and Gallagher's Three-Phase Model (1987) in parenthesis

eighth grade are toward that of attending some form of postsecondary institution after high school (88%), and they remain consistently high in tenth (86%) and twelfth (88%) grades. Secondly, they state that their model includes correlates for student expectations, including SES and other background predictors, thus controlling for factors influencing predisposition.

Although Plank and Jordan (2001) offer a persuasive argument in how they treat the predisposition stage in their framework, it lies at odds with the literature that indicates that predisposition is also influenced by college knowledge, or the reception of information that may influence a student's decisions to prepare for and attend college (Hamrick & Stage, 2004; St. John, 2002; Kirst & Venezia, 2004). Furthermore, as St. John (2002) indicates in the aforementioned "Balanced-Access model," as information influences college expectations this may in turn affect academic performance, suggesting a very dynamic process at work during the predisposition phase with college preparation information playing a central role. Plank and Jordan's (2001) treatment of the predisposition stage is static, while the literature indicates that it is the beginning of a very dynamic model. This may be a result of the authors' belief that the role of information takes place primarily during the latter end of the "search" stage, identified as "Influences/Media Used" in their model.

While Plank and Jordan's (2001) model includes "Public Policy" in the form of the amount of financial aid available and one's eligibility to receive it as an influencer on the predisposition stage, because predisposition is static in the model, this likely underestimates the potentiality of information (or lack of information) as an influencer on early and evolving student expectations and performance. Furthermore, the role of public policy regarding college access should be expanded to include information on academic preparation necessary for postsecondary opportunities, such as the courses students need to take and/or the level of academic performance

necessary to attend college, together with policy that informs students about the costs of college and available financial aid. All of these actions together may be better termed as "Early College Information" and suggest a form of public policy that is likely to influence initial student expectations as well as performance through the predisposition and much of the search phase.

Plank and Jordan's conceptual framework also indicates that "environment," such as cultural and economic conditions, influence the predisposition phase of the postsecondary decision-making process. Hossler, Schmit and Vesper (1999), however, discover that external information about the costs of college and alternative options, such as entering the workforce, do not play a role during the predisposition phase, but rather exert their influence during the latter part of the search phase. Finally, what Plank and Jordan term as "influences and media used" by students during the search phase, may more accurately be termed as a later source of college preparation information, coming typically during the search phase, from sources such as parents, counselors, and other avenues. This late college information may also contain within it the continued source of information motivated by public policy.

Given these changes and emendations, I introduce a conceptual framework entitled, "Dynamic Conceptual Model of College Choice and the Role of Information," an adaptation from Plank and Jordan's model, which takes into account a larger, pivotal role for information in the postsecondary decision-making process (see Figure 2). My conceptual framework has introduced a clearer sense of the timing of the stages and influencers in the college decision process by imposing grades eighth through twelve in the model parallel to and just beneath Hossler and Gallagher's (1987) three-stage model.

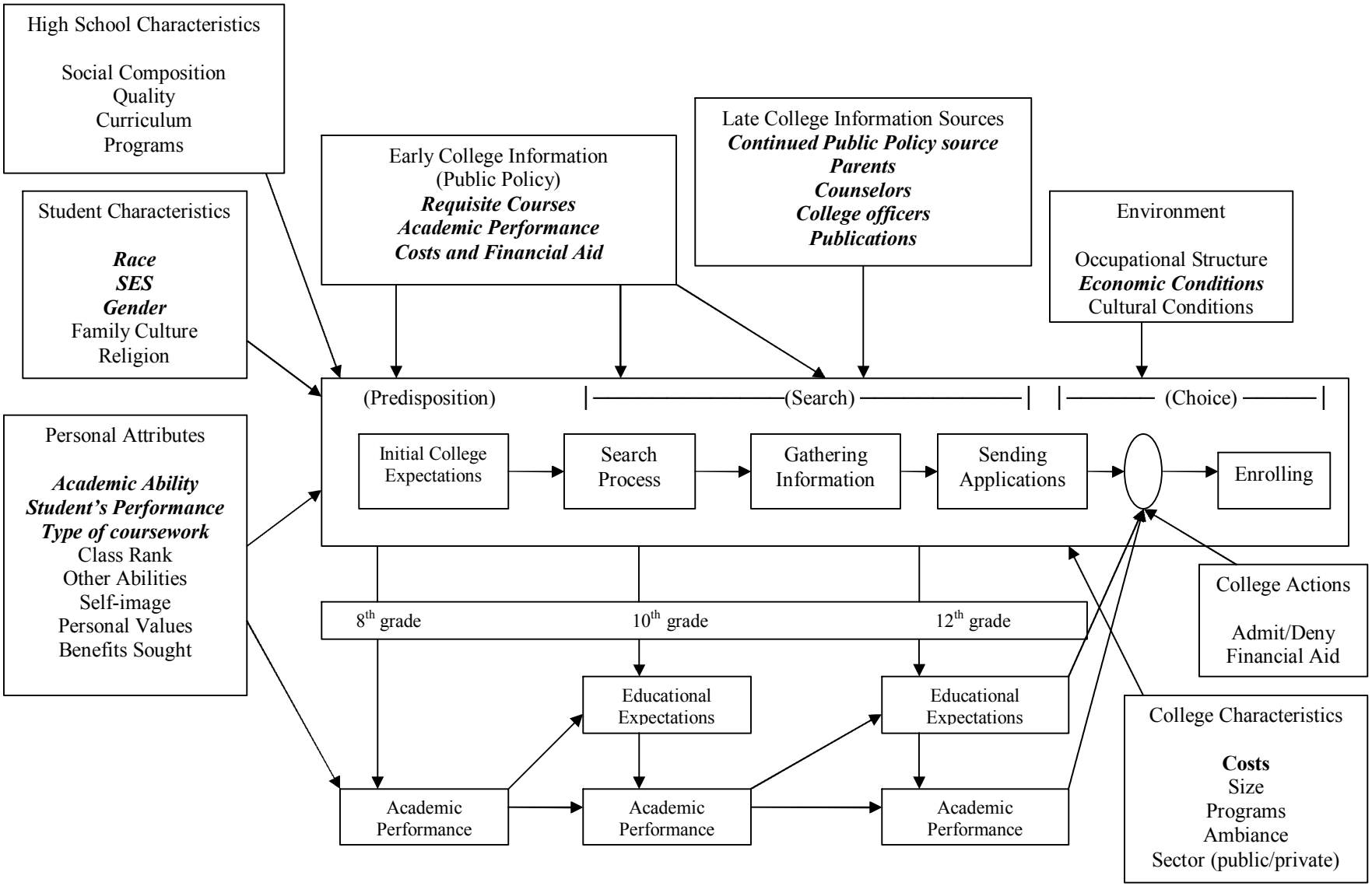


Figure 2. Dynamic Conceptual Model of College Choice and the Role of Information
Adaptation of Plank and Jordan's framework (2001),
also see Hanson and Litten (1982) and Hossler, Schmit and Vesper (1999)

As my model indicates that the decision process is dynamic, I have introduced educational expectations and academic performance as key elements in the choice process. Expectations and performance are influenced in each stage of the process by the quality and quantity of college preparation information that is made available to them, as well as by other personal and family characteristics. This early form of information is believed to be a policy lever which states can manipulate in order to help prepare students, and more particularly historically disenfranchised students, to prepare financially and academically for postsecondary educational opportunities. The arrows leading from information toward the college choice process indicated by each phase represent the influence of the reception of clear and sufficient college preparation information on those particular aspects of Hossler and Gallagher's process (predisposition, search and choice).

Arrows then proceed from the influence on a student's educational expectations (in the case of 8th grade, the predisposition process begins with initial student expectations) towards academic performance, as expectations are hypothesized to influence performance (St. John, 2002). Thus, the model indicates that early college information has a direct influence on initial (8th grade) expectations and a mediated influence on early academic performance through student expectations. By the end of the predisposition and the beginning of the search phase (10th grade), early college information influences the amount and type of information that a student finds in their search. Such information in the search process thus influences tenth grade student expectations as either a revision to, or a substantiation of, initial (eighth grade) educational expectations. Prior academic performance is also likely to influence

educational expectations measured at the beginning of the search stage during the tenth grade.

The final arrow extending from "early college information" coincides with an arrow coming from "late college information sources" as influencers on the mid- to latter stage of the search phase and towards the beginning of the choice phase. These both indicate additional influence on the information gathered by students as they prepare to make a postsecondary choice. While there is likely overlap between the "early" and "late" college information sources, conceptually they represent distinct avenues for providing information, and thus are represented separately. Early college information is conceived of as representing an active state policy directed at providing information to students about how they can sufficiently prepare academically and financially in order to access postsecondary educational opportunities. "Late" information is believed to represent college information that helps students to navigate some of the processes of selecting and applying for college, such as obtaining specific information about financial aid and about the application process.

The provision of college preparation information (whether by way of a public policy or because of access to other sources such as college counselors, parents, etc.) influences the quality and volume of information. This part of the search process in turn influences a student's final educational expectations which may represent either a change from 10th grade expectations or a reinforcement of those expectations. This final formulation of expectations in twelfth grade is also influenced by prior academic performance (tenth grade), and in turn both this final measure of expectation and the 10th

grade measure of academic performance both directly influence a final measure of a student's academic performance in twelfth grade.

Ultimately this dynamic conceptual framework for college choice and the role of information leads to the actual postsecondary choice and its direct and indirect determinants. The model indicates that information (both "early" and "late") influence the postsecondary choice in two manners. Information affects the college choice process model directly from predisposition to search to choice, and therefore by directly influencing the prior stages of the model influences the choice stage. Information also influences the postsecondary choice indirectly through its impact on evolving student expectations and academic performance, which is illustrated by the student's final expectations and performance influencing the college choice directly. The choice stage is also directly influenced by state-based economic factors as well as the actual cost of college.

The analysis now discusses each phase of the decision-making process and expectations for how determinants included in the model are likely to influence outcomes within that phase. Because no prior research has sought to investigate the outcomes of changes in educational expectations and in academic performance during the course of the college choice process, analysis of the predisposition and search phases remains exploratory. Only a few studies have empirically focused on the determinants of students' initial educational expectations during the predisposition phase, and no empirical research has looked at outcomes specific to the search phase of the choice process. Each phase will be presented with any relevant empirical evidence of possible determinants that influence the aforementioned outcomes followed by a short narrative indicating how

information is believed to influence student behavior during each phase of the choice process. As each phase directly influences the next, the implication is that earlier influencers may exert an indirect influence on the outcomes of a given phase.

Predisposition Phase

The framework suggests that student background characteristics, early college information, and personal attributes, such as academic ability and performance, influence the initial formulation of educational expectations at the beginning of the predisposition phase as well as an initial measure of academic performance. Furthermore, the model indicates that these factors continue to influence any revision or confirmation of initial educational expectations and changed academic performance by the end of the predisposition phase and the beginning of the search stage during the tenth grade. Few studies empirically analyze the predisposition phase of the college decision process, and those that have, focus on predictors that influence the initial formulation of educational expectations, but not a potential change in educational expectations, which is the focus of this research. Indeed throughout the literature on factors that influence educational expectations, studies focus on the initial creation of those expectations and then treat those expectations as static as a student moves forward in their postsecondary choice process.

This research posits that educational expectations are not static. It suggests that through the course of the predisposition (and search) phase that, along with other factors, college preparation information may influence a change in educational expectations. Because expectations have been shown to play an integral role on eventual postsecondary

choice (Perna , 2000; Beattie, 2002), understanding the impact of information and other determinants that may influence changes in expectations is a central step in understanding the college choice process. This research turns to Simon's conception of "bounded rationality" (1982) to offer a foundation for how students with varying levels of information might be influenced by information as they revise (or substantiate) their educational expectations during the tenth grade from their initial educational expectations measured at the beginning of the predisposition phase during the eighth grade.

Simon's (1982) theories on bounded rationality were constructed for organizational decision-making, but the principles also apply to individuals. Bounded rationality is a modification of rational choice theory which suggests that individuals (or organizations) make decisions based on reason which maximize the means to achieve their goals. Rational choice theory operates under assumptions that individuals have precise information about the outcome and unlimited time with which to make the decision. Bounded rationality suggests that these assumptions are faulty, and that individuals strive to make decisions with information that is neither perfect nor comprehensive, and that time is an active constraint. Because information is at the heart of this "bounded" decision-making process, varying levels of information at different times may cause one to alter their decisions. This is precisely the conjecture of this proposed framework for the college choice process.

Information and Educational Expectations

A student at the beginning of the predisposition phase who has obtained college preparation information that is relatively clear and complete has a strong chance of

developing appropriate educational expectations based on his/her current educational (and financial) status. Therefore, as the student approaches the end of the predisposition and the beginning of the search stage (tenth grade), she would be less likely to revise this initial educational expectation because the formulation of her original expectation was made with broader "bounds" in the form of more complete information. However, such a student may revise her expectations at this point in time if, for example, changes in her academic performance indicate that her original educational expectations are no longer tenable based on the clear information with which she formed the initial expectation. Still, such a revision is less likely, because this student would have been privy to information that would suggest how she needs to perform academically in order to achieve her expectations, and would most likely strive to perform academically in a manner that would keep her expectation viable.

Alternatively, a student who forms initial educational expectation with little college preparation information may be said to have an ill-founded expectation and his preparatory actions (academically and financially) for being able to meet that expectation may not be consistent with what clear and complete information would suggest needs to be in place in order to achieve this expectation. Thus, it is expected that if the student were to receive strong and clear college preparation information for the first time at the beginning of the search phase, and discovers that he is not prepared (or better prepared) to achieve his initial expectations based on his current financial and academic preparations, he would be more likely to revise his expectations at that time to be commensurate with a better-formed understanding of his postsecondary educational options.

Finally, students who have access to little or no college preparation information when forming their initial educational expectation are unlikely to revise that expectation if, by the end of the predisposition phase and the beginning of the search phase, they still have little quality information by which to formulate a more well-founded expectation. For example, a student in eighth grade indicates a postsecondary expectation for only a high school diploma and no college despite performing very well academically in school (termed "talent loss") primarily because he believes he cannot afford college. Quality information at the beginning of the search phase may provide him an understanding that there is need- and merit-based aid available to him, which might cause him to revise his expectations. However, without access to enough clear information about this possibility he is unlikely to revise his educational expectations even though he has much more promise of going to college then he believes.

Hypothesis: Students who are privy to clear and adequate college preparation information during the time of their initial formulation of educational expectations are likely to maintain those expectations at the beginning of the search stage. Students who are not privy to college preparation information neither at the beginning of the predisposition phase nor at the end of this phase and the beginning of the search phase are also less likely to revise the initial educational expectations. Finally students who receive clear and adequate college preparation information for the first time at the end of the predisposition phase are more likely to revise their initial (eighth grade) expectations. This hypothesis is proposed based on conditioning the possibility of changed expectations on a student's personal background and prior academic performance.

Growth in Academic Performance

Along with educational expectations, academic performance has been revealed to be a strong influencer on postsecondary choice (Perna, 2000; Plank & Jordan, 2001; Beattie, 2002). Therefore, just as it is important to discover how information and other predictors potentially influence changes in educational expectations during the college choice process, it also appears that, as St. John (2002) suggests, information potentially influences changes in academic performance as well. As the model indicates, any growth in academic performance by the end of the predisposition phase and the beginning of the search phase is not only influenced by background characteristics, but also by information and by educational expectations as well as by prior academic performance. Just as empirical research on changes in educational expectations is a fertile area for new research, research on the determinants that influence changes in academic performance during high school is also nascent. Once again, hypotheses for how information may influence changes in academic performance are exploratory and, as suggested by the framework, are conceived to be influenced by educational expectations.

Information, Expectations and Changes in Academic Performance

Returning to the hypothetical students posed in the narrative of how information is believed to influence changes in educational expectations, students who receive clear college preparation information are more likely to either remain consistent or grow in their academic performance in ways that correspond to their revised educational expectations. A student that receives college preparation information in the eighth grade, and develops expectations which indicate a trajectory for accessing college, may adjust

(or maintain) her academic performance in order to reach the expectation she has set. If this student's prior academic performance has been substandard, she may realize a need to elevate that performance in order to meet her educational expectations.

However, if her prior academic performance is so poor that, when she receives college preparation information she develops the belief that college is out of her reach, she may be less likely to grow positively in her academic performance. Because the confluence of prior performance, level and quality of information, and developing expectations all converge to influence academic performance, suggesting clear hypotheses is quite difficult. Still, students who possess high expectations for postsecondary education are hypothesized to maintain or grow in their academic performance, presuming they have received college preparation information to help inform the academic requirements for their postsecondary goals.

Hypothesis: Students who receive early college preparation information at the beginning of the predisposition phase are likely to maintain or demonstrate positive growth in their academic performance between 8^{th} and 10^{th} grade in ways that are related to their expectations. Students who do not receive any clear college preparation information (particularly with reference to the academic requirements for accessing college), or receive this information at the end of the predisposition and beginning of the search stage, are less likely to make gains in their academic performance between eighth- and tenth-grades. This hypothesis is also proposed based on conditioning the possibility of change in academic performance on a student's personal background and prior academic performance.

Search Phase

Analysis of the influence of information on educational expectations and academic performance from the beginning of the search phase to the end of that phase and the beginning of the choice phase is consistent with the dynamic that exists in the predisposition phase. Referencing the conceptual framework (figure 2) once again it is clear that students that have received clear and adequate college preparation information during their predisposition or early search process are much more likely to develop realistic educational expectations for college. Students who live in states that possess strong and active policies for providing this information are more likely to develop and maintain well-founded educational expectations and to perform academically in a manner that keeps their educational expectations viable.

However, if students are not privy to such college preparation information (which is often the case among historically disenfranchised students, such as students of color and students of lower socioeconomic status) they are less likely to possess well-founded educational expectations. If at some point during the search phase these students acquire college preparation information for the first time that is understandable and adequate in its explanation of what is required to attend college, they are likely to revise their original expectations (and tenth grade expectations, which are hypothesized to be maintained at tenth grade) as they near the choice phase of the college choice process in twelfth grade. This revision would take place assuming that the college preparation information they receive indicates that their preparations for college have either been inadequate, or that their preparation has been adequate and there are financial aid provisions available for

them to attend college, which they may not have expected, resulting in artificially low initial educational expectations compared with their academic preparation.

If the only kind of information that students receive during this phase is that which has been termed "late information" in the framework, students may see this information as a signal indicating whether they are able to attend college as opposed to an informational help in preparation towards attendance. As discussed earlier, this reveals the conceptual difference between "early" and "late" college preparation information. Early information, as denoted by public state policies that have dedicated resources towards informing their students of the process for preparing to attend college, serves to help students develop well-founded educational expectations and to perform academically in ways that are consistent with those expectations. Later information may serve as a "better-late-than-never" help in providing students with some information that may help them access college, even if it requires them to lower their original, poorly-founded expectations. It may also serve as a clear signal that one's expectations were not realistic given his lack of academic and financial preparation.

Hypothesis: Students that have not received information prior to the beginning of the search phase, but obtain quality information during the search phase are more likely to revise their educational expectations by the end of the search phase and beginning of the choice phase (twelfth grade). Students who have already obtained (and, perhaps, continue to receive) clear college preparation information are less likely to revise their expectations and are more likely to maintain or evidence positive growth in their academic performance. Students who have not received straightforward information about college preparation during either the predisposition or search phase are also less

likely to revise their expectations, but are more likely to decline in their academic performance.

Choice Phase

Because each phase of the college choice process is hypothesized to influence subsequent phases, those determinants that affect the predisposition and search stages are necessarily understood to influence the choice phase. Therefore, the choice phase is influenced by student's background characteristics, the role of "early" and "late" college preparation information, personal and parental educational expectations, academic performance, and state-level economic conditions and costs of college. Analysis of this phase now turns to prior research on these influencers with respect to postsecondary choice and enrollment.

Background Characteristics

Gender. Some research considers the impact of influencers on the initial creation of educational expectations, inasmuch as these expectations ultimately influence the entire process of college choice. Hossler and Stage's (1992) research on the college plans of ninth-grade students offers a review of student characteristics believed to influence the predisposition phase. They indicate that studies on the role of gender on educational expectations have been contradictory. Hamrick and Stage (2004) found that gender exercised an indirect influence on one's predisposition to go to college through parent's expectations in their path analysis of determinants on college predisposition. Morgan's (1996) research is the only research that looked at a change in educational expectations

between the search and choice stages. He discovered gender to be a significant predictor changing educational expectations between the sophomore and senior years of high school and found that gender positively influenced one's evolving educational expectations. On the probability of postsecondary enrollment, however, Plank and Jordan (2001) found no statistical influence from gender; while Perna (2000) discovered female gender to positively influence only the probability of attending a four-year college versus non-enrollment. Thus, the literature seems to be unclear on the influence of gender, and will be included in each stage (predisposition, search, and choice) of this model to determine its impact.

Ethnicity. Hossler and Stage (1992) indicate that much of the literature leading up to their research suggests a mixed picture for the influence of ethnicity as well. In their path analysis they found that ethnicity played an indirect role on student expectations through parents' expectations (significant and negative), grade point average (significant and lower for minorities), and student activities (significant and negative). Hamrick and Stage (2004) path analyses indicate differences between ethnicity in the role that other influencers have on their educational expectations. Morgan (1996) finds that, compared to white students, black students have lower educational expectations in both tenth and twelfth grades. Perna (2000) discovers that with positive changes in her academic and economic measures, African-American students were more likely to enroll in a four-year college.

Plank and Jordan (2001) find that compared with White students, African-American students are more likely to enroll in a 4-year vs. a 2-year (both full-time and part-time in 2-year colleges) and more likely to enroll in a 4-year than to not enroll. They

also found that Hispanic students, compared to White students, were more likely to enroll in a 4-year versus a 2-year (full-time) and in a 4-year versus non-enrollment. Finally, they found that Asian/Pacific Islander students were more likely than White students to enroll in a 4-year versus a 2-year (part-time) and in a 4-year versus non-enrollment. Beattie (2002) found that when interacting race with returns on going to college and socioeconomic status that African-American students were more likely to enroll in a 4-year college. No difference was found between Hispanic and White students under these same conditions.

Socioeconomic status (SES). Socioeconomic status is a composite measure typically combining parent's educational level, parent's occupational prestige, and family income. Some researchers do not use socioeconomic status in their models, preferring to directly measure parent's level of education, for example, on the outcome of interest. Some include both a measure for parental education and family income. As Plank and Jordan (2001) indicate, the three measures empirically are highly correlated, and including them separately in a model is likely to create serial correlation. The composite measure also increases the overall reliability, as combining the three measures helps to compensate for the possibility of any one measure being less reliable by itself. Where authors chose to disaggregate the measures, I report findings for those measures also.

Hossler and Stage (1992) in their path analysis find that parents' education has a positive direct effect on a student's educational plans, as well as a positive effect on their expectations for their student, on the student's GPA, and on the student's activities. In their path analyses, Hamrick and Stage (2004) find that parents' college education and family income influence one another, buttressing the argument for combining them,

while the two are differentially influential according to ethnicity. Among Hispanic students, family income does not have an influence except on parents' college education, whereas the parents' education has a positive direct influence on the parents' and student's educational expectations. For African-American students they find parents' education influenced their student's grades and the student's educational expectations. Among White students, the parents' educational level influenced the student's grades and school activities, as well as their own educational expectations for their child.

Morgan's (1996) results indicate that SES has a positive influence on the educational expectations of both sophomores and seniors. Perna (2000) finds that family income only yields an influence (positive) on the probability of White students enrolling in a four-year college, while parents' level of education has a positive influence on African-American and White students, but no influence on Hispanic students. Plank and Jordan (2001) discover that, even after conditioning on the role of information and guidance, socioeconomic status plays a positive and substantive role on the probability of students enrolling in a four-year college compared with two-year enrollment, and non-enrollment. Beattie (2002) finds that SES plays a positive direct role on a student's probability of enrolling in college as well as on their initial educational expectations.

Information

As indicated earlier, information is believed to play a role on changing educational expectations and academic performance. Referencing St. John's (2002) "balanced access model" once again, it is believed that if students from lower socioeconomic backgrounds are unaware of how much college costs and also of potential

aid available for those who aspire to attend college, these students are likely to moderate their expectations and their academic performance due to the belief that they cannot afford to attend college. Kirst and Venezia (2004) suggest that lack of information to students from this same humble socioeconomic background may not affect their educational expectations, but may thwart their likelihood of postsecondary enrollment if they do not take the right courses (academic preparation) to prepare for college. This concept to which both St. John and Kirst and Venezia have alluded to has been called "talent loss," the lost potential of students that could excel in high school and college but because of lack of information they did not explore their potential. This is the focus of Plank and Jordan's (2001) research as it influences the likelihood of postsecondary enrollment. Trusty and Niles (2004) also address this theme with a focus on whether students obtain a bachelor's degree.

Plank and Jordan (2001) employ measures for information and guidance and its influence on postsecondary choice. Perna (2000) utilizes a very similar measure, both obtained from the same dataset used to analyze the postsecondary choice process. This current research utilizes the same data (National Education Longitudinal Study of 1988) and notes that the measures that Plank and Jordan and Perna utilize are not measures of information received during the early stages of the college choice model, but rather are informational measures that may be termed "late-college information" sources. Students in the survey were asked what sources of financial aid information they had utilized as well as other contact they may have had with counselors during their senior year of high school, too late to meaningfully change their educational expectations or their academic performance in preparation for college.

Thus, while this information is reported to have influenced the probability of a student attending a four-year college or university, it does not come early in the postsecondary decision-making process, and thus may be suspect as solely a measure of information. Perna (2000) frames information in her research as an indicator of social capital, in which case the information is seen to be a partial proxy for a student's social capital. Unmeasured in all models is the potential that the reception of this late form of information may be a proxy for a student's motivation to go to college. Indeed, Kirst and Venezia's (2004) research lends credence to this possibility, as they discovered that it is a generally accepted belief among students that only those most motivated are likely to find college preparation resources.

Educational Expectations and Academic Performance

The framework suggests that not only are a student's educational expectations and academic performance influenced by their personal characteristics and attributes, but that they are also influenced by college preparation information as discussed in earlier stages. The model indicates that this can be termed "early college information" and may take the form of public policy directed at assisting students in their academic and financial preparations for college. Unlike previous models, however, this model indicates that as students proceed through the college decision-making process their educational expectations and academic performance are not necessarily static, but are influenced by information (see St. John, 2002; Kirst & Venezia, 2004) in ways that may indicate a shift in their original postsecondary expectations as well as a change in academic performance. Ultimately, a student's educational expectations and their performance are suggested to

have a direct influence on the choice phase, when they are beginning to make concrete decisions regarding their postsecondary future.

As has been discussed in previous sections, some have studied the impact of background characteristics and attributes on students' educational expectations (Hossler & Stage, 1992; Morgan, 1996; Hamrick & Stage, 2004), with the belief that educational expectations ultimately influence the probability of a student enrolling in college. Other researchers have explicitly tested the influence of a student's educational expectations on their likelihood of enrolling in a postsecondary institution. Perna (2000) observes that varying levels of expectations influenced the probability that a student would enroll in a four-year college. Student's with expectations to attend only "some college" were negatively associated with the likelihood of enrollment, while students who expected a bachelor's degree were significantly and substantively more likely to enroll in a four-year college or university. Those students who held expectations of postgraduate education were even more likely to enroll in these types of institutions. Beattie (2002) discovers similar results in her research on postsecondary enrollment. While she does not delineate different dichotomous levels of education, her model indicates that higher expectations were positively associated with the probability of postsecondary enrollment.

Personal Attributes

While a student's personal attributes may encompass a variety of possible traits and features, this research focuses on those that are related to a student's academic ability and performance. Two alternative measures have been hypothesized to influence students' postsecondary decision-making process. Academic ability and academic

performance are sometimes used interchangeably, and are typically measured through standardized tests and/or a student's grades as a proxy measure, while academic preparation is often measured through the type and rigor of coursework a student takes. All three of these measures are included in the framework. However, the measure for academic preparation is only able to be included during the search and choice stages of the model because of lack of availability.

Academic Ability. Perna (2000) finds that greater academic ability as measured through test scores was positively associated with the probability of enrollment in a four-year college across all ethnicities. Plank and Jordan's (2001) research focuses on analyzing varying levels of academic achievement, and therefore is not utilized as a stand-alone predictor in their model, but instead is combined with socioeconomic status. Beattie (2002) also finds test scores to be positively associated with postsecondary enrollment.

Academic Preparation. Adelman's (1999) research indicates that the type of courses students take is the strongest influence on student's accessing and succeeding college, stronger even then a student's socioeconomic background. Yet, Kirst and Venezia (2004) find that clear signals on the types of courses students need to take in high school are not being translated evenly to students of differing socioeconomic status. It is widely accepted that the type of courses a student takes in high school, or the type of track they are placed in (see Oakes, 1985), meaningfully influences their educational expectations and their chances for accessing and succeeding in postsecondary educational institutions. College enrollment rates have been shown to be higher for students who take college prep classes (Hossler, Braxton & Coopersmith, 1989; Jackson, 1990; St. John,

1991). However, few have empirically tested this influence in the college choice model. Perna (2000) reveals that a student's curricular program that is considered to be "academic" signified a greater probability of enrolling in a four-year college.

Economic Conditions

Finally, the framework suggest that the postsecondary decision process does not take place in a vacuum, but that outside factors, especially those associated with college costs and the economic situation where a student lives, are likely to influence whether or where a student chooses to apply to, and ultimately attend, college. Plank and Jordan (2001) articulate that status-attainment models, those that take a particular focus of the sociological factors in models of college choice, "often reject the assumption of students and families as rational decision-makers" (p. 952). Heller (1997) in his update to Leslie and Brinkman's (1987) meta-analysis of research on the relationship between college cost and enrollment in higher education, finds that students from different socioeconomic levels and students of varying ethnicity react differently to tuition increases/decreases and grant and loan offers. His overarching finding is that students of lower socioeconomic status are more sensitive to changes in tuition and aid than are middle- and upper-income students. Furthermore, black students are more sensitive to changes in tuition and aid than are white students.

Perna (2000) includes tuition and fees, grants, loans, and unemployment rate in her models of probability of enrollment in a four-year college or university. She finds that tuition increases have a small, but significant effect on the probability of enrollment in a four-year college, while growth in the unemployment rate and greater reliance on loans

has a modest but significant negative effect on this probability. Beattie (2002) incorporates university cost, per capita income, and unemployment rate in her predictive models on postsecondary enrollment. She finds that increased per capita income had a positive effect on a female high school graduate's probability of enrolling in a four-year college. Increases in university cost exerted a negative effect on the probability of enrollment. Increases in the unemployment rate, contrary to Perna (2000) had a substantive positive influence on the student's likelihood of four-year enrollment. Overall, the findings on the impact of economic conditions seem important, if not yet decided.

Information and Postsecondary Choice

Earlier emphases of information on changing educational expectations and academic performance indicate the centrality of the influence of expectations and academic preparation on the likelihood of postsecondary educational enrollment. Students who receive college preparation information early in their decision-making process are more likely to develop well-informed educational expectations and to understand the requirements of academic preparation and performance necessary to achieve those expectations for college enrollment. The later this critical preparatory information is received, the lower the likelihood those students will be prepared to access postsecondary education. Students who only receive clear and adequate preparation information for the first time during their senior year are likely to discover that their expectations are not commensurate with their probability of attending postsecondary education.

For example, a student who had academic potential in eighth grade, but because of lack of information did not take coursework that would prepare her to access a four-year institution, may discover at the choice phase that her expectations are no longer viable because she is not academically prepared. Alternatively, a student who has performed well academically throughout high school, but who holds low expectations because he believes he cannot afford college may discover at too late a stage that aid was available to him for enrollment in a four-year university.

Instead, he is left with his original expectation of two-year enrollment because he did not know of the aid and apply in time.

A counter example suggests that as a student, who historically has been underserved in receiving adequate information, receives unambiguous and sufficient college preparation information early in the choice process and thus formulates realistic expectations for postsecondary educational opportunities. She may be provided information about the academic preparation she must make in order to access a four-year university, as well as the financial preparations and sources of aid that will help her to afford this opportunity, leading to stable and reliable expectations as she approaches the choice phase of the process. Early information has played a critical role involving important determinants that lead to her probability of attaining her high postsecondary expectations.

Hypothesis 1: Students who live in states with strong and active policies for disseminating college preparation information early in the college choice process have a higher probability of enrolling in four-year and two-year colleges than students who are not availed of this early information. Furthermore, traditionally underserved students

(students of color and of lower socioeconomic status) who live in states with strong policies for college preparation information have a higher likelihood of four-year and two-year enrollment than do their counterparts who reside in states with no clear policy and activity.

Hypothesis 2: Prior research suggests that students who possess higher educational expectations (and whose parents hold higher expectations) and who are above average in their academic performance and preparation have a higher probability of four-year enrollment. This research suggests that educational expectations and academic performance are influenced in earlier stages by the reception of college preparation information. Therefore, while this research suggests the hypothesis that higher expectations and academic performance are associated with increased probability of four-year enrollment, it argues that these determinants have been influenced by college preparation information, muting the effect of information in this phase as it is being mediated through expectations and performance. Additionally, the reception of late college information, especially in the form of financial aid information, is associated with an increased probability of enrollment. This form of information may also mute the influence of early college information if it is an avenue through which the early information is made manifest.

Hypothesis 3: Earlier studies also indicate that African-American, Hispanic and Asian/Pacific Islander students have positive associations with four-year enrollment when compared to their White counterparts. Higher socioeconomic status is strongly associated with a greater likelihood of postsecondary enrollment, and more specifically, with enrollment in a four-year institution. Additionally, higher tuition and a lower

unemployment rate are associated with a modest increase in the probability of four-year enrollment.

Conclusion

This framework presents a dynamic model for college choice, adapted from Plank and Jordan's (2001) conceptual model of college choice. It highlights the influence of information on students' evolving educational expectations and changing academic performance throughout the stages of the postsecondary decision-making process. The model is termed "dynamic" because earlier models have rarely considered the impact of predictors on *changing* expectations and performance, and instead have typically focused on the latter part of the college choice process, what in Hossler and Gallagher's (1987) model would be considered the choice stage. This research explores St. John's (2002) concern that a lack of information can play a role, not only in whether a student can afford college, but in whether or not a student will try to prepare for college if they don't believe that college is financially attainable.

The framework suggests that as students transition into high school (ninth grade) they are beginning to develop their predisposition (first stage of college choice) towards postsecondary enrollment. This predisposition can be measured in terms of their educational expectations, which this model suggests may evolve through the course of their decision-making process. In other words, as these students progress through high school and through their decision-making process, they are likely to adjust their educational expectations according to information they may receive regarding academic and financial preparation for college. If students receive information early and often, they

are likely to maintain their expectations for college presuming that the information indicates a path that they are able to follow. In like manner, students are likely to increase in their academic performance as they receive information about what is required academically to attend college. Ultimately, realistic expectations (based on college preparation information) and positive academic performance and preparation, are likely to lead to a greater probability of postsecondary enrollment, and more particularly in four-year institutions.

On the contrary, students who are not privy to this college preparation information are less likely to maintain their expectations once they do receive clear college preparation information that indicates what they must do to access college. Furthermore, without knowledge of what might be required academically in order to access a postsecondary institution, these students are less likely to improve their academic performance. However, if at any time during the predisposition and search stages of the college choice process (ninth through eleventh grades) students receive college preparation information they may begin to adjust their academic performance in order to better prepare to meet their old or newly established expectations. All of these aspects of the college choice process suggest the necessity for a college choice model that includes the role of information on the potential for change. Ultimately, students that do not receive college preparation information (from any sources) are much less likely to enroll in college, and if they enroll it is likely to be in two-year institutions.

Given the suggested hypotheses, this research now proceeds to describe the data and analytical models used to study the research questions and test the hypotheses that spring from the conceptual framework articulated. The models will seek to analyze the

role of information and other influencers on the dynamic educational expectations and changing academic performance of students through the college choice model. Furthermore, it seeks to understand how information and other factors impact the probability of postsecondary enrollment, seeing educational expectations and academic performance as key mediating variables in the overall process.

CHAPTER IV

DATA AND METHODS

As the literature on the determinants of postsecondary access indicates, there is a need to develop a holistic approach that incorporates both the influence of college costs and financial aid and the impact of academic preparation on a student's likelihood of enrolling in college. The conceptual framework draws together the relationships that exist between college preparation information and its potential influence on student expectations and academic performance as students proceed through the predisposition, search, and choice stages of the postsecondary decision process. Furthermore, the literature indicates an important missing element in the access picture, the role of information on the likelihood of postsecondary access. The framework illustrates the influence that information is believed to yield during each stage of the decision-making process, influencing student expectations, academic performance, and ultimately their probability of enrollment in varying levels of postsecondary institutions.

Research on state-level policy and action on college information dissemination has rarely been explored systematically. As states vary in their commitments toward helping minority and disadvantaged youth achieve postsecondary access and success (Kirst & Venezia, 2004), an important arena for developing research pertaining to policy can be developed around the impact of informing students of how to prepare for college access.

