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THE NEXUS BETWEEN COLLEGE CHOICE AND PERSISTENCE

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Initial student commitments have long been considered an influence on persistence, but the reasons why students choose to attend a college have seldom been considered as dimensions of initial commitments that could influence persistence processes and outcomes. This study used NPSAS-87 to examine the influence of finance-related reasons for choosing a college on persistence decisions. The findings include (1) finance-related choices have direct and indirect influences on whether students persist in college; and (2) market-based, monetary measures of financial aid, tuition costs, housing costs, and other living costs have a substantial direct effect on persistence.

In the higher education literature, an artificial barrier has developed between theory and research on college-choice processes (e.g., Jackson, 1978; Hossler, Braxton, and Coopersmith, 1989; Paulsen, 1990) and theory and research on student persistence decisions (e.g.. Astin, 1975; Bean, 1982, 1985; Cabrera, Castaneda, Nora, Hengstler, 1992; Pascarella and Terenzini, 1980, 1991; Tinto, 1975, 1987). Not only have distinct theories been developed in the two areas, but the two lines of inquiry are thought to be applicable to two distinct managerial functions: college-choice research has been used to inform marketing and recruitment practices (Braxton, 1990; Clark and Hossler, 1990; Paulsen, 1990) and persistence research has been used to inform retention practices (e.g., Astin, 1975; Bean, 1990a, 1990b; Tinto, 1987). While the two management practices are increasingly interconnected under the umbrella of enrollment management (Hossler, Bean, and Associates, 1990), the linkages between the two student decision-making processes have seldom been examined in research on college students.

Interestingly, the basic theories on which much of the college-choice and persistence research are based do not make the same arbitrary distinctions. Sociological attainment theory (e.g., Alexander and Eckland, 1975; Blau and Dun-

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can, 1967), which has been used in college-choice research (e.g., Jackson, 1978, 1982; St. John, 1991) and is increasingly used to frame persistence research (Pascarella and Terenzini, 1991), does not make this distinction. Instead, educational attainment researchers use similar sets of variables to assess who attends college (e.g., Alexander and Eckland, 1977; Hearn, 1984; Jackson, 1978) and how much education students attain (e.g., Alexander and Eckland, 1974, 1975; Wolfle, 1985). Similarly, human capital theory (G. S. Becker, 1975), which is integral to the framing of college-choice, first-time enrollment and persistence models (e.g., Jackson, 1978, 1982; Manski and Wise, 1983; St. John, Kirshstein, and Noell, 1991; St. John and Noell, 1989), views these educational decisions as economic choices (G. S. Becker, 1964). Further, most attempts to develop standardized price-response measures did not distinguish between the two types of enrollment decisions (e.g., Jackson and Weathersby, 1975; Leslie and Brinkman, 1988). Rather, it is the researchers and theorists who have examined college choice and persistence who have made these distinctions in their attempts to build sound logical and statistical models.

This study explicitly examines the nexus between college choice and persistence. Specifically it examines the influence of a set of college-choice variables related to the financial reasons for choosing a college on whether students stay in their college of choice. A subsample of the National Postsecondary Student Aid Study of 1986–87 (NPSAS-87) was used to explore this relationship. First, as background, the origins and development of theories on college choice and persistence are highlighted to provide a basis for a model that examines the choice-persistence nexus. The first section addresses theory questions across what had become two extensive bodies of higher education research. The second section discusses both the research approach and the findings of the study. This particular study of the nexus between student choice and persistence focuses on the area of financial impact using a market-based model. The final section considers the implications of the research for the ongoing theory reconstruction process in higher education, as well as for the practice of enrollment management. Our discussion in this final section considers the prospect of further exploring the choice-persistence nexus.

