MAPPING THE PATH TO COLLEGE:

THE IMPORTANCE OF COLLEGE COSTS AND FINANCIAL AID

ON STUDENT AND FAMILY DECISION-MAKING

REGARDING COLLEGE ENROLLMENT

by

ANTHONY PAUL JONES

(Under the Direction of James C. Hearn)

ABSTRACT

This study draws from student demand as well as college access and choice literature, which supports the belief that students desire to attend college for a range of economic, psychological, and sociological reasons, and that a variety of influences affect (i.e., advance or intervene in) the process. This study acknowledges the effects of methodological and data limitations in previous research, and creates conceptual and theoretically-based models of college enrollment grounded in prior research. The models are built using nationally-representative data from the Education Longitudinal Study of 2002 (ELS). Key relationships and patterns are observed prior to building path models to demonstrate the effect of family financial concerns, and other important variables, on academic preparation, testing, application, and enrollment. Such methodical analysis contributes to causal understanding of these relationships and supports substantive, effective policies to ensure college access and success for students who are interested in becoming college qualified. Recognizing that policymakers are interested in improving

college access and completion, it is important to ensure available research has a thorough understanding of influential factors.

INDEX WORDS: college costs, enrollment influences, financial aid, perceptions of college costs, predictors of college enrollment, U.S. higher education

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A Dissertation Submitted to the Graduate Faculty of the University of Georgia in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSPHY

ATHENS, GEORGIA

2019

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May 2019

ACKNOWLEDGEMENTS

First and foremost, I thank the chair of my dissertation committee, Jim Hearn, for sharing his eminent research and policy knowledge, and for his thoughtful guidance and mentoring of my studies, writing, and intellectual and professional pursuits. I thank all my committee members—Jim Hearn, Erik Ness, and Karen Webber—for their insightful advice, dedication, and support.

I am grateful to Bill Goggin, who was a profound influence on and helped provide inspiration for my dissertation topic. In addition, I thank Susan Little for motivating me to pursue my program of study at the University of Georgia's Institute of Higher Education. Susan, along with Bonnie Joerschke, Carney McCullough, and Holley Schramski, provided invaluable experiences, opportunities, and advice in support of attaining my educational goals. I also thank Lan Gao, Austin Lacy, and Charles Sanchez for their advice and support on quantitative approaches and data analysis during my thesis work; Charles, in particular, spent significant time with me on modeling strategies. At various stages of writing, Karmen Baretich, Janet Chen, Carolyn Conner, and Elizabeth Kurban provided cogent editorial feedback and support.

During my studies, I was honored to be selected as an institutional research fellow by the Association of Institutional Research and the National Center for Education Statistics, and I appreciate the learning opportunities the fellowship afforded.

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CHAPTER 1

INTRODUCTION

Acknowledging that there are numerous individual, societal, and economic returns to postsecondary education, the question of why students—in particular, low-income students—do or do not attend college is one of the signal education issues of our time. With the landmark passage of the Higher Education Act of 1965 (HEA), the federal government cemented its commitment to expanding access to the benefits of postsecondary education by providing financial assistance to eligible students, especially those who demonstrate financial need. Since then, substantial progress has been made improving participation in postsecondary education as the overall number of students enrolling in college has increased, including gains in enrollment for certain racial and ethnic groups; however, inequities in enrollment rates still exist by race, ethnicity, income level, and other characteristics (Berube, 2010; Ma, Pender, & Welch, 2016; McFarland et al., 2018; Perna & Kurban, 2013).

In the five decades following initial implementation of the HEA, numerous studies and models[1] have been developed to parse out the effects of academic preparation, family income, and parents' education, among other factors, on the likelihood of matriculation, as well as the facilitative roles of adequate information and simplified application processes. There has also been significant interest in specifying

[1] For example, see Berkner and Chavez (1997); Choy (2001); Corrazini, Dugan, and Grabowski (1972); DesJardins, Ahlburg, and McCall (2006); Fuller, Manski, and Wise (1982); Hearn (1991); Heller (1997); Horn and Nunez (2000); Hossler, Braxton, and Coopersmith (1989); Kane (1994); Kim (2010); Klasik (2012); Leslie and Brinkman (1987); Long (2004a); Manski and Wise (1983); and Oseguera (2012).

and estimating the influence of student financial aid programs, particularly grants and loans, on access to and persistence in college.[2]

Following a broad conceptual model (Perna, 2006) incorporating multiple contextual layers (Perna, 2010; Perna, Rowan-Kenyon et al., 2008), Perna and Kurban (2013) identified from prior research four primary categories of predictors of college enrollment: financial resources; academic preparation and achievement; support from parents, family members, and significant others; and knowledge and information about college and financial aid. These four diverse categories each contain an array of components and sub-categories that affect whether students and families aspire to, adequately prepare for, and take the necessary actions to enroll in college. Quantifying the effects of such disparate but interrelated factors on college enrollment is both complex and difficult. Identifying causation is challenging because myriad factors are at play along the path to college, and the influence or prioritization of these factors in student and family decision-making often shifts over time (Choy, Horn, Nunez, & Chen, 2000; Long, 2004a).

Limitations to Estimating Stages to College Enrollment

Although single-equation linear models can be used to estimate the influence of one or more variables on college qualification and enrollment, such methods assume simultaneous interaction among dependent and independent variables, whereas the process for becoming college qualified and enrolling is comprised of a series of sequential—not simultaneous—stages (Cabrera & LaNasa, 2001; Hossler & Gallagher,

[2] For example, see Advisory Committee on Student Financial Assistance (ACSFA) (2010); Fife and Leslie (1976); Heller (2008); Hossler, Hu, and Schmit (1999); Leslie and Fife (1974); Linsenmeier, Rosen, and Rouse (2006); McPherson and Schapiro (1991); Mundel, 2008; Ness and Tucker (2008); Perna (2008; 2010); Schwartz (1985); St. John and Noell (1989); Tierney and Venegas (2009); Toutkoushian and Hillman (2012); and Waddell and Singell (2011).

1987; Perna, 2006; Young & Reyes, 1987). The stages along the pathway to college generally include: 1) development of college aspirations and academic preparation as early as middle school; 2) testing and applying for college in the latter years of high school; 3) completing high school; and, ultimately, 4) deciding whether and where to enroll (Braxton, 1990; Cabrera & LaNasa, 2001; Choy et al., 2000; Hossler & Gallagher, 1987; Perna, 2006).

Another limitation to accurate estimation is the unavailability of certain explanatory variables at critical points along the pathway, or pipeline, to postsecondary education—namely, financial aid (Becker, 2004; Goldrick-Rab, Harris, & Trostel, 2009; Heller, 2004; Perna, 2006). For example, a full analysis of the process is affected by the simultaneity of financial aid and enrollment; that is, eligibility for most forms of financial aid is determined only once a student has applied for admission and, thus, is not known during earlier stages of the path to college[3] (Curs & Singell, 2002; DesJardins, Ahlburg, & McCall, 2006). Further, financial aid data at the individual student level (i.e., the offered amounts of financial aid and the resulting net prices[4]) are generally available only for students who matriculate, and not for students who were offered aid and chose not to enroll (Berkner & Chavez, 1997; Heller, 2004).

[3] Although there are programs offering predictions or early commitments of financial aid eligibility, such efforts are currently limited in scope and do not serve as an adequate or sufficient determination of an actual offer of financial aid. The net price calculator mandated in the 2008 reauthorization of the HEA has been criticized for not being useful or user-friendly for students and families from at-risk or underserved populations (ACSFA, 2011; Anthony, Page, & Seldin, 2016; Holcombe, 2016; Perna, Wright-Kim, & Jiang, 2019; Shaffer, Sohl, & Steele, 2016; The Institute for College Access and Success [TICAS], 2011).

[4] "Net price" is defined as the difference between total cost of attendance (i.e., tuition, fees, books, supplies, room, board, and other education-related expenses) less total grant/scholarship ("gift") assistance from all sources (TICAS, 2011). Students and their families must meet the net price through out-of-pocket means (current or future) through cash/credit payments, employment earnings, or loans (Hearn, Jones, & Kurban, 2013).

Financial aid is known to be a powerful determinant of enrollment even for the most well prepared and talented students (Curs & Singell, 2010; Dynarski, 2003; Linsenmeier, Rosen, & Rouse, 2006; Manski & Wise, 1983; McPherson & Schapiro, 1991; Perna, 2010; Savoca, 1990; St. John, 1990; Tierney, 1982). The exclusion, or unavailability, of a variable known to be influential in enrollment and persistence decisions has very important and well-known statistical consequences, resulting in omitted variable bias (OVB) (Greene, 2018). Such distortion is particularly important when the omitted variable is powerfully related to the outcome and correlated with one or more variables in the equation (Cellini, 2008; van der Klaauw, 2002). If the correlation is strongly positive, the estimate of the effect of the included variable will be strongly biased upward; if the correlation is strongly negative, the effect will be biased downward (Greene, 2018). Family income and need-based financial aid are known to be inversely related, thus, the estimated effect of family income on enrollment in most, if not all, analyses is biased downward—and in some cases, to zero—because financial aid is omitted (Becker, 2004; Cellini, 2008; Heller, 2004). It is logically impossible to get an unbiased estimate of the effect of family income on enrollment if financial aid is excluded. If need-based grant assistance to students was sufficient in level and perfectly distributed, there would be no observable difference, by family income, in college enrollment among those seeking to enroll.[5]

Such limitations have had a tremendous impact on research and policy assumptions made regarding student financial aid and college access and persistence. In

[5] Differences in enrollment by family income have long been the focus of public policy discussions and such differences continue to exist (ACSFA, 2010; Perna & Kurban, 2013).

fact, they have given credence to an enormously important and widespread, but fallacious, conclusion that financial aid is sufficient for students who are college qualified.[6] In the face of these limitations, there is substantial evidence that student and parent concerns over, or the importance of, college costs[7] and the availability of financial aid negatively impact enrollment (Advisory Committee on Student Financial Assistance [ACSFA], 2010; Bell, 2011; DesJardins, 2006; Hall, Cabrera, & Bibo, 2012). Such evidence shows that concerns over costs and aid are strongly related to enrollment and appear to be uncorrelated to the error term in regression analyses. ACSFA's *Mortgaging Our Future* report (2006) contained a related critical observance:

> A comparison of expectations and plans of the [high school graduating] class of 1992 and 2004 shows that, while expectations in 10th grade increased among college-qualified high school graduates from low- and moderate-income families, plans in 12th grade to enroll in a 4-year college were at the same level or lower. Increases in academic preparation appear not to have increased plans to enroll in a 4-year college. (p. 29)

One assumption is that rising net prices and stagnant need-based grant aid have caused students from low- and moderate-income families to change their plans to enroll[8]

[6] Such statements were made by Berkner and Chavez (1997) and Choy (2002).

[7] For purposes of discussion in this thesis, the term "college costs" does not refer to opportunity costs; rather, it refers to the outlay for tuition, fees, books, supplies, and other expenses incurred for college enrollment (Hearn, Jones, & Kurban, 2013).

[8] ACSFA focused on need-based grant aid from all sources; Baird (2006) found a relationship between the level of state need-based grant aid and differences in enrollment.

(ACSFA, 2006, 2010), even among those who were academically prepared for college and expected to go—that is, preparation and expectations increased, but, ultimately, plans decreased. As Bell (2011) notes, there are "growing concerns that some groups of students do not plan to attend college because they believe the costs are too high" (p. 1). This appears to indicate that student and parent concerns over whether financial aid will be adequate and available may be negatively affecting decisions to prepare for and enroll in college (Fitzgerald, 2004; Heller, 2004).

Recognizing that questionable inferences regarding the adequacy of financial aid may have impacted public support for increases in financial aid, it is important to investigate the role that student and parent concerns over college costs and financial aid could have on critical stages leading to postsecondary enrollment. A survey of the literature yields numerous models of the college pipeline, but few models[9] structurally analyze the factors affecting progress to and through key stages along the entire path to initial enrollment in a postsecondary institution, and even fewer include student and parent concerns over costs and financial aid.

Overview and Purpose of the Study

This study acknowledges the effects of methodological and data limitations in previous research, and uses a conceptual and theoretically-based model of the pathway to college enrollment to analyze the effects of concerns on outcomes along the pathway. This study draws from student demand as well as college access and choice literature, which supports the belief that students desire to attend college for a range of economic, psychological, and sociological reasons, and that a variety of influences affect (i.e.,

[9] For example, see Cabrera and LaNasa (2001); Chapman (1981); DesJardins, Ahlburg, and McCall (2006); Hall, Cabrera, and Bibo (2012); Long (2004a); and Perna (2006).

advance or intervene in) the process. The model and its components are built using nationally-representative data from the Education Longitudinal Study of 2002 (ELS). Key relationships and patterns are observed in cross-tabulation analyses prior to building path models to demonstrate the impact of family financial concerns, and other important variables, on testing, application, and enrollment. Such methodical analysis contributes toward causal understanding, though not causation, of these relationships (Streiner, 2005). Recognizing that policymakers are interested in improving college access and completion, it is important to ensure available research has a thorough, unbiased understanding, and inclusion, of influential factors.

CHAPTER 2

LITERATURE REVIEW

Several studies have explored the influences on students' decisions and ability to enroll in postsecondary education, and several college access and choice models exist. The studies and models use a range of terms—e.g., pipeline, pathway, spectrum, etc.—to describe the span in which students and families gain (a) awareness of and information about college and financial aid, (b) academic readiness and preparation for college-level work, (c) access to and choice of postsecondary institution enrollment, (d) the ability to transfer among and persist within postsecondary institutions, and (e) attainment and completion of their educational goals (Cabrera & LaNasa, 2001; Choy, Horn, Nunez, & Chen, 2000; Deil-Amen & Lopez Turley, 2007; Jones, 2013; Wimberly & Noeth, 2005).

Stages within the Pipeline of Access and Choice

Across this pipeline, pathway, or spectrum, most researchers have come to agree that the process evolves over a series of stages (Braxton, 1990). Although some models differentiate among as many as seven stages (e.g., Chapman & Jackson, 1987; Kolter & Fox, 1985), all define three overarching, critical stages—aspirations/predispositions, search, and choice—through which students must advance in order to enroll successfully (DesJardins, Ahlburg, & McCall, 2006; Hossler & Gallagher, 1987; Hossler, Braxton, & Coopersmith, 1989).