Data

Sample

To study the role of information and other determinants on changes in students' educational expectations and academic performance as well as their influence on the probability of enrollment in various levels of postsecondary institutions, several sources of data are used. The primary source of data is the National Education Longitudinal Study of 1988 (NELS:88) which is conducted by the National Center for Educational Statistics (NCES) and the U.S. Department of Education. NELS:88 offers a comprehensive set of survey information with which to explore the research questions proposed. The study is composed of an initial survey to students and parents of students who were in the eighth grade (teachers and administrators were also surveyed, but do not figure in to this analysis), with follow-up waves of surveys every two years until 1994, approximately two years after most students in the cohort would have graduated from high school.[2] Parents of students in the cohort were surveyed only during the 1988 and 1992 (where most students were seniors in high school) surveys. Thus, this longitudinal panel captures students during the eighth, tenth, and twelfth grades of school, as well as two years following high school.

The study employed a complex selection design using a two-staged stratified random sample to select schools and then students within schools. The survey also developed weights that would allow for inferences to be made to the population of eighth grade American youth in 1988, tenth-grade American youth in 1990, and twelfth grade

[2] There is a final survey administered to students in 2000, approximately eight years after most students would have graduated from high school. While this research does not utilize this information, subsequent research which looks at "success" in postsecondary education would value this information.

American youth in 1992, and these weights were utilized in the analyses of this research. The base year survey included 24,599 completed eighth grade surveys[3], from among 1,032 schools sampled.[4] Because students were sampled from within schools, adjustments for this "nesting" characteristic were conducted in the analyses[5]. The original sample available for analysis comprised 14,915 students. This sample includes students that dropped out of school or otherwise left the sample, students who were then added, or what NELS terms "freshened", to the sample, and students across all school types (public, catholic, other private, etc.).

As this research seeks to understand the impact of information and other determinants on students starting in eighth grade and on through to the point they could enroll in college, the sample is limited to students who did not drop out of the sample and who were in school and in grade at each point as they took the survey (i.e., in 1990, a student needed to be in school and in the 10^{th} grade, and have begun in 1988 in 8^{th} grade). Furthermore, as there may be meaningful differences between public and private schools and how they disseminate college preparation information and/or the counseling they can offer students, and because it is impossible to know given the structure of the data whether that information is coming because the student sought it or because the school actively pursued the student, this current analysis commits to a sub-sample composed

[3] Note that these respondents included students, teachers, parents, and administrators.
[4] For a more complete analysis of the sample design, weighting and design effects employed by NELS:88, please refer to the "Base Year to Fourth Follow-up Data File User's Manual by Curtin, Ingels, Wu & Heuer, which can be found on the NCES web page at: http://nces.ed.gov/pubs2002/2002323.pdf
[5] Using STATA 9, the survey function of STATA was employed in order to indicate that the sample was obtained via surveying individuals who were nested within schools. All analyses were also conducted using robust standard errors in order to accommodate concerns over schools nested within states.

only of public school students. This leaves the analysis with a sample of 9533 students (see Table 1).[6]

Table 1. Creation of Sample

	Removed	**Sample Remaining**
Original Sample		14915
Missing School Identifier	1093	13822
Not In-school, In-Grade in 1990	1397	12425
Not In-school, In-Grade in 1992	1171	11254
Not in Public School in 1990	1628	9626
Not in Public School in 1992	46	9580
Missing State Identifier	47	9533
Missing Panel Weight	380	9153

Note: The creation of the sample was performed through elimination in a step-wise fashion. There may have been more "missing" in any given category except for School Identifiers.

Missing Data and Multiple Imputation

This research relies primarily on a national longitudinal sample of students and their parents over the course of six years, and as a result contains various levels of missing data among the variables of interest. As is noted in Table 2, when employing case-wise deletion (the elimination of a case if there is any missing data, also known as list-wise deletion) with observations that contain one or more missing variables in the matrix set forth for a given dependent variable, the sample loses anywhere from 31% of cases for analyses in 10th grade to nearly 50% of the cases for analyses in 12th grade. The

[6] It should be noted that observations that had a weight of zero assigned to them were eliminated during the analysis phase, shrinking the analyzed sample to 9153.

Table 2. Sample Lost Through Case-wise Deletion

	Sample Remaining	**Percent of Sample Lost**
Original Sample	9533	0.00%
Dependent Variables		
Change in Expectations in 10th Grade	6571	31.07%
Academic Performance in 10th Grade	6344	33.45%
Change in Expectations in 12th Grade	5648	40.75%
Academic Performance in 12th Grade	5120	46.29%
Enrollment in Postsecondary Institution	4795	49.70%

remaining observations compose cases with no missing data for complete-case analysis. Complete-case analysis relies on an assumption that the reduced sample after list-wise deletion is a random sub-sample of the original sample and that the data is missing completely at random (MCAR), thus producing biased estimates if this assumption is not true. Furthermore, this analysis ignores any systematic differences between complete and incomplete cases while also typically possessing larger than average standard errors because of the reliance on reduced information. Prior research on the postsecondary choice process has used case-wise deletion (Hossler & Stage, 1992; Plank & Jordan, 2001), replacement based on average values (Beattie, 2002; Perna, 2000), or did not indicate any treatment (Morgan, 1996; Hamrick & Stage, 2004). With such a meaningful loss of data because of incomplete cases, this research undertakes the best way to re-populate cases through a process of imputing missing data.

There are alterative ways to approach the problem of missing data based on one's assumptions on the nature of the missing data. Little and Rubin (2002) indicate that for variable Y if the probability of having a missing value is unrelated to the value of Y and/or to any other variables in the dataset (missing or observed), then the data is said to be missing completely at random (MCAR). An example of this would be that students

without a value for socioeconomic status (SES) on average have the same SES as students with a reported value. Furthermore, all other variables in the dataset for students with missing SES, would have to have to be the same on average.

A less restrictive assumption of missing data, missing at random (MAR), assumes that after controlling for other variables in the analysis, the missing data for variable Y is unrelated to the observed values for Y. An example would be that the probability of missing data on SES was dependent on parental expectations for the child, but within each category of parental expectations the probability of missing SES is unrelated to the value of SES.

If there is reason to believe that the missingness of a variable is related to observed values for a given variable, even after controlling for other variables, then the data is said to be not missing at random (NMAR). Following with the example of students with missing data on socioeconomic status, if students who came from high SES backgrounds were less likely to have data on their socioeconomic background (e.g., parents were uncomfortable reporting their income) even after adjusting for other variables. In cases where the assumption is that the data are NMAR, more sophisticated techniques then are utilized within this research are necessary to deal with the missing data.

The missing data in this research are assumed to be missing at random or missing completely at random. Some of the variables are missing for students simply because they had no reason to answer a particular question (i.e., students that were not currently taking social studies classes were unlikely to respond to what their average grade in those classes is). Others may be related to an inherent problem with gathering longitudinal data,

the problem of attrition, where, for example, parents who responded to the survey when their child was in school in eighth grade were somehow unavailable four years later to respond to the follow-up survey. Still others may be missing because of recording errors, etc.

The assumption that the data are missing at random allows one to explore various means of imputing values for the missing data[7]. A common and relatively simple approach has been to replace the missing variable with the mean of that variable. For example, all missing values for a student's average grade in English between eighth and tenth grade would be replaced with the mean of all observed English grades for that period of time. This method of missing data replacement, known as mean replacement, reveals a few important weaknesses. First, one must turn to median replacement for variables that are not continuous, and in variables with few categories such imputation is likely to bias the results towards the most commonly observed category. More importantly, however, mean replacement artificially underestimates the variance, and thus the standard error, associated with the variable as replacing with the mean observed value inserts values without adding any measure of realistic variation. In regression analysis this will result in overestimating statistical significance of variables that employ this method of missing data replacement, leading to Type I errors in hypothesis testing. While this has been a popular method in prior research for treating missing data, its inherent weaknesses suggest a better course.

Little and Rubin articulate a preferred method of imputing values for missing data, termed multiple imputation, that includes non-biased estimates for estimands while

[7] For a more complete reference of alternative approaches to missing data and their properties reference Little and Rubin's "Statistical Analysis with Missing Data" (2002). This analysis only deals with a limited number of possible imputation methods for re-populating missing data.

also incorporating sampling variability under one's model for nonresponse for explicit modeling the missing data or "uncertainty about the correct model for nonresponse" with implicit modeling of the missing data (2002, p. 85). The authors specify the manner in which multiple imputations should proceed. "MIs ideally should be drawn according to the following protocol. For each model being considered, the *D* imputations of Y_{mis} are *D* repetitions from the posterior predictive distribution of Y_{mis}, each repetition corresponding to an independent drawing of the parameters and missing values" (p. 86). The imputations involved thus come from conditional *draws* as opposed to conditional means, allowing for valid estimates to be created on a wide range of estimands (i.e., categorical variables)[8].

Several statistical software programs have developed special macro programs designed to create and analyze multiply imputed datasets. This research utilized the "ice" program available for download through Stata, version 9. ICE is an updated version to code written to perform multiply imputed chained equations (MICE), which added flexibility to how variables are treated in the imputation process[9]. The program allows for variables to be explicitly modeled in how they are to be imputed (i.e., categorical variables with many options can be explicitly modeled to be multinomial, whereas earlier programs defaulted to treating them as continuous).

Analysis of multiply-imputed datasets is straightforward. Little and Rubin indicate that the determination of the number of datasets to be imputed can be relatively minimal "where inference from the complete-data posterior distribution is based on

[8] For a step-by-step explanation of the process involved in multiple imputation, as well as an example of the process, see Doyle (2005).
[9] Patrick Royston updated the program for STATA-users and an explanation of how the program works can be found at Royston, P. (2005). "Multiple Imputation of Missing Values: Update." *The Stata Journal (5)*2:1-14.

multivariate normality" and state that "posterior moments of θ can be reliably estimated from a surprisingly small number, D, of draws of the missing data Y_{mis} (e.g. $D = 2–10$)" (p. 209). A commonly accepted number of imputed datasets necessary for appropriate inference is five imputed datasets. Little and Rubin offer equations illustrating the process of combining the imputed datasets. The combined estimate for a given variable is simply the average of all of the estimates, and could be modeled[10]:

$$\bar{\theta}_D \equiv \frac{1}{D}\sum_{d=1}^{D}\hat{\theta}_d$$

The variance associated with the multiply imputed datasets must account for both within- and between-imputation variation, where the within-imputation variance would be computed as:

$$\bar{W}_D \equiv \frac{1}{D}\sum_{d=1}^{D}W_d$$

and the between-imputation variance would be computed as:

$$B_D \equiv \frac{1}{D-1}\sum_{d=1}^{D}\left(\hat{\theta}_d - \bar{\theta}_D\right)^2$$

The total variance can then be computed as:

$$v \equiv (D-1)\left(1+\frac{1}{D+1}\frac{\bar{W}_D}{B_D}\right)^2$$

From this equation one can compute a standard error that is considered robust and which takes account of the sampling variation within an explicitly modeled imputation process and/or the uncertainty inherent to an implicitly modeled process. With confidence a newly complete-case dataset is composed of observed and imputed data which I will

[10] See Little and Rubin (2002, pp. 86-87) for these equations.

Table 3. Descriptive Statistics of Data Pre- and Post-Imputation

Variable	***Pre-Imputation***			***Post-Imputation***		
	Obs.	*Mean*	*SD*	*Obs.*	*Mean*	*SD*
Background						
Female	9533	0.520	0.500	9533	0.520	0.500
White	9526	0.679	0.467	9533	0.679	0.467
Black	9526	0.102	0.302	9533	0.102	0.302
Hispanic	9526	0.127	0.333	9533	0.127	0.333
Asian	9526	0.081	0.272	9533	0.081	0.272
Other	9526	0.012	0.107	9533	0.012	0.107
Socioeconomic status	9525	-0.070	0.751	9533	-0.070	0.751
Expectations						
Expectations 8th grade	9343	3.680	1.169	9533	3.673	1.173
High school or less	9343	0.084	0.278	9533	0.086	0.281
Vocational/< 2 years	9343	0.082	0.274	9533	0.083	0.275
College/> 2 years	9343	0.137	0.344	9533	0.139	0.346
Graduate college	9343	0.455	0.498	9533	0.456	0.498
Postgraduate	9343	0.235	0.424	9533	0.236	0.425
Expectations 8th grade (yrs)	9343	15.959	2.078	9533	15.949	2.082
Parents' Expectations 8th grade	8957	3.530	1.217	9533	3.524	1.219
High school or less	8957	0.101	0.301	9533	0.109	0.312
Vocational/< 2 years	8957	0.080	0.272	9533	0.080	0.272
College/> 2 years	8957	0.199	0.399	9533	0.200	0.400
Graduate college	8957	0.402	0.490	9533	0.400	0.490
Postgraduate	8957	0.213	0.409	9533	0.211	0.408
Parents' Expectations 8th grade (yrs)	8957	15.714	2.116	9533	15.696	2.121
Expectations 10th grade	9167	3.815	1.354	9533	3.808	1.355
High school or less	9167	0.074	0.262	9533	0.076	0.265
Less than 2 years	9167	0.067	0.250	9533	0.069	0.253
Greater than 2 years	9167	0.232	0.422	9533	0.235	0.424
Graduate college	9167	0.346	0.476	9533	0.346	0.476
Masters	9167	0.141	0.348	9533	0.140	0.347
PhD, MD or other advanced degree	9167	0.136	0.343	9533	0.134	0.341
Expectations 10th grade (yrs, scaled to 8th grade)	9167	16.005	2.155	9533	15.946	2.199

Table 3 (cont.). Descriptive Statistics of Data Pre- and Post-Imputation

Variable	*Pre-Imputation*			*Post-Imputation*		
	Obs.	*Mean*	*SD*	*Obs.*	*Mean*	*SD*
Expectations (cont.)						
Change in Expectations - 8th to 10th	8990	2.071	0.748	9533	1.985	0.727
Change in Expectations - 8th to 10th (yrs)	8990	0.051	2.067	9533	-0.003	2.076
Expectations 10th grade (yrs, original scale)	9167	16.253	2.399	9533	16.240	2.397
Expectations 12th grade	8777	3.990	1.270	9533	3.955	1.276
High school or less	8777	0.001	0.028	9533	0.056	0.231
Less than 2 years	8777	0.037	0.189	9533	0.042	0.201
Greater than 2 years	8777	0.213	0.409	9533	0.238	0.426
Graduate college	8777	0.353	0.478	9533	0.352	0.478
Masters	8777	0.182	0.386	9533	0.177	0.382
PhD, MD or other advanced degree	8777	0.140	0.347	9533	0.135	0.341
Expectations 12th grade (years)	8777	16.518	2.301	9533	16.459	2.295
Change in Expectations - 10th to 12th	8443	2.189	0.775	9533	2.093	0.742
Change in Expectations - 10th to 12th (years)	8443	0.215	2.209	9533	0.219	2.219
Parents' Expectations 12th grade	8240	4.281	1.183	9533	4.265	1.184
High school or less	8240	0.027	0.163	9533	0.033	0.177
Less than 2 years	8240	0.024	0.152	9533	0.027	0.163
Greater than 2 years	8240	0.129	0.335	9533	0.153	0.360
Graduate college	8240	0.388	0.487	9533	0.390	0.488
Masters	8240	0.227	0.419	9533	0.224	0.417
PhD, MD or other advanced degree	8240	0.177	0.381	9533	0.173	0.378
Parents' Expectations 12th grade (years)	8240	16.993	2.274	9533	16.963	2.269
Academics						
English - Avg. grade through 8th grade	9212	1.923	0.877	9533	1.935	0.882
Math - Avg. grade through 8th grade	9203	1.950	0.938	9533	1.961	0.942
Science - Avg. grade through 8th grade	9136	2.051	0.967	9533	2.067	0.972

Table 3 (cont.). Descriptive Statistics of Data Pre- and Post-Imputation

Variable	*Pre-Imputation*			*Post-Imputation*		
	Obs.	*Mean*	*SD*	*Obs.*	*Mean*	*SD*
Academics (cont.)						
Social Studies - Avg. grade through 8th grade	9088	2.024	0.995	9533	2.042	1.001
GPA for 8th grade	9355	1.994	0.712	9533	2.001	0.710
English - Avg. grade through 10th grade	9028	3.029	1.671	9533	3.051	1.679
Math - Avg. grade through 10th grade	9022	3.314	1.819	9533	3.338	1.823
Science - Avg. grade through 10th grade	8785	3.223	1.773	9533	3.266	1.784
Social Studies - Avg. grade through 10th grade	7487	3.045	1.800	9533	3.133	1.822
GPA for 10th grade	9156	3.172	1.394	9533	3.197	1.384
English - Avg. grade through 12th grade	8440	6.570	2.410	9533	6.610	2.409
Math - Avg. grade through 12th grade	8432	7.271	2.523	9533	7.311	2.526
Science - Avg. grade through 12th grade	8476	6.980	2.506	9533	7.008	2.509
Social Studies - Avg. grade through 12th grade	8499	6.476	2.562	9533	6.509	2.559
GPA for 12th grade	8504	6.831	2.247	9533	6.859	2.244
Combine Math/Reading Test - 8th grade	9105	51.565	9.792	9533	51.463	9.793
Combine Math/Reading Test - 10th grade	8986	51.352	9.608	9533	51.223	9.639
Combine Math/Reading Test - 12th grade	7927	51.170	9.541	9533	51.018	9.601
Difference between 8th and 10th grade test scores	8592	-0.225	4.703	9533	-0.240	4.715
Difference between 10th and 12th grade test scores	7608	-0.229	4.114	9533	-0.205	4.131
Coursework						
Rigorous	7367	0.238	0.426	9533	0.219	0.414
Academic	7367	0.579	0.494	9533	0.576	0.494
Rigorous/Academic	7367	0.012	0.107	9533	0.012	0.108
Academic/Vocational	7367	0.099	0.298	9533	0.105	0.307
Vocational	7367	0.072	0.259	9533	0.088	0.283

Table 3 (cont.). Descriptive Statistics of Data Pre- and Post-Imputation

Variable	*Pre-Imputation*			*Post-Imputation*		
	Obs.	*Mean*	*SD*	*Obs.*	*Mean*	*SD*
Financial Aid						
Help filling out financial aid application	8903	0.398	0.489	9533	0.393	0.488
Talked to counselor	8891	0.566	0.496	9533	0.557	0.497
Talked to college representative	8885	0.401	0.490	9533	0.396	0.489
Read info from Dept of Ed	8860	0.266	0.442	9533	0.259	0.438
Read info from a college	8863	0.466	0.499	9533	0.458	0.498
Talked to a knowledgeable adult	8864	0.612	0.487	9533	0.602	0.489
Index of financial aid variables	8963	0.000	0.663	9533	0.000	0.582
State-level						
State ID	9533	26.34	14.59	9533	26.34	14.59
State unemployment	9533	7.32	1.49	9533	7.32	1.49
State average of Need-based aid	9533	195.51	373.52	9533	195.51	373.50
State average of Merit-based aid	9533	20.01	49.38	9533	20.01	49.38
State average tuition for 4-year	9533	5758.65	1071.53	9533	5758.65	1071.49
High info disseminating state	9533	0.151	0.358	9533	0.151	0.358
Interactions						
High info disseminating state*Black	9151	0.008	0.087	9533	0.008	0.086
High info disseminating state*Hispanic	9151	0.031	0.175	9533	0.031	0.175
High info disseminating state*Asian	9151	0.028	0.166	9533	0.028	0.166
High info disseminating state*SES	9153	-0.018	0.291	9533	-0.018	0.291
Financial Aid Info*Black	8617	0.024	0.204	9533	0.023	0.218
Financial Aid Info*Hispanic	8617	0.003	0.200	9533	0.005	0.234
Financial Aid Info*Asian	8617	-0.002	0.159	9533	0.000	0.181
Financial Aid Info*SES	8619	-0.026	0.440	9533	-0.024	0.507
Postsecondary						
Level of Enrollment	9206	1.000	0.885	9533	0.998	0.884
Panel Weight	9533	212.135	184.588	9533	212.135	184.580

yield unbiased estimands and appropriately robust standard errors. A comparison of descriptive statistics of the data pre- and post-imputation is found in Table 3, and reveals that the mean and standard deviations are very similar.

Measures

The data are presented in three panels of research, correlating to the research questions posed and roughly commensurate with elements from each phase of the postsecondary decision-making process. The first panel represents data from eighth to tenth grade, with outcomes specified as a change in educational expectations and in academic performance from eighth to tenth grade. In the conceptual framework this represents the predisposition stage[11]. The second panel represents data from the tenth to twelfth grades, with similar outcomes as specified in the prior panel with the only difference being that they represent a change between tenth and twelfth grade. In the framework this primarily represents the search phase. The final panel of data represents variables between the twelfth grade and two years after high school graduation. This panel also contains state-level variables believed to exert influence on the postsecondary decision of students, and in the conceptual framework represents the choice stage.

Outcome Variables

As discussed, the outcome variables are measures of change in a student's educational expectations and in their academic performance, with the final outcome a measure of enrollment in postsecondary institutions. The research questions focus particularly on the role of information and thus examine whether living in a state with a strong policy for dissemination of college preparation information influences a student's educational expectations and/or a student's academic performance. It is reasonable to hypothesize that those students who live in states with such policies and actions are more likely to have stable educational expectations, presuming that they receive clear and

[11] See Hossler, Schmit and Vesper (1999).

adequate information when forming their initial expectations at the beginning of the predisposition phase during the eighth grade. Furthermore, such early information is also likely to indicate to the students what they need to do and how they need to perform academically in order to meet these expectations. Therefore, it is assumed that students with plain and sufficient college preparation information would either maintain the level of their initial academic performance or exhibit positive growth through the course of the process. In order to ascertain the influence of this and the other suggested predictors found in the research questions it is necessary to construct variables that indicate a change in student educational expectations and a change in their academic performance.

Educational Expectations. In each of the first three waves (eighth, tenth and twelfth grade) students were asked "As things stand now, how far in school do you think you will get?" This was deemed to be a measure of the student's educational expectations. Choices in the eighth grade included the following possibilities: (1) I won't finish high school, (2) will graduate high school but go no further, (3) will go to vocational, trade or business school after high school, (4) will attend college, (5) will graduate form college, and (6) will attend a higher level of school after graduating from college. The choices in tenth and twelfth grade were identical, and included the following: (1) less than high school graduation, (2) high school graduation only, (3) less than two years at a vocational, trade, or business school after high school, (4) two years or more at a vocational, trade, or business school, (5) less than two years of college, (6) two or more years of college, including a two-year degree, (7) finish college (four- or five-year degree), (8) Master's degree or equivalent, and (9) Ph.D., M.D., or other advanced professional degree. As is noted, the choices between eighth and tenth grade

were not commensurate, therefore, it was necessary to recode the tenth grade choices to match the eighth grade options. Furthermore, because of the extremely low number of students who responded "less than high school" the first category was collapsed to become "finish high school or less".

In order to create equal categories between eighth and tenth grade it was necessary to collapse other responses from the tenth grade survey. The choice was to determine between responses that suggest known types of postsecondary institutions (i.e., vocational school versus four-year college) or between "amount of education" that a student expected to receive. It was determined that the best reflection of student expectations from the eighth grade response for "vocational, business, or trade school" was to combine the choices relating to an expected amount of education. Students that only expected to attend college for less than two years were unlikely to enroll in four-year colleges, as no degree or certificate can typically be achieved in these institutions within that time frame. Thus, from the tenth grade responses, choices (3) and (5) were combined regarding less than two years of vocational, business, or trade school, or college, and choices (4) and (6) were combined representing two plus years of vocational, trade, or business school or college. Finally, the postgraduate categories (8) and (9) were combined to represent the same measure as category (5) from the eighth grade survey, establishing equivalency (see table 4). These same categories were devised for the tenth to twelfth grade comparison of changed expectations with the exception that the postgraduate categories of Master's degree (8), and Ph.D, M.D., or other advanced professional degree (9) were not combined (see table 4).

Table 4. Description of Variables from Base Year (8th grade) to First Wave (10th grade)

Dependent Variables	**Mean**	**SD**	**Min**	**Max**
Change in Educational Expectations between Eighth and Tenth Grade				
Difference between expectations in 8th grade and 10th grade.				
Coded in two ways:				
1. Change in expected years of education	-0.003	2.076	-7	7
2. Measured as a nominal shift: Changed Upward or Changed downward (w/ No change as Reference Category)	1.985	0.727	1	3
Change in Academic Performance between Eighth and Tenth Grade				
Difference in test scores between 8th grade and 10th grade.				
Coded as:				
Linear change between 8th grade and 10th grade scores	-0.240	4.715	-26.85	23.56
Background Characteristics				
Student Gender				
Coded as:				
Male = 0	0.480	—	0	1
Female = 1	0.520	—	0	1
Student Race *(White = reference category)*				
Groups:				
White	0.679	—	0	1
African-American	0.102	—	0	1
Hispanic	0.127	—	0	1
Asian/Pacific Islander	0.081	—	0	1
Other	0.012	—	0	1
Socioeconomic Status				
Coded as:				
Continuous variable (originally centered on zero, not on zero b/c of missing)	-0.070	0.751	-2.93	1.97

Table 4 (cont.). Description of Variables from Base Year (8th grade) to First Wave (10th grade)

Educational Expectations	**Mean**	**SD**	**Min**	**Max**
Student Expectations 8th grade *("Will graduate from college" = reference category)*				
Survey question: "As things stand now, how far in school do you think you will get?"				
Choices:				
Won't finish high school or will graduate from high school but won't go any further (12 years)	0.086	—	0	1
Will go to vocational, trade, or business school after high school (13.5 years)	0.083	—	0	1
Will attend college (14.5 years)	0.139	—	0	1
Will graduate from college (16 years)	0.456	—	0	1
Will attend a higher level of school after graduating from college (19 years)	0.236	—	0	1
Student Expectations 10th grade *("Finish college" = reference category)*				
Survey question: "As things stand now, how far in school do you think you will get?"				
Choices:				
Less than high school or high school graduation (12 years)	0.076	—	0	1
Less than two years of vocational/trade business school or less than two years of college (13.5 years)	0.069	—	0	1
Two or more years of vocational/trade business school or of college, including a 2-year degree (14.5 years)	0.235	—	0	1
Finish college (16 years)	0.346	—	0	1
Master's degree or PhD, MD or other advanced professional degree (19 years)	0.274	—	0	1
Parents' Expectations for 8th grader *("Will graduate from college" = reference category)*				
Survey question: "How far in school do you expect your 8th grader to go?"				
Choices:				
Less than high school diploma, GED, or high school graduation (12 years)	0.109	—	0	1
Less than two years of vocational/trade business school or less than two years of college (13.5 years)	0.080	—	0	1
Two or more years of vocational/trade business school or of college, including a 2-year degree (14.5 years)	0.200	—	0	1
Finish college (16 years)	0.400	—	0	1
Master's degree or PhD, MD or other advanced professional degree (19 years)	0.211	—	0	1

Table 4 (cont.). Description of Variables from Base Year (8th grade) to First Wave (10th grade)

Academic Performance	**Mean**	**SD**	**Min**	**Max**
Combined 8th grade GPA (includes courses of Math, English, Science and Social Studies)				
Coded as: Self-reported grades in each subject from 6th-8th grade, where As=1, Bs=2, Cs=3, Ds=4, Fs=5. GPA is an average across subjects of these reported grades.	2.001	0.710	1	5
Combined 8th grade Reading/Math Test Score				
Coded as: Continuous variable	51.463	9.793	24.44	80.14
Combined 10th grade Reading/Math Test Score				
Coded as: Continuous variable	51.223	9.639	25.45	78.60
Information Variable				
High Information Disseminating State §				
Coded as: Dichotomous variable of whether a student lived in a state that disseminated information about college going (i.e., academic qualifications for going to college, where to find financial aid information, or other information about how to get to college) created via a survey administered to a panel of experts	0.151	—	0	1
Information Interaction Variables				
High Information Disseminating State * Black	0.008	0.086	0	1
High Information Disseminating State * Hispanic	0.031	0.175	0	1
High Information Disseminating State * Asian	0.028	0.166	0	1
High Information Disseminating State * SES	-0.018	0.291	0	1

Note: §Variable created via a survey to a panel of experts

All other variables created from NELS:88 Survey

The measure of change in expectations was constructed in two ways. The first was to assign an equivalent expectation of number of years of education that each category represented. The combined category of high school graduation or less was given the value of twelve (12) years of schooling, as the great majority in this category expected to graduate form high school. The vocational school category for eighth grade was given a value of thirteen and a half (13.5) years of schooling, or a little less than two

years of postsecondary schooling. The category representing "attend college" was assigned the value of fourteen and a half (14.5) years, while the category representing "graduate from college" was assigned a value of sixteen (16) years. Finally the category representing "postgraduate education" was assigned the value of nineteen (19) years of education. The tenth grade categories "re-scaled" to match the eighth grade were naturally given the same values. In the categories represented with a change in expectations between tenth and twelfth grade, it was determined that the category of "less than two years of college" would still represent thirteen and a half (13.5) years, while the category of "two or more years of college" would be assigned a value of fifteen (15) years. Also, the category for Master's degree would be assigned the value of eighteen (18) years while the category of Ph.D., M.D., or other advanced professional degree was assigned the value of twenty-one (21) years.

Converting student's responses of educational expectations into expected years of schooling allows for a dependent variable that represents change along a continuous scale. In other words, what is the change in a student's educational expectations from eighth to tenth (or tenth to twelfth) grade, measured in years, conditioned on variables thought to impact educational expectations?

Another outcome for change in educational expectations was also constructed. This outcome represents a nominal shift in a student's expectations, and was created by merely taking the difference between the ordinal categories of educational expectations in each survey. This allows one to answer the question such as "did a student's educational expectations increase or decrease between the eight and tenth (or tenth and twelfth) grades, and if so, what factors influenced this shift?"

Academic Performance. The second outcome of interest deals with a change in a student's academic performance. St. John (2002) suggested that a lack of information on how or whether a student might be able to afford postsecondary education may influence that student's academic performance. If a student can't afford to attend college why bother with the effort to perform? This measure of academic performance can be gauged in a couple of different ways. One way to measure this would be to compare a student's grade point average between each year of the survey. While the measure for GPA is standardized in the survey, the measure in eighth and tenth grade was not taken from student transcripts, but were ascertained through self-report, a notably less reliable measure. Another measure of academic performance may be to understand the type of scholastic track they were in (i.e. academic, vocational, etc.). The only measure that exists for this in the data comes from the twelfth grade transcripts, and can therefore not be used to determine a change in performance.

One final measure may serve as a proxy for academic performance. The NELS:88 surveys included carefully constructed math and reading tests[12], administered in the first three waves of the data (eighth, tenth and twelfth grades). These tests were developed with the guidance of psychometricians and were created with the purpose of accurately measuring the status of an individual at a given point in time as well as their growth over time. The tests possess qualities that allow for valid comparisons to be drawn from voluntary surveys administered to a national sample of students (NCES, 1995)[13].

[12] Tests were also constructed for the subjects of Science and History/Social Studies, but because most students were required to take a math and English course each year but were less likely to have to take science or social studies, this research focuses on the math and reading tests.
[13] For more information on the psychometric properties of the test see http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=91468. For a psychometric report on all of the tests administered see http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=95382

Furthermore, the tests were constructed so that they would be commensurate in difficulty with how a student performed on their most prior test in order to prevent potential "ceiling" and "floor" effects. This tailored construction of the tests allows for them to be scaled allowing for growth in academic performance to be measured. This research relies on performance on these tests in order to best indicate a student's academic performance, and growth is measured by taking the difference between test scores for each panel.

Postsecondary Enrollment. The final outcome of interest is that of postsecondary enrollment (see table 6). The other outcomes can be considered as mediators for this final outcome, as student expectations and academic performance play a significant role in whether, and to what extent, a student enrolls in postsecondary education following high school graduation. Student enrollment was measured every month for two years following high school graduation. If a student enrolled in college in September of 1992 and remained in college through May of 1993, then that student would have a record of enrollment for each month beginning in September and ending in May. The month of highest enrollment within a year of graduating from high school was October of 1992. If a student was going to enroll in college within a year of high school graduation they were most likely to be enrolled at this time. Therefore, the variable for enrollment is taken from October 1992.

The options for enrollment included full-time enrollment at four-year public and private universities, private for profit institutions and private and public institutions that were less than four-year institutions and less than two-year institutions. Each of these categories also reported whether or not a student was enrolled more than half the time, but not full-time, and students that were enrolled less than half time. This research is

interested in the types of institutions that students were likely to enroll in conditioned on key aspects thought to influence the college decision-making process. Three categories were chosen to represent the possibilities for enrollment: non-enrollment, enrollment in a two-year college, vocational, business or trade school, and enrollment in a four-year college or university. The distinction of whether the school was private or public is not a focus of this research, but may provide interesting analyses in the future. Furthermore, it was determined that regardless of the level of enrollment (full-time, half-time +, or less than half-time), that a student who was enrolled in a given institution would simply be treated as enrolled. Few members of the sample were less than half-time, and for more analytical power and clarity in discussing the findings this decision was made.

Background Variables

Gender and Ethnicity. Some of the key determinants believed to possibly influence student expectations, academic performance and the likelihood of enrolling in postsecondary education are related to their background. As noted in the chapter describing the conceptual framework, gender has played a notable role in varying educational expectations and enrollment (Morgan, 1996; Beattie, 2002; Dominitz & Manski, 1996). Furthermore, it has been the aim of several studies to look at differing expectations and enrollment among students of varying ethnic backgrounds (Morgan, 1996; Perna, 2000; Beattie, 2002; Hossler & Stage, 1992). These variables were simply created from student responses to the survey regarding gender and ethnicity. Ethnicity possessed five categories: (1) Asian or Pacific Islander, (2) Hispanic, regardless of race, (3) Black, not of Hispanic origin, (4) White, not of Hispanic origin, and (5) American

Table 5. Description of Variables from First Wave (10th grade) to Second Wave (12th grade)

Dependent Variables		**Mean**	**SD**	**Min**	**Max**
Change in Educational Expectations between Tenth and Twelfth Grade					
Difference between expectations in 10th grade and 12th grade.					
Coded in two ways:					
	1. Change in expected years of education	0.219	2.219	-9	9
	2. Measured as a nominal shift: Changed Upward or Changed downward (w/ No change as Reference Category)	2.093	0.742	1	3
Change in Academic Performance between Tenth and Twelfth Grade					
Difference in test scores between 10th grade and 12th grade.					
Coded as:					
	Linear change between 10th grade and 12th grade scores	-0.205	4.131	-24.45	19.32
Background Characteristics					
Student Gender					
Coded as:					
	Male = 0	0.480	—	0	1
	Female = 1	0.520	—	0	1
Student Race *(White = reference category)*					
Groups:					
	White	0.679	—	0	1
	African-American	0.102	—	0	1
	Hispanic	0.127	—	0	1
	Asian/Pacific Islander	0.081	—	0	1
	Other	0.012	—	0	1
Socioeconomic Status					
Coded as:					
	Continuous variable (centered, not on zero because of missing)	-0.070	0.751	-2.93	1.97
Educational Expectations					
Student Expectations 10th grade *("Finish college" = reference category)*					
Survey question: "As things stand now, how far in school do you think you will get?"					
Choices:	Less than high school or high school graduation (12 years)	0.076	—	0	1
	Less than two years of vocational/trade business school or less than two years of college (13.5 years)	0.069	—	0	1
	Two or more years of vocational/trade business school or of college, including a 2-year degree (15 years)	0.235	—	0	1
	Finish college (16 years)	0.346	—	0	1
	Master's degree (18 years)	0.140	—	0	1
	PhD, MD or other advanced professional degree (21 years)	0.134	—	0	1

Table 5 (cont.). Description of Variables from First Wave (10th grade) to Second Wave (12th grade)

Educational Expectations		**Mean**	**SD**	**Min**	**Max**
Student Expectations 12th grade *("Finish college" = reference category)*					
Survey question: "As things stand now, how far in school do you think you will get?"					
Choices:	Less than high school or high school graduation (12 years)	0.056	—	0	1
	Less than two years of vocational/trade business school or less than two years of college (13.5 years)	0.042	—	0	1
	Two or more years of vocational/trade business school or of college, including a 2-year degree (14.5 years)	0.238	—	0	1
	Finish college (16 years)	0.352	—	0	1
	Master's degree (18 years)	0.177	—	0	1
	PhD, MD or other advanced professional degree (21 years)	0.135	—	0	1
Parents' Expectations for 8th grader *("Finish college" = reference category)*					
Survey question: "How far in school do you want your teenager to go?"					
Choices:	Less than high school or high school graduation (12 years)	0.109	—	0	1
	Less than two years of vocational/trade business school or less than two years of college (13.5 years)	0.080	—	0	1
	Two or more years of vocational/trade business school or of college, including a 2-year degree (14.5 years)	0.200	—	0	1
	Finish college (16 years)	0.400	—	0	1
	Master's degree or PhD, MD or other advanced professional degree (19 years)	0.211	—	0	1
Academic Performance					
Combined 10th grade GPA (includes courses of Math, English, Science and History)					
Coded as:	Average grades from transcript in each subject through high school, where As=1, As and Bs=2, Bs=3, Bs and Cs=4, Cs=5, Cs and Ds=6, Ds=7, Lower than Ds=8. GPA is an average across subjects of these reported grades.	3.197	1.384	1	8
Combined 10th grade Reading/Math Test Score					
Coded as:	Continuous variable	51.223	9.639	25.45	78.60
Combined 12th grade Reading/Math Test Score					
Coded as:	Continuous variable	51.018	9.601	22.38	78.48

Table 5 (cont.). Description of Variables from First Wave (10th grade) to Second Wave (12th grade)

Academic Performance		**Mean**	**SD**	**Min**	**Max**
Rigor of Coursework ** *("Academic" = reference category)*					
Taken from transcript of courses students took from 9th through 12th grade					
Choices:	Rigorous Academic	0.219	—	0	1
	Academic	0.576	—	0	1
	Rigorous academic/Vocational	0.012	—	0	1
	Academic/Vocational	0.105	—	0	1
	Vocational	0.088	—	0	1
Information Variable					
High Information Disseminating State §					
Coded as:	Dichotomous variable of whether a student lived in a state that disseminated information about college going (i.e., academic qualifications for going to college, where to find financial aid information, or other information about how to get to college) created via a survey administered to a panel of experts	0.151	—	0	1
Information Interaction Variables					
High Information Disseminating State * Black		0.008	0.086	0	1
High Information Disseminating State * Hispanic		0.031	0.175	0	1
High Information Disseminating State * Asian		0.028	0.166	0	1
High Information Disseminating State * SES		-0.018	0.291	0	1

Note: **Variable created from High School & Beyond Survey

§Variable created via a survey to a panel of experts

All other variables created from NELS:88 Surveys

Indian or Alaskan Native. These categories were kept intact, with only the American Indian or Alaskan Native being changed in name to “Other”. Approximately fifty-two (52) percent of the sample is female. The percentages of each ethnic category represented are: White – 67.9%, Black – 10.2%, Hispanic – 12.7%, Asian/Pacific Islander – 8.1%, and Other – 1.2% (see table 4).