THE COLLEGE CHOICE-PERSISTENCE NEXUS

In a sense, the processes of choosing a college and of deciding to reenroll in the college of choice are like branches of a tree. As long as we focus on the branches one at a time, treating them as separate and distinct, then we develop an understanding of the branches, but risk missing the integral interconnections. However, when we take a step back for a moment and focus on the tree, we can see the branches of inquiry—in this case, college choice and persistence—are interconnected, that they are both parts of the broader process of

student choice. This section first suggests a framework for examining student-choice research in a more integrated fashion, then reviews the major theoretical and research developments in these two areas of inquiry, and explores the possibility that there is a nexus between these phenomena that merits further exploration.

Framing Student Choice

Student choice is a basic and integral part of theory and research on higher education, as it well should be. For in higher education, unlike elementary and secondary education, students have the freedom to choose. They must decide whether to go to college, which college to enroll in, what to major in, whom to interact with in college, which courses (and even what professors) to take, whether to change majors, whether to drop out of a course, whether to stop out of college, whether to change colleges, and whether to drop out of college. These decisions have been the subject of extensive research (Pascarella and Terenzini, 1991). However, the interconnections between different types of student choices are seldom systematically examined.

Thus, it is appropriate to view students as educational choicemakers. Certainly faculty, administrators, and policymakers can influence these choice processes, through their policies and professional practices, but ultimately students retain the freedom to choose. When we hold this concept as a central assumption in student-choice research, then it becomes evident that research focusing on the linkages among different types of student choices has merit.[1] Our focus here is on understanding the nexus between two areas of student choice: decisions about which college to attend and whether to stay in the college of choice. There are a couple of reasons why this particular nexus merits exploration.

First, both of these student-choice processes can be, and have been, conceived of and investigated from diverse vantages. Whether a researcher or practitioner views these processes from the vantage of a single institution, or from the vantage of state or national policy processes, has an influence on the particular theories selected or developed. In the area of college choice, national and multi-institutional studies have predominated, since this particular student-choice process is usually conceived from among a set of institutions (Jackson, 1978, 1988; Manski and Wise, 1983). In contrast, many persistence studies have been institutionally based (e.g., Pascarella and Terenzini, 1980) and the theorists often view the topic from the institutional perspective (Bean, 1982, 1990b; Tinto, 1975, 1987), focusing on retaining students. But it is important to recognize that both phenomena can be conceived of and investigated from a single-institution or multi-institution vantage. Further, both vantages merit systematic consideration when exploring the nexus between college choice and persistence.

Second, the evolution of theory, research, and application has been inexorably tied in both areas of inquiry. The linkage between college-choice research and the development of institutional marketing and recruitment activities is now quite evident in the literature (Hossler, Bean, and Associates, 1990; Paulsen, 1990), as is the link between persistence research and retention strategies (Hossler, Bean, and Associates, 1990; Tinto, 1987). Increasingly, the construction of theory in the two areas has application as a central focus. Therefore, an exploration of the nexus between two lines of inquiry should consider the implications for practice, as well as the theoretical linkages.

To frame this initial inquiry into the nexus between college choice and persistence, we examine these three interrelated aspects of the theory-development process: the process of conceptualizing, investigating, then reconceptualizing based on what has been learned. Below, we look separately at the theory-development process in these two areas of student-choice research, focusing on the specific questions that guide this initial investigation.[2]

College Choice

College choice has consistently been viewed as a three-stage process (Hossler and Gallagher, 1987; Jackson, 1982), an approach that is especially appropriate for research on traditional college-age students. The results of research based on this three-stage model have been used to guide enrollment managers in student marketing and recruitment activities (Braxton, 1990; Hossler, 1984; Paulsen, 1990). This review emphasizes the ways in which the determinants of educational attainment in sociological models interact with the determinants of human capital investment decisions in economic models to influence choice behavior within each stage of the process.[3] Economists view college choice as a form of investment decision making or utility (net benefit) maximizing behavior, while sociologists view college choice as part of a broader status-attainment process (Jackson, 1978). The last part of this section presents several arguments for reconceptualizing the logical connections between college choice and persistence decisions, as part of the process of reconstructing theory to investigate the college choice–persistence nexus.