There are debates regarding the definition and terminology for the terms "aspirations" and "predispositions." Some define aspiration to mean the number of "years

of schooling the student would like and expects to obtain" (Howell & Frese, 1979, p. 37), while others characterize the term as expectations or hopes (Schultz & Ricciuti, 1954), or wishes or desires (Chapman, 1981), regarding educational goals. Hossler and Gallagher (1987), however, indicate a preference for the term "predisposition," meaning development of educational and occupational goals. Adelman (1999) asserts "expectations" are different from "aspirations" by distinguishing what a student expects to happen (expectations) from what they hope will happen (aspirations) (Bell, 2011). On the other hand, Nelson (1972) notes "plans"—defined as actions the student decides and prepares to take—are clearly distinguished from "aspirations," which are characterized as what the student would like to do. Research indicates aspirations and plans are important predictors of college enrollment (Adelman, 2006; St. John & Hu, 2006), and evidence points to students beginning to form these attitudes and plans as early as seventh grade (Choy et al., 2000; Terenzini, Cabrera, & Bernal, 2001). Adelman (1999) stresses the importance of clearly defining such terms in order to elicit a common understanding, as well as gather accurate data.

There is substantial agreement on the definition of the search and choice stages. Hossler, Braxton, and Coopersmith (1989) define the search stage to include the investigation of alternatives and options (including the number of institutions to which the student wishes to apply), application, and admission. The choice stage includes choosing among institutions to which the student has been accepted and enrolling in a specific institution (Hossler, Schmit, & Vesper, 1999; Hurtado, Inkelas, Briggs, & Rhee, 1997).

Perna (2006) affirms these three stages, but advances the relevance and influence of four contextual layers—individual habitus; school and community context; higher education context; and the broader social, economic, and policy context—affecting a student's college choice decisions. Paulsen's (1990) access and choice model emphasizes the economic, psychological, and sociological factors of decisions to pursue college enrollment. The economic perspective is driven by consideration of opportunity costs, sensitivity to price and debt, and the return on investment and economic benefits to higher education (Bergerson, 2009; Leslie & Brinkman, 1987; Paulsen, 1990; Perna, 2008). The psychological aspect involves student and family perceptions of the higher education environment, such as costs, curricular offerings, and location (Bergerson, 2009; Desmond & Lopez Turley, 2009; Manski & Wise, 1983; Paulsen, 1990). The sociological perspective aligns college choice with the desire for status attainment (Bergerson, 1990; Paulsen, 1990).

One facet of the psychological aspect that bears significant relevance to this study is level of concerns over finances. The importance placed on costs, finances, and affordability factor into decisions to prepare for and enroll in college, especially for students from low-income and certain racial/ethnic backgrounds (ACSFA, 2006, 2010; Grodsky & Jones, 2007; Hall, Cabrera, & Bibo, 2012; Long, 2004b; Ness & Tucker, 2008; Porter et al., 2006). Morgan (2002) points out that when individuals are making decisions and are less confident in their understanding of the issue, they tend to underinvest in actions that could help them achieve their goals. Hall, Cabrera, and Bibo (2012) analyzed ELS data and identify that children of parents who had strong concerns about college affordability and finances, regardless of income level, are less likely to

reach any of three stages leading to college enrollment—academically preparing, testing, and applying. Hall and colleagues speculate that the totality of college net price and any associated potential debt exacerbates negative perceptions of affordability and finances for individuals with the greatest financial concerns. Ness and Tucker (2008) observe that students from low-income families in Tennessee are more likely than students from families with higher incomes to perceive college decisions as being influenced by the receipt of aid; similarly, African Americans, compared to Caucasians, perceived a greater influence of aid receipt on college decisions.[10]

Grodsky and Jones (2007) argue that "parents who are less certain of the costs of college may be less likely to act in ways that help their children pursue college" (p. 761), even when their estimates of costs are not different, on average, than those of parents who have a better understanding of such costs. Extending this concept to stages prior to enrollment, Grodsky and Jones argue that variation in the quality of information on college issues may contribute to the inequalities in college preparatory behavior. Long (2004b) points out that most economic models, including those applied to college-going behaviors, assume perfect information among the actors to which the model applies, yet there is substantial evidence that information is neither perfect nor uniform across actors. When considering the benefits and costs to go to college, students and parents are not only using economic reasons, but also moral, religious, ideological, and altruistic reasons, among others; thus, the levels of importance are relative to the individual and not absolute (DesJardins & Toutkoushian, 2005; Shepsle, 2010).

[10] The researchers studied perceptions of Tennessee's merit aid program. For purposes of contextualizing net price decisions for study participants, it is of note that the merit-based grant award, and need-based grant supplement, funded the equivalent of in-state tuition and fees to recipients who were state residents and who demonstrated financial need along with the requisite academic qualifications.

Although some (Baum & Schwartz, 2012; Horn, Chen, & Chapman, 2003; Ikenberry & Hartle, 1998) assert that disadvantaged parents and students might act in a more rational way if they had more or better information, or were able to better understand the issues of college pricing and financial aid, others (Kane, 1999; Mumper, 1996) argue that regardless of the information, some students and parents responded negatively to rising college prices even when their estimates and actual costs were similar or the same. However, DesJardins and Toutkoushian (2005) point out:

> While having inaccurate or incomplete information may affect a student's decision, the decision would still be rational provided that it was based on a reasoned reaction to the information available to them [sic] at the time that they [sic] made the decision. (p. 218)… Particularly noteworthy is that rationality is always defined relative to each person's preferences and taste for risk. Rationality does not hold that given like information individuals will make the same decisions, or make decisions that an individual observing the situation would have made. (p. 233)

Regardless of how important a student or parent considers costs and financial aid, or whether the level of importance is precisely rational in economic or other definitional terms, such views can affect decisions made by the student or parent.

Within these myriad perspectives and contextual layers, most studies agree that student characteristics (e.g., race, ethnicity, gender, marital status, family income, parents' educational attainment and occupational status, academic ability, etc.),

institutional characteristics (e.g., tuition and fees, location, reputation, selectivity, curriculum, etc.), and affordability issues (e.g., costs of attendance as well as the availability, types, and amounts of financial aid, especially need-based grants) have tremendous influence on college decision-making and preparation (Curs & Singell, 2010; Dynarski, 2003; Heller, 1997; Kane, 1994; Manski & Wise, 1983; Perna, 2006; St. John, 1990; van der Klaauw, 2002).

Student Demand and Price Responsiveness

The conceptual framework chapter of this thesis elaborates on the student demand theories, but a general review of the literature related to price responsiveness and demand is necessary. First and foremost in student demand for education, students and families must desire, or see a strong benefit to, a college education. Among the many benefits to attending college are increased wages and earnings that students expect to receive as a result of a college education (Bowen, 1996; DesJardins & Toutkoushian, 2005; Ma, Pender, & Welch, 2016; Paulsen, 2001). Second, studies on price response have consistently found that increases in tuition are negatively associated with the decision process for enrollment in postsecondary education (Heller, 1997; Jackson & Weathersby, 1975; Leslie & Brinkman, 1987; St. John, 1990). Savoca (1990) points out that "a change in tuition may affect enrollments through its effect on the decision to apply to college" (p. 123).

Jackson and Weathersby (1975) identified three consistencies among the results of seven empirical studies from the late 1960s and early 1970s regarding student price responsiveness and demand for postsecondary education:

> (1) individuals from low-income families respond more to price changes in higher education than do individuals from middle- or high-income families; (2) at any income, increasing price decreases the proportion of individuals who choose to attend higher education; and (3) a change of $100 in the price of higher education will induce an average change of 2.5 percent in the enrollment in higher education. (p. 625)

In a more comprehensive review of 25 empirical studies, Leslie and Brinkman (1987) posited that while student response to different categories of costs may vary by family income, the response, on average, is roughly equal among costs less the amount of student financial aid. However, student price sensitivity is greatest for institutions with the lowest cost, least selectivity, and least wealthy student enrollment because, among other reasons, "a $100 price increase will be proportionately more in low-cost institutions" (Leslie & Brinkman, p. 198).

In an update to the Leslie and Brinkman study, Heller (1997) reviewed an additional 20 student demand studies that occurred in the decade following Leslie and Brinkman. In that decade, several changes occurred to tuition prices as well as types of financial aid programs. Heller looked at studies that occurred in the context of those changes, and investigated the responses of different categories of students and at different types of institutions. Heller observed that increases in tuition and decreases in financial aid lead to declines in enrollment. He found that the consensus from studies analyzing tuition data from the 1970s and early 1980s was for every $100 increase in tuition, enrollment drops between 0.5 and 2.0 percentage points across all institutional types. St.

John (1990) found that for every $1,000 in tuition increases, enrollments declined by 2.8 percent.

Although an increase in financial aid generally is associated with positive enrollment effects, the magnitude of the effect varies across demographic types (Bell, 2011; DesJardins, Ahlburg, & McCall, 2002; Heller, 1997; St. John, 2003). Heller (1997) notes that enrollments tend to be more sensitive to changes in grant award amounts than for work-study or loans. Heller's review further finds that lower-income students are more sensitive to changes in tuition and aid than students from higher incomes, Black students have greater sensitivity to these changes than White students, and students in two-year colleges are more sensitive than students enrolled in four-year public institutions.

Ultimately, such price response may extend to earlier stages in the process than determining whether to enroll in college once accepted. Zeidner (2006) points out that academic preparation is affected by students' perceptions of whether they can afford the costs of education; that is, students and families that perceive college may not be affordable, or the perceived costs would be greater than the perceived benefits, such students may determine that there is no need to prepare academically for college if they are not going to enroll. St. John (2002) emphasized this issue asserting that the role of finances is not exogenous to decisions to prepare academically for college while in high school; in fact, students' perceptions of college affordability or a meaningful rate of return factor significantly in curricular decisions in high school (Zeidner, 2006).

Characteristics Affecting Access and Choice

Bell (2011) notes that a variety of academic, demographic, and psychosocial characteristics predict student and family attitudes toward postsecondary education, as well as a student's progression through the education pipeline to enrollment. For example, Bell finds that compared to students who report plans to attend college, students reporting that they do not plan to go to college due to finances tend to have parents with lower education and occupation status, do not report they have significant others who want them to attend college, and tend to be poor, White, male, and low academic performers. Although numerous variables have been identified as predictors of college aspirations, search, and choice, five major categories emerge from the literature: academic preparation and achievement, attitudes and beliefs, demographic or background characteristics, finances, and information and awareness (Perna, 2006).

Academic preparation and achievement. As noted previously in this chapter, academic preparation is a key component to college enrollment because how well the student performs academically and the type of courses taken at the secondary education level has a substantial impact on how ready students are for college-level work. Several variables are evident in the literature: high school curriculum (Hearn, 1991; Hossler, Braxton, & Coopersmith, 1989; Perna, 2000, 2004), taking math as the highest level of high school coursework completed (Adelman, 1999; Horn, 1998; Perna & Titus, 2005); grades earned (Conley, 2005; Hearn, 1991); and standardized test scores (Ellwood & Kane, 2000; Hearn, 1991; Hossler & Stage, 1992; Perna, 2000; Perna & Titus, 2005).

Attitudes and beliefs. Many students intent on pursuing college view higher education as a path toward attaining improved social status (Hossler, Schmit, & Vesper,

1999; McClendon, 1976; Perna, 2006; Portes & Wilson, 1976; Sewell & Shah, 1967) and a better standard of living from increased wages and earnings (Avery & Hoxby, 2004; Becker, 1993; Bowen, 1996; Ellwood & Kane, 2000; Heller, 1997; Long, 2004a; Manski & Wise, 1983; Perna, 2006).

Demographic or background characteristics. Although numerous studies have analyzed a substantial amount of demographic and background characteristics, three are distinctive regarding differences among the three stages: gender (Hossler & Stage, 1992; Perna, 2000; Perna & Titus, 2005); parents' education (Ellwood & Kane, 2000; Hossler, Schmit, & Vesper, 1999; Hossler & Stage, 1992; McDonough, 1997; Perna & Titus, 2005); and race/ethnicity (Catsiapis, 1987; Hearn, 1988; Heller, 1997; Hurtado, Inkelas, Briggs, & Rhee, 1997; Perna, 2000; Perna & Kurban, 2013; Perna & Titus, 2005; St. John & Noell, 1989).

Finances. Finances have been consistently shown to be highly-influential on students' progression through secondary and into postsecondary education; the most direct link is family income (Avery & Hoxby, 2004; Ellwood & Kane; 2000; Hearn, 1991; Hossler, Schmit, & Vesper, 1999; Hurtado, Inkelas, Briggs, & Rhee, 1997; Kane, 1994; Long, 2004a), as well as receipt of student financial aid (Avery & Hoxby, 2004; Cabrera & LaNasa, 2001; Catsiapis, 1987; Dynarski, 2002; Long, 2004a; St. John, 1990; St. John & Noell, 1989). Additional literature documents the impact of student and parent perceptions or concerns about college costs and financial aid (ACSFA, 2006, 2010; DesJardins, 2006; Hall, Cabrera, & Bibo, 2012). As the Advisory Committee on Student Financial Assistance indicated in its 2011 report, many students and parents need to know the net prices they will face, and assumptions of net prices affect their decisions.

Information and awareness. Critical to the pursuit of postsecondary education is student and parent knowledge about college processes and benefits (Conley, 2005; Ellwood & Kane, 2000; McDonough, 1997; Perna, 2000; Perna & Titus, 2005), as well as consumer information regarding the college environment (Perna, 2006; Perna & Kurban, 2013).

Although there is evidence of a variety of returns to postsecondary educaton, and numerous characteristics and factors affect the ability and decisions to attend college, controversy remains over whether levels of financial aid are adequate, or have been for years (Berkner & Chavez, 1997; Choy, 2002). Some policymakers and researchers have intimated or explicitly stated that students and families are to blame for not understanding the available financial aid programs, not sufficiently preparing academically for college-level work, or not being rational in their assessments of the returns to investing in a college education (Hansen, 1982; Ikenberry & Hartle, 1998; Kane, 1999). However, as St. John (2003) and Bell (2011) indicate, if large numbers of academically prepared students are unable to enroll in college due to finances, then the need remains for government and other entities affecting entry to college to reconsider policy options to ensure aspiration to take the necessary steps to prepare for and gain access to postsecondary education.

CHAPTER 3

CONCEPTUAL FRAMEWORK

The following chapter consists of three parts. The first part addresses the theories and conceptual models providing the study's underlying rationale. The second addresses the reasons for re-assessing policies and models (including particular variables) of the stages to enrollment. The third section offers the research questions guiding the study.