Socioeconomic status. The conceptual framework explains the choice to use socioeconomic status (SES) as a composite variable as opposed to using separate measures for family income, occupational prestige, and level of parent's educational. Empirically these measures are highly correlated, so that utilizing measures separately in the model may engender bias in these estimates. As Plank and Jordan (2001) indicate, creating a composite measure for socioeconomic status also enhances reliability, as a combine measure provides a check on any one measure that may lack reliability or appropriate specificity. Socioeconomic status was created within NELS:88 and is a composite of parental responses to family income, type of occupation, and level of education. The measure was then standardized. While SES is known to change over time (i.e., over the course of ten years, one is likely to earn more money) it is treated as time-invariant in these analyses for two reasons. First, it is unclear how much variation might exist over the course of four years as there is likely to be little change in occupational prestige or level of education, conceding that there may be some change in family income. Second, and more importantly, information for creation of the variable was only gathered at one point in time, thus only allowing a static measure to be created.

Educational Expectations

Student Expectations. While the available response options and coding for a student's educational expectations have already been set forth, in analyses where the dependent variable was the probability of postsecondary enrollment, the expectations variable was also coded in two ways. First a set of dichotomous variables were created representing each possible response from the student, with the reference category in the

equation being the category of highest frequency, the expectation to "graduate from college." This allows for the probability of enrollment to be conditioned on the specific influence of the type of education a student expected to receive. The transformation of the variable into expected years of education allows for a continuous measure that utilizes fewer degrees of freedom in the analysis, and allows for a slight shift in the explanation of the influence of a student's educational expectations.

Parents' Expectations. The parent's survey offered the same response options as the student survey only with a shift in expectations for their child; however, the parent survey was only administered during the base year (8^{th} grade) and second follow-up (12^{th} grade). This measure was transformed in the same manner as was the variable on student expectations. First, the parent's expectations are presented as a collection of dichotomous choices, with "will graduate from college" being the reference category. Recalculation of parents' expectations into years also matched the student expectations transformation, with exact equivalency in number of years expected. Whenever the dichotomous variables for student expectations were used in analyzing the dependent variables of interest, dichotomous measures of parental expectations were used, and whenever student expectations were included measured in years in an equation, parental expectations was also measured in years.

Academic Variables

Grade Point Average (GPA). In the eighth grade survey students were asked "For each of the school subjects listed below, mark the statement that best describes your grades from the beginning of sixth grade until now. The subjects included Math, English,

History and Science, and the response options included: (1) As, (2) Bs, (3) Cs, (4) Ds, (5) Below Ds. In the tenth grade survey students were asked "For each of the school subjects listed below, mark the statement that best describes your grades from the beginning of ninth grade until now, and included the same subjects as the first survey with the following more articulated response options: (1) Does not apply to me, I have not taken any classes in this subject, (2) Mostly As, (3) Mostly As and Bs, (4) Mostly Bs, (5) Mostly Bs and Cs, (6), Mostly Cs, (7), Mostly Cs and Ds, (8) Mostly Ds, (9) Mostly below D, and (10) Does not apply to me, my classes are not graded. The GPA was constructed after data augmentation through multiple imputation, where the scale was from one to five for 8th grade GPA and one to eight for 10th grade GPA, with one was equivalent to all As and eight equivalent to an F. The grades were then averaged across subjects, providing a measure for grade point average. A stronger measure for GPA would be to have transcripts that indicate how well students performed in these subjects, but that was not accessible until high school transcripts were made available in twelfth grade.

Thus, grade point average for twelfth grade was created using transcripts that recorded the student's average performance across a number of subjects on a scale form one to thirteen (where 1=A+, 2=A, 3=A-, 4=B+… 13=F). The transcripts recorded student grade point average for classes from ninth to twelfth grade in many subjects, including those indicated above. However, the transcript did not provide a delineation of how a student performed grade-by-grade, thus making it impossible to compose a GPA for ninth through tenth grade using the transcript. This necessitated reliance on self-reported grades during the eighth and tenth-grade survey for a measure of GPA that could

be tested for influence on changes in educational expectations and the measure for change in academic performance. Measures of how highly they are correlated revealed that the eighth-grade reported GPA had a correlation of 0.6306 with tenth-grade, self-reported GPA, and a correlation of 0.6203 with the twelfth-grade, transcript-based GPA. Tenth-grade self-reported GPA was correlated at 0.7539 with the twelfth-grade, transcript-based GPA. These correlations, according to Cohen et. al (1988), can be interpreted as moderately large correlation.

High School Program. Another measure obtained from high school transcripts is that of the level of rigor of coursework that a student took from ninth to twelfth grade. This measure was created by gauging the number of units students took in a number of possible courses. Students who took upper-level math courses (such as calculus and trigonometry), who took science courses each year, and who took upper-level English courses throughout high school were coded as having taken "rigorous academic" coursework, and composed approximately 22% of the sample (see table 5). The great majority of students (approximately 58%) were coded as having been in an "academic" program. Approximately 9% of the sample was coded as taking courses that would constitute a "vocational" program, including classes such as home economics, business, and agriculture. Approximately 10.5% of the sample was coded as having a mixture of academic and vocational coursework, while only approximately 1% of the sample contained students that took a blend of rigorous academic and vocational coursework (see table 5).

As mentioned in the conceptual framework, research has indicated that one of the strongest predictors of access to and success in postsecondary educational institutions is

the rigor of coursework that a student took in high school (Adelman, 1999). This measure was only made available during the second follow-up survey, and thus was not used as a predictor in models that had changes in expectations between eighth and tenth grade as the dependent variable. However, because the transcript indicates the type of courses they were likely to remain enrolled in through their time in high school, the measure of rigor for coursework was included as an influencer on a change in educational expectations and academic performance between tenth and twelfth grade. Furthermore, the rigor of coursework a student is involved in would not necessarily influence a change in student expectations during the predisposition phase of the college choice model, but is more likely to play a role during the search and choice stages.

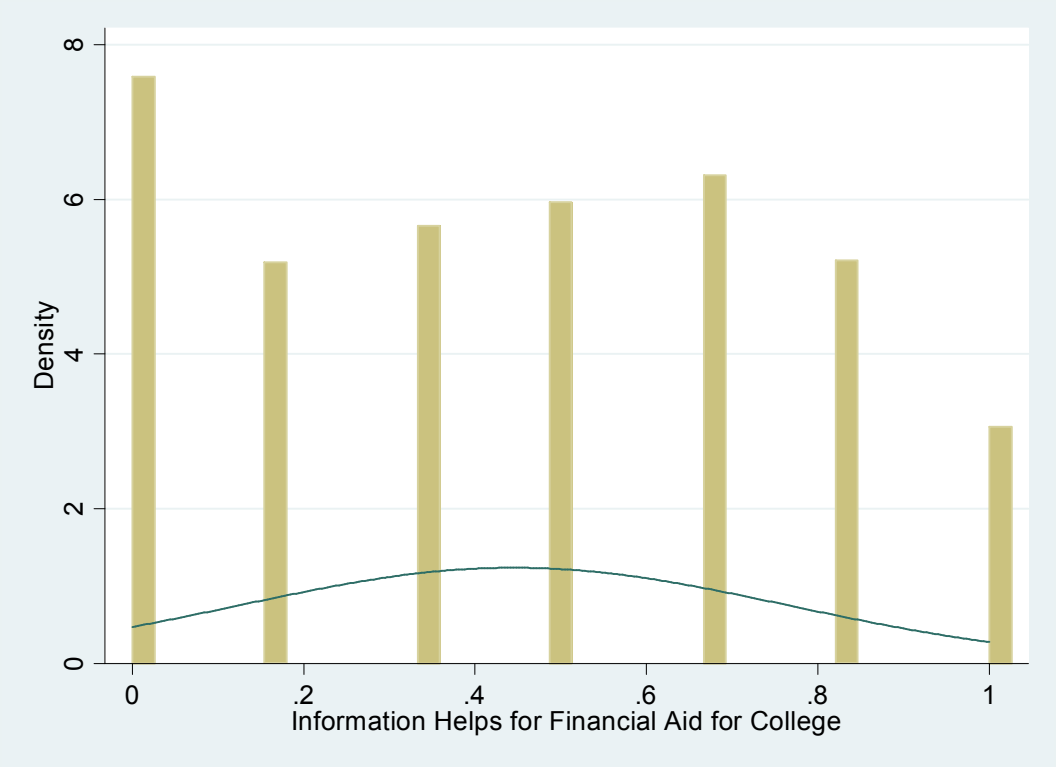
Combined Math/Reading Test. This measure was described earlier as an outcome variable, and the properties of the variable are contained there. These national tests provide a measure that is equal across all school types. Whereas schools may differ in how strict or lenient they are in their grading procedures (a possible GPA bias), or in the type and number of courses they might offer (a possible bias in program availability), the combined math/reading test is essentially devoid of these possible biases. Thus, academic performance can be gauged on a common metric with little concern over how the variable was specified or how reliable it may be as a measure.

Financial Aid Information

A key mediating variable of interest is the impact of information a student obtains regarding financial aid. This information is believed to have an impact on a student's probability of enrolling in a postsecondary institution as they are more likely to be

financially prepared to do so. The creation of this variable is based on a series of questions regarding financial aid information asked during the second follow-up (senior year) survey. Students were asked if they received help filling out a financial aid application. Next a series of questions related to sources of financial aid information were asked, beginning with "Have you done any of the following to learn about applying for financial aid?" with a simple yes/no response option: (1) Talked with a teacher/guidance counselor, (2) Talked with a representative form a vocational/technical school or college, (3) Read Department of Education information on financial aid, (4) Read information from a vocational/technical school or college, and (5) Talked to a knowledgeable adult. An index was created given responses to these questions and centered on zero, and was tested for reliability with an alpha = .7445. Furthermore, in order to insure that all of the questions represented a single index, a factor analysis was conducted and found to load on one factor. Plank and Jordan (2001) created a very similar measure for financial aid information sources, but included in their indexed measure elements that were found to load onto a separate factor when conducting a factor analysis. The authors also determined to transform the variable logarithmically, believing that each additional benefit comes with diminishing returns. In order to assess whether such a transformation was necessary I conducted a histogram on the indexed variable to see if it was skewed (see Figure 3). As is evidenced in the histogram, while the greatest number of students

Figure 3. Histogram of Information Sources for Financial Aid



appears not to have received information, there does not appear to be a strong skew towards students that received a number of sources of information. Thus, it was determined not to transform the variable logarithmically, but instead to simply standardize the indexed measure for ease of interpretation.

State-level Variables

The conceptual framework indicates that the economic-indicators at the state-level as well as average cost of college and grant-based aid available in one's state are likely to have an impact on the probability of enrollment for a student. The inclusion of these measures indicates the combined model approach discussed in Plank and Jordan (2001). Previously discussed measures indicate what have appeared in models as the

sociological aspects of the postsecondary decision-making process. Others have sought to incorporate economic perspectives of this process by including measures that would indicate that students are also rational decision-makers that consider the economic environment in their postsecondary decisions (Heller, 1997; Beattie, 2002; Perna, 2000; Dominitz & Manski, 1996). This research follows on the intuition of prior research, as the conceptual framework suggests, includes economic variables believed to influence the choice phase of the college decision process.

Unemployment. Seasonally adjusted unemployment statistics were accessed from the Bureau of Labor and Statistics[14]. The month of highest enrollment, October 1992, was the seasonally adjusted rate chosen to represent each state's economic environment at the time of student choice. Unemployment serves as a proxy for the general economic atmosphere of the states, and as suggested in the conceptual framework, the rate of unemployment may influence the college decision process of students. For example, higher unemployment rates may be likely to yield a positive influence on postsecondary enrollment as students choose college over immediate employment when employment is scarce.

Tuition. Average state tuition is believed to be another economic factor that influences the postsecondary decision process. For students from lower SES backgrounds, high average state tuition is likely to dissuade them from choosing to enroll in college, especially if these students are unfamiliar with any financial aid that may be available in helping them pay for college. This measure was created by taking the average state-tuition for a four-year public college as reported in *The Condition of*

[14] Available at www.bls.gov

Table 6. Description of Variables from Second Wave (12th grade) to Third Wave (2 years after graduation)

Dependent Variable		**Mean**	**SD**	**Min**	**Max**
Enrollment in Postsecondary Education *(Enrollment in 4-year college = reference category)*					
Coded as:					
	Nominal choice between (0)No Enrollment, (1) Enrollment in a two-year college or vocational school or (2) Enrollment in a four-year college	0.998	0.884	0	2
Background Characteristics					
Student Gender					
Coded as:					
	Male = 0	0.480	—	0	1
	Female = 1	0.520	—	0	1
Student Race *(White = reference category)*					
Groups:					
	White	0.679	—	0	1
	African-American	0.102	—	0	1
	Hispanic	0.127	—	0	1
	Asian/Pacific Islander	0.081	—	0	1
	Other	0.012	—	0	1
Socioeconomic Status					
Coded as:					
	Continuous variable (centered, not on zero because of missing)	-0.070	0.751	-2.93	1.97
Educational Expectations					
Student Expectations 12th grade *("Finish college" = reference category)*					
Survey question: "As things stand now, how far in school do you think you will get?"					
Choices:	Less than high school or high school graduation (12 years)	0.056	—	0	1
	Less than two years of vocational/trade business school or less than two years of college (13.5 years)	0.042	—	0	1
	Two or more years of vocational/trade business school or of college, including a 2-year degree (14.5 years)	0.238	—	0	1
	Finish college (16 years)	0.352	—	0	1
	Master's degree (18 years)	0.177	—	0	1
	PhD, MD or other advanced professional degree (21 years)	0.135	—	0	1
Parents' Expectations for 12th grader *("Finish college" = reference category)*					
Survey question: "How far in school do you want your teenager to go?"					
Choices:	Less than high school diploma, GED, or high school graduation (12 years)	0.033	—	0	1
	Less than two years of vocational/trade business school or less than two years of college (13.5 years)	0.027	—	0	1
	Two or more years of vocational/trade business school or of college, including a 2-year degree (14.5 years)	0.153	—	0	1
	Finish college (16 years)	0.390	—	0	1
	Master's degree or equivalent (18 years)	0.224	—	0	1
	PhD, MD or other advanced professional degree (21 years)	0.173	—	0	1

Table 6 (cont.). Description of Variables from Second Wave (12th grade) to Third Wave (2 years after graduation)

Academic Performance		**Mean**	**SD**	**Min**	**Max**
Combined 12th grade GPA (includes courses of Math, English, Science and History)**					
Coded as:					
	Average grades from transcript in each subject through high school, where A+=1, A=2, A-=3, B+=4, B=5, B-=6, C+=7, C=8, C-=9, D+=10, D=11, D-=12, and F=13. GPA is an average across subjects of these reported grades.	6.859	2.244	1	13
Combined 12th grade Reading/Math Test Score					
Coded as:					
	Continuous variable	51.018	9.601	22.38	78.48
Rigor of Coursework** *("Academic" = reference category)*					
Taken from transcript of courses students took from 9th through 12th grade					
Choices:	Rigorous Academic	0.219	—	0	1
	Academic	0.576	—	0	1
	Rigorous academic/Vocational	0.012	—	0	1
	Academic/Vocational	0.105	—	0	1
	Vocational	0.088	—	0	1
Financial Aid Information					
Index of Sources of Financial Aid Information a Student Obtained					
Coded as:					
	Indexed variable (centered on zero) that was composed of yes/no responses to the following questions: Did you receive help filling out a financial aid application? Have you done any of the following to learn about applying for financial aid? (1)Talked with a teacher/guidance counselor, (2)Talked with a representative from a vocational/ technical school or college, (3) Read Dept. of Ed. information on financial aid, (4) Read information from a vocational/technical school or college, (5) Talked to a knowledgeable adult (α=.7445)	0.000	0.663	-0.91	1.16
State-level Economic Variables					
Unemployment					
Coded as:					
	The average unemployment rate (seasonally adjusted) in the state in which the student lived	7.32	1.49	2.9	11.3
Tuition †					
Coded as:					
	Average tuition of a 4-year state college for a full-time enrolled student in 1992, according to state statistics	5759	1071	4171	8864

Table 6 (cont.). Description of Variables from Second Wave (12th grade) to Third Wave (2 years after graduation)

State-level Economic Variables (cont.)				
Need-based Aid ‡				
Coded as: Average need-based aid received by full-time enrolled student in 1991, according to state statistics	196	374	0.42	3140
Merit-based Aid ‡				
Coded as: Average merit-based aid received by full-time enrolled student in 1991, according to state statistics	20.01	49.38	0	659.2
Information Variable				
High Information Disseminating State §				
Coded as: Dichotomous variable of whether a student lived in a state that disseminated information about college going (i.e., academic qualifications for going to college, where to find financial aid information, or other information about how to get to college) created via a survey administered to a panel of experts.	0.151	—	0	1
Information Interaction Variables				
Financial Aid Info * Black	0.023	0.218	0	1
Financial Aid Info * Hispanic	0.005	0.234	0	1
Financial Aid Info * Asian	0.000	0.181	0	1
Financial Aid Info * SES	-0.024	0.507	0	1
High Information Disseminating State * Black	0.008	0.086	0	1
High Information Disseminating State * Hispanic	0.031	0.175	0	1
High Information Disseminating State * Asian	0.028	0.166	0	1
High Information Disseminating State * SES	-0.018	0.291	0	1

Note: **Variables created from High School & Beyond Survey

***Variable created from Bureau of Labor and Statistics

† Variable created from "Condition of Education" report from 1993

‡Variables created from the National Association of State Student Grant and Aid Programs (NASSGAP)

§Variable created via a survey to a panel of experts

All other variables created from NELS:88 Surveys

Education 1993[15] . While not all students might plan to attend a four-year college this proxy implies that students roughly know what it costs to attend college.

Need- and Merit-based Aid. A final economic factor thought to influence the postsecondary decision process is the average amount of aid available to students in the state in which they reside. While tuition prices for the present year of enrollment (1992)

[15] See http://nces.ed.gov/pubs93/93290.pdf, see page 310.

would be available to students, average aid would not be available. Instead students would need to rely on what the reported average for aid was a year earlier. This information was retrieved form the National Association of State Student Grant and Aid Programs[16]. Available information on how much help a student could receive is likely to impact a student's decision, presuming the student knows what aid was available and how to obtain it.

State-level Information Variable

The research questions posed by this dissertation indicate the need for developing a state-level measure of policy and/or action in which postsecondary preparation and access information is disseminated to students in a given state. The necessity of this variable is two-fold. According to the conceptual framework proposed, information plays a role throughout the three stages of the college choice model. Information, or the lack thereof, is thought to influence evolving student expectations for postsecondary education as well as their growing academic preparations for college. It is believed to continue to influence these mediating variables through the search stage of the choice model, and information is ultimately believed to play both a direct and indirect role on whether students access college.

Prior to this research others have sought to analyze the notion of "social capital," or the resources and connections that students possess, which facilitate them in accessing postsecondary education (Plank & Jordan, 2001; Perna, 2000). Often, though, social capital is measured through a proxy of variables that includes measures for the reception of information (similar to the aforementioned financial aid information index) together

[16] See 24th National Association of State Student Grant and Aid Programs Annual Survey Report, page 40.

with measures of parental expectations as well as parental and/or peer support. However, no research has been able to measure the reception of information at a stage earlier than the "choice" stage of Hossler and Gallagher's model (1987).

Furthermore, there is a concern that the later measure of financial aid information (constructed in a similar manner in other research) may be correlated with an unmeasured aspect of student motivation. In other words, these sources of financial aid information may serve as something of a proxy for a student's drive and determination to attend college, and therefore is actually a measure of motivation. As a measure for motivation does not exist in the model, this suggests that the measure of financial aid information may be correlated with the error term, which would be a violation of a classical statistical assumption. Thus an external measure of information that is not connected to a student's motivation (i.e. a state policy to disseminate postsecondary preparation and access information to all students in the state irregardless of motivation) could serve as an instrument through which financial aid information could be extricated from any correlation an unmeasured motivation that may exist within the error term.

An instrumental variable can be used in a regression analysis in order to create consistent estimators when explanatory variables, such as financial aid information, may be correlated with the error term. An instrument is a variable that does not itself belong in the regression, but that possesses the following three characteristics: (1) the instrument is correlated with the predictive variable in question, (2) the instrument is not correlated with the error term itself, and (3) the instrument acts upon the dependent variable indirectly and only through the predictive variable in question. The creation of an

instrumental variable based on state-policy for information dissemination is believed to serve as a possible instrument for the index of financial aid information.

High-Information Disseminating States. In order to create this variable it was necessary to rely on experts in the field of state and national higher education policy. The variable needed to be a good measure of which states could be considered by experts to be states that were active in providing postsecondary preparatory information to their students during the time period in which the students would have taken these surveys, from the late 1980s to the early 1990s. Even for experts this proved to be a challenging task, as developing a measure based on state policy over fifteen years ago can be difficult to achieve. Nevertheless it seemed that developing a measure for state involvement in postsecondary preparation and access through the provision of information could be a strong proxy for how much attention and resources a state devotes to postsecondary access for its students.

An inquiry was sent to eight experts in the field of postsecondary education policy. These individuals are uniformly deemed as people uniquely situated to respond to an inquiry of state postsecondary policies over the past twenty years. The letter asked the experts to respond to the following inquiry after a brief introduction and explanation for my research:

"I am interested in identifying ***five to ten states*** that provided in 1988, 1992, and 1995 the most robust, effective information to students as early as the 8th grade. Among the kinds of information they may have provided would be:

1. Academic preparation information, such as what courses a student will need to take and what grade point average they will need to maintain, in order to be able

to access and/or be successful in postsecondary institutions once they graduate from high school.

2. Financial aid information that indicates how much going to college in that state is likely to cost, how students are able to apply for financial aid, and/or what requirements exist to qualify for such aid.
3. Information that indicates that applying and getting accepted to college can be easy if they plan accordingly and follow information that has been provided." (see Appendix A for the entire inquiry and the list of experts surveyed)

Six of the eight experts responded. Their responses were coded in two manners. First, all of the states that the experts suggested were included as potential states termed "information-rich states" or states that provided rich information to their students regarding postsecondary preparation. Secondly, each state was rated on the reliability and specificity with which the expert articulated the state to belong in the category, where 1 indicated little confidence and 5 indicated high confidence and reliability. Two states had four or more of the experts indicate that they were states with real policies for providing postsecondary preparation information to their students. These included Indiana (where 5 of the six experts suggested it fit the profile) with an average reliability score of 4.8, and Minnesota (where 4 of the experts suggested it fit the profile) with an average reliability score of 3.75. Four other states were mentioned by at least half of the experts, but only two of those states rated higher than 3 on reliability. Oklahoma was named by three of the six experts and possessed a reliability score of 4.67, while California was also named by three of six experts and had a reliability score of 4.33. The other two states mentioned

by three experts, New York and Pennsylvania, had reliability scores of 2 and 2.33 respectively.

In this manner a dichotomous variable was created to indicate whether a student lived in a state with strong policies on providing information to their students on how to prepare for and access college. Students in the sample that resided in Indiana, Minnesota, Oklahoma, or California held a value of 1 for this variable, while all other students in the sample held a value of zero. This variable was then used as a proxy measure for whether a student received postsecondary preparation information during the predisposition and search phases of the college choice model, based on whether they lived in one of these four states.

This variable was also tested to see if it could serve as an explanatory instrument for the variable of financial aid information in the analysis on postsecondary enrollment. This test is reported and analyzed in Appendix C. Kirst and Venezia (2004) indicate the likelihood that the reception of information (in this case financial aid information) is strongly tied to a student's motivation. "The general belief among counselors and students was that only the most motivated students talked with their counselors about college, and that conversations are initiated by students" (p. 299). The index measure of financial aid information sources is potentially endogenous with unmeasured student motivation, and therefore may be an unreliable predictor for information. The state-level "high-information dissemination" variable was articulated as a potential source through which the indexed variable of financial aid information may be instrumented. The high-information dissemination variable was examined for relevance using a test in Stata

called "ivreg2"[17] and found to not be relevant and to be over-identified (see Appendix C). This should serve to highlight the importance of developing stronger measures for the reception of information that are not potentially highly correlated with student motivation, and calls into question the usage of such information variables as is utilized in this analysis as possibly being a biased estimate that is endogenous with the error term.

Information Interactions

Finally, the information variable was interacted with key background characteristics in order to determine if information was differential in its influence on specific types of students. It is conceivable that among the states who possessed active policies for disseminating college preparation information that these policies may have been targeted at students of color and/or at students who were socioeconomically disadvantaged. Therefore, the variable of information was interacted with race for African-American students, Hispanic students, and Asian or Pacific Islander students, and was also interacted with socioeconomic status. Descriptive statistics for these variables are found in each panel (Tables 4–6). Additionally, a variable gauging the interaction of the financial aid information index with each of these groups was also constructed and is also found in Table 6. Even if states did not undertake specific policies to focus on these subpopulations it is possible that the reception of college preparation information has a differential influence on various types of students. These variables are constructed to test this possibility.

[17] The module for performing is available through download in Stata version 9.

Table 7. Descriptive Statistics

Variable	*Mean*	*SD*
Background		
Female	0.520	0.500
White	0.679	0.467
Black	0.102	0.302
Hispanic	0.127	0.333
Asian	0.081	0.272
Other	0.012	0.107
Socioeconomic status	-0.070	0.751
Expectations		
Expectations 8th grade	3.673	1.173
High school or less	0.086	0.281
Vocational/< 2 years	0.083	0.275
College/> 2 years	0.139	0.346
Graduate college	0.456	0.498
Postgraduate	0.236	0.425
Expectations 8th grade (years)	15.949	2.082
Expectations (cont.)		
Parents' Expectations 8th grade	3.524	1.219
High school or less	0.109	0.312
Vocational/< 2 years	0.080	0.272
College/> 2 years	0.200	0.400
Graduate college	0.400	0.490
Postgraduate	0.211	0.408
Parents' Expectations 8th grade (years)	15.696	2.121
Expectations 10th grade	3.808	1.355
High school or less	0.076	0.265
Less than 2 years	0.069	0.253
Greater than 2 years	0.235	0.424
Graduate college	0.346	0.476
Masters	0.140	0.347
PhD, MD or other advanced degree	0.134	0.341
Expectations 10th grade (years, scaled to 8th grade)	15.946	2.199
Change in Expectations - 8th to 10th	1.985	0.727
Change in Expectations - 8th to 10th (years)	-0.003	2.076
Expectations 10th grade (years, original scale)	16.240	2.397
Expectations 12th grade	3.955	1.276
High school or less	0.056	0.231
Less than 2 years	0.042	0.201
Greater than 2 years	0.238	0.426
Graduate college	0.352	0.478
Masters	0.177	0.382
PhD, MD or other advanced degree	0.135	0.341

Table 7 (cont.). Descriptive Statistics

Variable	*Mean*	*SD*
Expectations (cont.)		
Expectations 12th grade (years)	16.459	2.295
Change in Expectations - 10th to 12th	2.093	0.742
Change in Expectations - 10th to 12th (years)	0.219	2.219
Parents' Expectations 12th grade	4.265	1.184
High school or less	0.033	0.177
Less than 2 years	0.027	0.163
Greater than 2 years	0.153	0.360
Graduate college	0.390	0.488
Masters	0.224	0.417
PhD, MD or other advanced degree	0.173	0.378
Parents' Expectations 12th grade (years)	16.963	2.269
Academics		
GPA for 8th grade	2.001	0.710
GPA for 10th grade	3.197	1.384
GPA for 12th grade	6.859	2.244
Combine Math/Reading Test - 8th grade	51.463	9.793
Combine Math/Reading Test - 10th grade	51.223	9.639
Combine Math/Reading Test - 12th grade	51.018	9.601
Difference between 8th and 10th grade test scores	-0.240	4.715
Difference between 10th and 12th grade test scores	-0.205	4.131
Coursework		
Rigorous	0.219	0.414
Academic	0.576	0.494
Rigorous/Academic	0.012	0.108
Academic/Vocational	0.105	0.307
Vocational	0.088	0.283
Financial Aid		
Help filling out financial aid application	0.393	0.488
Talked to counselor	0.557	0.497
Talked to college representative	0.396	0.489
Read info from Dept of Ed	0.259	0.438
Read info from a college	0.458	0.498
Talked to a knowledgeable adult	0.602	0.489
Index of financial aid variables	0.000	0.582
State-level		
State ID	26.34	14.59
State unemployment	7.32	1.49
State average of Need-based aid	195.51	373.50
State average of Merit-based aid	20.01	49.38
State average tuition for 4-year	5758.65	1071.49
High info disseminating state	0.151	0.358
Postsecondary		
Level of Enrollment	0.998	0.884
Panel Weight	212.135	184.580

Evidence of "High Information States" Variable

The creation of a variable that indicates which states possessed strong policies for college preparation information nearly twenty years ago relies on the recollection and experience of experts in the field. Despite their expertise and their involvement in the field during the time period being assessed, nearly every expert qualified their response with some concern over the accuracy of their intuitions. Therefore, it is necessary to provide some evidence of whether the states believed to possess strong policies for college preparation information during the late 1980s and early 1990s actually were devoting specific resources to outreach and information dissemination. This section looks at verification for each state that is believed by the experts to possess the policies and programs indicative of active college preparation information programs.

California

In 1987 the Commission for the Review of the Master Pan for Higher Education issued a response to an update of California's master plan for higher education presented in 1984 (Commission, 1987). The commission's report, "The Master Plan Renewed," focuses on unity, equity, quality, and efficiency in California's postsecondary educational system. The report's section on equity indicates clear recommendations for specific outreach efforts centered on identifying, recruiting and training minority and women students. Together with these clear recommendations, the Governor's budget for California from 1988–89 and from 1991–92 indicates that during the 1988–89 fiscal year Governor Deukmejian proposed an identical budget to what was allocated in the 1987–88 fiscal year of approximately $9.1 million on the student affirmative action program, with

$4.1 million dedicated specifically to early outreach efforts. Another $3 million were allocated for support services to these students, while nearly $800 thousand was targeted at specific financial aid for these students.

The 1991–92 budget, presented by Governor Pete Wilson to the California legislature, indicates that the 1989–90 fiscal year saw an increase to approximately $11.7 million on the student affirmative action program for education, with $4.77 million spent on early academic outreach and $1.44 million being spent on a new category of "immediate outreach." The 1990–91 budget revealed nearly identical numbers and the 1991–92 budget was based on the prior year's funded program level. Thus, California's renewed master plan for higher education, together with item level descriptions of monies allocated and spent on early outreach programs and support services for minority students, indicates that California did have functioning outreach systems in place targeted at minority students. The specifics of what type of information was provided to these students and in what manner are not readily available, but these sources of evidence seem to justify California being classified as a state with a strong policy on college preparation information given to its high school students, and particularly to students who tend to be disenfranchised.

Minnesota

The evidence for Minnesota possessing a strong and active policy for providing college preparation information to its students is indicated in 1989 and 1991 reports from the Minnesota Higher Education Coordinating Board to the Governor and legislature of Minnesota. The center of the Minnesota policy was the Minnesota Post-High School

Planning Program (PSPP) which was initially created through statute in 1986. The statute has been re-instituted biennially and was active during the years of 1988–1992. The PSPP was well funded during these fiscal years and had the objective of providing secondary students with information to help them make post-secondary education plans.

More specifically, the reports indicate that the program objectives beginning in 1988 were expanded beyond the original target of 11th grade students, to begin providing information to eighth grade students in the state, and to extend the conveyance of college preparatory information throughout high school as well as to adults with desires to return to school. Eighth grade students throughout the state received information about the wide variety of options for them in high school and beyond, and the importance of preparing well academically, and the availability of financial aid to help them afford postsecondary education. Eighth graders received this information in the form of a booklet titled "Future Choices." The PSPP also provided testing to high school juniors each year in order to provide information on college preparation and career planning. High school seniors received a simplified admissions application form for Minnesota colleges and universities.

Guidance counselors received testing information about the juniors that helped them in counseling the students in preparation fro their postsecondary plans. The counselors were also provided a calendar of events, as well as videos, financial aid information, and other resources to help them in counseling students. Parents also received information on how they can help their children prepare academically for postsecondary access, as well as information on financial aid, and was tailored to various stages of their children's lives. By 1990 parents received a booklet entitled "Get Ready"

which addressed what parents can do to help their children to prepare academically and financially for postsecondary educational opportunities. A media campaign was also conducted in conjunction with the release of this information. In short, Minnesota possessed a very strong, active, and tangible policy that provided college preparation information to students beginning in the eight grade, and tailored to their specific needs throughout high school and to their counselors and parents, all in an effort to help students to be prepared academically and financially to obtain a postsecondary education, and this policy was administered to all students regardless of socioeconomic or ethnic background.

Indiana

In their article, "The Indiana Postsecondary-Encouragement Experiment," Hossler and Schmit (1995) indicate that in the mid 1980s Indiana's governor and legislature began to search for a way to increase postsecondary educational participation. Their decisions and work, in concert with support from the Lilly Endowment and help and research from Indiana University and the State Commission of Higher Education, led to a strong and active policy of college preparation administered to students and parents beginning in 1987. From 1987–88 to 1991–92, Hossler and Schmit indicate that postsecondary participation rates remarkably increased by nearly eight percent. What led to this increase was the confluence of a number of concerned stakeholders, including the governor and legislature, the Lilly Endowment, an citizen action groups called SCIPPE (Steering Committee for the Improved Participation in Postsecondary Education), the Indiana Secondary Market for Educational Loans (ISM) and the Indiana University

researchers. At the center of this revolution in postsecondary attainment was the creation and success of the Indiana College Placement and Assessment Center (ICPAC).

ICPAC started with a pilot program of 5,000 ninth-grade student homes during the 1986–87 school year, and included surveys to both students and parents used to create a database to better understand the college choice process, newsletters specifically targeted to the varying informational needs of students and parents mailed directly to their homes, a postsecondary planning packet mailed directly to the student's home and a toll-free information hotline that could answer students' and parents' questions regarding information found in the newsletters, financial aid, career advice, and other needs related to postsecondary educational opportunities. Beginning in 1988 the information side of the policy was brought to scale and disseminated to ninth-grade students and their parents throughout the Hoosier state. In 1990 ICPAC included mailers to high school juniors and their parents about financial aid as well as academic preparation that would assist them in their postsecondary choice process. Also during this year, the state embarked on an ambitious new policy to help increase the number of low-income and first-time college enrollees by creating the 21st Century Scholars Program, guaranteeing 8th graders that if they comply with an academic contract designed to prepare them for college, that they will be have sufficient financial aid to attend the Indiana college or university of their choice. Beginning in 1991, ICPAC teamed with the Indiana Student Financial Aid Administrators association to mail federal financial aid forms to the home of every high school senior in the state.

Indiana's experiment clearly developed a strong and lasting policy of disseminating college preparation information to students and parents that would

meaningfully assist students in their postsecondary choice process. Beginning in 1988 this information was provided to students throughout the high school process, with specific attention being given to the eighth and eleventh grade student. Similar to Minnesota's policy, this information was provided to students regardless of their ethnic or socioeconomic background, and it was not until 1990, with the inception of the 21st Century Scholars Program, that specific programs were developed with the low-income and first-time college attendees in mind.

Oklahoma

The experts surveyed indicated that they believed that Oklahoma also possessed a strong and active policy in assisting high school students in their postsecondary decision process with academic and financial college preparation information during the late 1980s and early 1990s. One expert even indicated the acronym of the program, OHLAP, which was designed to assist students towards postsecondary educational attainment. OHLAP, the Oklahoma Higher Learning Access Program, has become one of the most successful programs in the country in providing Oklahoman students and their parents, beginning in eighth grade, with relevant information about academic and financial preparedness for postsecondary education. However, initial legislation for OHLAP was not introduced until 1992, and was not passed and instituted until 1994. Because the experts were given three years to respond to in the survey (1988, 1992, and 1995), their intuition about Oklahoma was correct in responding that the state had a program in place by 1995. Evidence indicates, however, that Oklahoma's program falls just outside of the boundaries that would place it within the scope of the NELS surveys that followed 8th

graders in 1988 through to their senior year in high school in 1992. Discussions with the current director of OHLAP and EPAS (Educational Planning and Assessment System) indicated that they believed that the both programs were instituted policy after 1992.