During the first stage of college choice—college aspiration formation—students develop the predisposition or intention to continue their education beyond the secondary level. Sometime after college aspirations are formed, students enter the second stage, search and application, which is when they begin to acquire information regarding the college attributes that are particularly important to them in deciding which colleges to consider attending. This phase ends when students have decided to apply to a particular set of institutions. After students have applied and been admitted to their chosen set of colleges, they enter the final phase: selection and attendance. During this third phase, students

compare and evaluate their preferred alternatives in terms of the college attributes most important to them. This phase ends with the final attendance or enrollment decision (Paulsen, 1990).

Economists base their models of college choice on human capital theory (G. S. Becker, 1975; Schultz, 1963) and revealed preference-utility theory (Manski and Wise, 1983). Human capital theorists view college-going behavior as a form of investment in the acquisition of human capital. Individuals and society are assumed to base their investment decisions on an economic calculus that compares the present discounted value of benefits with the present discounted value of costs associated with expenditures on college education (Thurow, 1970). Economists postulate that both the financial accessibility or cost of educational opportunities and the differential capacities of individuals to reap benefits from educational expenditures may be influenced by some of the same socioeconomic-background and academic-ability factors that help establish college-going aspirations in status-attainment models (G. S. Becker, 1975; Hauser, Sewell, and Alwin, 1976).

A series of early national studies based on economic models of college-going behavior used a wide-angle lens to examine determinants of the college-attendance decision. The economic models underlying these studies were based on revealed preference and utility analysis. This can be viewed as another way of conceptualizing optimal investments in human capital. When students select one college to attend from a set of colleges and/or noncollege alternatives, it is assumed that the utility or net benefit from this option must be greater than the utility from alternatives. Although actual utility cannot be observed, students reveal their true preferences through the act of choice so that utility or net benefit can be inferred. Students choose their postsecondary activities to maximize the expected utility or net benefits (both current and future) associated with their investment in human capital (W. E. Becker, 1990; Manski and Wise, 1983). These studies have shown that college attendance is significantly related to determinants of educational aspiration in sociological models, such as socioeconomic background and academic ability; college costs, such as tuition, financial aid, housing, commuting, and foregone earnings; and nonfinancial college attributes such as selectivity and academic programs (Bishop, 1977; Jackson, 1978; Kohn, Manski, and Mundel, 1976; Manski and Wise, 1983).

Sociologists focus on the ways in which various personal, social, academic, and financial factors influence the development and distribution of status in society (Alexander and Eckland, 1975; Sewell and Hauser, 1976). They consider aspirations or predispositions regarding educational attainment to be an important component of the overall status-attainment process. Status-attainment research has contributed a great deal to our understanding of the first stage of the college-choice process: college-aspiration formation. Research has shown college-aspiration formation to be directly related to a variety of factors, partic-

ularly a student's socioeconomic background, including family income, parental education, occupation, and encouragement; and academic ability, including aptitude and high school achievement (Hauser, Sewell, and Alwin, 1976; Sewell and Shah, 1967, 1968; Stage and Hossler, 1989).

It is noteworthy that financial factors play an important role in even this earliest stage of the college-choice process. A recent study of the college-planning behavior of ninth graders shows that socioeconomic background factors, such as family income, are significant determinants of parental saving for the purpose of financing children's college education. Parents' educational aspirations for their children, in turn, have a prominent influence on the college aspirations of the potential students themselves (Stage and Hossler, 1989). From the human capital perspective, this provides important evidence of investment decision-making behavior in this early phase of college choice.