Theories and Conceptual Models

This study relies primarily on two theoretical models: (1) student demand and price response (Heller, 1997; Hoenack & Weiler, 1979; Jackson & Weathersby, 1975; Leslie & Brinkman, 1987; St. John, 1990; Tierney, 1980, 1982) and (2) college access and choice (DesJardins, Dundar, & Hendel, 1999; Fuller, Manski, & Wise, 1982; Paulsen, 1990; Perna, 2006; St. John, Paulsen, & Starkey, 1996).

As Leslie and Brinkman (1987) note, the expansion and equalization of student access to college has long been a major public policy goal with manipulation of the price seen as a "major policy instrument of achieving this goal" (p. 182). Heller (1997) points out that the federal government interacts with price most often through subsidies in the form of student financial aid programs, whereas states tend to affect tuition and related costs through a combination of direct subsidies, primarily to public institutions, as well as through financial aid programs to students and families. Price may well serve as a primary influence on a student's enrollment in college, but numerous other issues impact the process as well.

The two constructs of student demand and college access and choice form the fundamental basis for understanding the path, or pipeline, to college enrollment by framing principles of (1) the demand for pursuing postsecondary education and (2) factors affecting a student's ability, preparation, and desire to successfully gain entry into college. Most models incorporate a variety of latent and observable characteristics to explain or predict college-going behaviors and preferences. However, as Perna's (2006) model notes, a complete understanding of the college enrollment process requires recognition of multiple theoretical perspectives—primarily human, cultural, and social capital theories. Perna further emphasizes that college enrollment processes are not universal, but vary across groups. Thus, in order to effectively close gaps in student access and success, policymakers must ensure interventions incorporate and address particulars affecting different groups. In short, context is critical, yet context is varied and dynamic.

Hoenack and Weiler (1979) recognize the contextual as well as direct influence of labor market variables on student demand by noting that student and family decisions are impacted by perceptions of the rate of return to higher education, which are defined by the "cash costs of college attendance and by labor market variables which affect earnings while in college, the opportunity cost of time spent studying and in class, and expectations of the increase in future income" (p. 93) resulting from going to college. As noted in the literature review chapter of this thesis, Heller (1997) affirms the conclusions made across numerous postsecondary demand studies: for every $100 increase in tuition, the college participation rate would drop for 18 – 24 year olds by between a quarter and three-quarters of a percentage point, resulting in a half- to two-percent decline in

enrollment on average across all institutional types. Evidence has shown, though, that students from higher-income families are not as sensitive to price as students from lower-income families; similar responses occur for the net price (Heller, 1997). Heller further notes that students and families have separate sensitivities to tuition and to financial aid, and sensitivities vary by income group (lower-income students are more sensitive to such changes than students from middle- and upper-income families), among races (sensitivity to such changes is greater among Blacks than Whites, with mixed reactions for Hispanic and Latino families), by institutional sector (students enrolled in community colleges tend to be more sensitive to tuition and financial aid changes than students enrolled in four-year institutions), and by type of aid program (students respond more positively to increases in grants than work or loans).

An important corollary to both the student demand and college access/choice models is the level of importance that students and parents place on college costs and financial aid, and whether the level of importance affects progression to and through the stages to enrollment. As Long (2004b) indicates, "Theoretically, college enrollment should be related to costs, and although most models assume perfect information among actors, this is unlikely to reflect reality" (p. 3). DesJardins and Toutkoushian (2005) supplement this notion by asserting that rationality is subjective and relative, and a single perception of cost, or the valuation of cost versus benefit, is individual; what might appear as irrational behavior by an individual may well be our own inability to observe the individual's beliefs, preferences, and propensity for uncertainty or risk.

Reassessing Access/Choice Models to Include Concerns

In order to have a cogent model of the pathway to college enrollment, it is important to determine key components of the model in order to effectively and appropriately represent the relevant influences on the process. As Perna (2006) notes in proposing a conceptual model for studying access and choice, an integrated model should draw on multiple disciplines and perspectives—such as economic and sociological—because patterns of educational attainment are not universal and, instead, vary. In addition to economic and sociological aspects, Goldrick-Rab and colleagues (2009) include psychological perspectives, which can account for perceptions and concerns in decision-making as an additional necessary component in such models. Drawing on prior research, and relying particularly on the work of Perna (2006) and Goldrick-Rab, Harris, and Trostel (2009), the model for this thesis identifies five stages of the pathway to college enrollment: (1) academic preparation, (2) taking a standardized admissions test, (3) applying for admission, (4) applying for financial aid, including scholarships, and (5) enrolling in a postsecondary institution.

As important to what a model contains can be what is omitted, be it intentionally or inadvertently. Even some of the most accessible and utilized research can have errors or biases. As Becker (2004) and Heller (2004) point out, several NCES reports released during the late 1990s and early 2000s regarding college access and persistence contained contradictions and biases. In each of the four reports Becker and Heller reviewed, NCES presents several tabular analyses, but ultimately relies on a single multivariate equation to measure a predicted outcome (college enrollment or persistence) as one factor among many predictors, and reports adjusted percentages of the outcome for each characteristic

after “controlling” for other factors (Fitzgerald, 2004; Heller, 2004). Heller identifies four major methodological errors—collinearity, endogeneity, omitted variable bias, and selection bias—that result from conclusions drawn from the single multivariate equation yet are contradicted by tabular analyses in the same reports. Heller (2004) provides an example of the policy implications of these methodological problems:

> [T]he conclusion in the NCES reports that differences in college-going rates are largely attributable to differences in parental education levels, rather than income, could lead to the conclusion that there is little that federal or state governments, or institutions can do to help close the gap in college participation between rich and poor. Levels of parental educational attainment are largely immutable, at least in the short run. However, if the differences in college entry rates are at least in part a factor of differences in resources among these groups—a conclusion that is not just plausible, but likely given the findings of other researchers—then there is a role for government and higher education institutions in closing the gap. The policy levers of financial aid and tuition levels can be utilized to help overcome these differences in resources. (pp. 55-56)

Heller also posits that if early in the process, students and their parents are discouraged about the possibility of attending college because they believe it is financially burdensome or out of reach, then they may not work to take the steps necessary to become college-qualified.

Several researchers have expanded on the works of Becker (2004) and Heller (2004). Perna (2006) referenced these two works in acknowledging the importance of selecting appropriate independent and control variables in research design, as well as the distorting effects of omitted variable bias in research on factors affecting college enrollment. Goldrick-Rab and colleagues (2009) drew upon Becker and Heller when addressing methodological challenges to identifying causal effects of aid on college enrollment and completion, and specifically mentioned the problems such biases created by the lack of "any reliable measure of financial aid" (p. 10) in many national longitudinal studies. St. John and colleagues (2018) referenced the works of Becker and Heller in advocating for experimental designs that allow for causal methods and include financial aid as a variable affecting enrollment.

Clearly, the works of Becker (2004) and Heller (2004) have been important and necessary. The body of research literature will be bolstered by demonstrations of the structural relationships among critical variables, especially levels of concern regarding finances, along the key stages to enrollment in college. Once these relationships are effectively established, they can then be carried forward to inform the construction of multivariate models for testing of future models. Such construction and testing should present a clearer and more accurate picture of access and choice in the recent decade with a goal of better informing policy for the future.

Research Questions

Based on the conceptual framework and review of literature, and recognizing that student and parent concerns over finances likely impact the demand for college as well as

aspirations, preparations, and enrollment, the following research questions serve as a guide to this study:

1. Which characteristics are most predictive of students' progression through the stages to initial college enrollment?
2. How do student concerns and parent concerns over costs and financial aid affect students' progression through the stages to initial enrollment in college?

CHAPTER 4

RESEARCH DESIGN

The conceptual framework in the previous chapter suggests that a variety of characteristics and influences affect whether students successfully navigate the critical stages to college enrollment and what factors bear the strongest relationship to the decision to advance to each successive stage. National longitudinal data best serve the purpose of studying such relationships. This chapter discusses the data and methods used to examine and analyze the individual and collective stages to enrollment in a four-year postsecondary institution, with particular attention to the effects student and parent concerns over finances have on progressing through the stages to enrollment. However, before discussing the data and methods, I address the design of models for the individual stages along the pathway to college enrollment, as well as a model of the cumulative path.

Drawing primarily from models established in the literature (Berkner & Chavez, 1997; Braxton, 1990; Cabrera & LaNasa, 2001; Chapman, 1981; DesJardins, Ahlburg, & McCall, 2006; Hall, Cabrera, & Bibo, 2012; Hossler, Braxton, & Coopersmith, 1989; Long, 2004a; Perna, 2006), and discussed in the literature review and conceptual framework chapters, I investigate five key stages—(1) academic preparation, because students must be prepared to take on the academic rigor of college-level coursework in order to be admitted and successful; (2) testing, because prior research has shown taking a standardized test for college admission is a strong signal of intent to enroll and is highly

correlated with admission and choice[11] (Hall, Cabrera, & Bibo, 2012; Hearn, 1991); (3) applying for admission, because most postsecondary institutions require application before granting admission; (4) applying for financial aid, because students—especially those from families without sufficient finances to pay college costs—typically need to apply for financial aid funds in order to receive them; and (5) enrolling at a postsecondary institution, because for students who aspire to go to college, enrollment is the ultimate outcome to achieving access or choice.

For this study, several models were created for the individual stages, in which key variables affecting each stage are illustratively presented, as were dynamic path models of the stages and the full path to college enrollment. For purposes of this thesis, representative models discussed include the models in Figures 1 through 4; however, the additional individual-stage and path models appear in the Appendix section. The models of each individual stage are represented in Figures 1 (Academic Preparation) and 2 (Enrolling in a Four-Year Institution), as well as Appendices C (Testing), D (Application for Admission), and E (Application for Financial Aid). These individual stage models, referred to as the logit models, reflect a visual representation of the direct relationship of key variables affecting the indicated stage. Dynamic path models, referred to as the GSEM models, are represented in Figures 3 (Academic Preparation) and 4 (Enrolling in a Four-Year Institution), as well as Appendices F (Testing), G (Application for Admission), and H (Application for Financial Aid). These GSEM models visually

[11] Although numerous postsecondary institutions have either stopped using standardized tests in or made such tests optional for the admission process, such optional- or non-use had not proliferated during the time ELS data were collected, thus the variable remains an important factor in analysis of college preparatory decision-making by students and families. For more information on the test-optional issue, see Buckley, Letukas, and Wildavsky (2018).