Methods and Analyses

This research proceeds with an analysis of the three research questions set out from the introduction, the influence of information and other determinants on the trend of a student's educational expectations, on the trend of their academic performance, and ultimately on their likelihood for enrolling at varying levels of postsecondary educational institutions. Each dependent variable is analyzed in a stepwise fashion in order to add key variables in intuitive blocks and so that model fit can be gauged.

Analysis of the variables measuring change in expectations from eighth to tenth grade, where the variable is coded as a multinomial choice (change upward, stay the same, change downward), will employ multinomial logistic regression models. As noted in Agresti (1990), these models are commonly employed when the dependent variable offers a selection between three or more nominal choices, and where it is conditioned on a combination of continuous and dichotomous variables. Multinomial logistic regression will also be employed when analyzing student postsecondary enrollment choices. For analysis of all other variables, ordinary least squares regression will be employed.

Change in Educational Expectations

The first model for each analysis of a change in expectations is an unconditional model, allowing for a baseline comparison to subsequent models. The second model adds

individual background characteristics, which include gender, ethnicity (where White is the reference category), and socioeconomic status. The third model integrates the impact of information by introducing the variable indicating whether or not students lived in a state with a strong policy for disseminating college preparation information beginning in the eighth and ninth grades. The fourth model adds academic background variables, which includes the corresponding antecedent student GPA (i.e., 8th grade GPA's influence on a change in 10th grade expectations) as well as the corresponding combined math/reading test to the panel measured dependent variable (i.e., test for eighth grade will be included in the change in expectations between eighth and tenth grade). The fifth model introduces parental expectations for the student, in the form of dichotomous choices when the dependent variable is measured as a multinomial choice, and in years when the dependent variable is measured in change in expected years of education. Finally, because is not known whether policies may have been directed at specific groups who are historically under-represented, the sixth model includes the aforementioned interactions between the state-level information variable and key background characteristics, including race (African-American, Hispanic, and Asian) and socioeconomic status.

The final model testing hypotheses regarding a change in educational expectations between 8th and 10th grade, with expectations measured in years is:

$$(ExpectaionYears10) = \beta_0 + \beta_1(Female) + \beta_2(Black) + \beta_3(Hispanic) + \beta_4(Asian) + \beta_5(Other) + \beta_6(HighInfoState) + \beta_7(SES) + \beta_8(GPA8) + \beta_9(Test8) + \beta_{10}(Parent'sExpectations) + \beta_{11}(Info*Black) + \beta_{12}(Info*Hispanic) + \beta_{13}(Info*Asian) + \beta_{14}(Info*SES) + \varepsilon_i$$

The final model testing hypotheses regarding a change in educational expectations between 10th and 12th grade, with expectations measured in years is:

$$(ExpectaionYears12) = \beta_0 + \beta_1(Female) + \beta_2(Black) + \beta_3(Hispanic) + \beta_4(Asian) + \beta_5(Other) + \beta_6(HighInfoState) + \beta_7(SES) + \beta_8(GPA10) + \beta_9(Test10) + \beta_{10}(Parent'sExpectations) + \beta_{11}(Info*Black) + \beta_{12}(Info*Hispanic) + \beta_{13}(Info*Asian) + \beta_{14}(Info*SES) + \varepsilon_i$$

The models indicate that information takes a priority in the process, conditioned upon background characteristics, parental expectations and prior academic performance. The models also test to see whether there is a difference in how information influences students of varying ethnicities and socioeconomic status with interaction terms included in the final step. These models analyze a change in educational expectations as measured in years.

Changes in educational expectations between 8th and 10th grade (and between 10th and 12th grade) are also measured as a choice between no change in educational expectations, a positive change in expectations, and a negative change in expectations. In these two models parental expectations are presented as specific dichotomous choices of how much education they expect their children to receive. To explore this polytomous dependent variable, the model is expressed as a multinomial logit regression, and for changes between 8th and 10th grade is:

$$Prob(NegativeChange/NoChange) = \beta_0 + \beta_1(Female) + \beta_2(Black) + \beta_3(Hispanic) + \beta_4(Asian) + \beta_5(Other) + \beta_6(SES) + \beta_7(HighInfoState) + \beta_8(GPA8) + \beta_9(Test8) + \beta_{10}(ParentsExpectHighSchool) + \beta_{11}(ParentsExpectVocational) + \beta_{12}(ParentsExpectSomeCollege) + \beta_{13}(ParentsExpectPostgraduate) + \beta_{14}(Info*Black) + \beta_{15}(Info*Hispanic) + \beta_{16}(Info*Asian) + \beta_{17}(Info*SES) + \varepsilon_i$$

and

$$\begin{aligned}\text{P}rob(PositiveChange/NoChange) &= \beta_0 + \beta_1(Female) + \beta_2(Black) + \beta_3(Hispanic) + \\ &\beta_4(Asian) + \beta_5(Other) + \beta_6(SES) + \beta_7(HighInfoState) + \beta_8(GPA8) + \beta_9(Test8) + \\ &\beta_{10}(ParentsExpectHighSchool) + \beta_{11}(ParentsExpectVocational) + \\ &\beta_{12}(ParentsExpectSomeCollege) + \beta_{13}(ParentsExpectPostgraduate) + \\ &\beta_{14}(Info*Black) + \beta_{15}(Info*Hispanic) + \beta_{16}(Info*Asian) + \beta_{17}(Info*SES) + \varepsilon_i\end{aligned}$$

The models testing these same changes between 10th and 12th grade include changes indicated specifically in prior academic performance, measured during the tenth grade instead of the eighth grade:

$$\begin{aligned}\text{P}rob(NegativeChange/NoChange) &= \beta_0 + \beta_1(Female) + \beta_2(Black) + \beta_3(Hispanic) + \\ &\beta_4(Asian) + \beta_5(Other) + \beta_6(SES) + \beta_7(HighInfoState) + \beta_8(GPA10) + \beta_9(Test10) + \\ &\beta_{10}(ParentsExpectHighSchool) + \beta_{11}(ParentsExpectVocational) + \\ &\beta_{12}(ParentsExpectSomeCollege) + \beta_{13}(ParentsExpectPostgraduate) + \\ &\beta_{14}(Info*Black) + \beta_{15}(Info*Hispanic) + \beta_{16}(Info*Asian) + \beta_{17}(Info*SES) + \varepsilon_i\end{aligned}$$

and

$$\begin{aligned}\text{P}rob(PositiveChange/NoChange) &= \beta_0 + \beta_1(Female) + \beta_2(Black) + \beta_3(Hispanic) + \\ &\beta_4(Asian) + \beta_5(Other) + \beta_6(SES) + \beta_7(HighInfoState) + \beta_8(GPA10) + \beta_9(Test10) + \\ &\beta_{10}(ParentsExpectHighSchool) + \beta_{11}(ParentsExpectVocational) + \\ &\beta_{12}(ParentsExpectSomeCollege) + \beta_{13}(ParentsExpectPostgraduate) + \\ &\beta_{14}(Info*Black) + \beta_{15}(Info*Hispanic) + \beta_{16}(Info*Asian) + \beta_{17}(Info*SES) + \varepsilon_i\end{aligned}$$

Both of these models test the hypothesis that students who receive clear and adequate early college preparation information are more likely to maintain their original educational expectations while those who do not receive it early but receive it later on are more likely to revise their educational expectations to be commensurate with their better-formed understanding of their opportunities for postsecondary education. Furthermore, it is hypothesized that students who never receive quality college preparation information to inform their choice process are likely to maintain their original expectations as they

remain unaware of whether their expectations are appropriately attuned. Additionally, the models once again test to see whether college preparation information has a differential impact on the educational expectations of students from varying ethnic and socioeconomic backgrounds.

Change in Academic Performance

Each panel of change in academic performance is analyzed with the two transformed measures of educational expectations (dichotomous choices, and in continuous years), and therefore there are four analyses (two for 8^{th} to 10^{th} grade changes, and two for 10^{th} to 12^{th} grade) presented. The model-building for analyzing changes in academic performance follows the same pattern as for analyzing change in educational expectations. The first model for each analysis of a change in academic performance is an unconditional model, allowing for a baseline comparison to subsequent models. The second model includes individual background characteristics, which include gender, ethnicity (where White is the reference category), and socioeconomic status. The third model introduces the variable indicating students who lived in states with strong policies for providing college preparation information. The fourth model adds both student and parent educational expectations, first in the form of dichotomous choices (with "Graduate from College" as the reference category), and then expressed in years in alternate analyses. The fifth model introduces academic background variables, which includes eighth-grade GPA during the tenth grade panel, but adds to tenth grade GPA the measure for rigor of coursework when analyzing the 10^{th} to 12^{th} grade change in performance. The sixth and final model for all four analyses introduces the interaction of information with

key ethnic and socioeconomic background characteristics, testing once again if information has a differential influence on minority and lower SES students.

The model for changes in academic performance between 8th and 10th grade is:

$$AcademicPerformance10 = \beta_0 + \beta_1(Female) + \beta_2(Black) + \beta_3(Hispanic) + \beta_4(Asian) + \beta_5(Other) + \beta_6(SES) + \beta_7(HighInfoState) + \beta_8(ExpectsHighSchool) + \beta_9(ExpectsVocational) + \beta_{10}(ExpectsSomeCollege) + \beta_{11}(ExpectsPostgraduate) + \beta_{12}(ParentsExpectHighSchool) + \beta_{13}(ParentsExpectVocational) + \beta_{14}(ParentsExpectSomeCollege) + \beta_{15}(ParentsExpectPostgraduate) + \beta_{16}(GPA8) + \beta_{17}(Info * Black) + \beta_{18}(Info * Hispanic) + \beta_{19}(Info * Asian) + \beta_{20}(Info * SES) + \varepsilon_i$$

and for changes between 10th and 12th grade:

$$AcademicPerformance12 = \beta_0 + \beta_1(Female) + \beta_2(Black) + \beta_3(Hispanic) + \beta_4(Asian) + \beta_5(Other) + \beta_6(SES) + \beta_7(HighInfoState) + \beta_8(ExpectsHighSchool) + \beta_9(ExpectsVocational) + \beta_{10}(ExpectsSomeCollege) + \beta_{11}(ExpectsMasters) + \beta_{12}(ExpectsDoctorate) + \beta_{13}(ParentsExpectHighSchool) + \beta_{14}(ParentsExpectVocational) + \beta_{15}(ParentsExpectSomeCollege) + \beta_{16}(ParentsExpectPostgraduate) + \beta_{17}(GPA10) + \beta_{18}(Rigorous) + \beta_{19}(Rigorous/Vocational) + \beta_{20}(Academic/Vocational) + \beta_{21}(Vocational) + \beta_{22}(Info * Black) + \beta_{23}(Info * Hispanic) + \beta_{24}(Info * Asian) + \beta_{25}(Info * SES) + \varepsilon_i$$

The alternative models with expectations measured in terms of years merely exchanges the dichotomous variables for personal and parental expectations with a single variable for each group's expectations expressed in number of years of education expected, a continuous variable. This model tests hypotheses related to the models for changes in educational expectations. Students who receive early college preparation information at the beginning of the predisposition phase are likely to maintain or demonstrate positive growth in their academic performance between 8th and 10th grade in ways that are related to their expectations. Students who do not receive any clear college preparation information (particularly with reference to the academic requirements for

accessing college), or receive this information at the end of the predisposition and beginning of the search stage, are less likely to make gains in their academic performance.

Postsecondary Institutional Enrollment

Because the variable of analysis is once again a nominal choice between three categories, multinomial logit regression will once again be utilized for analysis. The decision for this variable to be measured as a choice between three distinct categories (non-enrollment, enrollment in a two-year institution, and enrollment in a four-year institution) is unique to the postsecondary choice literature. In earlier research, studies have typically treated the choice as dichotomous, with the comparison being between either enrollment versus non-enrollment, or four-year enrollment versus everything else. As the real-world choice to attend college seems to legitimately present all three options, this model treats the dependent variable as a test of the probability of choosing any category over the others conditioned on variables believed to have influence on the decision. As was the case for analyzing changes in academic performance, two analyses of postsecondary educational enrollment will be conducted using the alternative measures for educational expectations (dichotomous choices, and in continuous years). The model-building for analyzing enrollment follows the same pattern as for the other dependent variables, with two exceptions that will be noted.

The first model for each analysis of enrollment, once again, is an unconditional model, allowing for a baseline comparison to subsequent models. The second model adds individual background characteristics, which include gender, ethnicity (where White is

the reference category), and socioeconomic status. The third model includes two measures for the reception of information. These are measures that indicate the reception of early college preparation information and of "late" college preparation information in the form of financial aid. This late information variable is a standardized index measure for sources of financial aid information that students in the twelfth-grade survey said they received. Conceptually and theoretically these two variables are unique, as the first represents a source of information that comes because of specific and active state policy, while the latter is a measure for financial aid information that is not tied to policy. However, the measurement of these two variables may overlap, as students who lived in states with strong policies on disseminating information may have responded to the survey regarding financial aid information based on the kind of information that the state policy was helping to provide, which would diminish the explanatory value of the "early information" variable.

The fourth model adds both student and parent educational expectations, first in the form of a continuous variable of expected years of education, and then expressed alternately as dichotomous choices (with "Graduate from College" as the reference category). The fifth model includes academic background variables, which include twelfth grade GPA, the twelfth grade combined math/reading test, and the measure for rigor of coursework. The sixth model introduces the interactions between the two information variables and particular ethnicities and socioeconomic status, to see if either form of information has a differential influence on students from varying backgrounds. The seventh and final model includes economic-based state-level variables, including

measures for state unemployment, average state tuition, and average merit- and need-based aid awarded to students.

The final model will be structured in the following manner (with personal and parental educational expectations measured in years in this structure):

$$\begin{aligned}\text{P}rob(NoEnroll/Four-Year) &= \beta_0 + \beta_1(Female) + \beta_2(Black) + \beta_3(Hispanic) + \beta_4(Asian) + \\ &\beta_5(Other) + \beta_6(SES) + \beta_7(HighInfoState) + \beta_8(FinancialAidInfo) + \beta_9(ExpectYears12) + \\ &\beta_{10}(ParentsExpectYears12) + \beta_{11}(GPA12) + \beta_{12}(Test12) + \beta_{13}(RigorousAcademic) + \\ &\beta_{14}(Rigorous/Vocational) + \beta_{15}(Academic/Vocational) + \beta_{16}(Vocational) + \\ &\beta_{17}(Info*Black) + \beta_{18}(Info*Hispanic) + \beta_{19}(Info*Asian) + \beta_{20}(Info*SES) + \\ &\beta_{17}(FinInfo*Black) + \beta_{18}(FinInfo*Hispanic) + \beta_{19}(FinInfo*Asian) + \beta_{20}(FinInfo*SES) + \\ &\beta_{16}(Unemployment) + \beta_{17}(Tuition) + \beta_{18}(Need-basedAid) + \beta_{19}(Merit-basedAid) + \varepsilon_i\end{aligned}$$

and

$$\begin{aligned}\text{P}rob(Two-Year/Four-Year) &= \beta_0 + \beta_1(Female) + \beta_2(Black) + \beta_3(Hispanic) + \beta_4(Asian) + \\ &\beta_5(Other) + \beta_6(SES) + \beta_7(HighInfoState) + \beta_8(FinancialAidInfo) + \beta_9(ExpectYears12) + \\ &\beta_{10}(ParentsExpectYears12) + \beta_{11}(GPA12) + \beta_{12}(Test12) + \beta_{13}(RigorousAcademic) + \\ &\beta_{14}(Rigorous/Vocational) + \beta_{15}(Academic/Vocational) + \beta_{16}(Vocational) + \\ &\beta_{17}(Info*Black) + \beta_{18}(Info*Hispanic) + \beta_{19}(Info*Asian) + \beta_{20}(Info*SES) + \\ &\beta_{17}(FinInfo*Black) + \beta_{18}(FinInfo*Hispanic) + \beta_{19}(FinInfo*Asian) + \beta_{20}(FinInfo*SES) + \\ &\beta_{16}(Unemployment) + \beta_{17}(Tuition) + \beta_{18}(Need-basedAid) + \beta_{19}(Merit-basedAid) + \varepsilon_i\end{aligned}$$

This model allows for the hypotheses regarding a student's probability of enrollment in varying levels of postsecondary education, presented in the previous chapter, to be tested. The hypotheses suggest students who were privy to early college preparation information have a greater probability of postsecondary enrollment. Furthermore, it suggests that late college information should exert a similar effect, even as it may be converging on the same type of role early information is hypothesized to have. By this point in time expectations and academic performance are typically set, and

higher indications of expectations and performance are related to a higher probability of enrollment, particularly in four-year institutions. Hypotheses about the differential influence of information and ethnicity and SES are also tested. Finally, the impact of state-based economic predictors is tested. All of these tests are conditioned on background characteristics of the students, whose influence is also noted.

CHAPTER V

RESULTS AND DISCUSSION

Former research has often sought to explain the influence of either academic preparation or financial aid information on a student's postsecondary decision-making process. Typically these studies have focused on the "choice" stage of the Hossler and Gallagher (1987) model for college choice. Others have sought to specifically study the determinants that affect student expectations and how that impacts the postsecondary decision process (Hamrick & Stage, 2004; Hossler & Stage, 1992). This research seeks to gain a more holistic understanding of the college decision-making process by studying the influence of determinants on each stage of the college choice model (predisposition, search, and choice phases) while striving to understand the role that college preparatory information may have on the mediating influences of evolving educational expectations and academic performance, and ultimately on the probability of postsecondary enrollment. The previous chapter explicates the models and methods that aim to answer the research questions of this project. Those research questions are:

- Conditioned on students' personal and family background (including parental expectations) and prior academic performance, how does early college preparation information influence changes in students' educational expectations between 8^{th} and 10^{th} grade, and between 10^{th} and 12^{th} grade?

- Similarly conditioned, how does early college preparation information influence changes in students' academic performance between 8th and 10th grade, and between 10th and 12th grade?
- How does the reception of early and late college information affect a student's probability of enrolling in various levels of postsecondary education, conditioned on the student's personal and family background (including personal and parental expectations), academic performance and the economic environment where a student lives?

This chapter provides analysis and discussion of the results of models set forth to investigate these questions and to test the articulated hypotheses. The chapter first addresses analyses of shifts in educational expectations during the predisposition to search phase and the search to choice phase. Next, changes in academic performance in each of these phases are addressed. Finally, the chapter addresses the influence of information and other determinants on the probability of enrolling at varying levels of postsecondary institutions. Each section begins with a description and a discussion of the dependent variable between states with strong policies of college information contrasted against states that were not believed to possess such policies.

Change in Educational Expectations between Eighth- and Tenth-Grade

Prevailing research has considered a student's original educational expectation to be static. This research suggests that students are likely to revise their expectations if the original expectations were formed with little relevant information and subsequently they receive clearer information to reformulate those expectations. Cross tabulations of

student expectations between eighth grade and tenth grade (Table 8), and between tenth grade and twelfth grade (Table 9) bear this out. The diagonals of each table represent the percentage of students who maintained their original expectations in each category.

Analysis of expectations during the eight and tenth grade reveals that students with higher expectations (i.e., Bachelor's degree and postgraduate) are more likely to

Table 8. Cross-tabulation of Eighth Grade and Tenth Grade Expectations

	10th grade				
	High School	*< 2 yrs college*	*> 2 yrs college*	*Bachelor's*	*Postgraduate*
8th grade					
High School	38.6%	17.7%	28.6%	11.7%	3.5%
< 2 yrs college	10.8%	15.9%	47.7%	17.8%	7.7%
> 2 yrs college	9.7%	12.0%	41.5%	26.7%	10.0%
Bachelor's	3.3%	4.4%	20.1%	47.5%	24.8%
Postgraduate	2.1%	1.4%	9.3%	28.2%	59.1%

maintain those expectations than are students with lower expectations. Students most likely to adjust their original expectations were those who originally expected to attend less than two years of college. Most of these students (approximately 48%) revised their expectations one step upward to expectations of attending more than two years or college. Furthermore, nearly a quarter of the students who originally planned to achieve a Bachelor's degree in 8th grade revised their expectations towards postgraduate work at the tenth grade, while a reverse trend of nearly the same proportion took place for students in eighth grade who planned on postgraduate work but revised to an expectation of only a Bachelor's degree. Interestingly, a comparison of changes between tenth-grade

Table 9. Cross-tabulation of Tenth Grade and Twelfth Grade Expectations

	12th grade				
	High School	*< 2 yrs college*	*> 2 yrs college*	*Bachelor's*	*Postgraduate*
10th grade					
High School	32.0%	10.3%	38.7%	12.8%	6.1%
< 2 yrs college	13.8%	17.2%	45.0%	17.3%	6.9%
> 2 yrs college	5.9%	6.3%	46.2%	30.4%	11.1%
Bachelor's	1.8%	1.6%	15.3%	52.7%	28.6%
Postgraduate	0.7%	0.6%	5.9%	28.0%	64.7%

and twelfth-grade expectations presents a very similar picture, with minor adjustments to the percentages in each cell. Overall, these two tables indicate that, contrary to the assumptions of earlier research, student expectations are evolving throughout the course of the college choice process. This research now turns to analysis of what are believed to be predictors of this change.

Change in educational expectations, as mentioned in chapter four, is measured in two ways. First, student expectations are converted into expected years of education, with a range of twelve years being equal to high school graduation and nineteen years being equal to a postgraduate education. Secondly, the variable is recorded as a nominal shift in expectations, a choice of three potential outcomes: student revised their expectations downward, student maintained their expectation, and student revised their expectation upward. Inter-state comparisons of this shift in expectations between the predisposition and search stages are presented in Table 10. Comparisons reveal that non-High Information states actually have a higher percentage of students who maintain their expectations (46%) then High-Information states (43%). Among the four states that represent the latter category (highlighted), Minnesota is notable for its low percentage of student maintaining original expectations (33%), while revisions upward (35%) are

Table 10. Nominal Shift in Expectations between 8th and 10th grade by State

State	*Down*	*Same*	*Up*
Alaska	34%	44%	23%
Alabama	24%	41%	35%
Arkansas	15%	54%	31%
Arizona	24%	41%	35%
California	30%	45%	25%
Colorado	23%	56%	22%
Connecticut	21%	45%	34%
Delaware	37%	38%	25%
Florida	29%	43%	28%
Georgia	28%	46%	26%
Hawaii	35%	36%	29%
Iowa	24%	56%	20%
Idaho	27%	45%	28%
Illinois	28%	47%	24%
Indiana	29%	41%	30%
Kansas	27%	43%	29%
Kentucky	22%	44%	33%
Louisiana	22%	52%	26%
Massachusetts	22%	53%	26%
Maryland	27%	47%	26%
Maine	36%	42%	22%
Michigan	31%	44%	25%
Minnesota	32%	33%	35%
Missouri	26%	48%	27%
Mississippi	25%	52%	23%
Montana	29%	36%	34%
North Carolina	28%	46%	26%

Table 10 (cont.). Nominal Shift in Expectations between 8th and 10th grade by State

State	*Down*	*Same*	*Up*
North Dakota	23%	48%	28%
Nebraska	22%	54%	24%
New Hampshire	19%	56%	25%
New Jersey	21%	54%	25%
New Mexico	25%	44%	31%
Nevada	20%	36%	44%
New York	25%	49%	26%
Ohio	24%	42%	34%
Oklahoma	28%	42%	30%
Oregon	26%	52%	23%
Pennsylvania	24%	49%	27%
Rhode Island	36%	40%	24%
South Carolina	30%	45%	25%
South Dakota	18%	64%	18%
Tennessee	28%	43%	30%
Texas	24%	47%	29%
Utah	33%	34%	33%
Virginia	29%	47%	24%
Vermont	30%	43%	26%
Washington	25%	46%	29%
Wisconsin	26%	43%	30%
West Virginia	34%	40%	26%
Wyoming	28%	33%	39%
Non-High Information	26%	46%	28%
High Information	29%	43%	27%

Table 11. Change in Educational Expectations Between Eighth and Tenth Grade (measured in years)

Variables	**Model 1**		**Model 2**			**Model 3**			**Model 4**			**Model 5**			**Model 6**		
Intercept	0.00	*0.02*	-0.06	*0.03*		-0.05	*0.03*		0.13	*0.19*		-0.14	*0.29*		-0.15	*0.29*	
Demographics																	
Sex (Female=1)			0.13	*0.04*	***	0.13	*0.04*	***	0.13	*0.04*	***	0.11	*0.05*	*	0.11	*0.05*	*
Race (ref=White)																	
Black			-0.07	*0.08*		-0.07	*0.08*		-0.07	*0.08*		0.03	*0.08*		0.02	*0.08*	
Hispanic			0.03	*0.08*		0.04	*0.07*		0.05	*0.07*		0.11	*0.08*		0.11	*0.08*	
Asian			0.05	*0.08*		0.08	*0.08*		0.09	*0.08*		0.08	*0.08*		0.15	*0.09*	†
Other			0.09	*0.21*		0.09	*0.21*		0.10	*0.21*		0.18	*0.21*		0.17	*0.21*	
Socioeconomic Status			0.03	*0.03*		0.03	*0.03*		0.04	*0.03*		-0.01	*0.04*		-0.01	*0.04*	
High Information State						-0.11	*0.07*	†	-0.11	*0.07*	†	-0.11	*0.07*		-0.07	*0.08*	
Parents' Expectation									-0.01	*0.01*		-0.04	*0.01*	**	-0.04	*0.01*	**
8th Grade Test												0.01	*0.00*	***	0.01	*0.00*	***
8th Grade GPA												-0.05	*0.04*		-0.05	*0.04*	
Interactions																	
Info*Black															0.05	*0.29*	
Info*Hispanic															-0.05	*0.18*	
Info*Asian															-0.21	*0.19*	
Info*SES															-0.01	*0.09*	
Model Fit (F-statistic)																	
	F(0, 901) = 0		F(6, 895) = 2.07			F(7, 894) = 2.15			F(8, 893) = 1.93			F(10, 889) = 5.94			F(14, 887) = 4.41		
	R-squared = 0		R-squared = .0014			R-squared = .0018			R-squared = .0019			R-squared = .0059			R-squared = .0061		
	Prob>F= .		Prob>F= .0582			Prob>F= .0381			Prob>F= .0534			Prob>F= .0000			Prob>F= .0000		

Notes: ***p<.001, **p<.01, *p<.05, †p<.10

Each model presents the coefficient, standard error (italicized) and indication of significance

slightly higher then revisions downward (32%). All four of the high information states fall below the average of non-high information states in the category of students maintaining their original eighth grade expectations. This indicates the possibility that students living in a state with a strong policy for providing early college preparation information are less likely to maintain their original eighth grade expectations compared with students not living in those states, contrary to my hypothesis.

The result of the stepwise model-growth regression where change in eighth grade expectations is measured in terms of years is presented in Table 11. It illustrates that the final model reveals the greatest explanatory power with a slight increase in the R^2 between model 5 and model 6 and the F-test indicating likewise. However, none of the last set of interaction variables proves to be statistically significant. Of particular note, the information variable is marginally statistically significant ($p<.10$) in each model until prior academic performance (model 5) is introduced. The information variable follows suit with what the descriptive statistics indicate, namely that students who live in states where active information dissemination is policy are associated with a downward revision of initial educational expectations by 0.11 years. Descriptive statistics (Table 7) indicate that the change in 8^{th}–10^{th} grade expectations have a mean of zero years and a standard deviation of approximately two years. Thus the result of living in a state is minimal, approximately 0.05 standard deviations.

Indeed, all of the variables that prove to be statistically significant in the final model are not substantively significant, with the largest coefficient being 0.15 years. The results from model 6 also indicate that female students revise their expectations upward by 0.11 years compared to male students, Asian students elevate expectations by 0.15

years compared with White students, and parental expectations exert a very minimal (0.04) negative influence on revised expectations. Prior academic performance as measured by the 8th grade test is also statistically significant, and a student with a test score one standard deviation above the mean is likely to revise his educational expectation upward in the tenth grade by approximately 0.10 years. Finally, while the interaction variables are not statistically significant in model 6, the coefficient on the interaction of Asian students living in high information states is, comparatively, very high (0.21), and suggests the possibility that Asian students that live in these states are more likely to meaningfully revise their expectations downward compared with White students.

When the model for changed educational expectations between 8th and 10th grade is measured alternatively as either a shift downward or a shift upward against a comparison category of no change, some new findings result. This is likely due to the fact that the dependent variable is no longer a measure of the average shift in years expected, but rather a choice between whether a student's expectations were revised. In the comparison of revision downward compared to no change, the results indicate that the variable for High Information State was statistically significant and positive, indicating that students in these states were likely to revise their expectations downward compared to students outside of these states. Alternatively, when an upward revision in expectations is compared with maintaining original expectations, there was no statistically significant difference in any of the models.

When seeking to gauge simply whether student's expectations increased or decreased, gender still does not play a role; however, ethnicity does. Asian students were

Table 12. Change in Educational Expectations Between Eighth and Tenth Grade (measured against "No Change)

Variables	**Model 1**			**Model 2**			**Model 3**			**Model 4**			**Model 5**			**Model 6**		
Change Downward																		
Intercept	-0.57	*0.03*	***	-0.52	*0.04*	***	-0.55	*0.04*	***	-0.59	*0.05*	***	-0.02	*0.24*		-0.03	*0.24*	
Demographics																		
Sex (Female=1)				-0.12	*0.05*	*	-0.12	*0.05*	*	-0.11	*0.05*	*	-0.05	*0.05*		-0.05	*0.05*	
Race (ref=White)																		
Black				0.19	*0.09*	*	0.20	*0.09*	*	0.28	*0.09*	***	0.10	*0.09*		0.14	*0.10*	
Hispanic				0.05	*0.08*		0.03	*0.08*		0.10	*0.08*		0.00	*0.08*		0.03	*0.09*	
Asian				-0.41	*0.11*	***	-0.46	*0.11*	***	-0.35	*0.11*	***	-0.32	*0.11*	**	-0.44	*0.14*	**
Other				0.13	*0.25*		0.12	*0.26*		0.15	*0.26*		-0.02	*0.25*		-0.02	*0.25*	
Socioeconomic Status				-0.36	*0.04*	***	-0.36	*0.04*	***	-0.26	*0.04*	***	-0.17	*0.04*	***	-0.15	*0.05*	***
High Information State							0.19	*0.08*	*	0.18	*0.08*	*	0.16	*0.08*	*	0.16	*0.09*	†
Parents' Expectation																		
High School or less										0.16	*0.09*	†	-0.05	*0.10*		-0.05	*0.10*	
2-years or less										0.24	*0.11*	*	0.00	*0.11*		0.00	*0.11*	
2+ years										0.27	*0.07*	***	0.10	*0.08*		0.10	*0.08*	
Postgraduate										-0.34	*0.07*	***	-0.20	*0.07*	**	-0.20	*0.07*	**
8^{th} Grade Test													-0.02	*0.00*	***	-0.02	*0.00*	***
8^{th} Grade GPA													0.29	*0.04*	***	0.29	*0.04*	***
Interactions																		
Info*Black																-0.36	*0.32*	
Info*Hispanic																-0.11	*0.22*	
Info*Asian																0.28	*0.21*	
Info*SES																-0.06	*0.09*	
Model Fit (F-statistic)																		
	F(0, 900) = 0			F(12, 889) = 16.37			F(14, 887) = 14.41			F(22, 879) = 14.67			F(26, 875) = 16.97			F(34, 867) = 13.37		
	Prob>F= .			Prob>F= .0000			Prob>F= .0000			Prob>F= .0000			Prob>F= .0000			Prob>F= .0000		

Notes: ***p<.001, **p<.01, *p<.05, †p<.10
Each model presents the coefficient, standard error (italicized) and indication of significance. Reference category for Expectations is Bachelor's degree.

Table 12 (cont.). Change in Educational Expectations Between Eighth and Tenth Grade (measured against "No Change)

Variables	**Model 1**			**Model 2**			**Model 3**			**Model 4**			**Model 5**			**Model 6**		
Change Upward																		
Intercept	-0.62	*0.03*	***	-0.67	*0.04*	***	-0.68	*0.04*	***	-0.78	*0.05*	***	-1.15	*0.24*	***	-1.15	*0.24*	***
Demographics																		
Sex (Female=1)				0.04	*0.05*		0.04	*0.05*		0.06	*0.05*		0.09	*0.05*		0.09	*0.05*	†
Race (ref=White)																		
Black				0.13	*0.09*		0.13	*0.09*		0.22	*0.09*	*	0.17	*0.09*	†	0.19	*0.10*	
Hispanic				0.13	*0.08*	†	0.12	*0.08*		0.20	*0.08*	*	0.18	*0.08*	*	0.22	*0.09*	*
Asian				-0.23	*0.10*	*	-0.25	*0.10*	*	-0.13	*0.10*		-0.10	*0.10*		-0.12	*0.11*	
Other				0.31	*0.23*		0.30	*0.23*		0.34	*0.24*		0.28	*0.24*		0.28	*0.24*	
Socioeconomic Status				-0.33	*0.04*	***	-0.33	*0.04*	***	-0.21	*0.04*	***	-0.18	*0.04*	***	-0.17	*0.05*	***
High Information State							0.07	*0.08*		0.06	*0.08*		0.05	*0.08*		0.08	*0.10*	
Parents' Expectation																		
High School or less										0.26	*0.09*	**	0.16	*0.10*	†	0.16	*0.10*	†
2-years or less										0.49	*0.10*	***	0.38	*0.11*	***	0.39	*0.11*	***
2+ years										0.30	*0.08*	***	0.23	*0.08*	**	0.23	*0.08*	**
Postgraduate										-0.27	*0.08*	***	-0.22	*0.08*	**	-0.22	*0.08*	**
8th Grade Test													0.00	*0.00*		0.00	*0.00*	
8th Grade GPA													0.22	*0.05*	***	0.22	*0.05*	***
Interactions																		
Info*Black																-0.18	*0.34*	
Info*Hispanic																-0.18	*0.20*	
Info*Asian																0.04	*0.23*	
Info*SES																-0.11	*0.11*	
Model Fit (F-statistic)																		
	F(0, 900) = 0			F(12, 889) = 16.37			F(14, 887) = 14.41			F(22, 879) = 14.67			F(26, 875) = 16.97			F(34, 867) = 13.37		
	Prob>F= .			Prob>F= .0000			Prob>F= .0000			Prob>F= .0000			Prob>F= .0000			Prob>F= .0000		

Notes: ***p<.001, **p<.01, *p<.05, †p<.10
Each model presents the coefficient, standard error (italicized) and indication of significance. Reference category for Expectations is Bachelor's degree.

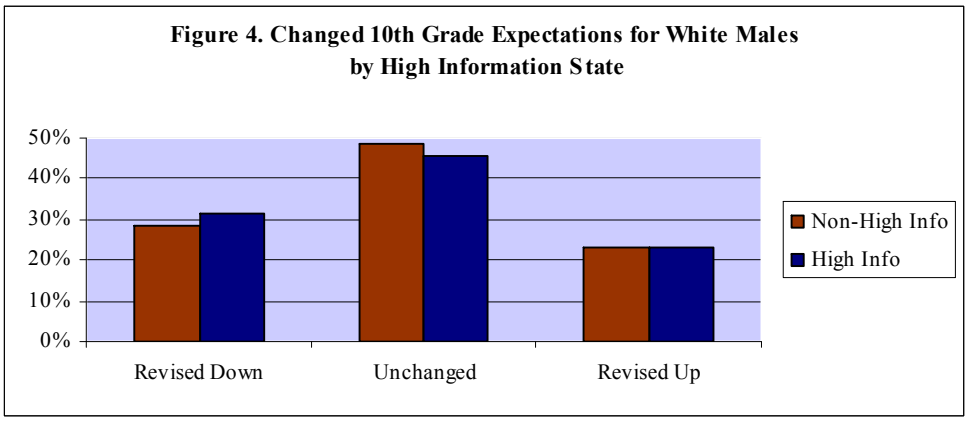
statistically significantly different than White students in their probability of revising their expectations downward with reference to simply maintaining their expectations (less likely to decrease expectations), while Hispanic students were different than White students with reference to revising their expectations upwards (more likely to increase expectations). No other ethnicity appeared to suggest differences in revising expectations when compared with non-minority students. Socioeconomic status and student GPA also proved to be a predictor in revisions of expectations in both directions, while the measure of prior performance of 8th grade test score only proved significant in students' negative living in a high-information state held a nearly 48.6% likelihood of maintaining his original expectation. As is noted in Table 13 and illustrated in Figure 4, students living in high-information states were slightly less likely (45.5%, a difference of 3%) to maintain their original expectations, shifting the probability of a negative revision of expectations up nearly 3%.