During the second stage of the college-choice process—search and application—the socioeconomic and ability factors that influence educational aspirations are combined with students' assessments of available financial resources to "exclude" many colleges as inappropriate for them. Potential students then proceed to collect information regarding the attributes of colleges they may consider attending (Jackson, 1982). When 3,000 high school seniors in six large metropolitan areas were asked to identify the college attributes they considered most important in deciding to which colleges they would apply, the top five were financial, fields of study, general academic reputation, location, and social atmosphere (Litten and Brodigan, 1982, p. 250). These findings are consistent with the results of other studies that have found cost, location, programs, and quality among the college attributes of pivotal importance in the search process (Leslie, Johnson, and Carlson, 1977; Murphy, 1981). In terms of human capital theory, students would presumably incorporate assessments of quality and programs into "benefit" calculations and assessments of the finance-related attributes (cost and location) into "cost" calculations in an investment decision-making perspective on their choice set of colleges to which they would apply.

In spite of these findings that college attributes influence the set of institutions to which students apply, there is also substantial evidence that students' application sets are preselected or predestined according to the same kind of socioeconomic and ability background factors that influence early college aspirations (Hearn, 1984; Jackson, 1978). In general, students with higher socioeconomic backgrounds and greater academic ability are more likely to apply to high-cost, highly selective institutions (Hearn, 1984; Jackson, 1978; Manski and Wise, 1983) and to institutions located a greater distance from home (Zemsky and Oedel, 1983).

In a study of college choice and socioeconomic attainment, Pascarella, Smart, and Smylie (1992) found attendance at high-cost institutions to be directly related to significantly "higher levels of educational attainment, occupa-

tional status and earnings nine years after initial enrollment in college" (p. 283). The researchers express their concern that the persistent increases in tuition will decrease the capacity of students from lower socioeconomic backgrounds to finance college attendance in general, and attendance at the high-cost institutions in particular. They further postulate that for financial aid policies to be "more effective at equalizing the socioeconomic benefits of postsecondary education" (p. 287), they should promote more than just access to higher education among students of lower socioeconomic status. Such policies also must encourage their attendance at the high-cost colleges that lead to genuine socioeconomic advancement in the future.

After students have applied and been admitted to some colleges in their choice set, they enter the last stage of the college-choice process: selection and attendance. During this stage, students typically select one college from their choice set at which to matriculate, or they decide not to attend college. Jackson (1982) postulates that it is difficult for students to compare colleges according to their potential benefits because choice sets tend to be homogeneous. Consequently, students can use net cost after financial aid to evaluate the college options in their choice set.[5] Furthermore, students' socioeconomic and academic backgrounds influence their assessments of the consistency (or inconsistency) between their own financial and academic resources and the net cost and academic quality or selectivity of a particular college (p. 241). These contentions have been consistently supported in both national and institutional studies that focus on choice between or among an explicit set of two or more colleges.

These studies have shown that college selection is inversely related to tuition (Chapman, 1979; Chapman and Jackson, 1987; Ehrenberg and Sherman, 1984; Moore, Studenmund, and Slobko, 1991; Seneca and Taussig, 1987; Tierney, 1982) and directly related to financial aid, especially grants or scholarships (Chapman, 1979; Chapman and Jackson, 1987; Ehrenberg and Sherman, 1984; Moore, Studenmund, and Slobko, 1991). Furthermore, the influence of grants on selection is intensified when they are renewable (Chapman and Jackson, 1987); the sensitivity of potential matriculants to tuition and financial aid is inversely related to level of income (Chapman and Jackson, 1987; Seneca and Taussig, 1987); and while selections tend to be directly related to the academic quality of a college (Chapman and Jackson, 1987; Moore, Studenmund, and Slobko, 1991), potential matriculants prefer colleges where their own academic ability is consistent with the average ability level of the student body (Chapman, 1979; Chapman and Jackson, 1987; Seneca and Taussig, 1987).

In combination, the sociological attainment and human capital perspectives provide a basis for a logical connection or linkage between college student choice and persistence. From the perspective of status-attainment research, matriculation is the point at which the background and ability influences on educa-

tional aspiration have interacted sufficiently with college attributes through all phases of the choice process so that what were educational plans are now transformed into initial institutional and goal commitments. Such initial commitments represent attitudes that may be modified by college experiences related to academic and social integration. The result may be revised commitments at a later time of inquiry that will be key predictors of the intent to persist (Bean, 1982; Tinto, 1975).