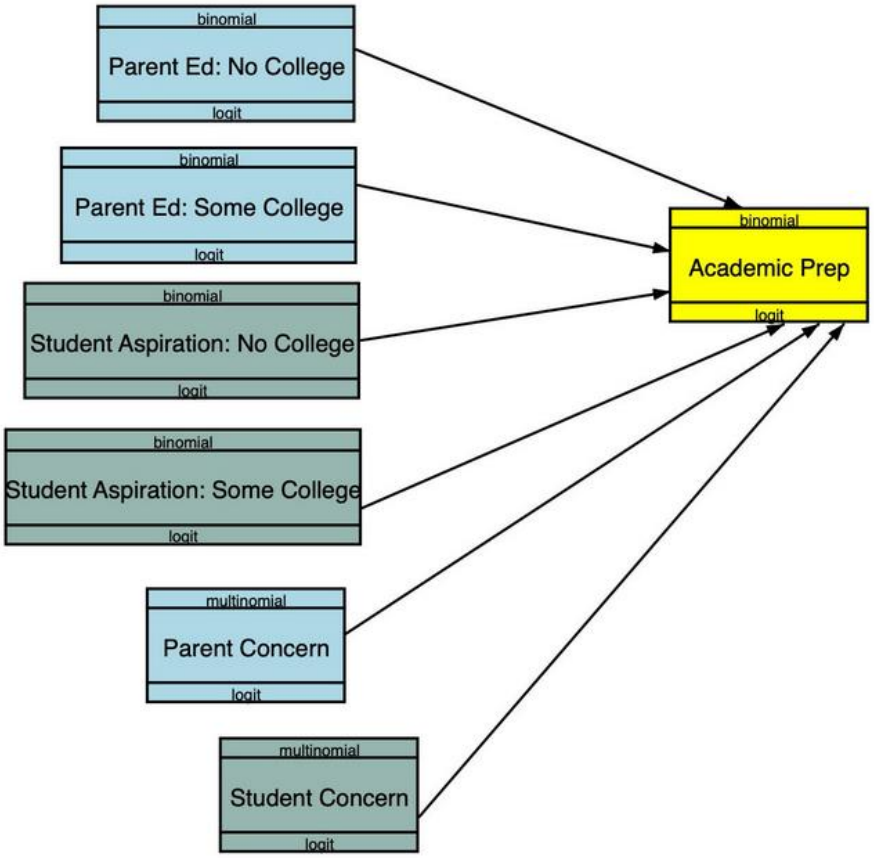

Figure 1. Logit Model for Factors Affecting Academic Preparation

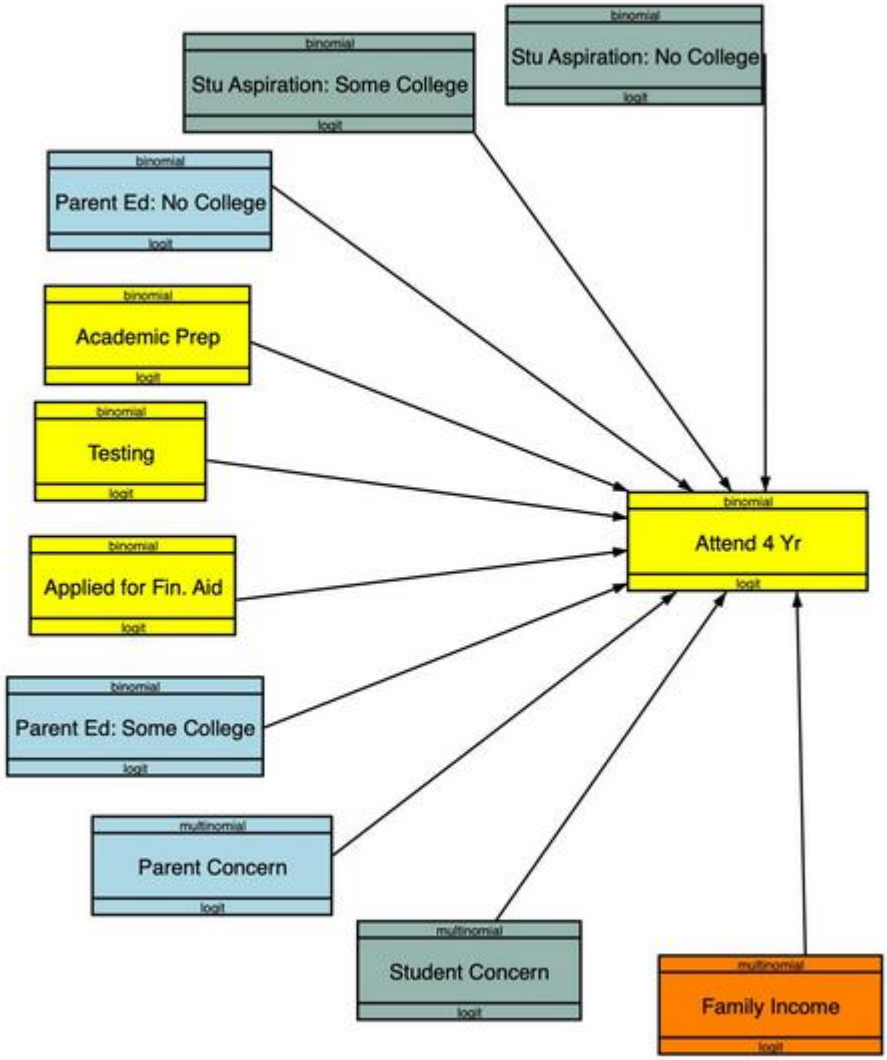

Figure 2. Logit Model for Factors Affecting Enrolling in Four-Year Institution

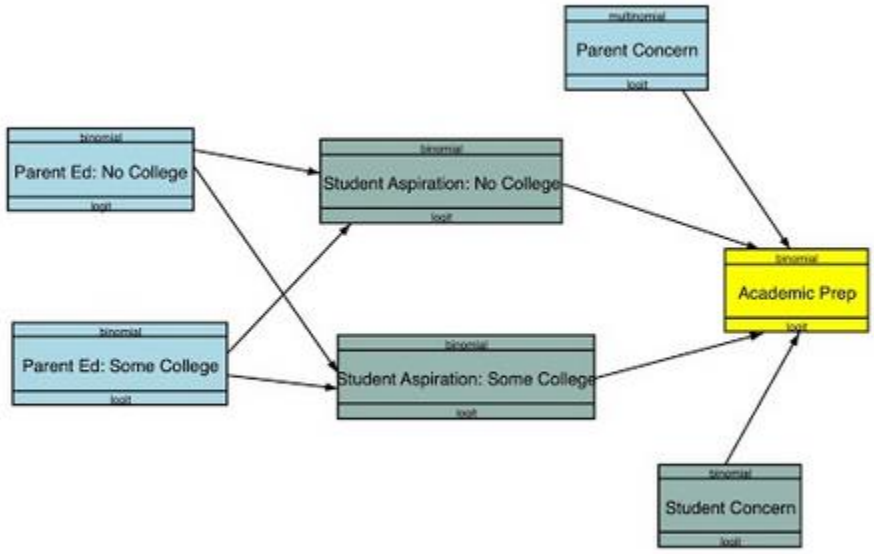

Figure 3. GSEM Path Model for Academic Preparation

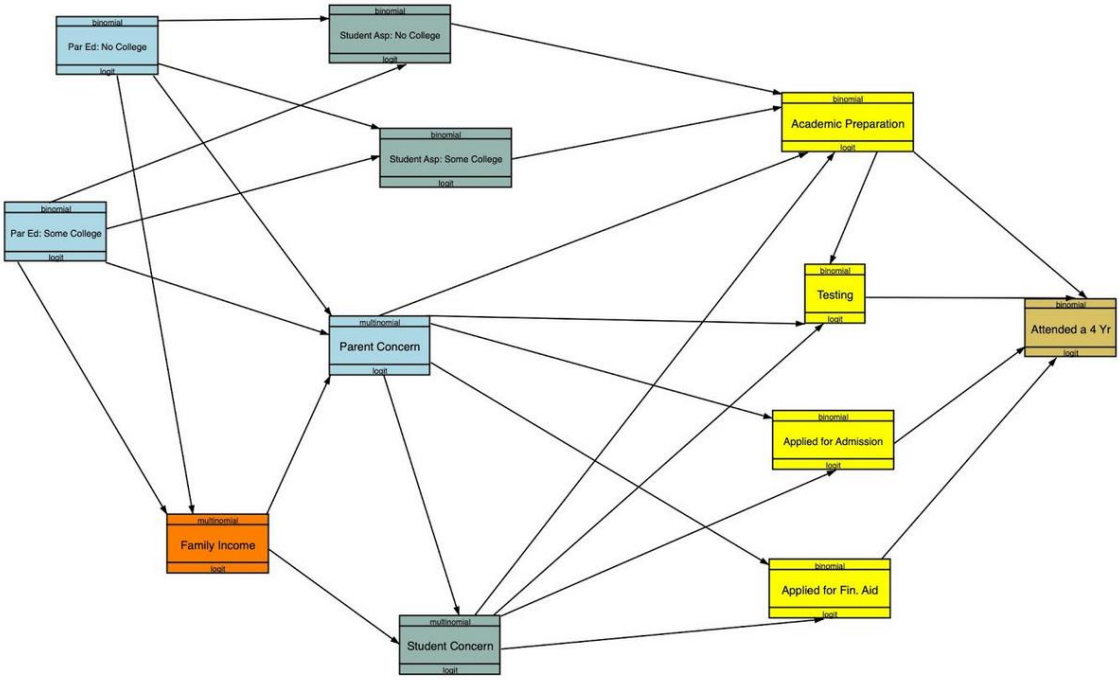

Figure 4. GSEM Path Model for Enrolling in Four-Year Institution (Full Path)

represent the interaction of variables along the path to and through the stages to enrollment in a four-year college or university. Detailed findings and further explanation of the analyses are discussed in Chapter 5.

Data

As noted in the introduction, this study draws on data from the Education Longitudinal Study of 2002 (ELS). ELS is a nationally-representative, longitudinal study administered by the National Center for Education Statistics within the U.S. Department of Education. ELS was designed to provide trend data on critical transitions, choices, and perceptions students experienced through high school and into postsecondary education and the labor market; the study gathered data and survey responses on high school sophomores in 2002 with follow-ups through eight years after high school (Ingels, Pratt, Alexander, Jewell, Lauff, Mattox, & Wilson, 2014). More specifically, ELS followed a cohort of students beginning with a survey of tenth graders (and their parents) in 2002, with survey follow-ups in 2004 (expected high school graduation), 2006 (two years after expected high school graduation), and 2012 (eight years after high school graduation) (Lauff & Ingels, 2014).

Although ELS is an appropriate dataset for this study, there are limitations. The ELS data initially focus on students who are in tenth grade and follow that national cohort through the timeframe associated with eight years after expected high school graduation; these data do not account for older or non-traditional students who are enrolled or wanting to enroll in college.

DesJardins (2006) notes as a limitation that national surveys such as ELS often have skip logic designed to skip certain questions based on an answer to a previous

question. The resulting lack of information leaves gaps in the analysis and limits the ability to make strong inferences regarding the sample. For example, on the ELS base year survey, students who did not indicate plans to continue their education beyond high school are not asked a series of questions about how important concerns over costs or financial aid were to those plans or where they received information, if any, about college, the associated costs, and the availability of financial aid (Bell, 2011; DesJardins, 2006).

An additional limitation of ELS is that survey questions are not asked in the same manner across each applicable follow-up. As Bell (2011) notes, one example of such a limitation is the set of questions related to a student's plans to enroll in college—in the base year and first follow-up, students who responded that they intend to go to college are asked subsequent questions in the base year worded differently from the subsequent questions in the first follow-up. Bell asserts that the differing language in the similar sets of questions could bias respondents and influence "which and what kind of college they plan to attend" (p. 79).

Although these limitations are notable, they are the only nationally-representative data available for the most recent preceding decade and they do indicate in broad, though imperfect, terms what were reactions, plans, and actions for students and families regarding student aspirations, expectations, preparations, and plans for postsecondary education while in secondary school; and levels of enrollment, persistence, and completion while in postsecondary education institutions. Ultimately, these data inform what was occurring in the 2000s regarding college access, choice, persistence, and completion. It is of note that these data represent decisions made to prepare for and enroll

in college prior to the Great Recession, which is roughly defined as the period between 2007 and 2009. Further discussion on this point can be found in Chapter 6 of this thesis.

This thesis uses the publicly-available ELS dataset, which provides pre-weighted data. ELS variables used in the analyses in this study are listed in Appendix A. Tables 1 and 2 provide descriptive statistics for the dependent and independent variables, respectively. Data from the two descriptive tables indicate survey responses are sufficiently representative; due to the sample size, weights were not employed in the analyses. Choices in variable selection, such as using quintiles for the income levels, resulted in unequal distributions among groupings which could affect outcome measures.

Variables representing background characteristics include measures of family income, student and parent concerns over college costs and the availability of financial aid to help cover those costs, highest level of education reached by a parent, and measures of student aspiration and parent expectation for how far in school the student will go. Dependent variables (i.e., the stages) include: academic preparation (taking at least one six-month term of Algebra II during high school[12]), testing (completion of a standardized test for admission—the ACT or SAT), applying for admission, applying for financial aid, and enrollment in a four-year (or higher) postsecondary institution.[13] Independent variables include: family income, student aspiration to enroll in

[12] This thesis referenced several studies identifying the act of taking at least Algebra II, or the equivalent, as a statistically-significant proxy of academic preparation for college coursework. See ACSFA (2006, 2010), Adelman (1999, 2006), Horn and Nunez (2000), and Rose and Betts (2001).

[13] The final outcome for enrollment was limited to four-year institutions because the student aspiration and parent expectation variables used achievement of at least a bachelor's degree as the reference group; when at least a four-year degree is a goal, enrollment in a four-year institution is an appropriate outcome measure. Although students can enter two-year colleges and attain a bachelor's degree, when ELS data were collected in 2002, baccalaureate degree pathways from two-year institutions were still nascent and emerging (ACSFA, 2008; Bragg, 2013). Data on application for admission are for any type of postsecondary institution because further level of detail is not in the public dataset.

postsecondary education, parent expectations for how far in school the student will go, parents' highest level of education, and student and parent concerns over college costs and financial aid availability.

Student and parent concern variables each were created from a composite of two variables: for the specified type of individual, the level of importance of low college costs and the level of importance regarding the availability of financial aid.[14] Additionally, dichotomous variables for both student aspirations and parent expectations for attainment of postsecondary schooling were generated and represent, respectively, whether a student did not aspire to go to college, or aspired to go to at least some college, and whether the parents expected their student not to go to college, or to go to at least some college. These variables use students who aspired to complete at least a bachelor's degree and their parents who expected them to complete at least a bachelor's degree at a four-year college as the respective reference groups.

Given the sequential nature of the path to college enrollment, and the analysis of stages individually and collectively, an endogenous, or dependent, variable in one analysis (e.g., Academic Preparation) may serve as an exogenous, or independent, variable in another analysis (e.g., Testing). For purposes of Tables 1 and 2, the primary stages in the model for this thesis are listed as dependent variables and are not listed separately again as independent variables.

[14] The composite variable serves as a proxy for the level of concern over net price. By combining the level of concern assigned to "how important are low costs" with the level of concern assigned to "how important is the availability of financial aid," the two together are a measure of the importance of net price to the individual.

Table 1. Descriptive Statistics for Dependent Variables

Variable	Mean	Standard Deviation	Minimum	Maximum	Sample Size
Academic Preparation. Whether the student took at least six months of Algebra II coursework	.710	.453	0	1	14,674
Testing. Whether the student took the SAT and/or ACT (standardized admission tests)	.651	.476	0	1	16,197
Applied for Admission. Whether the student applied for admission to any postsecondary institution	.810	.391	0	1	14,039
Applied for Financial Aid. Whether the student applied for financial aid	.713	.452	0	1	11,352
Enrolled at a Four-Year Institution. Whether the student enrolled at a four-year college or university	.618	.486	0	1	10,498

Notes: Sample sizes vary due to survey items not being applicable to respondent, as well as missing data or non-response.

Table 2. Descriptive Statistics for Independent Variables

Variable	Mean	Standard Deviation	Minimum	Maximum	Sample Size
Family Income *(Overall)*	2.70	1.33	1	5	16,197
$0 - $25,000	1	0	1	1	3,395
$25,001 - $50,000	2	0	2	2	4,916
$50,001 - $75,000	3	0	3	3	3,316
$75,001 - $100,000	4	0	4	4	2,178
$100,001 and higher	5	0	5	5	2,392
Parent Concerns over College Costs and Financial Aid *(Composite)*	.477	1.45	1	6	11,374
Both are not important	1	0	1	1	563
One is not important; the other is somewhat important	2	0	2	2	825
One is not important; the other is very important	3	0	3	3	508
Both are somewhat important	4	0	4	4	1,886
One is somewhat important; the other is very important	5	0	5	5	3,010
Both are very important	6	0	6	6	4,942
Parent Aid Concerns *How important is the availability of financial aid (such as a school loan, scholarship, or grant) to you in your tenth grader's choice of a school to attend after high school*	2.31	.696	1	3	11,833
Not Important	1	0	1	1	871
Somewhat Important	2	0	2	2	2,680
Very Important	3	0	3	3	8,294

Notes: Sample sizes vary due to survey items not being applicable to respondent, as well as missing data or non-response.

.

Table 2 (continued). Descriptive Statistics for Independent Variables

Variable	Mean	Standard Deviation	Minimum	Maximum	Sample Size
Parent Cost Concerns *How important is or was low expenses (tuition, books, room & board) to you in your tenth grader's choice of a school to attend after high school*	2.31	.696	1	3	11,833
Not Important	1	0	1	1	1,606
Somewhat Important	2	0	2	2	4,978
Very Important	3	0	3	3	5,249
Parent Expectation *How far in school the parent expects the tenth grader will go*	2.70	.597	1	3	12,266
No College	1	0	1	1	890
Some College	2	0	2	2	1,921
Bachelor's Degree or Higher	3	0	3	3	9,455
Parent Education Level	2.15	.806	1	3	15,321
High School Diploma/GED or Less	1	0	1	1	3,997
Two-year College Degree or Less, but Some College	2	0	2	2	5,021
Bachelor's Degree or Higher	3	0	3	3	6,303
Postsecondary Institution Sector (of First Institution) Enrolled	2.54	1.7	1	9	10,484
Four-year Public	1	0	1	1	4,178
Four-year Private Not-For-Profit	2	0	2	2	2,135
Four-year Private For-Profit	3	0	3	3	176
Two-year Public	4	0	4	4	3,465
Two-year Private Not-For-Profit	5	0	5	5	42
Two-year Private For-Profit	6	0	6	6	184
Less than Two-year Public	7	0	7	7	114
Less than Two-year Private Not-For-Profit	8	0	8	8	25
Less than Two-year Private For-Profit	9	0	9	9	165

Notes: Sample sizes vary due to survey items not being applicable to respondent, as well as missing data or non-response.