Table 13. Predicted Probability of Nominal Shift in 10th Grade Educational Expectations for White Males

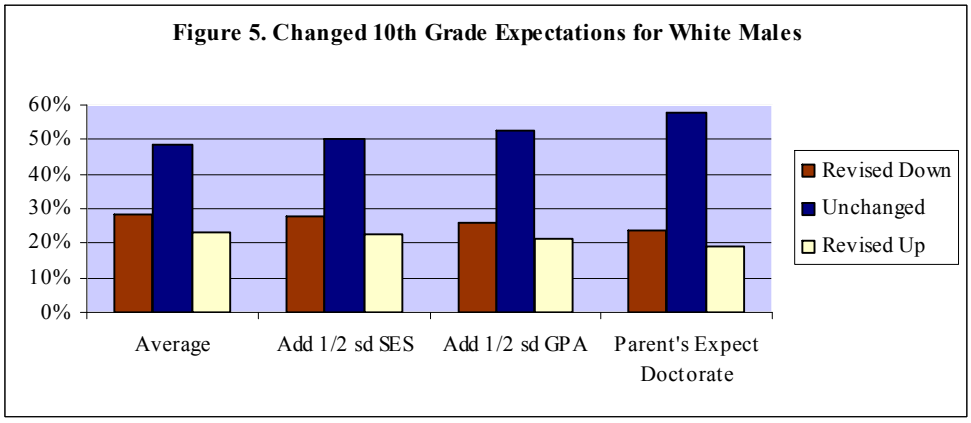
Nominal Choice	*Average student*	*High Info State*	*add 1/2 sd SES*	*add 1/2 sd GPA*	*Parent's Doctorate*
Revised down	28.47%	31.34%	27.70%	26.13%	23.51%
Unchanged	48.58%	45.49%	50.07%	52.40%	57.51%
Revised up	22.95%	23.18%	22.23%	21.47%	18.98%
Total	100%	100%	100%	100%	100%

Note: sd means "standard deviation". Each column following "High Info State" represents an addition to a student who did not live in a "High Info State," also known as an "average" student. For example, the third column represents an average student that had an SES ½ sd higher than the mean and whose GPA was ½ sd higher than the mean.

The pattern presented by Table 13 suggests that contrasting an average White male student with a student possessing greater advantages (such as a higher socioeconomic status, a higher eighth grade GPA, and having parent's with the highest



expectations), the probability of maintaining one's original expectations is moderately greater for the privileged student (57.5%) than the average student (48.6%). Figure 5 presents the difference in probability of revising and maintaining one's educational expectations by the end of the predisposition phase and the beginning of the search phase as additional positive attributes are hypothesized for a White male student. It is notable that the predictor carrying the largest impact is that of students whose parent's have above average expectations, revealing a 5% increase in the likelihood of maintaining



original expectations with approximately a 2.5% decrease in the probability of revising expectations downward or upward.

The average Hispanic male student (Table 14) has a slightly lower likelihood of maintaining his eighth-grade expectations (45.7%) than his non-minority counterpart

Table 14. Predicted Probability of Nominal Shift in 10th Grade Educational Expectations for Hispanic Males

Nominal Choice	*Average student*	*High Info State*	*add 1/2 sd SES*	*add 1/2 sd GPA*	*Parent's Doctorate*
Revised down	27.54%	30.27%	26.84%	25.37%	22.98%
Unchanged	45.68%	42.71%	47.17%	49.46%	54.64%
Revised up	26.79%	27.02%	25.99%	25.16%	22.38%
Total	100%	100%	100%	100%	100%

Note: sd means "standard deviation". Each column following "High Info State" represents an addition to a student who did not live in a "High Info State," also known as an "average" student. For example, the third column represents an average student that had an SES ½ sd higher than the mean and whose GPA was ½ sd higher than the mean.

(48.6%), a difference of nearly 3%. Furthermore, his probability of revising his expectations downward is approximately 1% lower than a White student's, indicating that a Hispanic student's likelihood of positively revising his expectations between eighth

Table 15. Predicted Probability of Nominal Shift in 10th Grade Educational Expectations for Asian Males

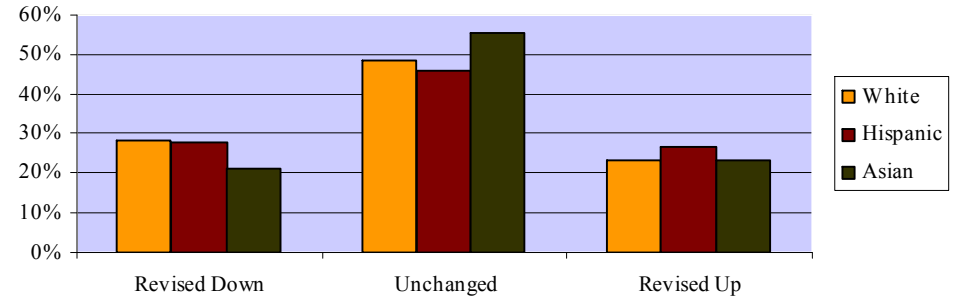
Nominal Choice	*Average student*	*High Info State*	*add 1/2 sd SES*	*add 1/2 sd GPA*	*Parent's Doctorate*
Revised down	21.06%	23.46%	20.40%	19.11%	16.96%
Unchanged	55.69%	52.78%	57.18%	59.39%	64.30%
Revised up	23.25%	23.76%	22.42%	21.50%	18.74%
Total	100%	100%	100%	100%	100%

Note: sd means "standard deviation". Each column following "High Info State" represents an addition to a student who did not live in a "High Info State," also known as an "average" student. For example, the third column represents an average student that had an SES ½ sd higher than the mean and whose GPA was ½ sd higher than the mean.

and tenth grades is higher (3.8%) than a White student's. Alternatively, Asian male students (Table 15) hold a much higher likelihood of maintaining their original expectations with approximately a 2.5% decrease in the probability of revising expectations downward or upward.

The average Hispanic male student (Table 14) has a slightly lower likelihood of maintaining his eighth grade expectations (45.7%) than his non-minority counterpart their probability of revising their expectations upward is also slightly higher (approximately 1% greater), revealing that the average Asian male student is much less likely to revise his expectations downward by the tenth grade (nearly 7.5% less) than the average White male student. The tables for a Hispanic male student and an Asian male student (Tables 14 and 15) both indicate the same trend of a higher likelihood of maintaining original expectations for students with comparative advantages to the average student within each ethnicity. A comparison of these three ethnicities across the options for revision of educational expectations between eighth and tenth grades is presented in Figure 6.

Figure 6. Changed 10th Grade Expectations by Ethnicity



My hypothesis suggested that students living in high-information states would have a greater probability of maintaining their original expectations. The foundation for this hypothesis was that students living in these states would have clear information early in the college choice process (by the eighth grade) about how to prepare for postsecondary opportunities. Such information would provide a strong foundation for initial educational expectations that are more likely to be maintained during the course of the choice process. The findings indicate, contrary to the hypothesis, that students living in states with strong college information policies were more likely to revise their expectations, and to revise them downward, then students not living in these environments.

One possible reason for this finding could be that the early college information was not received before the initial assessment of educational expectations. Thus, while the original expectations were ill-founded, their revised expectations in tenth-grade had a much stronger foundation. Therefore, their adjusted expectations in tenth grade would be more likely to be maintained through twelfth grade. This will be tested in the subsequent models analyzing changes in educational expectations between the search and choice stages. An alternative explanation may be that the type of information that was provided between eighth and tenth grade served to lower students' initial expectations. For example, a student develops an initial plan to attend a four-year college and get a bachelor's degree. However, the state provides information that indicates that a better route would be through the community college system, and therefore the student changes their expectation to be commensurate with that influence. A final possibility could be that students armed with better information early on have a clearer understanding of where

their academic performance and financial preparedness will lead them. This understanding may have been less clear initially, but with clear and consistent information, students may revise those, often artificially high, expectations because of a better sense of their postsecondary likelihoods.

Change in Educational Expectations between Tenth- and Twelfth-Grade

Change in educational expectations between tenth and twelfth grades are measured in the same manner as the eighth to tenth grade changes. First, student expectations are once again converted into expected years of education, with a range of twelve years still being equal to high school graduation but an alteration to the high end of the range, with twenty-one years now being equal to a doctoral education. Secondly, once again the variable is recorded as a nominal shift in expectations, a choice of three potential outcomes: student revised their expectations downward, student maintained their expectation, and student revised their expectation upward. Inter-state comparisons of this shift in expectations between the beginning of the search stage and then end of that stage and the beginning of the choice stage are presented in Table 16. Comparisons reveal that students living in states with policies disseminating college preparation information are essentially no different from states who do not hold such policies with regard to changed educational expectations between tenth and twelfth grades. This suggests that in regression-based analyses that students who reside in high-information states are not likely to not be statistically significantly different from students not living in those states.

Table 16. Nominal Shift in Expectations between 10th and 12th grade by State

State	*Down*	*Same*	*Up*
Alaska	22%	43%	36%
Alabama	22%	44%	33%
Arkansas	31%	41%	28%
Arizona	28%	42%	31%
California	25%	42%	33%
Colorado	15%	48%	37%
Connecticut	21%	49%	31%
Delaware	24%	30%	45%
Florida	22%	42%	36%
Georgia	29%	31%	39%
Hawaii	27%	32%	41%
Iowa	23%	46%	30%
Idaho	22%	37%	41%
Illinois	22%	48%	30%
Indiana	23%	48%	29%
Kansas	19%	51%	30%
Kentucky	28%	42%	30%
Louisiana	21%	42%	36%
Massachusetts	24%	42%	35%
Maryland	30%	46%	24%
Maine	35%	34%	31%
Michigan	24%	40%	36%
Minnesota	15%	55%	29%
Missouri	23%	43%	34%
Mississippi	26%	39%	35%
Montana	16%	55%	29%
North Carolina	24%	45%	31%

Table 16 (cont.). Nominal Shift in Expectations between 10th and 12th grade by State

State	*Down*	*Same*	*Up*
North Dakota	25%	52%	23%
Nebraska	15%	54%	30%
New Hampshire	18%	61%	21%
New Jersey	22%	52%	26%
New Mexico	30%	44%	26%
Nevada	24%	45%	31%
New York	22%	46%	31%
Ohio	23%	43%	35%
Oklahoma	25%	45%	30%
Oregon	25%	45%	30%
Pennsylvania	22%	47%	32%
Rhode Island	16%	41%	43%
South Carolina	23%	47%	30%
South Dakota	18%	73%	9%
Tennessee	20%	47%	34%
Texas	23%	41%	35%
Utah	25%	35%	40%
Virginia	23%	40%	37%
Vermont	33%	33%	34%
Washington	27%	39%	35%
Wisconsin	22%	47%	31%
West Virginia	31%	43%	26%
Wyoming	20%	37%	43%
Non-High Information	23%	44%	33%
High Information	24%	44%	32%

A closer examination, however, provides an underlying confirmation of the impact of policies for providing early college preparation information. Three of the four states that compose the "High-Information state" variable are above the average for students who maintained their tenth-grade expectations, with California the only exception. Oklahoma is only one percent above the average, but Indiana is 3% above the average (48%) and Minnesota is 11% above the average (55%). Indiana and Minnesota are even more notable because the percentages for students in their states who maintained their eighth-grade expectations when asked again during the tenth-grade were only 41% and 33%, respectively. That indicates a 7% increase in stability of tenth-grade expectations (compared with eighth-grade) in Indiana, and a 22% increase in stability of expectations for students in Minnesota. Analysis of specific state policies in place during the late 1980s and early 1990s, articulated in chapter four, indicate that Indiana and Minnesota had clear and strong policies that were well-funded in their efforts to provide college preparation information to students. Oklahoma fell outside of this window of time and, while California had some sense of a policy, there was little indication of specific policies in place similar to those of Minnesota and Indiana.

The stepwise model-growth regression indicating a revision of tenth grade expectations measured in terms of years is presented in Table 17. The results reveal that the final (sixth) model explains the greatest amount of variance. The variable indicating a comparison of students living in states with active policies for disseminating information for this final model, and in every stage of the model where the variable is included, is not statistically significant. However, the interaction variable for African-American students living in these states is statistically significant and is substantively large. Descriptive

Table 17. Change in Educational Expectations Between Tenth and Twelfth Grade (measured in years)

Variables	**Model 1**		**Model 2**			**Model 3**			**Model 4**			**Model 5**			**Model 6**		
Intercept	0.00	*0.02*	-0.06	*0.03*		-0.05	*0.03*		0.13	*0.19*		0.53	*0.28*		0.51	*0.28*	†
Demographics																	
Sex (Female=1)			0.13	*0.04*	***	0.13	*0.04*	***	0.13	*0.04*	***	-0.13	*0.05*	**	-0.13	*0.05*	**
Race (ref=White)																	
Black			-0.07	*0.08*		-0.07	*0.08*		-0.07	*0.08*		0.18	*0.08*	*	0.25	*0.09*	**
Hispanic			0.03	*0.08*		0.04	*0.07*		0.05	*0.07*		0.08	*0.08*		0.13	*0.10*	
Asian			0.05	*0.08*		0.08	*0.08*		0.09	*0.08*		0.17	*0.09*	†	0.07	*0.11*	
Other			0.09	*0.21*		0.09	*0.21*		0.10	*0.21*		0.08	*0.22*		0.08	*0.21*	
Socioeconomic Status			0.03	*0.03*		0.03	*0.03*		0.04	*0.03*		0.01	*0.04*		0.02	*0.04*	
High Information State						-0.11	*0.07*	†	-0.11	*0.07*	†	-0.03	*0.07*		0.03	*0.08*	
Parents' Expectation									-0.01	*0.01*		-0.05	*0.01*	***	-0.05	*0.01*	***
10^{th} Grade Test												0.00	*0.00*		0.00	*0.00*	
10^{th} Grade GPA												0.08	*0.02*	***	0.08	*0.02*	***
Interactions																	
Info*Black															-0.78	*0.31*	*
Info*Hispanic															-0.25	*0.19*	
Info*Asian															0.22	*0.22*	
Info*SES															-0.09	*0.10*	
Model Fit (F-statistic)																	
	F(0, 901) = 0		F(6, 895) = 3.47			F(7, 894) = 2.98			F(8, 893) = 4.98			F(10, 889) = 5.65			F(14, 887) = 4.78		
	R-squared = 0		R-squared = .0022			R-squared = .0022			R-squared = .0045			R-squared = .0062			R-squared = .0075		
	Prob>F= .		Prob>F= .0022			Prob>F= .0044			Prob>F= .0000			Prob>F= .0000			Prob>F= .0000		

Notes: ***p<.001, **p<.01, *p<.05, †p<.10

Each model presents the coefficient, standard error (italicized) and indication of significance

statistics (see Table 7) indicate that the mean change in expectations between 10th and 12th grade is 0.22 years with a standard deviation of 2.22 years. The coefficient on this interaction of African-American students living in high-information states is -0.78, indicating a large downward revision, approximately one-third standard deviation, of tenth grade expectations for these students.

Other variables of significance in the final model include the background characteristics of gender and African-American ethnicity. Female students are likely to revise their 10th grade expectations modestly downward by -0.13 years, while African-American students are likely to revise their expectations upwards by one-fourth of a year in comparison with White students. Thus, the average African-American student is likely to revise tenth-grade expectations upwards by 0.25 years, but those students in high-information states are predicted to revise their expectations downward by a little more than three-quarters of a year, indicating a net downward revision of expectations for African-American students in these states of a little more than one-half year. Other variables of interest reveal that parental expectations yield a small negative influence (-0.05 years) on a change in tenth-grade expectations, while prior academic performance measured by GPA suggests a small positive influence (0.08 years) for each half-jump in GPA (e.g. Bs versus As and Bs).

When the model for changed educational expectations between 10th and 12th grade (Table 18) is measured as either a shift downward or a shift upward against a comparison category of no change the results still indicate that the variable for High Information State is never statistically significant among any of the models or comparisons. However, once again the final model indicates significance for the interaction of African-American

Table 18. Change in Educational Expectations Between Tenth and Twelfth Grade (measured against "No Change)

Variables	**Model 1**			**Model 2**			**Model 3**			**Model 4**			**Model 5**			**Model 6**		
Change Downward																		
Intercept	-0.65	*0.03*	***	-0.75	*0.04*	***	-0.75	*0.05*	***	-0.75	*0.05*	***	-0.35	*0.27*		-0.36	*0.27*	
Demographics																		
Sex (Female=1)				0.12	*0.05*	*	0.12	*0.05*	*	0.12	*0.05*	*	0.13	*0.05*	*	0.13	*0.06*	*
Race (ref=White)																		
Black				0.12	*0.10*		0.12	*0.10*		0.11	*0.10*		0.05	*0.10*		0.05	*0.11*	
Hispanic				0.10	*0.09*		0.10	*0.09*		0.08	*0.09*		0.05	*0.09*		0.10	*0.10*	
Asian				-0.07	*0.11*		-0.08	*0.11*		-0.09	*0.11*		-0.08	*0.11*		-0.15	*0.13*	
Other				0.45	*0.28*	†	0.45	*0.28*		0.45	*0.27*		0.39	*0.28*		0.39	*0.28*	
Socioeconomic Status				-0.18	*0.04*	***	-0.17	*0.04*	***	-0.19	*0.04*	***	-0.16	*0.05*	***	-0.16	*0.05*	***
High Information State							0.01	*0.08*		0.01	*0.08*		0.01	*0.08*		0.02	*0.11*	
Parents' Expectation																		
High School or less										-0.15	*0.11*		-0.22	*0.11*	*	-0.21	*0.11*	*
2-years or less										-0.17	*0.11*		-0.24	*0.12*	*	-0.24	*0.12*	*
2+ years										0.11	*0.08*		0.06	*0.08*		0.06	*0.08*	
Postgraduate										0.06	*0.07*		0.10	*0.07*		0.10	*0.07*	
10^{th} Grade Test													-0.01	*0.00*	*	-0.01	*0.00*	*
10^{th} Grade GPA													0.03	*0.02*		0.03	*0.02*	
Interactions																		
Info*Black																0.00	*0.37*	
Info*Hispanic																-0.19	*0.20*	
Info*Asian																0.20	*0.23*	
Info*SES																0.03	*0.11*	
Model Fit (F-statistic)																		
	F(0, 900) = 0			F(12, 889) = 8.05			F(14, 887) = 7.00			F(22, 879) = 5.81			F(26, 875) = 6.79			F(34, 867) = 5.45		
	Prob>F= .			Prob>F= .0000			Prob>F= .0000			Prob>F= .0000			Prob>F= .0000			Prob>F= .0000		

Notes: ***p<.001, **p<.01, *p<.05, †p<.10
Each model presents the coefficient, standard error (italicized) and indication of significance. Reference category for Expectations is Bachelor's degree.

Table 18 (cont.). Change in Educational Expectations Between Tenth and Twelfth Grade (measured against "No Change)

Variables	Model 1			Model 2			Model 3			Model 4			Model 5			Model 6		
Change Upward																		
Intercept	-0.32	*0.03*	***	-0.37	*0.04*	***	-0.36	*0.04*	***	-0.38	*0.05*	***	-0.57	*0.23*	*	-0.59	*0.23*	*
Demographics																		
Sex (Female=1)				-0.04	*0.05*		-0.04	*0.05*		-0.03	*0.05*		0.00	*0.05*		0.00	*0.05*	
Race (ref=White)																		
Black				0.30	*0.08*	***	0.30	*0.08*	***	0.33	*0.08*	***	0.28	*0.08*	***	0.33	*0.09*	***
Hispanic				0.15	*0.08*	†	0.16	*0.08*	†	0.19	*0.09*	*	0.17	*0.09*	*	0.23	*0.10*	*
Asian				0.02	*0.10*		0.03	*0.11*		0.09	*0.11*		0.14	*0.11*		0.02	*0.13*	
Other				0.55	*0.24*	*	0.56	*0.24*	*	0.57	*0.24*	*	0.51	*0.24*	*	0.51	*0.24*	*
Socioeconomic Status				-0.22	*0.04*	***	-0.22	*0.04*	***	-0.17	*0.04*	***	-0.14	*0.04*	***	-0.13	*0.04*	**
High Information State							-0.08	*0.08*		-0.08	*0.08*		-0.09	*0.08*		-0.07	*0.09*	
Parents' Expectation																		
High School or less										0.12	*0.08*		0.03	*0.09*		0.03	*0.09*	
2-years or less										-0.01	*0.10*		-0.10	*0.10*		-0.10	*0.10*	
2+ years										0.15	*0.07*	*	0.08	*0.07*		0.08	*0.07*	
Postgraduate										-0.18	*0.07*	**	-0.13	*0.07*	†	-0.13	*0.07*	†
10^{th} Grade Test													0.00	*0.00*		0.00	*0.00*	
10^{th} Grade GPA													0.11	*0.02*	***	0.12	*0.02*	***
Interactions																		
Info*Black																-0.61	*0.34*	†
Info*Hispanic																-0.24	*0.20*	
Info*Asian																0.32	*0.23*	
Info*SES																-0.05	*0.11*	
Model Fit (F-statistic)																		
	F(0, 900) = 0			F(12, 889) = 8.05			F(14, 887) = 7.00			F(22, 879) = 5.81			F(26, 875) = 6.79			F(34, 867) = 5.45		
	Prob>F= .			Prob>F= .0000			Prob>F= .0000			Prob>F= .0000			Prob>F= .0000			Prob>F= .0000		

Notes: ***p<.001, **p<.01, *p<.05, †p<.10
Each model presents the coefficient, standard error (italicized) and indication of significance. Reference category for Expectations is Bachelor's degree.

students living in these states, but only in the comparison of upward revision of expectations compared with no change. The coefficient is negative, which suggests that African-American students in these states are more likely to maintain their original expectations then revise them upwards. This reveals the importance of running alternative analyses, as the analysis of changed expectations measured in years indicated a downward revision among this group of students, while the analysis of a nominal shift in expectations among these students suggests that their Alternatively, when an upward revision in expectations is compared with maintaining original expectations, there was no statistically significant difference in any of the models.

In this model a nominal shift of expectations between tenth and twelfth grade, several background characteristics appear to have an influence. Gender is significant for a downward shift in expectations, while the ethnicities of African-Americans, Hispanics and Asians are all significant for upward revisions in expectations. Socioeconomic status is significant in both categories (revise down and revise up) of comparison. Lower parental expectations of less than two years of college or lower are significant for the comparison of negatively revised expectations, but indicate that students of these parents are more likely to maintain their tenth-grade expectations compared to students whose parents expect a bachelor's degree. Parent's with postgraduate expectations for their students is borderline significant ($p<.10$) for an upward revision of expectations, but suggests that students of these parents are more likely to maintain their 10^{th} grade expectations. Finally, the academic variable of a measure for prior performance gauged by the tenth grade test, suggests that students with higher scores are more likely to maintain their original expectations compared with students at the average for test scores. Students with higher academic performance measured by tenth grade

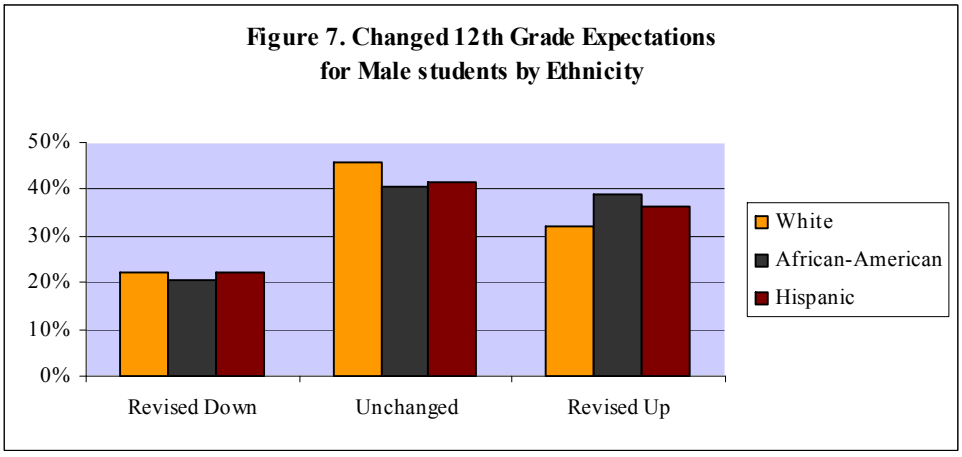
GPA are more likely to revise their expectations upwards then to maintain them compared with students with the average GPA in the sample.

Once again, as the coefficients in a multinomial logit regression model are of themselves not easily interpreted, the results are presented in predictive probability tables constructed analyzing hypothetical students conditioned on variables that prove to be statistically significant. Because the background characteristic of several ethnicities was statistically significant, Table 19 compares the predicted probabilities of a shift in tenth

Table 19. Predicted Probability of Nominal Shift in 12th Grade Educational Expectations among Males by Ethnicity

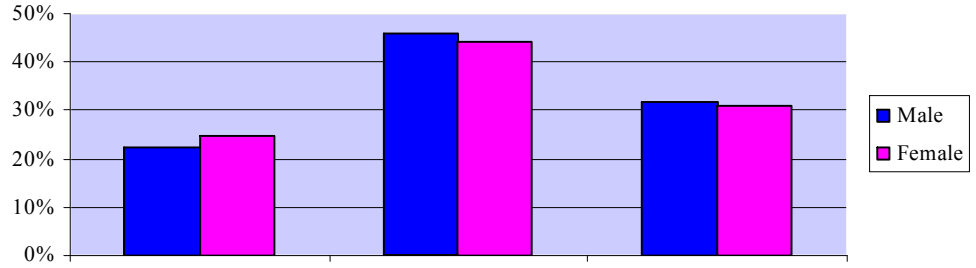
Nominal Choice	*White*	*African-American*	*Hispanic*
Revised down	22.35%	20.65%	22.32%
Unchanged	45.77%	40.39%	41.41%
Revised up	31.88%	38.96%	36.27%
Total	100%	100%	100%

to twelfth grade expectations by ethnicity for the average White, African-American, and Hispanic male students. A bar chart (Figure 7) reveals that African-American and Hispanic



probability of raising those expectations in comparison to the average White male students have a lower probability of maintaining their tenth grade expectations and higher student. The probability of revising twelfth grade expectations downward is relatively equal across with revisions upward but not with revisions downward, and should indicate that any difference in the likelihood of revising expectations downward were not statistically significantly different between White students and other ethnicities. Furthermore, as is noted earlier, gender is statistically significant for downward revision and indicates that female ethnicity. This is consistent with the results found in Table 18 where ethnicity was significant students are more likely than male students to negatively revise their educational expectations between tenth and twelfth grade. An illustration of this difference among average White students is indicated in Figure 8, and reveals that the average White female student has a 24.6% probability of revising downward compared to a 22.4% probability for her male counterpart. This is relatively small difference, but does indicate that compared to their male counterparts, female students are more likely to revise their expectations downwards.

Figure 8. Changed 12th Grade Expectations for Average White student by Gender



Similar to the predicted probability table indicating a hypothetical student with additional socioeconomic and academic advantages compared to the average student, Table 20 indicates the changing probabilities for a White male student who possesses additional advantages over the average White male student among variables that were indicated to be statistically significant for a upward revision in twelfth grade educational expectations.[18] The column indicating "High Info State" was not statistically significant and any difference between students living in these states and not living in these states should be approached with caution. As is noted in the table, with additional advantages in terms of

Table 20. Predicted Probability of Nominal Shift in 12th Grade Educational Expectations for White Males

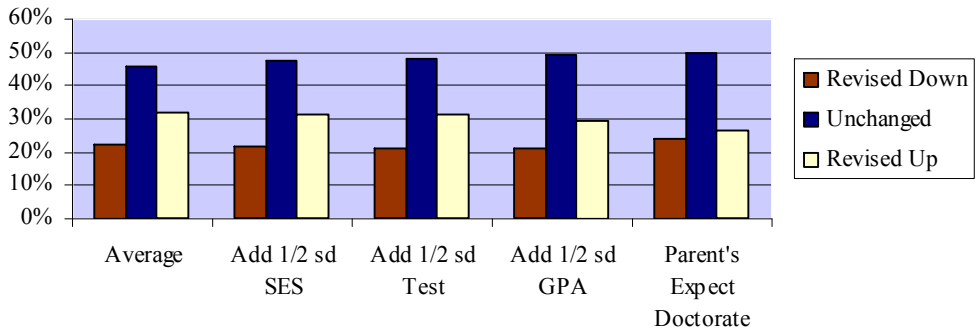
Nominal Choice	*Average student*	*High Info State*	*add 1/2 sd SES*	*add 1/2 sd Test*	*add 1/2 sd GPA*	*Parent's Doctorate*
Revised down	22.35%	23.15%	21.63%	21.01%	21.22%	23.81%
Unchanged	45.77%	46.59%	47.11%	47.75%	49.12%	49.79%
Revised up	31.88%	30.26%	31.26%	31.23%	29.66%	26.40%
Total	100%	100%	100%	100%	100%	100%

Note: sd means "standard deviation". Each column following "High Info State" represents an addition to a student who did not live in a "High Info State," also known as an "average" student. For example, the third column represents an average student that had an SES ½ sd higher than the mean and whose GPA was ½ sd higher than the mean.

socioeconomic status and academic performance and with parents who have high expectations, this hypothetical student is slightly more likely (49.8%, approximately 4%) to maintain his tenth-grade expectations than the average White male student. A graph (Figure 9) indicates the small increases in the probability of maintaining original expectations with each additional hypothesized advantage over the average White male student.

[18] See Appendix B for predicted probability tables (Tables 34–37) and charts (Figures 15–18) for changed twelfth-grade expectations for White female students, for African-American female students, and for male and female Hispanic students.

Figure 9. Changed 12th Grade Expectations for White Males



One finding that stands out from the analyses of a nominal shift in twelfth grade expectations is that for African-American students living in states with strong college preparation information policies. Table 18 indicates that the interaction of African-American students living in these states was borderline statistically significant ($p<.10$) and that these students are more likely to maintain their educational expectations then revise them upward, compared with African-American students not living in these states. The predicted probability table for African-American male students (Table 21) is commensurate with Table

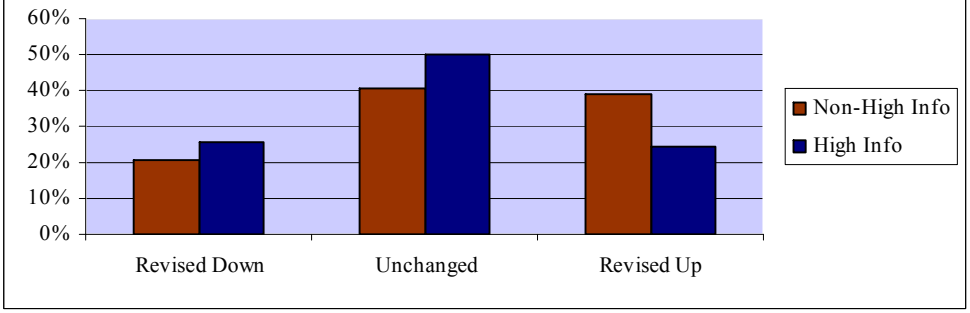
Table 21. Predicted Probability of Nominal Shift in 12th Grade Educational Expectations for African-American Males

Nominal Choice	*Average student*	*High Info State**	*add 1/2 sd SES*	*add 1/2 sd Test*	*add 1/2 sd GPA*	*Parent's Doctorate*
Revised down	20.65%	25.81%	20.04%	19.47%	19.76%	22.40%
Unchanged	40.39%	49.75%	41.67%	42.25%	43.69%	44.74%
Revised up	38.96%	24.44%	38.29%	38.28%	36.55%	32.86%
Total	100%	100%	100%	100%	100%	100%

Note: sd means "standard deviation". High-Info State" represents the interaction of being African-American in a High-Info State. Each column following "High Info State" represents an addition to a student who did not live in a "High Info State," also known as an "average" student. For example, the third column represents an average student that had an SES ½ sd higher than the mean and whose GPA was ½ sd higher than the mean.

20 for White students except for the fact that the "High Info State" variable is significant for a comparison between unchanged expectations and expectations revised upward. The likelihood for an African-American living in a high-information state is nearly 50% compared to approximately 40.4% of those not living in these states, nearly a 10% increase in probability. Most of this increase is associated with a decrease in the likelihood of revising tenth grade expectations upwards. The average African-American male student not living in a high-information state holds a 39% probability of positively revising his tenth grade educational expectations, while his counterpart living in a high-information state had only a 24.4% chance of an upward revision of expectations, a difference of over 15%. The figure below (Figure 10) illustrates this considerable difference. While the findings for other

Figure 10. Changed 12th Grade Expectations for African-American Males by High Information State



ethnicities in high-information states are not statistically significant, they indicate the possibility that these state policies for college preparation information may have a differential effect on non-minority students, such as is seen among African-American students.

The results indicating that African-American students in high-information states are more likely to maintain their tenth grade expectations by the beginning of the choice phase

seems to validate the hypothesis of how information affects changing expectations. The hypothesis stated that students living in states that provided clear and adequate college preparation information at the beginning of the search phase (tenth grade) or earlier, would be more likely to maintain their expectations then revise them. That the difference in predicted probability for revised expectations among African-American students was seen greatest in a difference between students with information maintaining their expectations, and students not in these high-information states revising their expectations upward, may suggest that those revising their expectations positively are doing so with little justifiable foundation, while those with information are maintaining well-founded (tenth grade) expectations.

However, because the information variable was never significant throughout the process of model-building in either measure of change in educational expectations between tenth and twelfth grade (measured in years or as a nominal shift), this suggests caution for a positive interpretation of the hypothesis. While their appears a possibility that states with policies for early college preparation information have a differential influence on different groups of students compared with White students, this sample did not indicate a statistically significant difference. The results did indicate that student background characteristics, including race, gender and socioeconomic status, as well as prior academic achievement and parental expectations, do influence a change in student educational expectations between the beginning of the search phase and the end of that phase and the beginning of the choice phase.

Change in Eighth to Tenth Grade Academic Performance

As was indicated in the prior chapter on methods and analyses, the outcome for change in academic performance between eighth and tenth grade is a measure of the difference between the combined math/reading test given to eighth graders and the combined math/reading test given to tenth graders. The tenth grade tests were adjusted in their difficulty according to how students performed on their eighth grade tests. For example, if a student had a high performance on her eighth grade test, her tenth grade test was gauged at a difficulty-level that reflected her eighth grade performance. This was done in order to measure academic growth between eighth and tenth grade and also to prevent "floor" and "ceiling" effects. A comparison of change in academic growth (measured in change in quintiles) across states is illustrated in Table 22. The table also reveals how students' performance in states with strong information policies compared with students not living in those states. The table indicates how the original quintiles of academic performance (all originally equal proportions of 20%) changed in their performance. For example, analysis of the state of Minnesota indicates that a change in academic performance in that state reveals small shifts toward the lowest and highest quintiles and away from the second and third quartiles. Comparison of the aggregate change in performance students living in high-information states and students not in those states suggests that there is little difference between these states, with the lowest and highest quintiles in high-information states slightly growing (by 1% and 2%, respectively).