Table 2 (continued). Descriptive Statistics for Independent Variables

Variable	Mean	Standard Deviation	Minimum	Maximum	Sample Size
Student Aspiration *Highest level of education the student believes he or she will attain*	2.74	.586	1	3	13,447
No College	1	0	1	1	1,028
Some College	2	0	2	2	1,407
Bachelor's Degree or Higher	3	0	3	3	11,012
Student Concerns over College Cost and Availability of Financial Aid *(Composite)*	.437	4.38	1	6	13,051
Both are Not Important	1	0	1	1	1,113
One is Not Important; the other is Somewhat Important	2	0	2	2	1,174
One is Not Important; the other is Very Important	3	0	3	3	672
Both are Somewhat Important	4	0	4	4	2,743
One is Somewhat Important; the other is Very Important	5	0	5	5	3,402
Both are Very Important	6	0	6	6	3,947
Student Aid Concerns *How important is the availability of financial aid (such as a school loan, scholarship, or grant) to you in choosing a school you would like to attend*	2.44	.718	1	3	13,080
Not Important	1	0	1	1	1,762
Somewhat Important	2	0	2	2	3,857
Very Important	3	0	3	3	7,461
Student Cost Concerns *How important are low expenses (tuition, books, room & board) in choosing a school to attend*	2.17	.704	1	3	13,079
Not Important	1	0	1	1	2,325
Somewhat Important	2	0	2	2	6,218
Very Important	3	0	3	3	4,536

Notes: Sample sizes vary due to survey items not being applicable to respondent, as well as missing data or non-response.

Dichotomous variables were created for academic preparation, testing, applying for admission to a college, applying for financial aid, and finally whether a student enrolled in at least a four-year institution. *Academic Preparation* was coded as 1 for a student who took at least six months of Algebra II, else 0, due to actual attainment of Algebra II credit being available only in the restricted ELS 2002 data. *Testing* was coded as 1 for students who had already taken the SAT or ACT or indicated they would take one or both tests in the upcoming two years, else 0; also, students were coded as 0 if they indicated that they were not planning to take either exam in the upcoming two years, or if they had not thought about it. *Applied for Admission* and *Applied for Financial Aid* were dichotomous variables identifying whether students had applied for admission to a postsecondary institution (1) and financial aid (1) respectively, else 0. The final outcome variable, *Enrolled at a Four-Year Institution*, represented whether a student enrolled in at least a four-year postsecondary institution following high school and was coded 1 if a student enrolled as such, else 0.

Survey responses representing "Non-respondent," "Missing," "Partial-Interview breakoff," "Survey component legitimate skip N/A," and "Multiple Response" were recoded as missing so as to keep the observation in the dataset yet exclude it when running statistical analyses on a given outcome.

Methods

Based on the conceptual framework, and considering available ELS data, I pose research questions regarding variables affecting whether students prepare academically, take a standardized admissions test, apply for financial aid, and apply for admission to, as well as enroll in, college. Before delving deeply into analyzing models or relationships, I

conduct cross-tabular analyses, or crosstabs, of key variables against family income to observe relationships and patterns. Crosstabs provide insight into the interrelationships and interactions among variables, including how the distribution of one variable varies according to categories of another variable (Miller, 2005). Such insight sets the stage for more complex relationships and analyses.

Structural equation modeling (SEM), and its intrinsic path analysis, is appropriate for testing various types of theoretical models and uses models to depict relationships among observed variables, with the goal of providing a quantitative test of the theoretical model (Olobatuyi, 2006; Schumacker & Lomax, 2010). Put simply, SEM can be used to test various models that hypothesize how sets of variables define constructs and how they are related to each other (Savalei & Bentler, 2006; Schumacker & Lomax, 2010).

Inherent to SEM, path analysis facilitates summarizing results stemming from a theoretical model, but more fundamentally, it requires researchers to think in explicitly causal terms by requiring *a priori* statements of any relationships among background independent variables, intervening variables, and the focal dependent variables (Hearn, 1988). As such, several path models emerge. All structural paths substantiated among the variables are presented for each stage (see Figure 3) and also included in an integrated, comprehensive model across all stages (see Figure 4). I report model-fit assessments to ensure the statistical significance and the substantive meaning of the theoretical model (Schumacker & Lomax, 2010; Tanaka, 1993). Logistic regression was employed to assess the effect student and parent variables have on the probability of reaching each stage and enrolling in college.

Analysis of each individual stage considers the likelihood of advancing through that particular stage, therefore, coefficients are presented as marginal effects in the logit models. However, as models representing the individual stages are analyzed, generalized structural equation modeling (GSEM) is used so that the models converge and produce odds ratios and relative risk ratios, depending upon whether the variables are binomial (odds ratios) or multinomial (relative risk ratios) (Kline, 2016; Savalei & Bentler, 2006).

A note on, and limitation of, these analyses, is that in most cases only direct effects are reported. Path analyses typically report direct, indirect, and total effects for each variable on the measured outcome and over-simplicity of a theoretical structure can lead to false inferences or erroneous interpretations (Olobatuyi, 2006). Some of the conceptually-defensive path arrows—such as the effect of parent education on student aspirations—are ignored in this model in order to focus on the most proximate influences. This limitation likely inhibits mediating effects, which mean the direct effects as reported in this thesis likely are overstated. For example, in Figure 3 a full theoretical and conceptual model would include path arrows emanating from parent education to parent concerns, and another arrow from parent education to academic preparation. Thus, parent concerns may be overstated in the models because the indirect and total effects of parent education are not taken into account when determining the path structures.

CHAPTER 5

FINDINGS

This chapter first discusses observations from the cross-tabular analyses before addressing findings from the individual stages, followed by outcomes from the path models, including the full path model of all stages through enrollment at a four-year college or university. The cross-tabular analyses examined how ELS respondents in a particular category—such as student aspirations, parent expectations, testing, applying for admission, student level of concerns, parent level of concerns and aid, and type of college enrolled) were sorted by family income level. At a summary level, the crosstabs demonstrate clear patterns that level of family income affects decision-making and planning regarding the stages of college enrollment, and as the level of family income increases, student and parent concerns over costs and financial aid are affected as well.

Detailed statements for each of the crosstab tables follows, but in general, as the level of family income increases, student aspirations (Table 3) and parent expectations (Table 4) for completing at least a four-year college degree increase, in a linear fashion. Moreover, as family income levels increase, so do the frequencies for taking a standardized admissions test (Table 5), applying for admission (Table 6), and enrolling in a four-year public or private non-profit postsecondary institution (Table 7). Table 7 also shows that as family income increases, the frequency of students enrolling in a two-year institution, of any type, decreases.

Table 3. Student Aspiration by Family Income

	Total Family Income				
	$0 - $25,000	$25,001 - $50,000	$50,001 - $75,000	$75,001 - $100,000	$100,001 +
Student Aspiration for Highest Level of Education					
No College	352 (13.30)	396 (9.81)	164 (5.91)	70 (3.71)	46 (2.19)
Some College	408 (15.42)	521 (12.91)	256 (9.22)	136 (7.21)	86 (4.09)
Bachelor's Degree or Higher	1,886 (71.28)	3,119 (77.28)	2,357 (84.88)	1,680 (89.08)	1,970 (93.72)
Total	2,646	4,036	2,777	1,886	2,102

Notes: Percentages in parentheses

In Table 3, although the frequencies in each category fluctuate, it is of note that the percentage in each category trends in a linear fashion. As family income level increases, the percentage of students who aspire to no college decreases, and the percentage of students who aspire to only some college—but not a bachelor's degree or higher—also decreases. As family income level increases, the percentage of students who aspire to attaining a bachelor's degree or higher increases.

Table 4. Parent Expectation by Family Income

	Total Family Income				
	$0 - $25,000	$25,001 - $50,000	$50,001 - $75,000	$75,001 - $100,000	$100,001 +
Parent Expectation for How Far in School Student Will Go					
No College	346 (14.39)	330 (9.05)	140 (5.46)	51 (2.98)	23 (1.18)
Some College	468 (19.47)	723 (19.83)	421 (16.43)	201 (11.76)	108 (5.56)
Bachelor's Degree or Higher	1,590 (66.14)	2,593 (71.12)	2,002 (78.11)	1,457 (85.25)	1,813 (93.26)
Total	2,404	3,646	2,563	1,709	1,944

Notes: Percentages in parentheses

Similar to Table 3 and other cross-tabulation analyses, although the frequencies in each category fluctuate, it is of note that the percentage in each category typically trends in a linear fashion. As family income level increases, the percentage of parents who expect their student to attain no college enrollment decreases, and the percentage of parents who expect their student to attain only some college—but not a bachelor's degree or higher—also decreases, but this one area is not completely linear. However, as family income increases, the percentage of parents who expect their students to attain a bachelor's degree or higher increases in a consistent pattern.

Table 5. Standardized Test Taking by Family Income

	Total Family Income				
	$0 - $25,000	$25,001 - $50,000	$50,001 - $75,000	$75,001 - $100,000	$100,001 +
Status of Taking SAT or ACT					
Will Not or Have Not Thought About It	1,852 (54.55)	2,038 (41.45)	984 (29.67)	473 (21.71)	301 (12.58)
Already Taken/Will Take Within Year	1,543 (45.54)	2,878 (58.54)	2,332 (70.32)	1,705 (78.28)	2,091 (87.41)
Total	3,395	4,916	3,316	2,178	2,392

Notes: Percentages in parentheses

Similar to other cross-tabulation analyses, in Table 5 it is of note that the percentage in each category trends in a linear fashion, even though the frequencies in each category fluctuate. As family income level increases, the percentage of students who have not or have not considered taking the SAT or ACT decreases. In contrast, as family income level increases, the percentage of students who have taken or plan to take the SAT or ACT increases.

Table 6. Applied for Admission by Family Income

		Total Family Income				
		$0 - $25,000	$25,001 - $50,000	$50,001 - $75,000	$75,001 - $100,000	$100,001 +
Whether Applied to Any College or University						
	No	898 (31.23)	919 (21.91)	504 (17.31)	204 (10.58)	129 (6.056)
	Yes	1,977 (68.77)	3,275 (78.09)	2,407 (82.69)	1,725 (89.42)	2,001 (93.94)
	Total	2,875	4,194	2,911	1,929	2,130

Notes: Percentages in parentheses

For Table 6, although frequencies in each level fluctuate, the percentage in each category trends in a linear fashion. As family income level increases, the percentage of students who did not apply to a college or university decreases. In contrast, as family income level increases, the percentage of students who did apply to a postsecondary institution increases.

Table 7. Type of Postsecondary Institution Student Enrolled by Family Income

	Total Family Income				
	$0 - $25,000	$25,001 - $50,000	$50,001 - $75,000	$75,001 - $100,000	$100,001 +
Postsecondary Institution Type					
Public 4-Year (or higher)	522 (31.54)	1,044 (36.17)	938 (40.59)	745 (44.85)	929 (47.13)
Private Not-For-Profit 4-Year (or higher)	197 (11.90)	461 (15.97)	457 (19.77)	389 (23.42)	631 (32.01)
Private For-Profit 4-Year (or higher)	33 (1.994)	59 (2.044)	34 (1.471)	28 (1.686)	22 (1.116)
Public 2-Year	752 (45.44)	1,127 (39.05)	783 (33.88)	448 (26.97)	355 (18.01)
Private Not-For-Profit 2-Year	8 (0.483)	12 (0.416)	9 (0.389)	6 (0.361)	7 (0.355)
Private For-Profit 2-year	50 (3.021)	71 (2.460)	39 (1.688)	18 (1.084)	6 (0.304)
Public Less Than 2-Year	37 (2.236)	44 (1.525)	19 (0.822)	8 (0.482)	6 (0.304)
Private Not-For-Profit Less Than 2-Year	8 (0.483)	8 (0.277)	5 (0.216)	2 (0.120)	2 (0.101)
Private For-Profit Less Than 2-Year	48 (2.900)	60 (2.079)	27 (1.168)	17 (1.023)	13 (0.660)
Total	1,655	2,886	2,311	1,661	1,971

Notes: Percentages in parentheses

For Table 7, note that the highest proportion of students from the two lowest income quintiles enroll in a public two-year institution whereas a the highest proportion students from higher income families enroll in four-year public institutions.

Table 8. Student Concerns over College Costs and Availability of Financial Aid by Family Income

	Total Family Income				
	$0 - $25,000	$25,001 - $50,000	$50,001 - $75,000	$75,001 - $100,000	$100,001 +
Student Concerns					
Both are not important	107	175	211	170	450
	(4.400)	(4.596)	(7.574)	(8.976)	(21.12)
One is not important; the other somewhat important	127	233	237	226	351
	(5.222)	(6.119)	(8.507)	(11.93)	(16.47)
One is not important; the other very important	140	180	148	112	92
	(5.757)	(4.727)	(5.312)	(5.913)	(4.317)
Both are somewhat important	360	712	631	494	546
	(14.80)	(18.70)	(22.65)	(26.08)	(25.62)
One is somewhat important; the other very important	652	1,112	757	461	420
	(26.81)	(29.20)	(27.17)	(24.34)	(19.71)
Both are very important	1,046	1,396	802	431	272
	(43.01)	(36.66)	(28.79)	(22.76)	(12.76)
Total	2,432	3,808	2,786	1,894	2,131

Notes: Percentages in parentheses

In Table 8, patterns emerge by family income based on level of student concerns, although not consistently. Of note is that as the level of family income increases, the proportion of students viewing both college costs and financial aid as not important increases, and the proportion viewing both as very important decreases. For students in the two lowest income quintiles, the greatest proportion believe both costs and financial aid are very important in their decision-making, whereas proportionality shifts among levels of concern for the three upper quintiles.