As mentioned earlier, this dependent variable (and its twelfth grade equivalent) is run with alternative measurements for the student and parent educational expectations variables. In both cases, the fully-specified models resulted in the most explanatory and best fit models,

Table 22. Change in Academic Performance between 8th and 10th grade by State (quintiles)

State	*Low*				*High*
Alaska	17%	33%	11%	19%	19%
Alabama	17%	23%	24%	17%	20%
Arkansas	20%	19%	23%	21%	17%
Arizona	16%	22%	20%	31%	11%
California	21%	20%	19%	18%	22%
Colorado	25%	22%	20%	13%	20%
Connecticut	19%	24%	16%	22%	18%
Delaware	12%	20%	10%	19%	39%
Florida	19%	20%	22%	17%	21%
Georgia	13%	19%	19%	21%	28%
Hawaii	12%	21%	25%	23%	19%
Iowa	20%	24%	14%	23%	19%
Idaho	14%	17%	24%	22%	22%
Illinois	22%	22%	19%	19%	19%
Indiana	20%	22%	22%	20%	17%
Kansas	25%	18%	21%	18%	18%
Kentucky	20%	21%	22%	17%	20%
Louisiana	16%	23%	24%	19%	17%
Massachusetts	23%	18%	23%	18%	17%
Maryland	13%	20%	24%	18%	24%
Maine	30%	8%	12%	26%	23%
Michigan	25%	16%	15%	26%	17%
Minnesota	25%	16%	17%	19%	23%
Missouri	18%	23%	14%	29%	16%
Mississippi	15%	13%	28%	28%	16%
Montana	16%	28%	18%	20%	19%
North Carolina	19%	23%	18%	17%	22%

Table 22 (cont.). Change in Academic Performance between 8th and 10th grade by State (quintiles)

State	*Low*				*High*
North Dakota	21%	15%	29%	23%	12%
Nebraska	10%	22%	22%	27%	19%
New Hampshire	44%	19%	0%	13%	25%
New Jersey	21%	24%	23%	16%	17%
New Mexico	13%	16%	25%	23%	23%
Nevada	27%	18%	13%	24%	18%
New York	18%	21%	20%	20%	20%
Ohio	21%	21%	20%	18%	21%
Oklahoma	20%	15%	17%	25%	24%
Oregon	21%	18%	18%	18%	25%
Pennsylvania	26%	18%	18%	19%	19%
Rhode Island	7%	25%	25%	9%	34%
South Carolina	18%	17%	22%	20%	23%
South Dakota	18%	9%	27%	27%	18%
Tennessee	19%	21%	24%	18%	17%
Texas	18%	19%	22%	20%	21%
Utah	12%	21%	25%	21%	21%
Virginia	18%	20%	23%	19%	20%
Vermont	12%	15%	21%	21%	31%
Washington	21%	17%	17%	25%	19%
Wisconsin	23%	20%	18%	19%	20%
West Virginia	17%	30%	30%	11%	11%
Wyoming	39%	11%	19%	11%	20%
Non-High Information	20%	20%	20%	20%	20%
High Information	21%	20%	19%	19%	22%

Table 23. Change in Academic Performance Between Eighth and Tenth Grade

Variables	Model 1			Model 2			Model 3			Model 4			Model 5			Model 6		
Intercept	-0.24	*0.06*	***	-0.25	*0.10*	*	-0.24	*0.10*	*	0.08	*0.12*		-0.09	*0.19*		-0.10	*0.19*	
Demographics																		
Sex (Female=1)				-0.21	*0.11*	*	-0.21	*0.11*	*	-0.23	*0.11*	*	-0.22	*0.11*	*	-0.22	*0.11*	*
Race (ref=White)																		
Black				0.14	*0.19*		0.14	*0.19*		0.13	*0.19*		0.11	*0.19*		0.07	*0.20*	
Hispanic				0.35	*0.18*	*	0.36	*0.18*	*	0.36	*0.18*	*	0.36	*0.18*	*	0.47	*0.19*	*
Asian				0.60	*0.21*	**	0.62	*0.21*	**	0.63	*0.21*	**	0.64	*0.21*	**	0.63	*0.24*	**
Other				0.03	*0.43*		0.03	*0.43*		0.10	*0.42*		0.08	*0.42*		0.07	*0.42*	
Socioeconomic Status				-0.16	*0.07*	*	-0.16	*0.07*	*	-0.28	*0.08*	***	-0.27	*0.08*	***	-0.30	*0.09*	***
High Information State							-0.06	*0.19*		-0.07	*0.19*		-0.08	*0.19*		0.00	*0.24*	
Student's Expectation																		
High School or less										-0.46	*0.23*	*	-0.50	*0.23*	*	-0.51	*0.23*	*
2-years or less										-0.14	*0.20*		-0.16	*0.20*		-0.16	*0.21*	
2+ years										-0.42	*0.16*	**	-0.44	*0.16*	**	-0.44	*0.16*	**
Postgraduate										-0.27	*0.14*	*	-0.26	*0.14*	†	-0.26	*0.14*	†
Parents' Expectation																		
High School or less										-0.78	*0.20*	***	-0.81	*0.20*	***	-0.80	*0.20*	***
2-years or less										-0.29	*0.22*		-0.31	*0.22*		-0.32	*0.22*	
2+ years										-0.10	*0.15*		-0.12	*0.16*		-0.13	*0.15*	
Postgraduate										-0.11	*0.15*		-0.10	*0.15*		-0.09	*0.15*	
GPA 6^{th}-8^{th} Grades													0.09	*0.08*		0.09	*0.08*	
Interactions																		
Info*Black																0.52	*0.84*	
Info*Hispanic																-0.46	*0.50*	
Info*Asian																-0.01	*0.50*	
Info*SES																0.16	*0.25*	
Model Fit (F-statistic)																		
	F(0, 901) = 0 R-squared = 0 Prob>F= .			F(6, 895) = 3.47 R-squared = .0028 Prob>F= .0017			F(7, 894) = 3.31 R-squared = .0029 Prob>F= .0024			F(15, 886) = 4.58 R-squared = .0073 Prob>F= .0000			F(16, 885) = 4.42 R-squared = .0074 Prob>F= .0000			F(20, 881) = 3.82 R-squared = .0079 Prob>F= .0000		

Notes: ***p<.001, **p<.01, *p<.05, †p<.10
Each model presents the coefficient, standard error (italicized) and indication of significance. Reference category for Expectations is Bachelor's degree.

and they shared the same variables of statistical significance, at approximately the same values. However, in the model with educational expectations measured in years, neither the student nor the parent's expectations were statistically significant (see Appendix B), while the dichotomized version of expectations indicates several categories of expectations as being statistically significant (Table 23). As this result seems intuitively appropriate, and because the possibility of coding expectations continuously may have led to no significance, this analysis will deal solely with the model with dichotomous measures for expectations[19].

As a consequence of the test being designed to measure growth, the average change in academic performance between eighth and tenth grade on these tests is -0.240 points with a standard deviation of 4.715 points. The results from the regression analysis substantiate the inference that students from high-information states are not statistically significantly different from students in non-high-information states with regard to changes in academic performance. None of the models indicate significance, and the final model does not indicate any significance among different ethnicities and socioeconomic strata with regard to receiving early college preparation information on the outcome.

Background characteristics of gender, ethnicity (Hispanic and Asian/Pacific Islanders), and socioeconomic status were all statistically significant predictors in the model. Female students, on average have approximately a -0.22 change in their academic performance from eighth to tenth grade compared with their male counterparts, while Hispanic (0.47) and Asian/Pacific Islander (0.63) students have gains in their academic performance compared to White students, approximately 0.10 and 0.15 of standard deviations above the mean, respectively. Socioeconomic status, on the other hand, reveals a result that is not intuitive. The model predicts that a one unit increase in socioeconomic status

[19] See Appendix B for the table of models with expectations coded in years, Table 38.

(approximately 1.4 standard deviations from the mean), indicates a -0.30 negative growth in academic performance between eighth- and tenth-grade.

Three categories of student expectations are significantly different for changes in 8th to 10th grade academic performance, compared to the comparison category of student's who expect to attain a bachelor's degree. Students who expect to only graduate from high school or less are expected to have a negative growth of -0.51 points. Those who expect to attain 2+ years of college, but not obtain a bachelor's degree have an average negative growth of -0.44 points, and those who expect postgraduate work have a downward change in performance of -0.26 points. While it appears surprising that there is negative growth associated with students who have the highest expectations, that loss is comparatively much lower than the other two categories. The only category for parental expectations that is significant is for parents who have the lowest expectations for their child, expecting only high school completion or less. Students with these parents perform -0.80 points lower than students who have parents that expect them to obtain a bachelor's degree. The sole academic predictor in the model, GPA, was not found to be statistically significant. Thus, a hypothetical student who is a White female and who has low educational expectations for herself along with her parents would expect to see a net change in academic performance of -1.53 points, or about a third of a standard deviation below the mean.

The hypothesis suggested for a change in academic performance is complex and relies on a student's educational expectations and whether those expectations are well-founded. The largest influencers on changes in academic performance are related to educational expectations, but the variable which serves as a proxy for information was not statistically significant. While these analyses reveal small overall losses, it is worthwhile to

note the influential predictors for change in academic performance. However, very little of the overall variance is explained by the most explanatory model (R^2=.0079), suggesting that there are likely other predictors not included in these models which may more fully explain changes in academic performance between the predisposition and search phase of the college choice process.

Change in Tenth to Twelfth Grade Academic Performance

A comparison of change in academic growth between tenth and twelfth grades across states is illustrated in Table 24. The table also reveals how students' performance in states with strong information policies compared with students not living in those states. The table indicates how the original quintiles of academic performance in tenth grade (all originally equal proportions of 20%) changed in their twelfth-grade performance. While individual states among those that had strong policies for disseminating college preparation information (highlighted states of California, Indiana, Minnesota, and Oklahoma) show considerable variation, in the aggregate these states are very similar to the aggregate of states that are not considered to have strong policies on providing college preparation information. This suggests, similar to the analysis of changes in academic performance between eighth and tenth grade, that there is little difference in changes in academic performance between tenth and twelfth grades between students who live in high-information states and those who do not.

As mentioned earlier, this dependent variable is run with alternative measurements for the student and parent educational expectations variables. Once again (as was the case with change in academic performance between 8th and 10th grade) in both cases the fully-

Table 24. Change in Academic Performance between 10th and 12th grade by State (quintiles)

State	Low				High
Alaska	19%	18%	20%	14%	29%
Alabama	24%	24%	19%	20%	13%
Arkansas	23%	17%	17%	18%	26%
Arizona	13%	14%	21%	30%	23%
California	16%	22%	21%	20%	22%
Colorado	20%	18%	21%	17%	24%
Connecticut	22%	26%	20%	21%	12%
Delaware	21%	21%	5%	25%	28%
Florida	20%	20%	22%	19%	20%
Georgia	20%	23%	25%	16%	16%
Hawaii	24%	12%	21%	22%	21%
Iowa	23%	19%	22%	17%	19%
Idaho	20%	27%	14%	22%	17%
Illinois	20%	23%	21%	21%	15%
Indiana	22%	20%	20%	17%	21%
Kansas	20%	18%	30%	13%	19%
Kentucky	31%	19%	17%	23%	10%
Louisiana	20%	18%	22%	21%	20%
Massachusetts	18%	13%	20%	19%	29%
Maryland	15%	13%	25%	23%	24%
Maine	19%	19%	20%	19%	23%
Michigan	20%	18%	20%	20%	23%
Minnesota	24%	19%	20%	19%	17%
Missouri	26%	21%	15%	22%	16%
Mississippi	19%	16%	22%	22%	22%
Montana	9%	13%	21%	28%	31%
North Carolina	17%	23%	22%	21%	18%

Table 24 (cont.). Change in Academic Performance between 10th and 12th grade by State (quintiles)

State	Low				High
North Dakota	22%	24%	20%	16%	18%
Nebraska	27%	30%	20%	14%	9%
New Hampshire	16%	18%	46%	13%	8%
New Jersey	16%	19%	21%	23%	21%
New Mexico	20%	26%	18%	18%	18%
Nevada	24%	15%	20%	15%	27%
New York	20%	18%	18%	24%	20%
Ohio	22%	20%	21%	18%	19%
Oklahoma	28%	18%	18%	16%	20%
Oregon	18%	18%	15%	24%	25%
Pennsylvania	20%	18%	17%	21%	25%
Rhode Island	14%	32%	20%	10%	24%
South Carolina	24%	19%	18%	24%	15%
South Dakota	31%	20%	29%	18%	2%
Tennessee	26%	20%	17%	17%	20%
Texas	18%	21%	20%	20%	21%
Utah	14%	23%	26%	21%	16%
Virginia	18%	21%	20%	19%	21%
Vermont	21%	10%	22%	18%	29%
Washington	21%	22%	15%	18%	23%
Wisconsin	21%	18%	26%	20%	16%
West Virginia	15%	19%	21%	16%	29%
Wyoming	23%	27%	16%	11%	23%
Non-High Information	20%	20%	20%	20%	20%
High Information	19%	21%	20%	19%	21%

specified models resulted in the most explanatory and best fit models, and they shared the same variables of statistical significance, at approximately the same values. However, as was the case earlier, in the model with educational expectations measured in years, neither the student nor the parent's expectations were statistically significant (see Appendix B), while the dichotomized version of expectations indicates several categories of expectations as being statistically significant (Table 25), and thus this analysis will deal solely with the model with dichotomous measures for expectations[20].

The mean growth in academic performance between tenth and twelfth grade (see Table 7), is -0.205 points with a standard deviation of 4.131 points. The results from the regression analysis support the inference that students from high-information states are not statistically significantly different from students in non-high-information states with regard to changes in academic performance. None of the models indicate significance, and the final model does not indicate any significance among different ethnicities and socioeconomic strata with regard to receiving early college preparation information on the outcome. However, as the final model does increase the R^2 significantly from the prior model (a change from .0099 to .0171), this suggests that while the interactions are not statistically significant, they still appear to reveal an influence on changes in academic performance.

Background characteristics of gender, ethnicity (Hispanic and Asian/Pacific Islanders), and socioeconomic status were once again all statistically significant predictors in the model. Female students, on average have approximately a -0.31 change in their academic performance from tenth- to twelfth-grade compared with their male counterparts, while Hispanic (0.37) and Asian/Pacific Islander (0.43) students have gains in their academic performance compared to White students, a little lower than the influence on eighth to tenth

[20] See Appendix B for the table of models with expectations coded in years, Table 39.

Table 25. Change in Academic Performance Between Tenth and Twelfth Grade

Variables	Model 1			Model 2			Model 3			Model 4			Model 5			Model 6		
Intercept	-0.23	*0.06*	***	-0.28	*0.09*	**	-0.28	*0.09*	**	-0.32	*0.13*	*	-0.57	*0.18*	***	0.29	*0.20*	
Demographics																		
Sex (Female=1)				-0.12	*0.10*		-0.12	*0.10*		-0.13	*0.10*		-0.14	*0.10*		-0.31	*0.10*	**
Race (ref=White)																		
Black				-0.05	*0.17*		-0.05	*0.17*		-0.03	*0.17*		-0.09	*0.17*		0.04	*0.20*	
Hispanic				0.51	*0.17*	**	0.51	*0.17*	**	0.54	*0.17*	**	0.47	*0.17*	**	0.37	*0.19*	*
Asian				0.60	*0.17*	***	0.61	*0.17*	***	0.64	*0.17*	***	0.62	*0.18*	***	0.43	*0.24*	†
Other				0.23	*0.39*		0.23	*0.39*		0.22	*0.39*		0.20	*0.40*		0.11	*0.43*	
Socioeconomic Status				-0.01	*0.07*		-0.01	*0.07*		0.00	*0.08*		-0.04	*0.08*		-0.41	*0.08*	***
High Information State							-0.03	*0.15*		-0.03	*0.15*		-0.05	*0.15*		0.02	*0.24*	
Student's Expectation																		
High School or less										-0.15	*0.21*		-0.01	*0.21*		-0.69	*0.24*	**
2-years or less										-0.13	*0.21*		-0.03	*0.22*		-0.50	*0.25*	*
2+ years										0.12	*0.15*		0.16	*0.15*		-0.23	*0.16*	
Masters										0.33	*0.14*	*	0.35	*0.14*	*	-0.32	*0.16*	*
Doctorate										0.10	*0.17*		0.14	*0.17*		0.01	*0.17*	
Parents' Expectation																		
High School or less										0.16	*0.18*		0.22	*0.18*		-0.49	*0.20*	*
2-years or less										-0.17	*0.20*		-0.08	*0.20*		0.03	*0.22*	
2+ years										0.10	*0.13*		0.13	*0.13*		0.08	*0.15*	
Postgraduate										-0.24	*0.12*	†	-0.22	*0.12*	†	-0.21	*0.15*	
GPA 8^{th}-10^{th} Grades													0.10	*0.04*	**	-0.07	*0.04*	
Coursework																		
Rigorous Acad.													0.10	*0.13*		0.48	*0.14*	***
Rigorous/Vocational													-0.05	*0.44*		0.65	*0.59*	
Acad./Vocational													-0.56	*0.18*	**	-0.04	*0.19*	
Vocational													-0.87	*0.21*	***	-1.06	*0.23*	***
Interactions																		
Info*Black																0.51	*0.83*	
Info*Hispanic																-0.37	*0.51*	
Info*Asian																0.04	*0.51*	
Info*SES																0.20	*0.26*	
Model Fit (F-statistic)																		
	F(0, 901) = 0 R-squared = 0 Prob>F= .			F(6, 895) = 4.84 R-squared = .0033 Prob>F= .0002			F(7, 894) = 4.23 R-squared = .0033 Prob>F= .0004			F(16, 885) = 2.92 R-squared = .0051 Prob>F= .0005			F(21, 880) = 3.47 R-squared = .0099 Prob>F= .0000			F(25, 876) = 5.97 R-squared = .0171 Prob>F= .0000		

Notes: ***p<.001, **p<.01, *p<.05, †p<.10
Each model presents the coefficient, standard error (italicized) and indication of significance.
Reference category for Expectations is "Bachelor's degree", and for Coursework is "Academic".

grade change, both about one-tenth of a standard deviation increase. Socioeconomic status, once again reveals a non-intuitive, a -0.41 negative growth in academic, slightly higher than the influence of SES on eighth to tenth grade change in academic performance.

Three categories of student expectations are significantly different for changes in 10^{th} to 12^{th} grade academic performance, compared to the comparison category of student's who expect to attain a bachelor's degree. Students who expect to only graduate from high school or less are expected to have a negative growth of -0.69 points. Those who expect to attain less than two-years of college have an average negative growth of -0.50 points, and those who expect to earn a Master's degree have a downward change in performance of -0.32 points. Again, the only category for parental expectations that is significant is for parents who have the lowest expectations for their teenager, expecting only high school completion or less. Students with these parents perform -0.49 points lower than students who have parents that expect them to obtain a bachelor's degree. These results mimic the results found in the analysis of changes in academic performance between eighth to tenth grade, and substantiate the role of these predictors in changing academic performance.

An additional academic predictor is included in the analysis of tenth to twelfth grade changes in academic performance, the measure of rigor of coursework. This is the only academic predictor in the model that reveals significance. Students enrolled in a rigorous academic coursework have a positive growth of 0.48 points compared to students who take a regular academic course load. Alternatively, students enrolled primarily in vocational coursework have a negative growth of -1.06 points. GPA was not found to be statistically significant. Thus, a hypothetical student who is a White female and who has low educational expectations for herself along with her parents, and was enrolled primarily in vocational

courses would expect to see a net change in academic performance of -2.55 points, or about two-thirds of a standard deviation below the mean.

The hypothesis suggested for a change in academic performance between the beginning of the search process (10^{th} grade) and the beginning of the choice process (12^{th} grade) mirrors the hypothesis of change in academic performance during the predisposition phase. The hypothesis relies on a student's educational expectations and whether those expectations are well-founded. The largest influencers on changes in academic performance, except for vocational coursework, are related to educational expectations, but the variable which serves as a proxy for information was not statistically significant. Thus, it is possible that information, while not significant as a stand-alone predictor, is being mediated through student educational expectations. It is worthwhile to once again note that the influential predictors for change in academic performance are consistent, if substantively small, for changes in academic performance in an earlier phase. More of the overall variance is explained by the most explanatory model (R^2=.0171), which is likely due to the introduction of an additional academic variable, the measure of coursework. As the R^2 is still quite small, this suggests that this model is not a great predictor for changes in academic performance and that there are likely other predictors not included in these models which may more fully explain changes in academic performance.

Enrollment in Postsecondary Educational Institutions

This research has focused on dynamic changes in educational expectations and academic performance, inasmuch as they are important intermediating influencers in the postsecondary decision-making process. Understanding what induces changes in these

influencers provides a more robust picture of the overarching process of a student's decision of whether and where to attend college after high school graduation. The culminating aspect of this research is to better understand primarily how early and late reception of college preparation information, effect a student's probability of enrolling in postsecondary education while conditioned upon, and secondarily analyzing, personal and familial background (including prior academic performance), and state-level economic variables. A descriptive analysis states and the percent of students not enrolled, enrolled in a two-year college, and enrolled in a four-year college within a year of graduating from high school, indicates differences between high-information and non-high-information states (Table 26). Furthermore, there are considerable differences between some of the four states that compose the high-information states variable.

Minnesota and Indiana, which are the two states with the clearest policy and actions for college preparation information during the late 1980s and early 1990s, have high proportions of students (51% and 53%, respectively) enrolling in four-year universities. This is well above the average non-high-information states average of 40%, and nearly 20% higher than the average for high-information states (33%) to which they belong. California clearly draws the four-year enrollment average down for the collection of high-information states (27%) and exerts a greater influence on the average because of the number of students from California that were sampled in order to have a proportionally representative sample. Oklahoma is right in the middle of these states with 38% enrolled in a four-year college or university, close to the average for non-high-information states (40%).

Table 26. Postsecondary Enrollment Decision by State

State	*No Enroll*	*Two-year*	*Four-year*
Alaska	49%	14%	38%
Alabama	41%	27%	32%
Arkansas	49%	13%	38%
Arizona	41%	19%	40%
California	37%	37%	27%
Colorado	37%	20%	43%
Connecticut	49%	18%	34%
Delaware	43%	26%	30%
Florida	38%	25%	37%
Georgia	44%	16%	40%
Hawaii	45%	22%	33%
Iowa	32%	18%	50%
Idaho	47%	16%	37%
Illinois	34%	21%	45%
Indiana	39%	8%	53%
Kansas	38%	30%	33%
Kentucky	50%	17%	33%
Louisiana	40%	20%	40%
Massachusetts	30%	17%	53%
Maryland	39%	21%	40%
Maine	44%	22%	33%
Michigan	41%	26%	33%
Minnesota	25%	24%	51%
Missouri	43%	23%	35%
Mississippi	48%	29%	23%
Montana	44%	12%	44%
North Carolina	42%	24%	34%

Table 26 (cont.). Postsecondary Enrollment Decision by State

State	*No Enroll*	*Two-year*	*Four-year*
North Dakota	34%	23%	43%
Nebraska	33%	14%	53%
New Hampshire	19%	0%	81%
New Jersey	30%	18%	52%
New Mexico	47%	21%	33%
Nevada	38%	15%	48%
New York	34%	18%	48%
Ohio	48%	17%	35%
Oklahoma	45%	17%	38%
Oregon	42%	35%	23%
Pennsylvania	31%	16%	53%
Rhode Island	48%	21%	31%
South Carolina	44%	19%	37%
South Dakota	4%	40%	56%
Tennessee	42%	20%	38%
Texas	43%	20%	37%
Utah	43%	20%	36%
Virginia	35%	22%	43%
Vermont	50%	23%	28%
Washington	38%	37%	25%
Wisconsin	41%	13%	47%
West Virginia	54%	16%	31%
Wyoming	54%	20%	25%
Non-High Information	40%	20%	40%
High Information	37%	30%	33%

Two-year enrollment percentages help to tell the rest of the story of the differences between California and the other three high-information states. California's system is, and has been, fundamentally geared at helping the large majority of students in its state get to college through their two-year college system, with an eye towards transferring into the Cal State or University of California system after two years. As a result, the majority of Californian student who go directly on to college go to a two-year college (37%). Indiana and Minnesota, on the other hand, have relatively few students go on to two-year colleges. Only 8% of the sample of Hoosier students enrolled in a two-year college within a year of high school graduation, while 24% of Minnesotans enrolled in a community, technical, or business college. For Oklahoma, 17% of their students enrolled in a two-year college. These lower percentages, especially in Indiana, may be as much an indication of a minimal two-year college system, as the high percentages in California speak to the focus on their two-year system. Finally, while California and Indiana had relatively equal percentages of non-enrollees (37% and 39%, respectively), and Oklahoma had an above average percentage of non-enrollees of 45% (Oklahoma's program did not begin until two years after this sample was taken), Minnesota's percentage of non-enrollees was considerably lower at 25%, the third lowest in the nation, and the lowest of states with a relatively substantial population.

This descriptive analysis indicates that two of the four high-information states (Indiana and Minnesota) had a high percentage of students in four-year universities, while one state (Oklahoma) was near the average of non-high-information states for this category, and one state (California) held the second-highest percentage of two-year enrollees among all fifty states. Therefore, in aggregate, because of the weight of

California-sample students, the high-information states (33%) are lower than non-high information states (40%) in percentage of four-year enrollees, and much higher (40% for high-information states) than non-high-information states (30%) in percentages of two-year enrollees. This suggests that if the restriction for high-information states had been confined to strong and clear evidence of specific policies in place for disseminating college preparation information (Indiana and Minnesota), there would likely result a different outcome.

This model, as indicated in the previous chapter, suggests that during the choice process students are determining between three distinct postsecondary options: not enrolling in college, enrolling in a two-year college (including vocational or business schools), and enrolling in a four-year college or university. This analysis of probability of postsecondary enrollment, like that of the analyses on academic performance, is performed with educational expectations measured in years (Table 27) and alternatively measured as dichotomous categories for expectations, with a comparison category of expectations for a Bachelor's degree. This research utilizes the results from the models with educational expectations measured in terms of years, while the results for the analysis with expectations measured in terms of dichotomous choices are located in Appendix B (see Table 40).

The fully-specified model (model 7) articulated in this analysis is the most explanatory of the variance that exists in the outcome. The variable indicating students living in states with strong policies for disseminating college preparation information ("High Info States") is statistically significant in every model for comparisons of both "non-enrollment" and "two-year enrollment" to "four-year enrollment," except for the

Table 27. Enrollment in Postsecondary Educational Institution (ref = "Enrollment in 4-Year Institution")

Variables	**Model 1**		**Model 2**			**Model 3**			**Model 4**		
Not Enrolled											
Intercept	-0.01	*0.03*	0.20	*0.04*	***	0.08	*0.05*		10.10	*0.40*	***
Demographics											
Sex (Female=1)			-0.42	*0.05*	***	-0.29	*0.05*	***	-0.16	*0.06*	**
Race (ref=White)											
Black			-0.24	*0.09*	*	0.05	*0.10*		0.53	*0.11*	***
Hispanic			-0.02	*0.10*		0.03	*0.10*		0.50	*0.11*	***
Asian			-0.79	*0.13*	***	-0.82	*0.13*	***	-0.31	*0.13*	*
Other			0.57	*0.25*	*	0.68	*0.28*	*	0.94	*0.31*	**
Socioeconomic Status			-1.34	*0.04*	***	-1.47	*0.05*	***	-1.12	*0.05*	***
High Information State						0.17	*0.10*	†	0.19	*0.11*	†
Financial Aid Info						-1.09	*0.05*	***	-0.86	*0.05*	***
Student's Expectation									-0.41	*0.02*	***
Parents' Expectation									-0.20	*0.02*	***
GPA 9th-12th grade											
12th Grade Test											
Coursework (ref=Academic)											
Rigorous Academic											
Rigorous/Vocational											
Acad./Vocational											
Vocational											
Interactions											
Info*Black											
Info*Hispanic											
Info*Asian											
Info*SES											
FinInfo*Black											
FinInfo*Hispanic											
FinInfo*Asian											
FinInfo*SES											
State-level economic variables											
Unemployment											
Tuition											
Need-based Aid											
Merit-based Aid											
Model Fit (F-statistic)											
	F(0, 900) = 0		F(12, 889) = 87.55			F(16, 885) = 95.06			F(20, 881) = 93.43		
	Prob>F= .		Prob>F= .0000			Prob>F= .0000			Prob>F= .0000		

Notes: ***p<.001, **p<.01, *p<.05, †p<.10
Each model presents the coefficient, standard error (italicized) and indication of significance.

Table 27 (cont.). Enrollment in Postsecondary Educational Institution (ref = "Enrollment in 4-Year Institution")

Variables	**Model 1**			**Model 2**			**Model 3**			**Model 4**		
Two-Year Enrollment												
Intercept	-0.59	*0.04*	***	-0.52	*0.06*	***	-0.58	*0.06*	***	5.17	*0.31*	***
Demographics												
Sex (Female=1)				0.02	*0.06*		0.08	*0.06*		0.15	*0.06*	*
Race (ref=White)												
Black				-0.45	*0.11*	***	-0.28	*0.11*	*	-0.01	*0.12*	
Hispanic				0.26	*0.11*	*	0.22	*0.11*	*	0.50	*0.12*	***
Asian				-0.24	*0.13*	†	-0.41	*0.13*	***	-0.14	*0.13*	
Other				0.23	*0.30*		0.24	*0.31*		0.41	*0.32*	
Socioeconomic Status				-0.76	*0.05*	***	-0.83	*0.05*	***	-0.62	*0.05*	***
High Information State							0.58	*0.12*	***	0.59	*0.13*	***
Financial Aid Info							-0.58	*0.05*	***	-0.47	*0.05*	***
Student's Expectation										-0.22	*0.02*	***
Parents' Expectation										-0.12	*0.02*	***
GPA 9th-12th grade												
12th Grade Test												
Coursework (ref=Academic)												
Rigorous Academic												
Rigorous/Vocational												
Acad./Vocational												
Vocational												
Interactions												
Info*Black												
Info*Hispanic												
Info*Asian												
Info*SES												
FinInfo*Black												
FinInfo*Hispanic												
FinInfo*Asian												
FinInfo*SES												
State-level economic variables												
Unemployment												
Tuition												
Need-based Aid												
Merit-based Aid												
Model Fit (F-statistic)												
	F(0, 900) = 0			F(12, 889) = 87.55			F(16, 885) = 95.06			F(20, 881) = 93.43		
	Prob>F= .			Prob>F= .0000			Prob>F= .0000			Prob>F= .0000		

Notes: ***p<.001, **p<.01, *p<.05, †p<.10
Each model presents the coefficient, standard error (italicized) and indication of significance.

Table 27 (cont.). Enrollment in Postsecondary Educational Institution (ref = "Enrollment in 4-Year Institution")

Variables	**Model 5**			**Model 6**			**Model 7**		
Not Enrolled									
Intercept	6.16	*0.52*	***	6.17	*0.52*	***	6.46	*0.56*	***
Demographics									
Sex (Female=1)	0.05	*0.07*		0.04	*0.07*		0.04	*0.07*	
Race (ref=White)									
Black	-0.39	*0.13*	***	-0.42	*0.14*	**	-0.47	*0.14*	***
Hispanic	0.11	*0.12*		0.10	*0.14*		-0.02	*0.14*	
Asian	-0.01	*0.14*		0.13	*0.17*		0.13	*0.17*	
Other	0.16	*0.34*		0.17	*0.34*		0.11	*0.34*	
Socioeconomic Status	-0.87	*0.05*	***	-0.91	*0.06*	***	-0.90	*0.06*	***
High Information State	0.29	*0.13*	*	0.31	*0.15*	*	0.17	*0.15*	
Financial Aid Info	-0.67	*0.05*	***	-0.66	*0.06*	***	-0.66	*0.06*	***
Student's Expectation	-0.29	*0.02*	***	-0.28	*0.02*	***	-0.29	*0.02*	***
Parents' Expectation	-0.13	*0.02*	***	-0.13	*0.02*	***	-0.13	*0.02*	***
GPA 9th-12th grade	0.40	*0.02*	***	0.40	*0.02*	***	0.41	*0.02*	***
12th Grade Test	-0.04	*0.01*	***	-0.04	*0.01*	***	-0.04	*0.01*	***
Coursework (ref=Academic)									
Rigorous Academic	-0.65	*0.10*	***	-0.64	*0.10*	***	-0.66	*0.10*	***
Rigorous/Vocational	-0.41	*0.30*		-0.42	*0.30*		-0.42	*0.30*	
Acad./Vocational	0.87	*0.13*	***	0.87	*0.13*	***	0.84	*0.13*	***
Vocational	1.35	*0.22*	***	1.33	*0.22*	***	1.36	*0.22*	***
Interactions									
Info*Black				0.21	*0.50*		0.20	*0.50*	
Info*Hispanic				0.24	*0.29*		0.29	*0.29*	
Info*Asian				-0.27	*0.30*		-0.32	*0.31*	
Info*SES				0.25	*0.15*	†	0.22	*0.15*	
FinInfo*Black				0.06	*0.19*		0.03	*0.19*	
FinInfo*Hispanic				0.03	*0.17*		0.04	*0.17*	
FinInfo*Asian				0.23	*0.20*		0.20	*0.21*	
FinInfo*SES				0.31	*0.08*	***	0.31	*0.08*	***
State-level economic variables									
Unemployment							0.14	*0.04*	***
Tuition							0.00	*0.00*	***
Need-based Aid							0.00	*0.00*	
Merit-based Aid							0.00	*0.00*	†
Model Fit (F-statistic)									
	F(32, 869) = 67.20			F(48, 853) = 46.39			F(56, 845) = 40.17		
	Prob>F= .0000			Prob>F= .0000			Prob>F= .0000		

Notes: ***p<.001, **p<.01, *p<.05, †p<.10
Each model presents the coefficient, standard error (italicized) and indication of significance.

Table 27 (cont.). Enrollment in Postsecondary Educational Institution (ref = "Enrollment in 4-Year Institution")

Variables	**Model 5**			**Model 6**			**Model 7**		
Two-Year Enrollment									
Intercept	3.94	*0.49*	***	3.98	*0.49*	***	3.83	*0.55*	***
Demographics									
Sex (Female=1)	0.27	*0.07*	***	0.27	*0.07*	***	0.27	*0.07*	***
Race (ref=White)									
Black	-0.79	*0.13*	***	-0.85	*0.15*	***	-0.90	*0.16*	***
Hispanic	0.12	*0.12*		-0.06	*0.15*		-0.15	*0.15*	
Asian	0.02	*0.13*		-0.19	*0.16*		-0.20	*0.16*	
Other	-0.27	*0.33*		-0.27	*0.33*		-0.32	*0.33*	
Socioeconomic Status	-0.39	*0.05*	***	-0.43	*0.06*	***	-0.43	*0.06*	***
High Information State	0.64	*0.13*	***	0.37	*0.17*	*	0.26	*0.16*	
Financial Aid Info	-0.34	*0.06*	***	-0.35	*0.07*	***	-0.34	*0.07*	***
Student's Expectation	-0.14	*0.02*	***	-0.14	*0.02*	***	-0.14	*0.02*	***
Parents' Expectation	-0.06	*0.02*	***	-0.07	*0.02*	***	-0.07	*0.02*	***
GPA 9th-12th grade	0.24	*0.02*	***	0.24	*0.02*	***	0.24	*0.02*	***
12th Grade Test	-0.05	*0.01*	***	-0.05	*0.01*	***	-0.05	*0.01*	***
Coursework (ref=Academic)									
Rigorous Academic	-0.50	*0.09*	***	-0.49	*0.09*	***	-0.50	*0.09*	***
Rigorous/Vocational	-0.04	*0.28*		0.00	*0.27*		-0.03	*0.28*	
Acad./Vocational	0.65	*0.13*	***	0.66	*0.14*	***	0.64	*0.14*	***
Vocational	0.73	*0.26*	**	0.72	*0.25*	**	0.77	*0.25*	**
Interactions									
Info*Black				0.27	*0.43*		0.23	*0.42*	
Info*Hispanic				0.89	*0.29*	**	0.80	*0.29*	**
Info*Asian				0.59	*0.28*	*	0.43	*0.27*	
Info*SES				0.13	*0.13*		0.09	*0.13*	
FinInfo*Black				0.07	*0.20*		0.04	*0.20*	
FinInfo*Hispanic				-0.11	*0.18*		-0.11	*0.18*	
FinInfo*Asian				-0.16	*0.19*		-0.19	*0.19*	
FinInfo*SES				0.12	*0.08*		0.12	*0.08*	
State-level economic variables									
Unemployment							0.15	*0.04*	***
Tuition							0.00	*0.00*	**
Need-based Aid							0.00	*0.00*	*
Merit-based Aid							0.00	*0.00*	†
Model Fit (F-statistic)									
	F(32, 869) = 67.20			F(48, 853) = 46.39			F(56, 845) = 40.17		
	Prob>F= .0000			Prob>F= .0000			Prob>F= .0000		

Notes: ***p<.001, **p<.01, *p<.05, †p<.10
Each model presents the coefficient, standard error (italicized) and indication of significance.

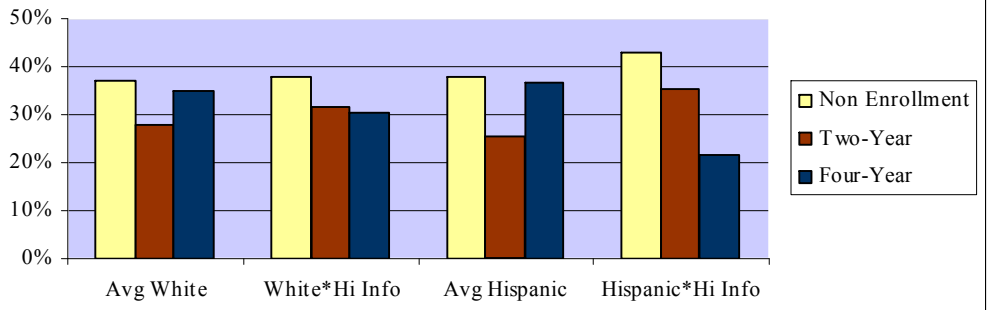
final model, where state-level economic variables are included. In the comparison of two- to four-year enrollment, however, the interaction of Hispanic students living in high-information states is significant and positive, indicating that Hispanic students living in these states have a higher probability of two-year enrollment than do students living outside of these high-information states. Converting significant coefficients into predicted probabilities, a comparison of students living in these states to those not living in these states (Table 28) reveals a 10% increase in the probability of a Hispanic student in a high-information state (35.5%) enrolling in a two-year college compared to his non-high-information state counterpart (25.3%). Comparatively, Hispanic students in these states are 15% less likely (21.6%) to enroll in a four-year college than those not living (36.7%) in these high-information states (see Table 28).

Table 28. Predicted Probability of Enrollment in Postsecondary Institutions among White and Hispanic Students by High-Information States

Nominal Choice	*Average White*	*Avg. White * High Info*	*Average Hispanic*	*Avg. Hispanic * High Info*
No enrollment	36.89%	37.96%	38.04%	42.90%
Two-year	28.12%	31.65%	25.27%	35.50%
Four-year	34.99%	30.38%	36.69%	21.60%
Total	100%	100%	100%	100%

Looking at the same comparison among White students, the results indicate that, while there is a similar trend among White students living in high-information states having a higher probability of two-year enrollment and a lower probability of four-year enrollment, the gap is much smaller (3.5% increase in two-year enrollment and 4.6% decrease in four-year enrollment). Figure 10 illustrates these differences between students

Figure 11. Probability of Postsecondary Enrollment among White and Hispanic Students by High Information State



in high-information and non-high-information states for White and Hispanic students.

A possible explanation for this finding particularly among Hispanic students relates to an earlier discussion regarding the descriptive statistics for states and types of enrollment (Table 26). These statistics reveal that California has the second highest percentage (37%) of students enrolled in a two-year college within a year of high school graduation. This percentage is nearly double the average for non-high-information states (20%), and because of the sample size drawn from California, wields the majority influence on the measure for high-information states. Furthermore, California has a very high percentage of Hispanic students in its population (28% in the sample) compared with all other states (11% of the non-California sample). Therefore, because California is the most two-year-centric state, because it holds a high proportion of the sample that creates the high-information states variable, and because California has one of the highest proportions of Hispanic students, this result seems likely.