Table 9. Parent Concerns over College Costs and Availability of Financial Aid by Family Income

	Total Family Income				
	$0 - $25,000	$25,001 - $50,000	$50,001 - $75,000	$75,001 - $100,000	$100,001 +
Parent Concerns					
Both are not important	20	41	63	83	356
	(0.915)	(1.175)	(2.553)	(4.943)	(18.61)
One is not important; the other somewhat important	45	122	143	167	348
	(2.059)	(3.497)	(5.794)	(9.946)	(18.19)
One is not important; the other very important	72	123	121	106	86
	(3.295)	(3.525)	(4.903)	(6.313)	(4.496)
Both are somewhat important	114	373	480	396	523
	(5.217)	(10.69)	(19.45)	(23.59)	(27.34)
One is somewhat important; the other very important	417	962	781	496	354
	(19.08)	(27.57)	(31.65)	(29.54)	(18.50)
Both are very important	1,517	1,868	880	431	246
	(69.43)	(53.54)	(35.66)	(25.67)	(12.86)
Total	2,185	3,489	2,468	1,679	1,913

Notes: Percentages in parentheses

In Table 9, patterns—similar to those in Table 8—emerge by family income based on level of parent concerns, though, again, not consistently. Of note is that as the level of family income increases, the proportion of parents viewing both college costs and financial aid as not important increases, and the proportion viewing both as very important decreases. For parents in the two lowest income quintiles, the greatest proportion believe both costs and financial aid are very important in their decision-making, whereas proportionality shifts the strongest in the two upper quintiles.

Table 10. Individual Stages Logit Models (Presented as Marginal Effects)

	Academic Preparation	Testing	Applied for Admission	Applied for Financial Aid	Enrolled at Four-Year Institution
Parent Education (No College)	-0.0864***	-0.1146***	-0.0939***	-0.0816***	-0.1011***
	(0.0113)	(0.0099)	(0.0089)	(0.0147)	(0.0143)
Parent Education (Some College)	-0.0680***	-0.0822***	-0.0561***	-0.0454***	-0.0966***
	(0.0097)	(0.0088)	(0.0082)	(0.0114)	(0.0109)
Student Aspiration (No College)	-0.2489***	-0.2294***			-0.1390**
	(0.0189)	(0.0164)			(0.0434)
Student Aspiration (Some College)	-0.2031***	-0.1530***			-0.1548***
	(0.0122)	(0.0101)			(0.0206)
Parent Concerns (Composite)	-0.0151***	-0.0128***	-0.0131***	0.0265***	-0.0225***
	(0.0033)	(0.0031)	(0.0029)	(0.0034)	(0.0038)
Student Concerns (Composite)	-0.0067*	0.0011	0.0117***	0.0494***	-0.0228***
	(0.0029)	(0.0025)	(0.0021)	(0.0029)	(0.0035)
Academic Preparation (Took Algebra II)		0.1783***			0.1133***
		(0.0066)			(0.0125)

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are presented as marginal effects; Standard errors in parentheses; Academic Preparation refers to Figure 1, Testing refers to Figure 2, Applied for Admission refers to Figure 3, Applied for Financial Aid refers to Figure 4, Enrolled at Four-Year Institution refers to Figure 5; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

Table 10 (continued). Individual Stages Logit Models (Presented as Marginal Effects)

	Academic Preparation	Testing	Applied for Admission	Applied for Financial Aid	Enrolled at Four-Year Institution
Family Income (Composite)		0.0385***	0.0275***	-0.0306***	0.0328***
		(0.0034)	(0.0031)	(0.0043)	(0.0044)
Applied for Financial Aid					0.1975***
					(0.0112)
Testing (Took SAT and/or ACT)					0.3675***
					(0.0175)
Observations	8,936	8,936	9,205	8,206	6,886
Pseudo *R*	0.067	0.249	0.073	0.069	0.225
AIC	8.7e+03	6.6e+03	5.8e+03	8.9e+03	6.6e+03
BIC	8.7e+03	6.7e+03	5.8e+03	8.9e+03	6.7e+03
chi2	619.8219	2.2e+03	452.8533	659.9164	1.9e+03

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are presented as marginal effects; Standard errors in parentheses; Academic Preparation refers to Figure 1, Testing refers to Figure 2, Applied for Admission refers to Figure 3, Applied for Financial Aid refers to Figure 4, Enrolled at Four-Year Institution refers to Figure 5; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

Of particular interest is what the crosstabs tell us regarding levels of family income and the level of student and parent concerns over college costs and the availability of financial aid in their college decision-making. Tables 8 (student) and 9 (parent) show how the level of concern varies by family income level. In general, the level of concern is inversely related to the level of income. The proportion for which a student or parent believes both costs and aid are very important diminishes in a linear fashion as family income level increases. Likewise, the proportion for which a student or parent believes both costs and aid are not important increases in a linear fashion as the level of family income increases. These are important observations because these measurements of concerns are the only proxy we have for whether students and parents believe they can afford college. For purposes of this thesis, the family income patterns identified in the crosstabs with several variables are compelling, especially considering the relationship between family income and levels of concern are as direct and linear as demonstrated.

When analyzing the logit models for the individual stages, similar patterns emerge. Table 10 displays the marginal effects for maximum likelihood estimates for relationships between key variables in each of the individual stages. Each relationship in each of the stages is statistically significant at the .001 level, except for student concerns for two of the stages—academic preparation (although significant at the .05 level) and testing. The consistency between the Akaike's Information Criterion (AIC) and Bayesian Information Criterion (BIC) measures of fit lend credence to the strength of the models, especially given the sample size (Dziak, Coffman, Lanza, & Li, 2012).

It is of note that parents who have the highest level of concern over costs and aid are 7.5 percent less likely to have their students prepare academically (due to a 1.5 percent change per unit of concern), 6.4 percent less likely to test (due to a 1.28 percent change per unit of concern), 6.6 percent less likely to apply for admission (due to a 1.31 percent change per unit of concern), and 11.25 percent less likely to enroll at a four-year college or university (due to a 2.25 percent change per unit of concern). Unsurprisingly, both students and parents who are concerned with costs and aid are 24.7 percent and 13.3 percent, respectively (due to the respective 4.94 percent and 2.65 percent changes per unit of concern), more likely to apply for financial aid. Although likelihoods in this range may not seem pronounced, note that the crosstab between family income and student aspiration (Table 3) showed the frequency of college aspiration decreased as family income decreased, and Table 10 indicates students who aspire to no college are just under 25 percent less likely to prepare academically than students who aspire to complete at least a bachelor's degree, and students who aspire to some college are 20 percent less likely to prepare academically than students who aspire to a bachelor's degree or higher. This point is exacerbated when reviewing outcomes from the full path model; see Appendix B for all reported measures and Tables 11 and 12 for select reported measures, as discussed in this chapter. Students from the lowest family income bracket are 70 times more likely to have a parent with the greatest level of concerns than students from the highest income bracket. Compounding this issue is that parents who have the greatest level of concerns are 16 times more likely to have students with the greatest level of concerns as well.

Further, data from Table 11 demonstrates that when parents' concerns over costs and aid are highest—compared to those with lower levels of concern—the likelihood decreases that their students will academically prepare, test, and apply for admission. Table 12 addresses the likelihood of successfully completing each of the stages has on enrolling in a four-year institution; those who academically prepare are 2.4 times more likely to enroll than those who do not take at least Algebra II, those who test are nearly 14 times more likely to enroll than those who do not take the SAT and/or ACT, and those who apply for financial aid are nearly 2 times more likely to enroll than those who do not.

Table 11. GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios) – Highest Level of Parent Concerns by Levels of Family Income and Parent Education

		Exponentiated(b)
Parent Concerns[6] (Both are very important)		
Family Income Brackets		
	$0 - $25,000	69.6*** (17.6)
	$25,001 - $50,000	44.8*** (8.43)
	$50,001 - $75,000	15.3*** (2.44)
	$75,001 - $100,000	6.46*** (.952)
	$100,000+	(Reference Group)
Parent Education		
	No College	2.08*** (.384)
	Some College	2.26*** (.298)
	Bachelor's Degree or Higher	(Reference Group)
Constant		.602*** (.051)

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

For Table 11, the relative risk ratios indicate that as the level of family income increases, the chances of a parent believing that both costs and aid are very important decreases—from a parent in the lowest quintile being just under 70 times more likely to believe both are very important than a parent in the highest income quintile. As compared to students whose parents had at least a bachelor's degree, students who had a parent with no college education were twice as likely to have a parent that believed both concerns were very

important; those with a parent who had some college, compared to when a parent had at least a bachelor's degree, were 2.25 times as likely to have a parent believe both concerns were very important.

Table 12. GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios) – Enrolled in Four-Year Institution by Academic Preparation, Testing, and Applying for Financial Aid

	Exponentiated(b)
Attended a Four-Year Institution	
Academic Preparation (Attempted Algebra II)	2.44***
	(0.154)
Testing (Took the SAT and/or ACT)	13.8***
	(1.18)
Applied for Financial Aid	1.89***
	(0.102)
Constant	.057***
	(.006)

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

For Table 12, the results of this model indicate that relative risk ratio tells us a student who academically prepares for college (by taking at least six months of Algebra II or higher) is nearly 2.5 times as likely to attend a four-year institution than a student who did not academically prepare. Additionally, a student who takes the SAT or the ACT, or both, is nearly 14 times more likely to attend a four-year institution that a student who does not take one of the standardized admissions tests. The model further indicates that applying for financial aid slightly increases the chance—by less than 2 times—of attending a four-year institution.

CHAPTER 6

DISCUSSION

This chapter reviews the study, highlighting the research questions, methods used, and the findings that emerged. The chapter concludes with a discussion of implications of the study for theory and policy, as well as directions for future research.

There are positive returns—economically, socially, and culturally—to attaining postsecondary education and especially to completing a bachelor's degree. Local, state, and federal governments, as well as national organizations, benefit from a well-educated society and workforce. However, students and families must take several steps in order to be admitted to and be successful in college.

Based on the conceptual framework and review of literature, and recognizing that student and parent concerns over finances likely impact the demand for college as well as aspirations, preparations, and enrollment, the following research questions served as a guide to this study:

1. Which characteristics are most predictive of students' progression through the stages to initial college enrollment?
2. How do student concerns and parent concerns over costs and financial aid affect students' progression through the stages to initial enrollment in college?

The study found that completing the stages within the pathway had a positive effect on enrolling in a four-year college or university, and that family income, student and parent concerns over costs and aid, student aspiration, parent expectation, and parent's level of education were predictors of whether a student progressed to and through the stages, including enrollment at a four-year postsecondary institution.

This study used five stages to define the path to college enrollment—academic preparation, testing, applying for admission, applying for financial aid, and enrollment at a four-year college or university. The decision whether to take the steps necessary to complete each stage has significant consequences on being able to advance along the pathway and ultimately enroll in college further in the process. Affordability is an important factor in cost-benefit decision-making, and key components of affordability are college costs and the availability of financial aid. Because some of the stages to college enrollment begin three to four years, at a minimum, before the time of matriculation, data are unavailable for precise college costs or the types and amounts of financial aid; the only proxy are student and parent concerns over affordability. However, few studies have included how student and parent concerns, along with other key variables, affect family decision-making regarding college enrollment.

This study used the most recent set of nationally-representative longitudinal data on secondary and postsecondary school to analyze the effect of key variables, including concerns over costs and aid, on each of the stages, and to establish path analyses of the college enrollment processes. To identify patterns related to affordability, cross-tabular analyses were conducted between key variables and family income. Results from the crosstabs tended to contradict statements or previous findings from the literature

indicating no differences in enrollment rates by income for students who were academically prepared for college-level work. The crosstabs for this study, and from data gathered during the time—or shortly before—the NCES data were published, indicate differences by family income not only for enrollment, but also in levels of concern over costs and aid, as well as advancing to and through the stages.

Models were constructed based on prior and emerging literature, and tested using logit functions and generalized structural equation modeling. Although model construction and analysis were limited to the most proximate variables and effects, which could overstate some of the study's findings, appropriate goodness of fit measures indicated the models were structured well and have strong predictive performance. The results of the more sophisticated analysis support the cross-tabular analyses—as the level of parent concerns over college costs and the availability of financial aid increase, the likelihood of completing each stage is affected negatively for all stages, except applying for financial aid, which increases along with the level of concern. Similar observations result from the level of student concerns, although not as strongly and without statistical significance in the earlier stage, namely academic preparation and testing. More specifically, and as mentioned in Chapter 5, data from Table 10 show student concerns over costs and aid do not have a statistically significant effect, or when they do not at the same magnitude as the effect of parent concerns, on academic preparation and testing. These observations could be due to students being less risk-averse than parents, or not as financially literate, in terms of assumptions regarding future earnings or debt; thus, students may still be willing to academically prepare and test. This speculation is supported by data (in Table 10) on the effect of student concerns on applying for

admission and enrolling in a four-year institution, which are statistically significant at the .001 level. The stages of application for admission stage and enrolling in a four-year institution are closer in proximity to the time when costs and financial aid are calculated and less speculative on the part of the student (or parent).

When a student does not complete an earlier stage in the process, such as academic preparation, the likelihood of enrolling in a four-year college decreases dramatically. This study identified that parent concerns affect academic preparation greatly. Thus, this finding becomes critically important for future researchers studying related topics, and policymakers who want to ensure college opportunities for low- and moderate-income families.

Implications for Theory, Policy, and Future Research

Although a limitation of this study was that all effects were not reported, the direct effects indicate student and parent concerns over costs and financial aid impact the stages to college enrollment and have a place in future research and policy considerations. Findings from this study are important for theory and policy in two ways. For theory, concerns over affordability affect decision-making for college and measures of such concerns over costs and affordability need to be factored into theoretical models for access and choice, as well as student demand theories. As demonstrated in this study, students and families may make decisions to not attempt a rigorous high school curriculum, or to not test or apply for admission, due to affordability concerns. Or, if they do make it through one or more stages, change their decision to advance further along the pathway to college enrollment due to such concerns.

For policy, it is important for legislators, college administrators, non-profit administrators, and other policymakers to recognize that costs matter, especially when considering the need for financial aid as an offset when affordability concerns affect decisions. College prices and financial aid programs need attention in terms of how students and families perceive the bottom line.

Until assurances of net price (college costs minus calculated financial aid eligibility) are able to be offered earlier in the process of aspiring to and preparing for college, models and analyses of the college enrollment pathway need to include measures of student and parent concerns over costs and financial aid. Future research should test models including these concerns, and investigate the range of effects—direct, indirect, and total—on measured outcomes. In addition, levels of concern by race, ethnicity, gender, level of parent education, and other characteristics are worthy and important observations to continue reducing gaps in college access and choice.