An additional measure for the influence of financial aid information, termed "late information" in the conceptual framework is statistically significant in every model analyzing influencers on postsecondary enrollment choices. In every model, including the final model that is analyzed here, the reception of financial aid information indicates a

positive influence on the likelihood of enrolling in a four-year college or university. Furthermore, the interaction of the reception of financial aid information and students' socioeconomic status is statistically significant in the comparison of non-enrollment versus four-year enrollment. The coefficient on this interaction variable is positive (see Table 27), which may at first glance seem counterintuitive. Because the variable for financial aid information is actually an index of the level of financial aid information that a student receives with a mean of zero, an interaction that would lead to a positive coefficient would either entail students who were above the mean in reception of financial aid information and above the mean socioeconomic status (less likely to indicate a higher probability of non-enrollment versus four-year enrollment) or a student who is below the mean in reception of information and below the mean socioeconomic status (more likely to indicate a higher probability of non-enrollment). Therefore, a hypothetical student of interest m would be one who is above the mean for reception of financial aid information but below the mean socioeconomic status, which produces a negative coefficient on this variable. Such an interaction produces an increased probability of four-year enrollment for these students compared to a student below the mean socioeconomic status but with the average reception of financial aid information.

Converting coefficients into predicted probabilities reveals comparisons of the impact of financial aid information on an average White student are presented together with the impact of financial aid information on a student who is below the mean for socioeconomic status (Table 29).

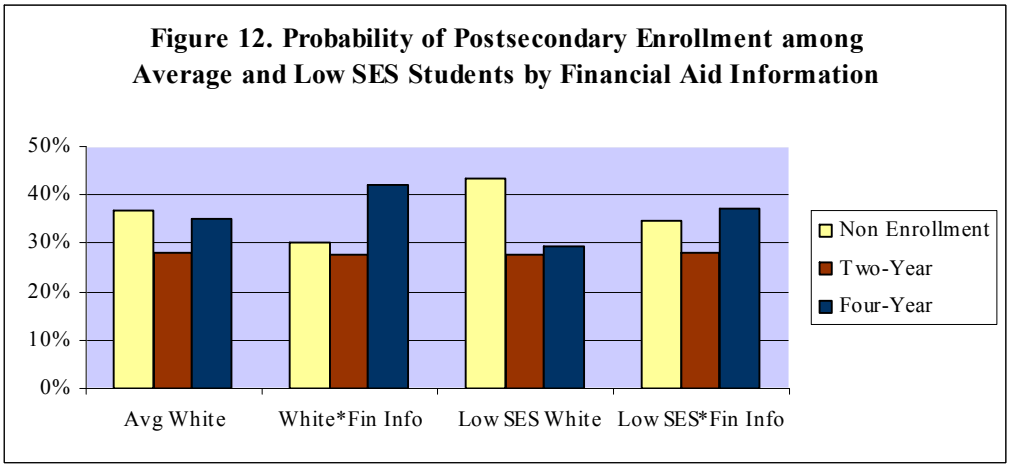
Table 29. Predicted Probability of Enrollment in Postsecondary Institutions among Low SES Students by Financial Aid Information

Nominal Choice	*Average White*	*Average White * Fin Info*	*Average Low SES White*	*Low SES * Fin Info*
No enrollment	36.89%	30.21%	43.25%	34.89%
Two-year	28.12%	27.74%	27.55%	27.96%
Four-year	34.99%	42.04%	29.21%	37.15%
Total	100%	100%	100%	100%

Note: Low SES is ½ standard deviation below the mean. The interaction with financial aid information in columns 2 and 4 is of students who are one standard deviation above the mean of financial aid information received.

Calculations indicate that a slight collective gain-difference in probability of four-year enrollment for lower SES students (8% increase)with the same level of information as an average SES student (7% increase). Furthermore the probability for non-enrollment among lower SES students with a reception of greater financial aid information is approximately 8.4%, while for the average SES student with equal information the decreased probability of non-enrollment is approximately 6.7% (see Figure 11). While the differences in probability of four-year enrollment and of non-enrollment for low SES students may be small, the results reveal that the reception of this information has a greater influence on these students then on students with average SES.

Figure 12. Probability of Postsecondary Enrollment among Average and Low SES Students by Financial Aid Information



Other non-information-based student characteristics found to be influential on the increased probability of four-year enrollment compared to both non-enrollment and two-year enrollment are students of African-American ethnicity, higher socioeconomic status, higher personal and parental expectations, higher GPA and students who take rigorous academic coursework throughout high school. Female students have an increased probability of two-year enrollment versus four-year enrollment, but no difference between four-year enrollment and non-enrollment. Academic performance measured through the twelfth-grade combine math/reading test indicates a slightly lower probability of four-year enrollment compared to two-year and non-enrollment.

Once again converting key variables coefficients into predicted probabilities allows for baseline comparisons of average White male and female students and average African-American male and female students (Table 30). These results reveal that the average African-American

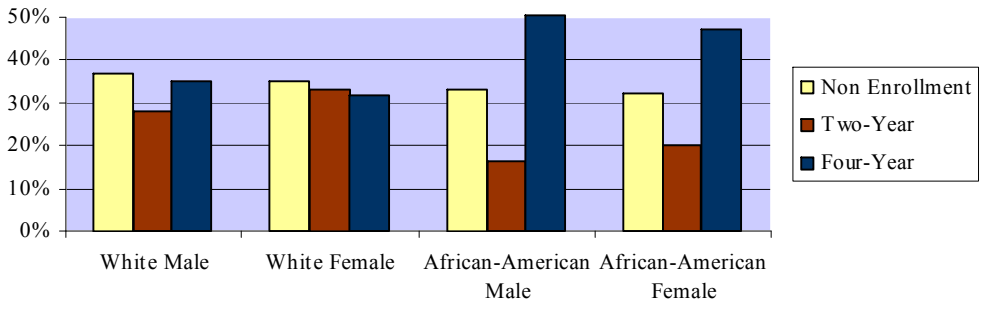
Table 30. Predicted Probability of Enrollment in Postsecondary Institutions among Average White and African-American Students by Gender

Nominal Choice	*White Male*	*White Female*	*Black Male*	*Black Female*
No enrollment	36.89%	34.87%	33.20%	32.47%
Two-year	28.12%	33.33%	16.49%	20.22%
Four-year	34.99%	31.81%	50.31%	47.31%
Total	100%	100%	100%	100%

male student has the highest probability of four-year enrollment (50.3%) of the four groups, while the average African-American female student has the lowest probability of non-enrollment (32.5%). The average White female student has the highest probability of two-year enrollment (33.3%), while the average White male student has the highest

probability of non-enrollment (36.9%) among the four groups (see Figure 12). Collectively, African-American students have a higher probability of four-year enrollment and lower probability of non-enrollment compared to White students, while female students have a higher probability of two-year enrollment and lower probability of four-year enrollment and of non-enrollment compared to male students.

Figure 13. Probability of Postsecondary Enrollment among White and African-American Students by Gender



While the other non-information-based characteristics mentioned earlier reveal differences in probability of enrollment in the various categories, these differences are proportional to the baseline of each respective ethnicity and gender, revealing identical trends for additional positive or negative characteristics indicated for a given hypothetical student. Therefore, while conversions of these coefficients into predicted probability tables and graphical charts are conducted for White female students, and African-American male and female students, these tables (Tables 41–46) and charts (Figures19–24) are found in Appendix B. The predicted probabilities of enrollment for a White male student are presented, together with analysis, below in Tables 31 and 32.

The first table suggests additional below average characteristics for a hypothetical White male student. The table reveals the impact of significant variables as they are added to the profile of this student. These characteristics are altered in a manner that would be consistent with preceding changes in other characteristics, and as indicated by the conceptual framework. The first characteristic of socioeconomic status reveals that an average student who is one half of a standard deviation below the mean socioeconomic status is predicted to have a decreased probability of four-year enrollment of approximately 5.8% and an increased probability of non-enrollment of approximately 6.4%, with probability of two-year enrollment slightly decreasing (see Figure13). Students of lower socioeconomic status, on average, have lower educational expectations than students of average socioeconomic status. If this student then possesses expectations that are lower than the average White male student (one-half standard deviation) his

Table 31. Predicted Probability of Enrollment in Postsecondary Institution with Negative Characteristics for White Male Students

Nominal Choice	*Average student*	*less 1/2 sd SES*	*Student Expectations less 1/2 sd*	*Parents Expectations less 1/2 sd*	*less 1/2 sd GPA*	*less 1/2 sd Test*	*Academic/ Vocational*
No enrollment	36.89%	43.25%	49.34%	52.02%	59.44%	60.55%	69.00%
Two-year	28.12%	27.55%	26.67%	26.23%	24.80%	26.12%	24.43%
Four-year	34.99%	29.21%	24.00%	21.75%	15.76%	13.33%	6.57%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

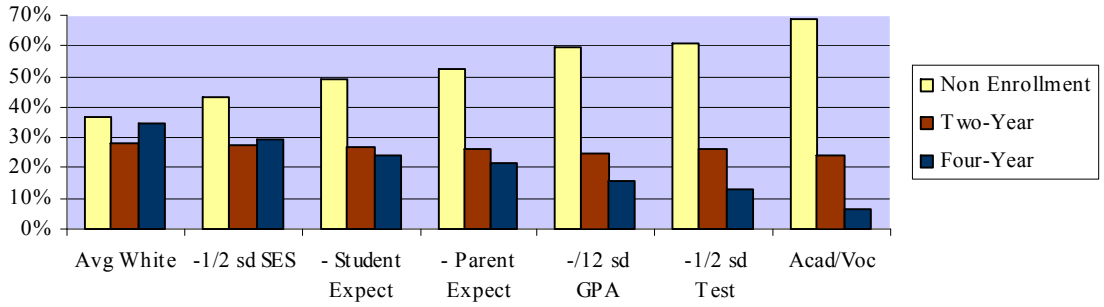
Note: sd means "standard deviation". Each column represents an additional characteristic to the column that precedes it.

probability of four-year enrollment drops another 4.8% to 24%, while his likelihood of non-enrollment increases 6.1% to 49.3%. Student's with lower than average expectations often have parents with lower than average expectations. Thus, if the hypothesized student has parents with educational expectations one-half standard deviation below the

mean, his probability for four-year enrollment drops to 21.75% (2.25%), and for non-enrollment increases commensurately to 52%.

Students with lower expectations often perform below the average academically. If the hypothetical student has a GPA a half standard deviation below the mean (approximately a C-) his probability of four-year enrollment drops 6% to 15.8%, for two-year enrollment drops slightly (1.4%) to 24.8% and his probability for non-enrollment increases 7.4% to 59.4%. An additional academic measure that may be below average for students who are below average in GPA is the measure of growth via the twelfth-grade combined math/reading test. This measure may not be as predictable as other variables because the test is modified according to how a student performs on his tenth-grade test.

Figure 14. Probability of Postsecondary Enrollment among White Male Students with Below Average Indications



Thus, the hypothetical student who has below average SES, has below average expectations along with his parents, and a below average GPA and is a half standard deviation below average growth measured by the twelfth-grade test, is predicted to drop 3.4% in his probability of four-year enrollment to 13.3%, modestly increase his

probability of non-enrollment to 60.6%, and slightly increase his probability of two-year enrollment 1.3% to 26.1%. Finally, this hypothetical student could be a student who is taking a blend of regular academic courses and vocational courses. Adding this characteristic of type of coursework, the student's probability for four-year enrollment drops considerably (6.8%) to only a 6.6% likelihood of four-year enrollment. His probability of non-enrollment also increase dramatically (8.5%) to 69%, while his probability of two-year enrollment drops 2.2% to 24.4%

An alternative but comparative approach suggests additional above average characteristics for a hypothetical White male student. A table of predicted probabilities (Table 32) for the categories of postsecondary enrollment reveals the impact of "positive" significant variables as they are added to the profile of this student. These characteristics once again are altered in a manner that would be consistent with preceding changes in other characteristics, and as indicated by the conceptual framework. Starting again with he first characteristic of socioeconomic status an average student who is one half of a standard deviation above the mean socioeconomic status is predicted to have an increased probability of four-year enrollment of approximately 6.1% and a decreased probability of non-enrollment of approximately 6.1%, with probability of two-year enrollment remaining constant (see Figure14). Students of higher socioeconomic status, on average, possess higher educational expectations than students of average socioeconomic status. If this student then possesses expectations that are one half standard deviation above the average White male student's educational expectations, his probability of four-year enrollment grows another 6.1% to 47.1%, while his likelihood of non-enrollment decreases 5.3% to 25.5%, and his probability of two-year enrollment drops slightly to

Table 32. Predicted Probability of Enrollment in Postsecondary Institution with Positive Characteristics for White Male Students

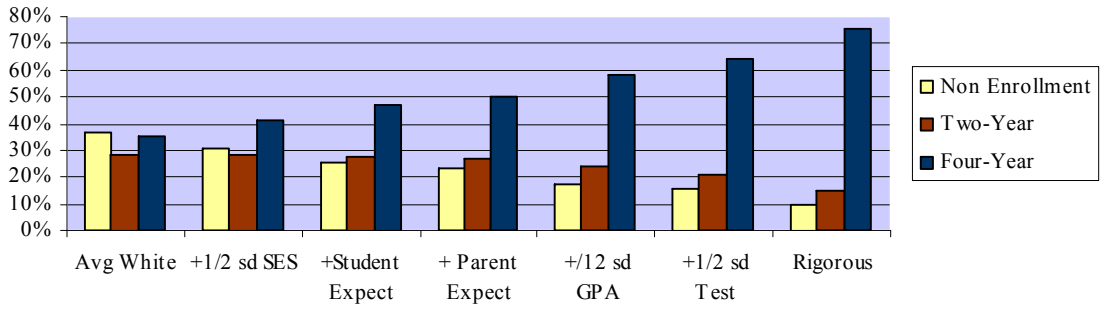
Nominal Choice	*Average student*	*plus 1/2 sd SES*	*Student Expectations plus 1/2 sd*	*Parents Expectations plus 1/2 sd*	*plus 1/2 sd GPA*	*plus 1/2 sd Test*	*Rigorous Academic*
No enrollment	36.89%	30.83%	25.49%	23.24%	17.28%	15.39%	9.44%
Two-year	28.12%	28.12%	27.39%	26.78%	24.07%	20.67%	14.86%
Four-year	34.99%	41.05%	47.12%	49.97%	58.65%	63.94%	75.70%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Note: sd means "standard deviation". Each column represents an additional characteristic to the column that precedes it.

27.4%. Students with above average educational expectations often have parents with higher expectations. Thus, if the hypothesized student has parents with educational expectations one-half standard deviation above the mean, his probability for four-year enrollment increases to 50% (2.85%), and for non-enrollment decreases 2.25% to 23.2%. Once again, his likelihood for two-year enrollment drops minimally to 26.8%.

As was suggested (in the contrary form) for the first table, students who have an above average socioeconomic status and possess higher educational expectations along with their parents, are also more likely to perform better academically compared to the average student, in order to realize those educational expectations. Thus, if the hypothetical student has a GPA a half standard deviation above the mean (approximately a C+ to B-) his probability of four-year enrollment grows a considerable 8.3% to 58.7%, for two-year enrollment drops slightly (2.7%) to 24.1% and his probability for non-enrollment decreases 6% to 17.3%. Students who perform above average academically may also be expected to indicate positive academic growth as measured by the twelfth-grade combined math/reading test. Thus, the hypothetical student who has above average

Figure 15. Probability of Postsecondary Enrollment among White Male Students with Above Average Indications



SES, above average expectations along with his parents, an above average GPA and is a half standard deviation above average in academic performance growth measured by the twelfth-grade test, is predicted to increase 5.4% in his probability of four-year enrollment to 63.9%, modestly decrease his probability of non-enrollment to 15.4%, and meaningfully decrease his probability of two-year enrollment 3.4% to 20.7%. Finally, this hypothetical student who is performing above average academically and who holds above average educational expectations is often taking rigorous academic coursework to prepare for his postsecondary education. This student's probability for four-year enrollment increases a remarkable 11.8% to 75.7%. The decreased probability is split between the other two categories of an approximate 5.9%, bringing the probability of non-enrollment to 9.4% and of two-year enrollment to 14.9%.

Finally, this analysis seeks to understand the influence of state-level economic variables on the choice phase of students. These variables, such as state unemployment and average tuition at a public four-year university are measures for environmental variables that are believed to directly influence postsecondary choice. The results from

the final model indicate that state unemployment and average tuition are statistically significant predictors for all three choices of enrollment. Average merit-based aid

Table 33. Predicted Probability of Enrollment in Postsecondary Institutions among Average White Students by State-level Economic Variables

Nominal Choice	*White Male*	*Increased Unemployment*	*Increased Tuition*	*Increased Unemployment and Tuition*
No enrollment	36.89%	39.13%	32.99%	35.32%
Two-year	28.12%	30.55%	27.45%	30.10%
Four-year	34.99%	30.32%	39.56%	34.58%
Total	100%	100%	100%	100%

for students in the state was significant for differences between the likelihood of two-year and four-year enrollment and average need-based was borderline significant ($p<.10$) for all three options of enrollment. Converting the coefficients of the two variables that were statistically significant for all choice options into predicted probabilities for those options is presented in Table 33. The first column indicates that the average who lives in a state that has an unemployment rate a standard deviation above the mean unemployment rate decreases his probability of four-year enrollment by 3.7% to 30.3%, and increase his probability of two-year enrollment by 2.4% and of non-enrollment by 1.2% to 30.6% and 39.1%, respectively. States that are a standard deviation above the mean for average four-year college tuition, on the other hand, increase a student's probability of four-year enrollment 4.6% to 39.6%, while decreasing his probability of two-year enrollment to 27.5% (a decrease of 0.7%) and his probability of non-enrollment to 33% (a decrease of 3.9%). An average White male student who lives in a state with an above average unemployment rate and an above average tuition rate is likely to have nearly the same

probability of four-year enrollment, with a slight decrease in non-enrollment and a slight increase (2%) of two-year enrollment, compared to living in an "average" state.

Assessing the hypotheses for influential predictors of postsecondary choice proposed in chapter three, early information appears to exert some direct influence on the postsecondary choice, but the results were only statistically significant for Hispanic students (compared to White students) living in these states. These results indicate that Hispanic students living in these states have a higher probability of two-year enrollment and a lower probability of four-year enrollment. It should be noted again, however, that these findings were likely influenced by the inclusion of California in the "high-information states" variable. Furthermore, the reception of financial aid information (termed "late information") is associated with an increase in the probability of four-year enrollment, and is slightly more influential among students who possess a lower socioeconomic status.

The second hypothesis suggested that higher personal and parental educational expectations and higher academic performance would be associated with a higher probability of four-year enrollment. Furthermore, because it was suggested that these expectations and academic performance would likely be influenced by the reception of college preparation information, thus indicating an indirect influence of early preparation information on postsecondary choice through expectations and performance. The results clearly validate the hypothesis that higher expectations and academic performance and preparation are strongly associated with significant increase in a student's probability of enrolling in a four-year college or university.

The final hypothesis suggested that there were differences between White students and students of other ethnicities in their probability of four-year enrollment, indicating that the average White student holds the lowest probability compared to other ethnicities. Additionally it was hypothesized that students of higher socioeconomic status were more likely to enroll in a four-year university and less likely to not-enroll compared to students at the mean socioeconomic level. The findings indicate that only African-American students are statistically different from White students in the postsecondary choice set, and are much more likely to enroll in a four-year university conditioned on other factors being equal, and less likely to enroll in a two-year college. Students of higher socioeconomic status are also found to have a higher probability of four-year enrollment. Finally, this hypothesis suggested that the external economic factors of lower state unemployment and higher average tuition would be related to an increased likelihood of four-year enrollment was also validated.

Conclusion

Analysis of the role of information across the entire college choice process indicates that the reception of early college preparation information does yield an influence on the formulation and revision of educational expectations and upon the outcome of postsecondary choice. The framework suggests that students who receive college preparation information early are more likely to develop expectations that are well-informed and that are more likely to be solidified over time. This is because clear and adequate information about what a student must do in order to access certain levels of postsecondary education allows the student to make an informed decision about what

they want and what they must do to get there. Furthermore, as early information indicates the relative costs of various postsecondary choices and the aid available, students (and their parents) can develop expectations and plans that can are legitimate and attainable.

As students receive information at the beginning of the college choice process they are more likely to perform academically in ways that are commensurate with their expectations. If a student knows that she must take certain courses and perform to a certain level in order to meet her expectations of enrolling a in four-year university after high school, she is more likely to act on that knowledge. A student who may possess the same expectation but who may not possess adequate information regarding what is necessary academically and economically in order to achieve those expectations is less likely to take courses and prepare in ways that are aligned with his expectations. As he discovers later in the process that he is ill-prepared for his initial expectations, he is likely to revise those expectations (in this case) downward. However, if a student never receives adequate college preparation information throughout the college choice process, he is likely to discover a disconnect between his expectations at the moment of choice and his likelihood of being able to achieve those expectations. Information is argued to play a critical role in the evolution of students' expectations and preparations as they approach the moment of postsecondary choice.

CHAPTER VI

CONCLUSION

Prior empirical research on the postsecondary decision-making process and on access to higher education has often been fragmented, with some research devoted to the implications of financial aid and costs of college and other research focused on academic performance and still others centered on conceptions of social and cultural capital. Furthermore, earlier research has most often focused on a particular phase of the process, either ascertaining the determinants of early educational expectations (the predisposition phase) or factors that influence the final decision to attend college (the choice phase).

Central Findings

This research set forth to assess a complete framework for the college choice process, following the student through each influential phase on their way towards determining whether and where they will attend college. Additionally, it indicated a model that treated the development of this end decision as a dynamic process, where changes in students' expectations and academic performance were measured and studied to discover the influencers that might affect these changes. An understudied aspect of the literature, the role of information, was believed to be an important player in the intermediary elements of whether and how students' educational expectations and academic performance evolved, as well as exercising a direct influence on a student's postsecondary decision.

Changes in Educational Expectations

In his research on Black-White differences in educational expectations, Morgan (1996) found that Black students were likely to have greater educational expectations than White students. He also found that students with higher socioeconomic status had higher expectations than students with average SES, and that students who had higher academic achievement also held higher expectations. This research discovered differences among African-American students living in states with strong policies for providing college preparation and information and those not living in these states. The findings indicate that African-American students who received this information by the tenth-grade were more likely to maintain those expectations as they approached the choice phase, while those not availed to such information were more likely to revise their expectations upward.

One possible explanation put forth in this research suggests that if these students are revising expectations upward without a clear foundation for doing so, these expectations are likely to be frustrated when the students seek to make a postsecondary choice. This rationale carries for the finding that students, regardless of ethnicity, who on average possessed greater socioeconomic and academic advantages than the average student held greater odds of maintaining their original educational expectations. This is consistent with the belief that these students are better informed about the academic and economic preparations necessary for achieving higher expectations.

Changes in Academic Performance

There is no prior research that looks at predictors related to changes in academic performance as it relates to the college choice model. This research did not discover any relationship to growth in academic performance associated with the variable indicating reception of college preparation information. One possibility for a lack of findings may be that the proxy measures for information and/or for changes in academic performance may not be adequate in order to assess a direct relationship. However, the conceptual framework indicates that a change in academic performance is influenced by information in an indirect manner through student expectations. This research found that changes in how a student performs during the predisposition-to-search and of the search-to-choice phases of the process are related to the student's and their parents' educational expectations. The largest substantive findings during this period indicated that low expectations were negatively associated with academic performance at a meaningful level.

During the latter years of high school the rigor of coursework that a student takes also affects their changes in academic performance (see Adelman, 1999). Students who are enrolled in varying levels of vocational coursework are associated with a meaningful drop in academic performance. This suggests that the trajectory of coursework that a student begins in early high school eventually begins to have a real influence on how well students are prepared academically for postsecondary enrollment. This trajectory is likely influenced by whether students receive adequate and clear information early in the college process about the coursework they need to take in order to meet their postsecondary expectations and merits additional research.

Postsecondary Enrollment

In her analysis on differing "adolescent econometricians" Beattie (2002) discovered that African-American students were more likely than White students to enroll in a four-year college. Her results also indicated that higher family SES, academic performance, and educational expectations were all associated with a greater probability of enrollment in a four-year institution. Plank and Jordan (2001) found very similar results when the comparison was four-year enrollment to non-enrollment. All minorities were found to be more likely than non-minorities to enroll in a four-year institution compared to not enrolling in any college, but only Hispanic and Black students had higher probabilities of enrolling in a four-year versus a two-year (full-time). In their study, academic performance and socioeconomic status were also found to be positively associated with an increased likelihood of four-year enrollment compared to either two-year or non-enrollment. Finally, Plank and Jordan (2001) found that students who received financial aid information were more likely to enroll in a four-year college when compared with non-enrollment only.

In her research on differences in decisions to enroll in four-year institutions among Black, White, and Hispanic students, Perna (2000) found that African-American students were more likely to enroll in a four-year college than White students, but not so for Hispanic students. Perna also discovered that academic performance and rigor of coursework were also associated with an increased probability of four-year enrollment. Higher parental education (part of the component of socioeconomic status) had a positive impact on four-year enrollment, while higher personal and parental educational expectations were also found to be associated with a higher chance of four-year

enrollment. Finally, Perna found that higher tuition was associated with a higher probability of four-year enrollment, while higher unemployment was connected to a lower probability of enrollment.

This research finds that the reception of college preparation information (both "early" and "late") has a direct influence on postsecondary choice among Hispanic students and differentially among students from different socioeconomic backgrounds. However, the direct influence of early college preparation information, as measured through the variable of "high-information states" possesses a few factors that may unduly affect its influence, and stronger, clearer measure is needed for future research. This research also indicates that the influences of socioeconomic status and academic performance are very important players in the likelihood that a student will enroll in a four-year institution after graduating from high school, much as Perna (2000), Beattie (2001) and Plank and Jordan (2001) found. Furthermore, students with high educational expectations of postgraduate work, held much greater odds of enrolling in a four-year institution compared students with expectations to obtain a Bachelor's degree. Students that have plans to receive a Doctorate degree are typically students who have investigated what they want to do long-term and have discovered that this requires a high level of education. These students, it is assumed, prepare more fully for postsecondary access as they realize that their long-term success depends on this, and this research indicates that expectations are influenced by the reception of college preparation information.

A second important finding from this model was that of the strong role of rigor of academic coursework. Student's who on average took a rigorously academic path in education were associated with a strong increase in their likelihood of four-year

enrollment, while students who were primarily involved in vocational coursework were associated with a much greater likelihood of not enrolling in college (see Adelman, 1999). Students who took a blend of academic and vocational coursework, while much less likely to enroll in a four-year college, tended to maintain their likelihood for enrolling in a two-year college. These would appear to be students that are preparing to attend two-year colleges and may be taking courses that are indicative of the type of postsecondary education they want. This is comparable to Perna's (2000) general measure for rigor. Again, this research suggests that the reception of college preparation information early in the college choice process likely influences the decisions of students in the classes the choose to take, particularly as they are aware of the academic requirements necessary to achieve their postsecondary expectations.

Implications for Future Research and Educational Policy

Earlier research on the importance of financial aid and on academic preparation have consistently signaled the importance of preparatory information influencing the access and reception of aid and the influence on student performance (Kist & Venezia, 2004; St. John, 2002; Plank & Jordan, 2001; McDonough, 1997; Hossler, Schmit & Vesper, 1999; Galdieux & Swail, 1999). However, one of the major challenges to assessing the influence of information on student access to college is constructing a variable that serves as an accurate measure indicating the reception of adequate and clear college preparation information early and consistently during the college choice process. The variable of "high-information states" was created for this purpose. Verification of states that held policies during the period of time these analyses were focused on

suggested that the variable can be fine-tuned and that it may stand as a meaningful first step in trying to create such variables in the future.

Another major challenge is parsing out whether the latter measure of information (financial aid information) is an indication of the role of information or if it is more of an indication of unmeasured student motivation. This endogeneity presents a difficult challenge towards assessing the real impact of college preparation information, and this research has sought to address this problem by developing an instrument that would indicate to what extent the measure of information used was truly a measure of information itself.

The creation of the "high-information states" variable was also developed to serve as an instrument that might parse out student motivation and the reception of late college preparation information. While this particular instrument did not prove to be valid (or "strong") in serving to overcome the problem of the reception of financial aid information endogenous with unmeasured student motivation, it offers a step and an important indication in the direction that future research must turn. In order for policy-makers to clearly understand the impact of college preparation information, research must find a way of measuring that influence independent of other non-measurable factors. Furthermore, many of the experts indicated the need for better understanding how states differ in their policies toward disseminating college information, and that such an analysis would prove worthwhile in analyzing the variation that may exist between states and their levels of postsecondary access and success.

This research has also indicated the necessity of understanding the dynamic nature of the college choice process, and offers an adapted framework that includes the

important role of information in the evolution of student educational expectations and performance. Prior research has not yet sought to study changes in academic performance on the road to postsecondary choice, and thus this study offers insights into what influences student performance through the course of their high school career. This investigation also suggests new methods for understanding changes in educational expectations, by measuring those changes as nominal shifts in a positive, neutral, or negative direction from prior expectations. Conceptually this offers researchers the opportunity to explore the dynamic nature of student expectations and whether certain groups or factors are more or less influential in maintaining or revising student expectations throughout the course of high school.

The modeling of the college choice also offers a fresh "complete choice" set for determining the influence of predictors on all of the postsecondary options available to a student. Prior research has approached college choice as a binary decision, comparing either the likelihood of non-enrollment to enrollment, or the odds of four-year enrollment to any other option. Students, however, do not typically determine their postsecondary choices in this dichotomous fashion. Instead, they consider all of the potential options of non-enrollment, enrollment in vocational/business or two-year colleges, and enrollment in four-year colleges and universities. This study suggests that future research conceive similar manners of measuring the odds of all viable options in a choice set. For example, subsequent research may be interested in what predictors influence the types of four-year institutions students choose to attend such as might be indicated by the Carnegie classification system, and would suggest that the outcome measure would most appropriately be measured in terms of a multinomial choice rather than a binary decision.

Finally, this research has sought to find the most appropriate way to treat the challenges of missing data. The study suggests that the determination of college choice is not a static event influenced by a snapshot of predictors at the moment of decision but rather that it is an evolving process that culminates in a decision. In order to clearly measure the factors of this process research must rely on rich longitudinal panel data. Yet, this data tends to be fraught with missing variables because of the difficulty of continuing to track and elicit responses from subjects over time. Some researchers have simply chosen to dispose of incomplete cases, but this often decreases the power of predictive variables and may also introduce bias if those missing cases are somehow correlated with other important factors measured or unmeasured.

Other researchers, realizing the importance of keeping all available data have replaced missing values with the mean value found on that variable. This approach falsely deflates variation in these variables, thus impairing the trustworthiness of whether statistically significant variables that have been imputed in this manner might suffer from Type I error. This investigation relied upon a reliable approach for imputing missing data values that, given assumptions that the data are missing at random, proves to be statistically reliable while maintaining predictive power, and suggests that similar approaches be adopted when dealing with these challenges associated with longitudinal data in the future.

Having a more complete understanding of what influences the student college choice process offers a meaningful platform for future research that might more fully explore some of the intermediary determinants, while also more closely modeling the true choices available to students as they arrive at the moment of their postsecondary futures.

APPENDIX A – CREATION OF VARIABLE FOR HIGH-INFORMATION DISSEMINATING STATES

Inquiry submitted to experts in the field of state-policy on college preparation and information:

Dear Dr. (Expert) –

I am writing to you on the advice of Will Doyle, Jim Hearn, and John Braxton, who are members of my doctoral dissertation committee and/or faculty advisors here at Vanderbilt. For my thesis, I am investigating how information provided by governments affects students' expectations and academic performance throughout the various stages of their decision-making regarding college attendance. As part of my work, I am seeking to construct a list of what might be called "Information-Rich States," that is, states that have aggressively worked to ensure that youth are sufficiently knowledgeable regarding their postsecondary options.

Specifically, I am interested in identifying ***five to ten states*** that provided in 1988, 1992, and 1995 the most robust, effective information to students as early as the 8th grade. Among the kinds of information they may have provided would be:

4. Academic preparation information, such as what courses a student will need to take and what grade point average they will need to maintain, in order to be able to access and/or be successful in postsecondary institutions once they graduate from high school.
5. Financial aid information that indicates how much going to college in that state is likely to cost, how students are able to apply for financial aid, and/or what requirements exist to qualify for such aid.
6. Information that indicates that applying and getting accepted to college can be easy if they plan accordingly and follow information that has been provided.

I am seeking your judgment on this question as you are widely considered an expert in postsecondary education policy. It would be a great help to me if you could offer your thoughts on which states might most clearly be termed information-rich .

Thank you, in advance, for taking just a few moments of your valuable time to help me with this process. You may respond to this query by phone **(615-310-8669)**, by e-mail (**tim.zeidner@vanderbilt.edu)**, or by postal mail, whichever is easiest for you. If you could respond by June 15, I would be very grateful. Should you have any questions, please don't hesitate to contact me or any of my committee members at Vanderbilt.

Sincerely,

Tim Zeidner
Ph.D. Candidate
3030 Chelsea Way
Antioch, TN 37013

Experts who responded to the survey and their positions:

1. Don Hossler – Vice Chancellor of Enrollment Services and Professor of Educational Leadership and Policy studies at Indiana University. Co-author of "Going to college: How social, economic, and educational factors influence the decisions students make".
2. Ed St. John – Professor of Educational Leadership and Policy studies at Indiana University and Director of the Indiana Education Policy Center. Co-author of numerous articles on the impact of financial aid on educational choices, including access to and persistence in higher education.
3. David Longanecker – Executive Director of the Western Interstate Commission for Higher Education. Previously he served for six years as the assistant secretary for postsecondary education at the U.S. Department of Education, developing and implementing national policy and programs that provided more than $40 billion annually in student aid and $1 billion to institutions. Prior to that he was the state higher education executive officer (SHEEO) in Colorado and Minnesota. He was also the principal analyst for higher education for the Congressional Budget Office, and has served on numerous boards and commissions, writing extensively on higher education issues.
4. Paul Lingenfelter – President of the State Higher Education Executive Officers (SHEEO) since 2000, as focused on increasing successful participation in higher education.
5. Dennis Jones – President of the National Center for Higher Education Management Systems (NCHEMS) a research and development center founded to improve the management effectiveness of colleges and universities.
6. Jacqueline King – Director for the Center for Policy Analysis at the American Council on Education (ACE). King's particular area of expertise is student financing of higher education and access to higher education. She is the author of numerous articles, reports, and book chapters on these topics and is the editor of *Financing a College Education: How It Works, How It's Changing* (Oryx Press, 1999).

Table 34. Predicted Probability of Nominal Shift in 12th Grade Educational Expectations for White Females

Nominal Choice	*Average student*	*High Info State*	*add 1/2 sd SES*	*add 1/2 sd Test*	*add 1/2 sd GPA*	*Parent's Doctorate*
Revised down	24.61%	25.46%	23.84%	23.18%	23.39%	26.17%
Unchanged	44.40%	45.14%	45.74%	46.40%	47.72%	48.21%
Revised up	30.99%	29.39%	30.42%	30.42%	28.89%	25.62%
Total	100%	100%	100%	100%	100%	100%

Note: sd means "standard deviation". Each column following "High Info State" represents an addition to a student who did not live in a "High Info State," also known as an "average" student. For example, the fourth column represents an average student that had an SES ½ sd higher than the mean and whose GPA was ½ sd higher than the mean.

Figure 16. Changed 12th Grade Expectations for White Females

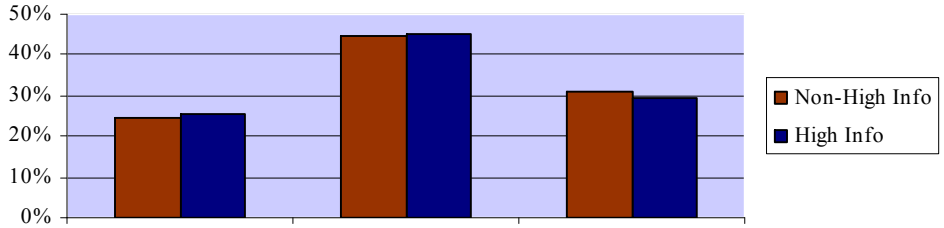


Table 35. Predicted Probability of Nominal Shift in 12th Grade Educational Expectations for African-American Females

Nominal Choice	*Average student*	*High Info State*	*add 1/2 sd SES*	*add 1/2 sd Test*	*add 1/2 sd GPA*	*Parent's Doctorate*
Revised down	22.78%	23.69%	22.12%	21.51%	21.83%	24.66%
Unchanged	39.26%	40.12%	40.54%	41.13%	42.52%	43.39%
Revised up	37.96%	36.18%	37.34%	37.35%	35.65%	31.94%
Total	100%	100%	100%	100%	100%	100%

Note: sd means "standard deviation". Each column following "High Info State" represents an addition to a student who did not live in a "High Info State," also known as an "average" student. For example, the fourth column represents an average student that had an SES ½ sd higher than the mean and whose GPA was ½ sd higher than the mean.