Future research should expound on the measures of student and parent concerns over net price (i.e., the level of importance to the individual of college costs and the availability of financial aid). As demonstrated in this thesis, such concerns have an effect on students' progression to and through the stages of college enrollment. Further research should be conducted to specify models addressing differing levels of concern by race, ethnicity, gender, cultural groups, interest in enrollment at different types of postsecondary education institutions, and other characteristics. In addition, future research should make an effort to strengthen data collection of longitudinal studies to ensure a much more holistic capture of student and parent concerns, aspirations, expectations, and plans. Because circumstances and policies change, surveys in such

studies should, for example, continue to seek feedback from students and families who indicate no interest in attaining some level of college in the event policies affect their previous decision, or circumstances otherwise change. Such reduction of selection bias could better inform how concerns are mediated or policies have an effect on decision-making related to college. As local, regional, and national efforts evolve to support and encourage college completion by non-traditional students, changes to parent education levels may have an impact on decisions along the pathway, as the effects of parent education on each of the stages to enrollment are noted in Table 10. Continued analyses of the pathway, especially when refining inclusion of variables that are proximal to decision-making, will likely improve theory and policy toward closing gaps to in college achievement, and associated gains at the individual and societal levels.

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APPENDIX A

ELS Variables Used in Analysis

ELS Variable Name(s)	Description	Use in Full Model
BYINCOME	2001 Family Income (all sources)	Family Income (independent variable)
BYPARED	Highest level of education reached by either parent	Parent Education Level (independent variable)
BYP80A	Importance to parent of low college costs	Parent Cost Concern (independent variable)
BYP80B	Importance to parent of availability of financial aid	Parent Aid Concern (independent variable)
BYP81	How far in school parent expects tenth grader will go	Parent Educational Expectation (independent variable)
BYS56	How far in school student thinks they will get	Student Educational Aspiration (independent variable)
F1S17E	Years of Algebra II coursework	Academic Preparation (dependent variable)
F1S52A	Importance to student of low college costs	Student Cost Concern (independent variable)
F1S52B	Importance to student of availability of financial aid	Student Aid Concern (independent variable)
F2B04	Whether student applied for financial aid	Applied for Financial Aid (dependent variable)
F2EVRAPP	Whether student applied for admission to any postsecondary institution	Applied for Admission (dependent variable)
F2PS1LVL	Whether student enrolled in a four-year institution	Attended Four-Year Institution (dependent variable)
F2PSEEXM	Whether student took standardized admissions test (e.g., SAT/ACT)	Testing (dependent variable)
F2PS1SEC	Sector of first postsecondary institution	Used in Cross Tabulations
STU_ID	Student identifier	

APPENDIX B

GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios)

		Exponentiated(b)
Parent Concerns[2] (One is not important; the other somewhat important)		
Family Income Brackets		
	$0 - $25,000	2.15** (.634)
	$25,001 - $50,000	2.84*** (.591)
	$50,001 - $75,000	2.18*** (.381)
	$75,001 - $100,000	1.98*** (.309)
	$100,000+	(Reference Group)
Parent Education		
	No College	1.02 (.223)
	Some College	1.32+ (.199)
	Bachelor's Degree or Higher	(Reference Group)
Constant		.950*** (.060)

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

Appendix B (continued). GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios)

	Exponentiated(b)
Parent Concerns[3] (One is not important; the other very important)	
Family Income Brackets	
$0 - $25,000	11.9***
	(3.53)
$25,001 - $50,000	10.1***
	(2.33)
$50,001 - $75,000	6.84***
	(1.38)
$75,001 - $100,000	4.86***
	(.931)
$100,000+	(Reference Group)
Parent Education	
No College	1.35
	(.302)
Some College	1.70***
	(.278)
Bachelor's Degree or Higher	(Reference Group)
Constant	.224***
	(.027)

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

Appendix B (continued). GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios)

	Exponentiated(b)
Parent Concerns[4] (Both are somewhat important)	
Family Income Brackets	
$0 - $25,000	3.49*** (.929)
$25,001 - $50,000	5.64*** (1.06)
$50,001 - $75,000	4.79*** (.743)
$75,001 - $100,000	3.10*** (.435)
$100,000+	(Reference Group)
Parent Education	
No College	1.06 (.206)
Some College	1.41* (.191)
Bachelor's Degree or Higher	(Reference Group)
Constant	1.41*** (.100)

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

Appendix B (continued). GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios)

	Exponentiated(b)
Parent Concerns[5] (One is somewhat important; the other very important)	
Family Income Brackets	
$0 - $25,000	17.0***
	(4.32)
$25,001 - $50,000	19.3***
	(3.60)
$50,001 - $75,000	10.5***
	(1.64)
$75,001 - $100,000	5.46***
	(.775)
$100,000+	(Reference Group)
Parent Education	
No College	1.20
	(.227)
Some College	1.91***
	(.253)
Bachelor's Degree or Higher	(Reference Group)
Constant	.908***
	(.070)

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

Appendix B (continued). GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios)

	Exponentiated(b)
Parent Concerns[6] (Both are very important)	
Family Income Brackets	
$0 - $25,000	69.6***
	(17.6)
$25,001 - $50,000	44.8***
	(8.43)
$50,001 - $75,000	15.3***
	(2.44)
$75,001 - $100,000	6.46***
	(.952)
$100,000+	(Reference Group)
Parent Education	
No College	2.08***
	(.384)
Some College	2.26***
	(.298)
Bachelor's Degree or Higher	(Reference Group)
Constant	.602***
	(.051)

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

Appendix B (continued). GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios)

	Exponentiated(b)
Student Concerns[2] (One is not important; the other somewhat important)	
Family Income Brackets	
$0 - $25,000	1.19 (.231)
$25,001 - $50,000	1.48** (.230)
$50,001 - $75,000	1.32* (.184)
$75,001 - $100,000	1.63*** (.227)
$100,000+	(Reference Group)
Parent Concerns	
Both are not important	(Reference Group)
One not important; the other somewhat important	1.76** (.304)
One not important; the other very important	1.606+ (.415)
Both are somewhat important	2.01*** (.320)
One somewhat important; the other very important	2.28*** (.386)
Both are very important	2.22*** (.418)
Constant	.481*** (.060)

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

Appendix B (continued). GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios)

	Exponentiated(b)
Student Concerns[3] (One is not important; the other very important)	
Family Income Brackets	
$0 - $25,000	3.29*** (.729)
$25,001 - $50,000	3.11*** (.596)
$50,001 - $75,000	2.44*** (.452)
$75,001 - $100,000	2.30*** (.448)
$100,000+	(Reference Group)
Parent Concerns	
Both are not important	(Reference Group)
One not important; the other somewhat important	1.64 (.536)
One not important; the other very important	4.93*** (1.72)
Both are somewhat important	3.33*** (.928)
One somewhat important; the other very important	5.72*** (1.84)
Both are very important	6.64*** (1.84)
Constant	.071*** (.018)

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

Appendix B (continued). GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios)

	Exponentiated(b)
Student Concerns[4] (Both are somewhat important)	
Family Income Brackets	
$0 - $25,000	1.52* (.253)
$25,001 - $50,000	2.22*** (.294)
$50,001 - $75,000	1.87*** (.228)
$75,001 - $100,000	1.96*** (.245)
$100,000+	(Reference Group)
Parent Concerns	
Both are not important	(Reference Group)
One not important; the other somewhat important	2.33*** (.392)
One not important; the other very important	3.47*** (.794)
Both are somewhat important	3.78*** (.576)
One somewhat important; the other very important	5.67*** (.905)
Both are very important	5.61*** (.914)
Constant	.427*** (.054)

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

Appendix B (continued). GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios)

	Exponentiated(b)
Student Concerns[5] (One somewhat important; the other very important)	
Family Income Brackets	
$0 - $25,000	3.48***
	(.564)
$25,001 - $50,000	4.27***
	(.567)
$50,001 - $75,000	2.71***
	(.337)
$75,001 - $100,000	2.28***
	(.298)
$100,000+	(Reference Group)
Parent Concerns	
Both are not important	(Reference Group)
One not important; the other somewhat important	3.45***
	(.677)
One not important; the other very important	7.51***
	(1.81)
Both are somewhat important	5.30***
	(.955)
One somewhat important; the other very important	10.2***
	(1.88)
Both are very important	11.16***
	(2.15)
Constant	.194***
	(.031)

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

Appendix B (continued). GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios)

	Exponentiated(b)
Student Concerns[6] (Both are very important)	
Family Income Brackets	
$0 - $25,000	7.62***
	(1.26)
$25,001 - $50,000	7.49***
	(1.05)
$50,001 - $75,000	4.17***
	(.556)
$75,001 - $100,000	3.05***
	(.430)
$100,000+	(Reference Group)
Parent Concerns	
Both are not important	(Reference Group)
One not important; the other somewhat important	2.64***
	(.591)
One not important; the other very important	6.02***
	(1.57)
Both are somewhat important	4.97***
	(.999)
One somewhat important; the other very important	10.7***
	(2.16)
Both are very important	16.4***
	(3.324)
Constant	.112***
	(.021)

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

Appendix B (continued). GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios)

	Exponentiated(b)
Income Bracket[1] ($0-$25,000)	
Parent Education (No College)	69.0***
	(8.88)
Parent Education (Some College)	10.2***
	(.808)
Constant	.312***
	(.015)
Income Bracket[2] ($25,001-$50,000)	
Parent Education (No College)	32.6***
	(4.08)
Parent Education (Some College)	8.07***
	(.565)
Constant	.674***
	(.025)
Income Bracket[3] ($50,001-$75,000)	
Parent Education (No College)	10.3***
	(1.33)
Parent Education (Some College)	5.03***
	(.3598)
Constant	.730***
	(.026)
Income Bracket[4] ($75,001-$100,000)	
Parent Education (No College)	4.05***
	(.574)
Parent Education (Some College)	2.78***
	(.215)
Constant	.666***
	(.024)

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

Appendix B (continued). GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios)

	Exponentiated(b)
Student Aspiration (No College)	
Parent Education (No College)	5.25***
	(.468)
Parent Education (Some College)	2.53***
	(.237)
Constant	.033***
	(.002)
Student Aspiration (Some College)	
Parent Education (No College)	3.38***
	(.249)
Parent Education (Some College)	2.28***
	(.169)
Constant	.059***
	(.003)

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

Appendix B (continued). GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios)

	Exponentiated(b)
Academic Preparation (Attempted Algebra II)	
Student Concerns	
Both are not important	(Reference Group)
One not important; the other somewhat important	0.955 (0.131)
One not important; the other very important	0.897 (0.144)
Both are somewhat important	0.864 (0.103)
One somewhat important; the other very important	0.831 (0.097)
Both are very important	0.740* (0.086)
Parent Concerns	
Both are not important	(Reference Group)
One not important; the other somewhat important	0.730+*** (0.133)
One not important; the other very important	0.615* (0.122)
Both are somewhat important	0.608** (0.098)
One somewhat important; the other very important	0.668* (0.106)
Both are very important	0.446*** (0.069)
Student Aspiration	
Student Aspiration (No College)	0.184*** (0.023)
Student Aspiration (Some College)	0.244*** (0.020)
Constant	9.69*** (1.58)

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

Appendix B (continued). GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios)

	Exponentiated(b)
Testing (Took the SAT and/or ACT)	
Student Concerns	
Both are not important	(Reference Group)
One not important; the other somewhat important	1.14 (.155)
One not important; the other very important	1.88*** (0.32)
Both are somewhat important	1.35** (0.15)
One somewhat important; the other very important	1.30* (0.14)
Both are very important	.979 (0.110)
Parent Concerns	
Both are not important	(Reference Group)
One not important; the other somewhat important	.633* (.134)
One not important; the other very important	.582* (.135)
Both are somewhat important	.495*** (.094)
One somewhat important; the other very important	.463*** (.086)
Both are very important	.218*** (.040)
Academic Preparation (Attempted Algebra II)	6.26*** (.350)
Constant	2.58*** (.488)

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

Appendix B (continued). GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios)

	Exponentiated(b)
Applied for Admission to Postsecondary Institution	
Student Concerns	
Both are not important	(Reference Group)
One not important; the other somewhat important	1.375* (0.219)
One not important; the other very important	1.887** (0.378)
Both are somewhat important	1.562** (0.214)
One somewhat important; the other very important	1.966*** (0.269)
Both are very important	1.471** (0.194)
Parent Concerns	
Both are not important	(Reference Group)
One not important; the other somewhat important	0.842 (0.229)
One not important; the other very important	0.692 (0.208)
Both are somewhat important	0.559* (0.130)
One somewhat important; the other very important	0.419*** (0.095)
Both are very important	0.241*** (0.053)
Constant	14.67*** (3.23)

Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

Appendix B (continued). GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios)

	Exponentiated(b)
Applied for Financial Aid	
Student Concerns	
Both are not important	(Reference Group)
One not important; the other somewhat important	1.92***
	(0.207)
One not important; the other very important	4.37***
	(0.639)
Both are somewhat important	2.76***
	(0.266)
One somewhat important; the other very important	5.99***
	(0.604)
Both are very important	4.32***
	(0.428)
Parent Concerns	
Both are not important	(Reference Group)
One not important; the other somewhat important	1.41**
	(0.184)
One not important; the other very important	3.23***
	(0.530)
Both are somewhat important	2.09***
	(0.244)
One somewhat important; the other very important	3.57***
	(0.417)
Both are very important	2.53***
	(0.288)
Constant	.345***
	(.040)