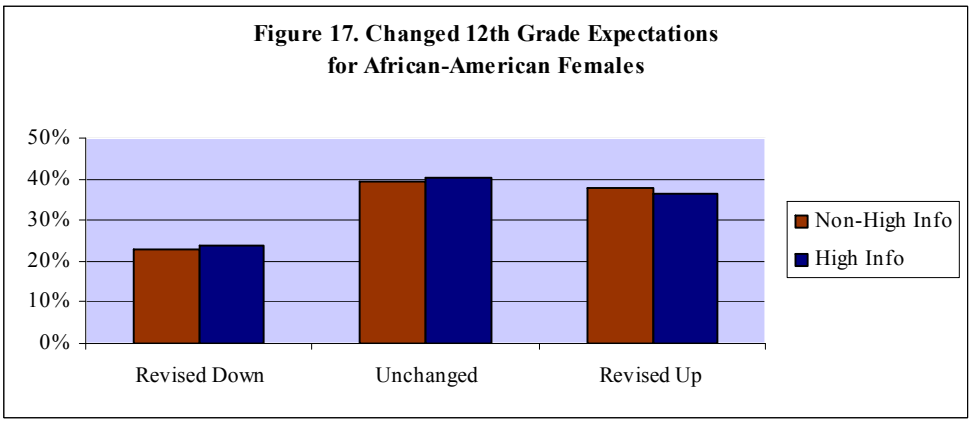


Table 36. Predicted Probability of Nominal Shift in 12th Grade Educational Expectations for Hispanic Males

Nominal Choice	*Average student*	*High Info State*	*add 1/2 sd SES*	*add 1/2 sd Test*	*add 1/2 sd GPA*	*Parent's Doctorate*
Revised down	22.32%	23.19%	21.66%	21.05%	21.32%	24.06%
Unchanged	41.41%	42.27%	42.71%	43.32%	44.71%	45.56%
Revised up	36.27%	34.54%	35.64%	35.64%	33.96%	30.38%
Total	100%	100%	100%	100%	100%	100%

Note: sd means "standard deviation". Each column following "High Info State" represents an addition to a student who did not live in a "High Info State," also known as an "average" student. For example, the fourth column represents an average student that had an SES ½ sd higher than the mean and whose GPA was ½ sd higher than the mean.

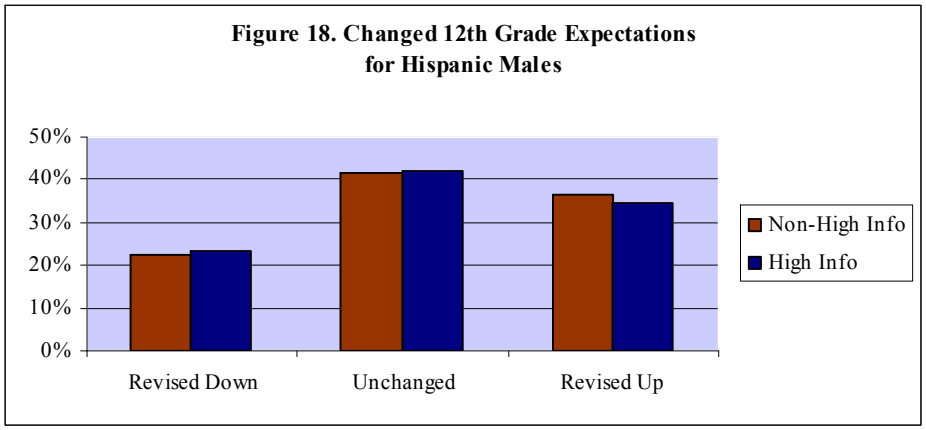


Table 37. Predicted Probability of Nominal Shift in 12th Grade Educational Expectations for Hispanic Females

Nominal Choice	*Average student*	*High Info State*	*add 1/2 sd SES*	*add 1/2 sd Test*	*add 1/2 sd GPA*	*Parent's Doctorate*
Revised down	24.58%	25.51%	23.86%	23.21%	23.51%	26.43%
Unchanged	40.16%	40.96%	41.46%	42.09%	43.43%	44.10%
Revised up	35.26%	33.54%	34.68%	34.70%	33.06%	29.47%
Total	100%	100%	100%	100%	100%	100%

Note: sd means "standard deviation". Each column following "High Info State" represents an addition to a student who did not live in a "High Info State," also known as an "average" student. For example, the fourth column represents an average student that had an SES ½ sd higher than the mean and whose GPA was ½ sd higher than the mean.

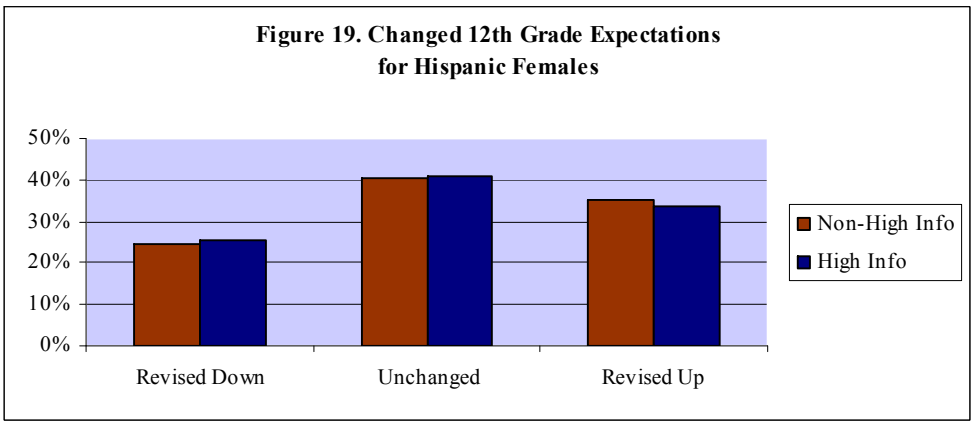


Table 38. Change in Academic Performance Between Eighth and Tenth Grade ("Expectations" measured in years)

Variables	**Model 1**			**Model 2**			**Model 3**			**Model 4**			**Model 5**			**Model 6**		
Intercept	-0.24	*0.06*	***	-0.25	*0.10*	*	-0.24	*0.10*	*	-1.57	*0.54*	**	-0.31	*0.61*		-0.34	*0.61*	
Demographics																		
Sex (Female=1)				-0.21	*0.11*	*	-0.21	*0.11*	*	-0.23	*0.11*	*	-0.26	*0.11*	*	-0.26	*0.11*	*
Race (ref=White)																		
Black				0.14	*0.19*		0.14	*0.19*		0.08	*0.19*		0.14	*0.19*		0.09	*0.20*	
Hispanic				0.35	*0.18*	*	0.36	*0.18*	*	0.30	*0.18*	†	0.32	*0.18*	†	0.42	*0.18*	*
Asian				0.60	*0.21*	**	0.62	*0.21*	**	0.53	*0.22*	*	0.46	*0.21*	*	0.45	*0.24*	†
Other				0.03	*0.43*		0.03	*0.43*		0.02	*0.43*		0.08	*0.43*		0.08	*0.43*	
Socioeconomic Status				-0.16	*0.07*	*	-0.16	*0.07*	*	-0.25	*0.08*	**	-0.27	*0.08*	***	-0.30	*0.09*	***
High Information State							-0.06	*0.19*		-0.06	*0.19*		-0.04	*0.19*		0.02	*0.24*	
Student's Expectation										0.01	*0.03*		-0.01	*0.03*		-0.01	*0.03*	
Parents' Expectation										0.08	*0.03*	*	0.05	*0.03*	†	0.06	*0.03*	†
GPA 6^{th}-8^{th} Grades													-0.64	*0.82*		-0.67	*0.82*	
Interactions																		
Info*Black																0.52	*0.84*	
Info*Hispanic																-0.49	*0.50*	
Info*Asian																-0.02	*0.51*	
Info*SES																0.17	*0.25*	
Model Fit (F-statistic)																		
	F(0, 901) = 0 R-squared = 0 Prob>F= .			F(6, 895) = 3.68 R-squared = .0028 Prob>F= .0017			F(7, 894) = 3.31 R-squared = .0029 Prob>F= .0024			F(9, 892) = 3.68 R-squared = .0040 Prob>F= .0003			F(10, 891) = 3.54 R-squared = .0041 Prob>F= .0002			F(14, 887) = 2.89 R-squared = .0046 Prob>F= .0005		

Notes: ***p<.001, **p<.01, *p<.05, †p<.10
Each model presents the coefficient, standard error (italicized) and indication of significance.

Table 39. Change in Academic Performance Between Tenth and Twelfth Grade ("Expectations" measured in years)

Variables	**Model 1**			**Model 2**			**Model 3**			**Model 4**			**Model 5**			**Model 6**		
Intercept	-0.23	*0.06*	***	-0.28	*0.09*	***	-0.28	*0.09*	**	-0.01	*0.43*		0.07	*0.53*		0.08	*0.52*	
Demographics																		
Sex (Female=1)				-0.12	*0.10*		-0.12	*0.10*		-0.12	*0.10*		-0.13	*0.10*		-0.13	*0.10*	
Race (ref=White)																		
Black				-0.05	*0.17*		-0.05	*0.17*		-0.04	*0.17*		-0.09	*0.17*		-0.10	*0.17*	
Hispanic				0.51	*0.17*	**	0.51	*0.17*	**	0.53	*0.17*	**	0.47	*0.17*	**	0.37	*0.19*	*
Asian				0.60	*0.17*	***	0.61	*0.17*	***	0.63	*0.17*	***	0.61	*0.17*	***	0.75	*0.19*	***
Other				0.23	*0.39*		0.23	*0.39*		0.24	*0.39*		0.22	*0.40*		0.22	*0.40*	
Socioeconomic Status				-0.01	*0.07*		-0.01	*0.07*		0.01	*0.07*		-0.03	*0.07*		-0.05	*0.08*	
High Information State							-0.03	*0.15*		-0.03	*0.15*		-0.05	*0.15*		-0.07	*0.18*	
Student's Expectation										0.03	*0.02*		0.02	*0.02*		0.02	*0.02*	
Parents' Expectation										-0.05	*0.02*	*	-0.06	*0.02*	*	-0.06	*0.02*	*
GPA 8^{th}-10^{th} Grades													0.10	*0.04*	**	0.10	*0.04*	**
Coursework																		
Rigorous Acad.													0.10	*0.13*		0.10	*0.13*	
Rigorous/Vocational													-0.04	*0.44*		-0.03	*0.44*	
Acad./Vocational													-0.56	*0.19*	**	-0.56	*0.19*	**
Vocational													-0.89	*0.20*	***	-0.89	*0.20*	***
Interactions																		
Info*Black																0.02	*0.52*	
Info*Hispanic																0.44	*0.33*	
Info*Asian																-0.35	*0.40*	
Info*SES																0.12	*0.18*	
Model Fit (F-statistic)																		
	F(0, 901) = 0 R-squared = 0 Prob>F= .			F(6, 895) = 4.84 R-squared = .0033 Prob>F= .0002			F(7, 894) = 4.23 R-squared = .0033 Prob>F= .0004			F(9, 892) = 3.95 R-squared = .0039 Prob>F= .0002			F(14, 887) = 5.46 R-squared = .0089 Prob>F= .0000			F(18, 883) = 4.71 R-squared = .0093 Prob>F= .0000		

Notes: ***p<.001, **p<.01, *p<.05, †p<.10
Each model presents the coefficient, standard error (italicized) and indication of significance.
Reference category for Expectations is "Bachelor's degree", and for Coursework is "Academic".

Table 40. Enrollment in Postsecondary Educational Institution (ref = "Enrollment in 4-Year Institution")

Variables	Model 1		Model 2			Model 3			Model 4		
Not Enrolled											
Intercept	-0.01	*0.03*	0.20	*0.04*	***	0.08	*0.05*		-0.59	*0.07*	***
Demographics											
Sex (Female=1)			-0.42	*0.05*	***	-0.29	*0.05*	***	-0.17	*0.06*	**
Race (ref=White)											
Black			-0.24	*0.09*	*	0.05	*0.10*		0.53	*0.11*	***
Hispanic			-0.02	*0.10*		0.03	*0.10*		0.52	*0.11*	***
Asian			-0.79	*0.13*	***	-0.82	*0.13*	***	-0.25	*0.13*	†
Other			0.57	*0.25*	*	0.68	*0.28*	*	0.78	*0.34*	*
Socioeconomic Status			-1.34	*0.04*	***	-1.47	*0.05*	***	-0.94	*0.05*	***
High Information State						0.17	*0.10*		0.17	*0.11*	
Financial Aid Info						-1.09	*0.05*	***	-0.75	*0.05*	***
Student's Expectation											
High school or less									3.25	*0.36*	***
2-years or less									2.64	*0.33*	***
2+ years									2.00	*0.11*	***
Masters									-0.36	*0.09*	***
Doctorate									-0.66	*0.11*	***
Parents' Expectation											
High school or less									1.97	*0.36*	***
2-years or less									2.43	*0.71*	***
2+ years									1.63	*0.14*	***
Masters									-0.36	*0.09*	***
Doctorate									-0.26	*0.10*	*
GPA 9th-12th grade											
12th Grade Test											
Coursework (ref=Academic)											
Rigorous Academic											
Rigorous/Vocational											
Acad./Vocational											
Vocational											
Interactions											
Info*Black											
Info*Hispanic											
Info*Asian											
Info*SES											
FinInfo*Black											
FinInfo*Hispanic											
FinInfo*Asian											
FinInfo*SES											
State-level economic variables											
Unemployment											
Tuition											
Need-based Aid											
Merit-based Aid											
Model Fit (F-statistic)											
	F(0, 900) = 0		F(12, 889) = 87.55			F(16, 885) = 95.06			F(36, 865) = 57.66		
	Prob>F= .		Prob>F= .0000			Prob>F= .0000			Prob>F= .0000		

Notes: ***p<.001, **p<.01, *p<.05, †p<.10
Each model presents the coefficient, standard error (italicized) and indication of significance. Reference category for Expectations is Bachelor's degree.

Table 40 (cont.). (Enrollment in Postsecondary Educational Institution (ref = "Enrollment in 4-Year Institution")

Variables	Model 1			Model 2			Model 3			Model 4		
Two-Year Enrollment												
Intercept	-0.59	*0.04*	***	-0.52	*0.06*	***	-0.58	*0.06*	***	-0.83	*0.08*	***
Demographics												
Sex (Female=1)				0.02	*0.06*		0.08	*0.06*		0.14	*0.07*	*
Race (ref=White)												
Black				-0.45	*0.11*	***	-0.28	*0.11*	*	0.01	*0.12*	
Hispanic				0.26	*0.11*	*	0.22	*0.11*	*	0.51	*0.12*	***
Asian				-0.24	*0.13*	†	-0.41	*0.13*	***	-0.08	*0.13*	
Other				0.23	*0.30*		0.24	*0.31*		0.30	*0.31*	
Socioeconomic Status				-0.76	*0.05*	***	-0.83	*0.05*	***	-0.50	*0.05*	***
High Information State							0.58	*0.12*	***	0.58	*0.13*	***
Financial Aid Info							-0.58	*0.05*	***	-0.42	*0.06*	***
Student's Expectation												
High school or less										1.11	*0.42*	**
2-years or less										1.83	*0.32*	***
2+ years										1.70	*0.11*	***
Masters										-0.37	*0.08*	***
Doctorate										-0.60	*0.11*	***
Parents' Expectation												
High school or less										0.24	*0.50*	
2-years or less										2.01	*0.76*	**
2+ years										1.33	*0.15*	***
Masters										-0.31	*0.09*	***
Doctorate										-0.31	*0.10*	***
GPA 9th-12th grade												
12th Grade Test												
Coursework (ref=Academic)												
Rigorous Academic												
Rigorous/Vocational												
Acad./Vocational												
Vocational												
Interactions												
Info*Black												
Info*Hispanic												
Info*Asian												
Info*SES												
FinInfo*Black												
FinInfo*Hispanic												
FinInfo*Asian												
FinInfo*SES												
State-level economic variables												
Unemployment												
Tuition												
Need-based Aid												
Merit-based Aid												
Model Fit (F-statistic)												
	F(0, 900) = 0			F(12, 889) = 87.55			F(16, 885) = 95.06			F(36, 865) = 57.66		
	Prob>F= .			Prob>F= .0000			Prob>F= .0000			Prob>F= .0000		

Notes: ***p<.001, **p<.01, *p<.05, †p<.10
Each model presents the coefficient, standard error (italicized) and indication of significance. Reference category for Expectations is Bachelor's degree.

Table 40 (cont.). Enrollment in Postsecondary Educational Institution (ref = "Enrollment in 4-Year Institution")

Variables	**Model 5**			**Model 6**			**Model 7**		
Not Enrolled									
Intercept	-1.59	*0.42*	***	-1.52	*0.42*	***	-1.39	*0.49*	**
Demographics									
Sex (Female=1)	0.01	*0.07*		0.01	*0.07*		0.01	*0.07*	
Race (ref=White)									
Black	-0.36	*0.13*	**	-0.40	*0.14*	**	-0.45	*0.14*	**
Hispanic	0.13	*0.12*		0.11	*0.14*		-0.01	*0.14*	
Asian	0.02	*0.14*		0.17	*0.16*		0.18	*0.16*	
Other	0.06	*0.37*		0.06	*0.37*		-0.01	*0.36*	
Socioeconomic Status	-0.74	*0.06*	***	-0.78	*0.06*	***	-0.77	*0.06*	***
High Information State	0.26	*0.13*	*	0.27	*0.16*		0.13	*0.16*	
Financial Aid Info	-0.58	*0.06*	***	-0.58	*0.07*	***	-0.58	*0.07*	***
Student's Expectation									
High school or less	2.69	*0.37*	***	2.66	*0.37*	***	2.64	*0.37*	***
2-years or less	1.99	*0.35*	***	2.00	*0.35*	***	2.01	*0.35*	***
2+ years	1.57	*0.12*	***	1.56	*0.12*	***	1.56	*0.12*	***
Masters	-0.14	*0.09*		-0.14	*0.09*		-0.15	*0.09*	
Doctorate	-0.36	*0.12*	**	-0.35	*0.12*	**	-0.36	*0.12*	**
Parents' Expectation									
High school or less	1.71	*0.41*	***	1.70	*0.41*	***	1.74	*0.41*	***
2-years or less	2.18	*0.73*	**	2.18	*0.72*	**	2.21	*0.73*	**
2+ years	1.35	*0.14*	***	1.34	*0.14*	***	1.37	*0.14*	***
Masters	-0.21	*0.09*	*	-0.21	*0.09*	*	-0.23	*0.09*	*
Doctorate	0.01	*0.11*		0.01	*0.11*		-0.01	*0.11*	
GPA 9th-12th grade	0.40	*0.02*	***	0.40	*0.02*	***	0.40	*0.02*	***
12th Grade Test	-0.03	*0.01*	***	-0.03	*0.01*	***	-0.03	*0.01*	***
Coursework (ref=Academic)									
Rigorous Academic	-0.59	*0.10*	***	-0.59	*0.10*	***	-0.60	*0.10*	***
Rigorous/Vocational	-0.55	*0.35*		-0.54	*0.35*		-0.54	*0.35*	
Acad./Vocational	0.75	*0.14*	***	0.75	*0.14*	***	0.71	*0.14*	***
Vocational	1.02	*0.24*	***	1.01	*0.23*	***	1.05	*0.23*	***
Interactions									
Info*Black				0.14	*0.50*		0.13	*0.50*	
Info*Hispanic				0.26	*0.30*		0.31	*0.30*	
Info*Asian				-0.31	*0.30*		-0.38	*0.31*	
Info*SES				0.24	*0.15*		0.21	*0.15*	
FinInfo*Black				0.09	*0.19*		0.07	*0.19*	
FinInfo*Hispanic				0.00	*0.18*		0.00	*0.17*	
FinInfo*Asian				0.22	*0.20*		0.19	*0.20*	
FinInfo*SES				0.24	*0.08*	**	0.24	*0.08*	**
State-level economic variables									
Unemployment							0.15	*0.04*	***
Tuition							0.00	*0.00*	***
Need-based Aid							0.00	*0.00*	
Merit-based Aid							0.00	*0.00*	
Model Fit (F-statistic)									
	F(48, 853) = 47.59			F(64, 837) = 36.42			F(72, 829) = 32.91		
	Prob>F= .0000			Prob>F= .0000			Prob>F= .0000		

Notes: ***p<.001, **p<.01, *p<.05, †p<.10

Each model presents the coefficient, standard error (italicized) and indication of significance. Reference category for Expectations is Bachelor's degree..

Table 40 (cont.). Enrollment in Postsecondary Educational Institution (ref = "Enrollment in 4-Year Institution")

Variables	Model 5			Model 6			Model 7		
Two-Year Enrollment									
Intercept	0.03	*0.40*		0.11	*0.40*		-0.21	*0.48*	
Demographics									
Sex (Female=1)	0.24	*0.07*	***	0.24	*0.07*	***	0.23	*0.07*	***
Race (ref=White)									
Black	-0.73	*0.14*	***	-0.81	*0.16*	***	-0.86	*0.16*	***
Hispanic	0.15	*0.12*		-0.04	*0.15*		-0.15	*0.15*	
Asian	0.06	*0.13*		-0.13	*0.16*		-0.15	*0.16*	
Other	-0.34	*0.32*		-0.32	*0.32*		-0.39	*0.32*	
Socioeconomic Status	-0.31	*0.05*	***	-0.34	*0.06*	***	-0.34	*0.06*	***
High Information State	0.62	*0.13*	***	0.34	*0.17*	†	0.22	*0.17*	
Financial Aid Info	-0.30	*0.06*	***	-0.32	*0.07*	***	-0.31	*0.07*	***
Student's Expectation									
High school or less	0.69	*0.44*		0.67	*0.44*		0.64	*0.43*	
2-years or less	1.31	*0.34*	***	1.31	*0.34*	***	1.32	*0.34*	***
2+ years	1.37	*0.12*	***	1.37	*0.12*	***	1.36	*0.12*	***
Masters	-0.19	*0.09*	*	-0.19	*0.09*	*	-0.21	*0.09*	*
Doctorate	-0.35	*0.11*	**	-0.33	*0.11*	**	-0.34	*0.11*	**
Parents' Expectation									
High school or less	0.06	*0.54*		0.05	*0.54*		0.11	*0.54*	
2-years or less	1.82	*0.76*	*	1.84	*0.76*	*	1.90	*0.76*	*
2+ years	1.08	*0.14*	***	1.07	*0.15*	***	1.10	*0.15*	***
Masters	-0.19	*0.09*	*	-0.19	*0.09*	*	-0.21	*0.09*	*
Doctorate	-0.09	*0.10*		-0.10	*0.10*		-0.12	*0.10*	
GPA 9th-12th grade	0.22	*0.02*	***	0.22	*0.02*	***	0.22	*0.02*	***
12th Grade Test	-0.04	*0.01*	***	-0.04	*0.01*	***	-0.04	*0.01*	***
Coursework (ref=Academic)									
Rigorous Academic	-0.46	*0.09*	***	-0.45	*0.09*	***	-0.46	*0.09*	***
Rigorous/Vocational	-0.15	*0.29*		-0.11	*0.28*		-0.13	*0.29*	
Acad./Vocational	0.57	*0.15*	***	0.58	*0.15*	***	0.54	*0.15*	***
Vocational	0.47	*0.27*	†	0.48	*0.27*	†	0.53	*0.26*	*
Interactions									
Info*Black				0.31	*0.43*		0.27	*0.42*	
Info*Hispanic				0.95	*0.30*	**	0.85	*0.29*	**
Info*Asian				0.57	*0.28*	*	0.39	*0.27*	
Info*SES				0.14	*0.13*		0.10	*0.13*	
FinInfo*Black				0.13	*0.20*		0.10	*0.20*	
FinInfo*Hispanic				-0.10	*0.18*		-0.10	*0.18*	
FinInfo*Asian				-0.12	*0.19*		-0.15	*0.19*	
FinInfo*SES				0.09	*0.08*		0.09	*0.08*	
State-level economic variables									
Unemployment							0.17	*0.04*	***
Tuition							0.00	*0.00*	**
Need-based Aid							0.00	*0.00*	*
Merit-based Aid							0.00	*0.00*	
Model Fit (F-statistic)									
	F(48, 853) = 47.59			F(64, 837) = 36.42			F(72, 829) = 32.91		
	Prob>F= .0000			Prob>F= .0000			Prob>F= .0000		

Notes: ***p<.001, **p<.01, *p<.05, †p<.10
Each model presents the coefficient, standard error (italicized) and indication of significance. Reference category for Expectations is Bachelor's degree.

Table 41. Predicted Probability of Enrollment in Postsecondary Institution with Negative Characteristics for White Female students

Nominal Choice	*Average student*	*less 1/2 sd SES*	*Student Expectations less 1/2 sd*	*Parents Expectations less 1/2 sd*	*less 1/2 sd GPA*	*less 1/2 sd Test*	*Academic/ Vocational*
No enrollment	34.87%	40.85%	46.61%	49.16%	56.24%	57.06%	65.12%
Two-year	33.33%	32.62%	31.59%	31.07%	29.42%	30.86%	28.91%
Four-year	31.81%	26.53%	21.80%	19.77%	14.34%	12.08%	5.97%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Note: sd means "standard deviation". Each column represents an additional characteristic to the column that precedes it.

Figure 20. Probability of Postsecondary Enrollment among White Female Students with Below Average Indications

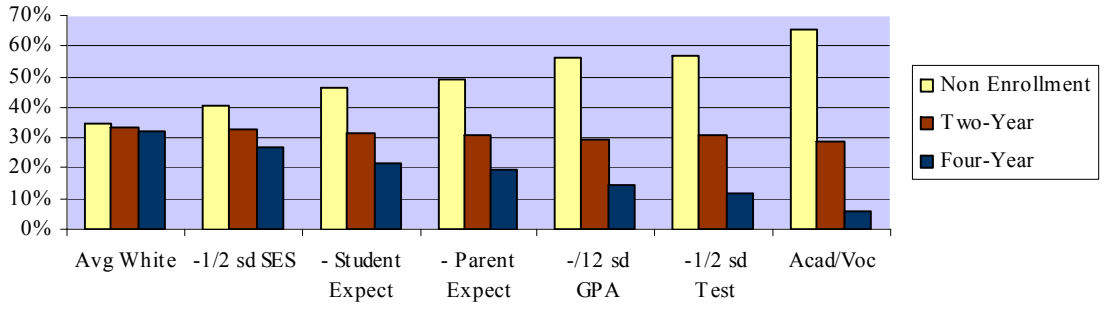


Table 42. Predicted Probability of Enrollment in Postsecondary Institution with Positive Characteristics for White Female students

Nominal Choice	*Average student*	*plus 1/2 sd SES*	*Student Expectations plus 1/2 sd*	*Parents Expectations plus 1/2 sd*	*plus 1/2 sd GPA*	*plus 1/2 sd Test*	*Rigorous Academic*
No enrollment	34.87%	29.21%	24.24%	22.16%	16.64%	14.97%	9.36%
Two-year	33.33%	33.40%	32.67%	32.02%	29.06%	25.21%	18.47%
Four-year	31.81%	37.40%	43.10%	45.82%	54.30%	59.82%	72.17%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Note: sd means "standard deviation". Each column represents an additional characteristic to the column that precedes it.

Figure 21. Probability of Postsecondary Enrollment among White Female Students with Above Average Indications

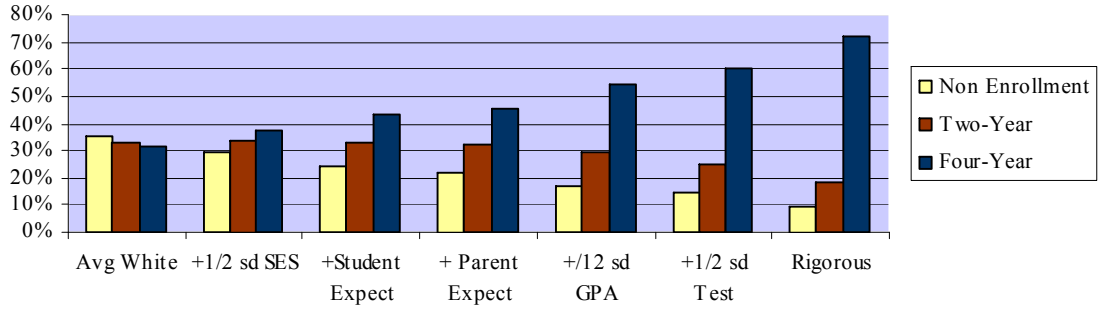


Table 43. Predicted Probability of Enrollment in Postsecondary Institution with Negative Characteristics for African-American Male students

Nominal Choice	*Average student*	*less 1/2 sd SES*	*Student Expectations less 1/2 sd*	*Parents Expectations less 1/2 sd*	*less 1/2 sd GPA*	*less 1/2 sd Test*	*Academic/ Vocational*
No enrollment	33.20%	40.10%	46.97%	50.09%	58.98%	61.25%	72.31%
Two-year	16.49%	16.64%	16.54%	16.45%	16.03%	17.21%	16.68%
Four-year	50.31%	43.26%	36.49%	33.46%	24.98%	21.54%	11.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Note: sd means "standard deviation". Each column represents an additional characteristic to the column that precedes it.

Figure 22. Probability of Postsecondary Enrollment among African-American Male Students with Below Average Indications

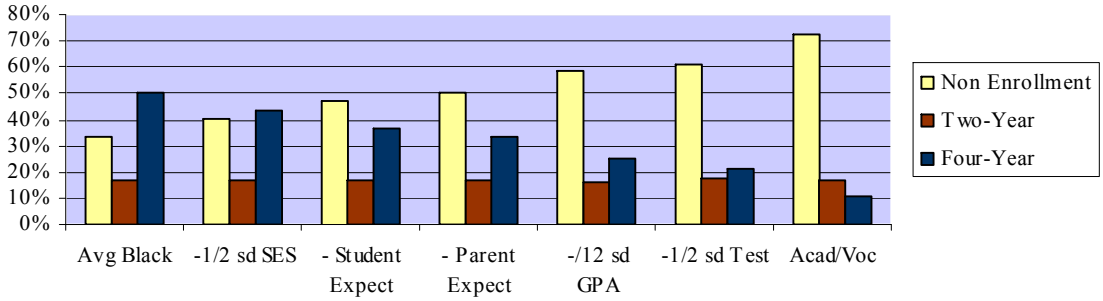


Table 44. Predicted Probability of Enrollment in Postsecondary Institution with Positive Characteristics for African-American Male students

Nominal Choice	*Average student*	*plus 1/2 sd SES*	*Student Expectations plus 1/2 sd*	*Parents Expectations plus 1/2 sd*	*plus 1/2 sd GPA*	*plus 1/2 sd Test*	*Rigorous Academic*
No enrollment	33.20%	26.87%	21.49%	19.29%	13.65%	11.75%	6.74%
Two-year	16.49%	15.97%	15.05%	14.48%	12.38%	10.28%	6.92%
Four-year	50.31%	57.16%	63.46%	66.23%	73.97%	77.97%	86.34%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Note: sd means "standard deviation". Each column represents an additional characteristic to the column that precedes it.

Figure 23. Probability of Postsecondary Enrollment among African-American Male Students with Above Average Indications

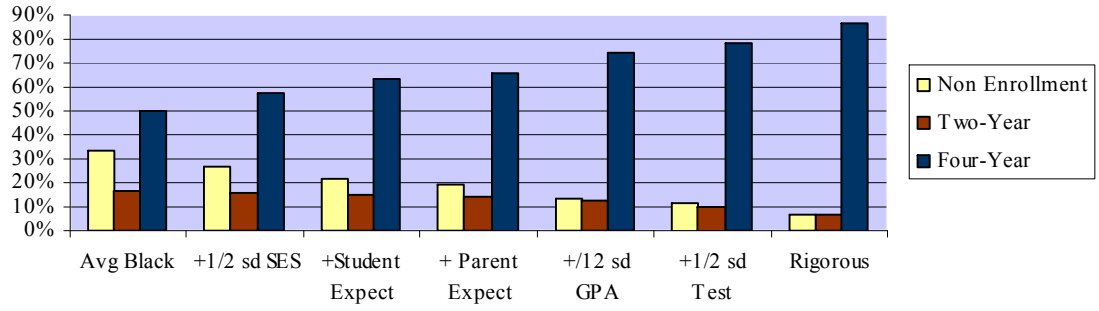


Table 45. Predicted Probability of Enrollment in Postsecondary Institution with Negative Characteristics for African-American Female students

Nominal Choice	*Average student*	*less 1/2 sd SES*	*Student Expectations less 1/2 sd*	*Parents Expectations less 1/2 sd*	*less 1/2 sd GPA*	*less 1/2 sd Test*	*Academic/ Vocational*
No enrollment	32.47%	39.10%	45.69%	48.68%	57.20%	59.15%	69.66%
Two-year	20.22%	20.34%	20.17%	20.05%	19.50%	20.85%	20.15%
Four-year	47.31%	40.56%	34.13%	31.27%	23.30%	20.01%	10.19%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Note: sd means "standard deviation". Each column represents an additional characteristic to the column that precedes it.

Figure 24. Probability of Postsecondary Enrollment among African-American Female Students with Below Average Indications

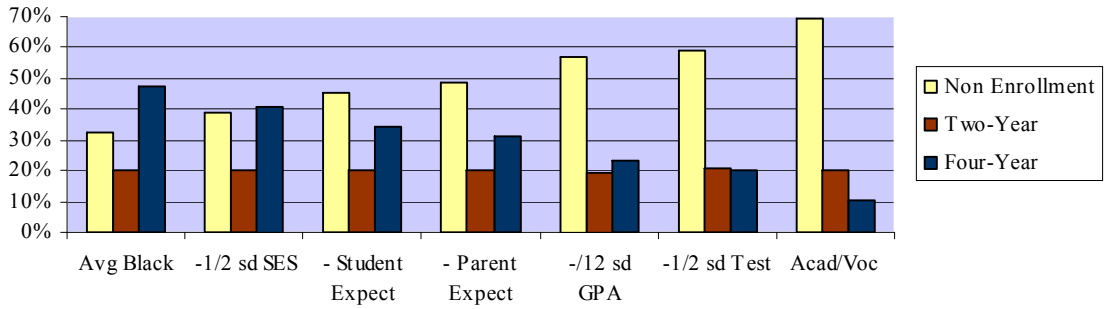
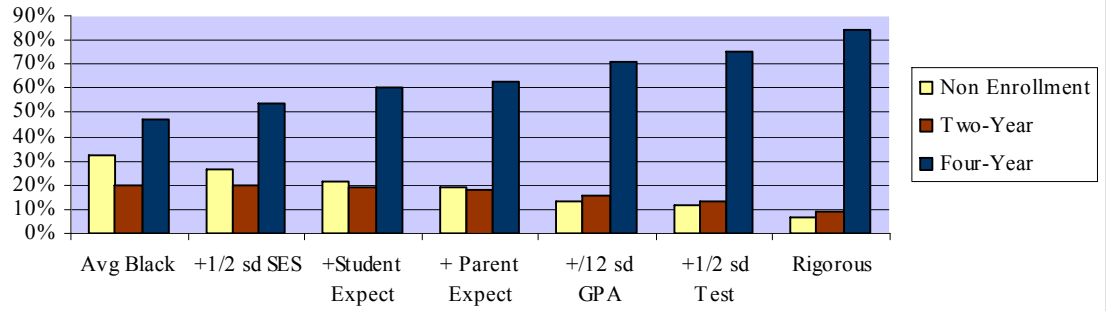


Table 46. Predicted Probability of Enrollment in Postsecondary Institution with Positive Characteristics for African-American Female students

Nominal Choice	*Average student*	*plus 1/2 sd SES*	*Student Expectations plus 1/2 sd*	*Parents Expectations plus 1/2 sd*	*plus 1/2 sd GPA*	*plus 1/2 sd Test*	*Rigorous Academic*
No enrollment	32.47%	26.38%	21.20%	19.07%	13.60%	11.79%	6.85%
Two-year	20.22%	19.65%	18.61%	17.95%	15.48%	12.94%	8.81%
Four-year	47.31%	53.96%	60.19%	62.98%	70.92%	75.27%	84.35%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Note: sd means "standard deviation". Each column represents an additional characteristic to the column that precedes it.

Figure 25. Probability of Postsecondary Enrollment among African-American Female Students with Above Average Indications



APPENDIX C – TEST FOR THE INSTRUMENTAL VARIABLE

The test for instrumental variables in Stata, ivreg2, is explicitly constructed to test the strength of an instrumental variable in a model utilizing generalized method of moments (GMM) for equations analyzing dependent variables that are dichotomous (enroll was transformed into a dichotomous option between enrollment in a four-year college versus non-enrollment) and the endogenous variables in question. Results for testing the relevance and validity of an instrument can be reported in several ways. Through GMM estimation, the test gauges whether the instrument is over-identified as well as whether the instrument is relevant, measured through an F-statistic. On both counts, the instrument was found wanting, as the Hansen J statistic revealed the instrument to be over-identified and the F-statistic indicated that the instrument was not valid. For more information related to the testing of instrumental variables through GMM estimation, see the working paper "Instrumental variables and GMM: Estimation and testing" by Baum, Schaffer, and Stillman, found online at http://faculty.washington.edu/ezivot/econ583/ivreg2_bcwp545.pdf

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