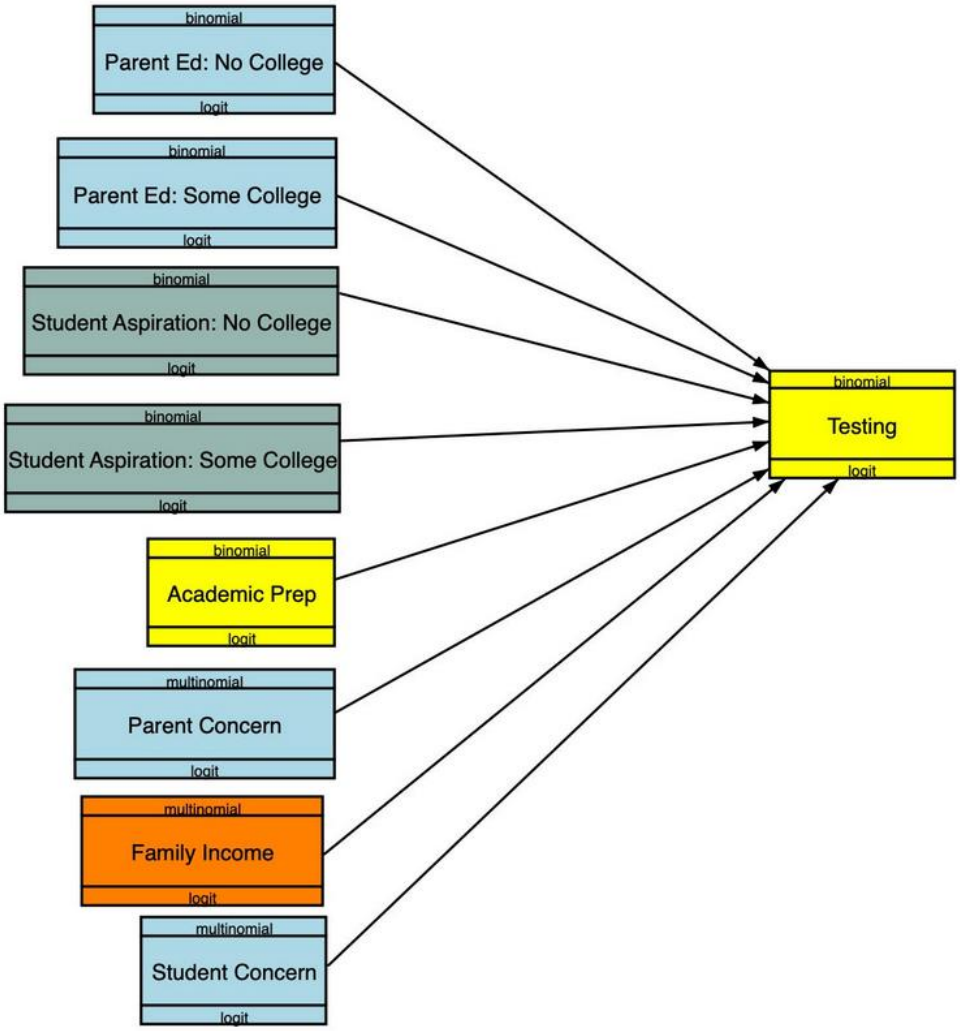
Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

Appendix B (continued). GSEM Full Path Model (Presented as Odds Ratios and Relative Risk Ratios)

	Exponentiated(b)
Attended a Four-Year Institution	
Academic Preparation (Attempted Algebra II)	2.44***
	(0.154)
Testing (Took the SAT and/or ACT)	13.8***
	(1.18)
Applied for Financial Aid	1.89***
	(0.102)
Constant	.057***
	(.006)
N	15,757
AIC	1.6e+05
BIC	1.7e+05

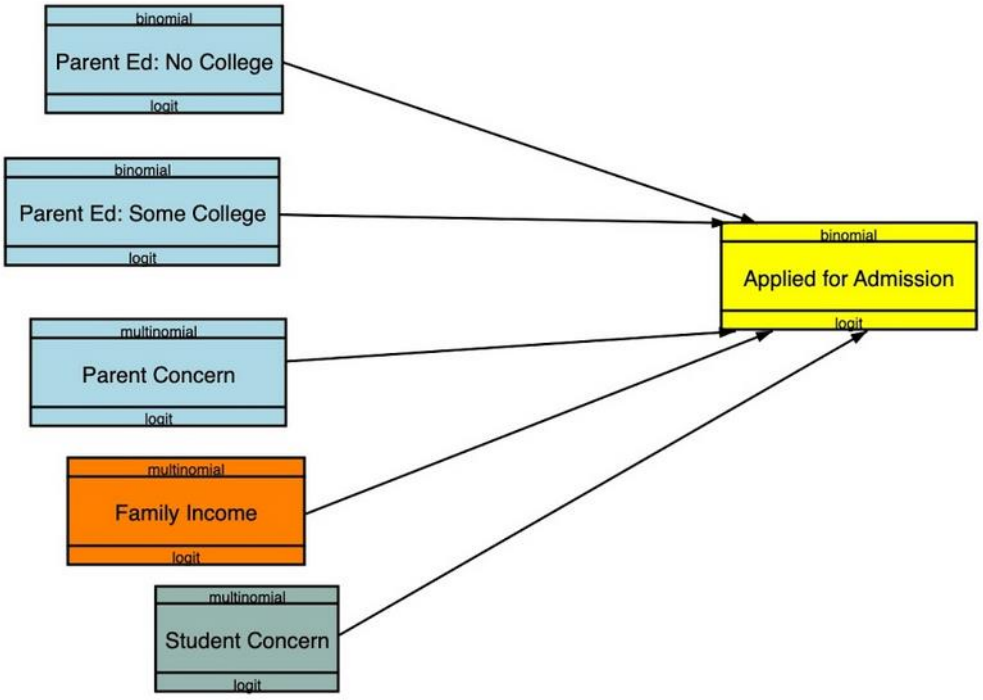
Notes: *** p<.001, ** p<.01, *p<.05, + p<.10; Coefficients are exponentiated; Standard errors in parentheses; Parent Education variables use parents with a Bachelor's degree or higher as the reference group; Student Aspiration variables use students who aspire to college as the reference group; Parent Concerns is an interaction variable for parent concerns over cost and aid where 1 = Both Not Important, 2 = One Not Important/the Other Somewhat Important, 3 = One Not Important/the Other Very Important, 4 = Both Somewhat Important, 5 = One Somewhat Important/the other Very Important, 6 = Both Very Important (the same values apply for Student Concerns); Family Income represents the income bracket a given student's family falls under, where 1 = $0-$25,000, 2 = $25,001-$50,000, 3 = $50,001-$75,000, 4 = $75,001-$100,000, and the reference group (5 = $100,000+)

APPENDIX C



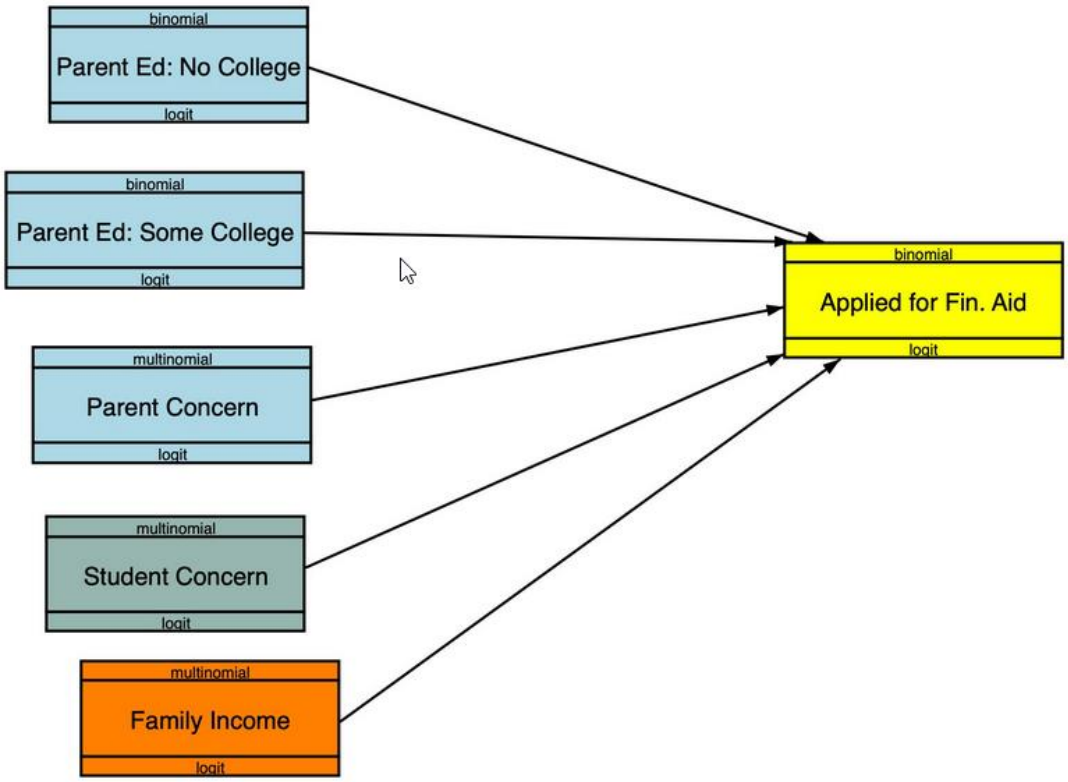
Logit Model for Factors Affecting Testing

APPENDIX D



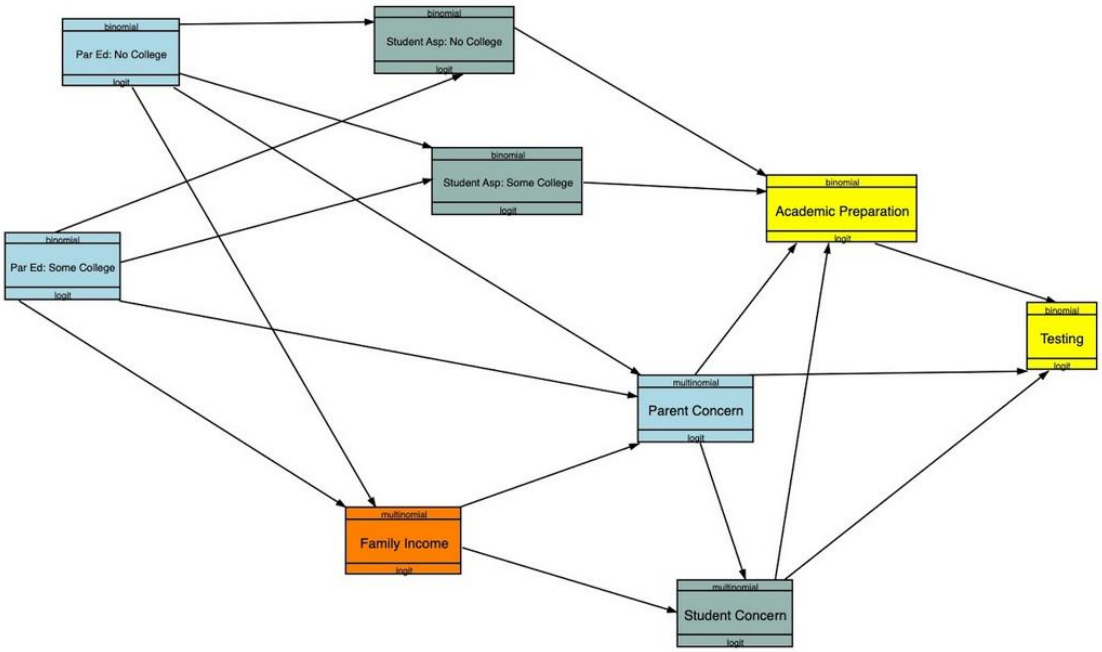
Logit Model for Factors Affecting Application for Admission

APPENDIX E



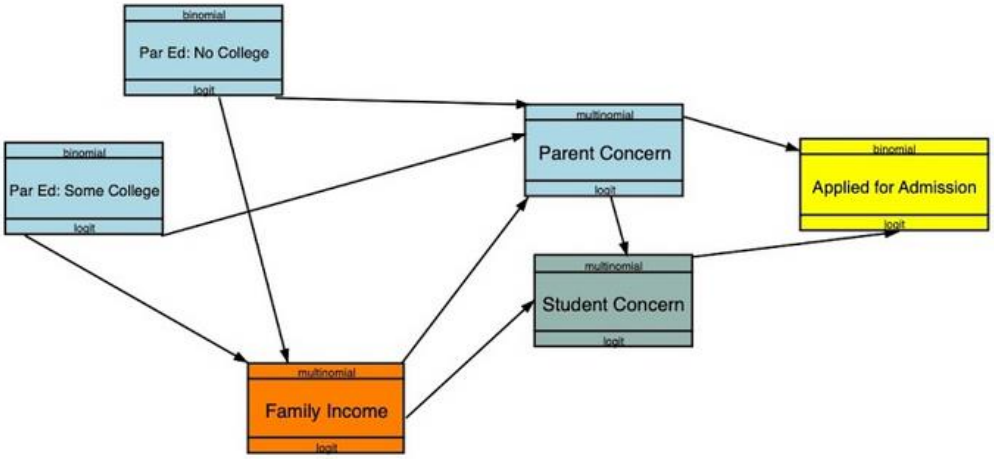
Logit Model for Factors Affecting Application for Financial Aid

APPENDIX F



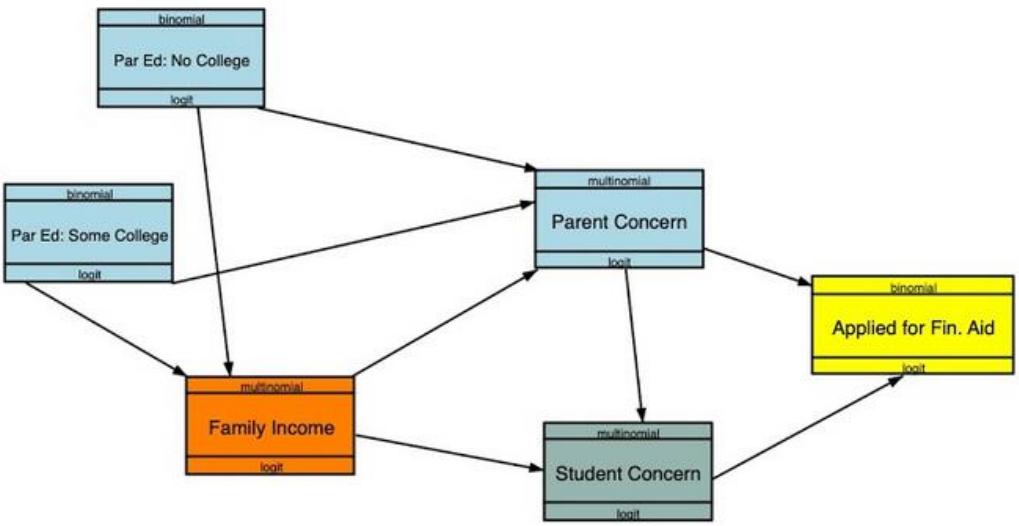
GSEM Path Model for Testing

APPENDIX G



GSEM Path Model for Application for Admission

APPENDIX H



GSEM Path Model for Application for Financial Aid