From the perspective of human capital theory, matriculation represents the point at which the economic calculus (influenced by socioeconomic background and ability factors) used to evaluate tangible and intangible benefits and costs of college have culminated in an investment decision that results in an initial commitment to the institution and to the goal of persistence in college. Human capital theory predicts that the student investor will target her investment on the postsecondary option where the perceived return of benefits relative to costs is the greatest. Rate-of-return studies consistently demonstrate that the rate of return on "some college" is greater than the return on high school, while the rate of return on "college completion" is greater than the return on some college (Cohn and Geske, 1990; Leslie and Brinkman, 1988; McPherson and Schapiro, 1991). These studies suggest that, all else being equal, a student's matriculation would be most likely to be an initial commitment to college completion, second most likely a commitment to some college, and least likely a commitment to not persist.

It is important to remember that the matriculation decision is only an initial commitment. It is based on the student's prematriculation perceptions or "expectations" of the benefits (academic, social, financial) and costs (financial) of attendance at the chosen college. This matriculation or initial commitment may be viewed as an implicit contract that is upheld when a student's expectations are met through college experiences that interact favorably with the background and ability of the student. Embedded in the implied contract of the investment decision are (1) specific "reasons" for making an investment decision regarding attendance and matriculation at a particular college and (2) the assumptions that there will be no unanticipated increases in costs (such as reduced financial aid) or decreases in benefits (academic, social) associated with continued attendance. This implicit contract may be modified as college experiences interact with an individual student's characteristics to generate inconsistencies with the expectations held by the student at the time of matriculation. As the student reevaluates the benefits and costs of continued attendance, one possible result is a change in the intent to persist. An early investigation of this nexus found that whether students matriculated at their first-, second-, third-, or fourth-ranked option in their choice set is significantly and inversely related to the consistency between their expectations and their actual experiences at college. This expectation-experience inconsistency is, in turn, related to their intent to persist (Villella and Hu, 1990).

In a single statement, our argument is: if a particular variable, such as financial aid, increases the likelihood of a matriculation decision, that same variable may influence the likelihood of a persistence decision and/or of how intervening factors influence this decision. This nexus construct could apply to a range of college choice-persistence interactions: the social reasons for choosing a college could influence the social integration process; the academic reasons for choosing a college could influence the way students integrate academically; the financial reasons for choosing a college could influence college affordability; and all three sets of reasons could interact in a comprehensive model.

In order to examine this nexus, we have integrated a set of finance-related, college-choice variables in our persistence analysis. This analysis focuses specifically on the financial nexus, a construct that can be tested with extant sources. This seems to be reasonable to an initial investigation of the nexus because (1) finance-related variables and issues are common to all studies of college choice, cutting across all three stages of the choice process; (2) finance-related variables represent the most tangible components of the benefit-cost calculus that students appear to use in both college-choice and persistence decisions; and (3) institutional, state, and federal policymakers can control finance-related variables in ways that may influence college-choice and persistence decisions. Through this initial inquiry we hope to stimulate further inquiries into the college choice-persistence nexus.

Persistence as a Choice Process

Persistence research has become one of the most extensive areas of the literature on higher education. This section traces some of the major developments in theory, research, and application as they pertain to the construction of models for assessing the nexus between college choice and persistence. The major theoretical and research developments in persistence research have occurred in institutional studies. Tinto (1975) and Bean (1982) have been the major theorists and both their theories have been used by other researchers (e.g., Cabrera, Castaneda, Nora, and Hengstler, 1992). Both theories examine the influence of student background, initial commitment, and social and academic integration on recommitment and retention. Tinto's theory considers few other forces, while Bean's theory leaves room for more external forces, such as economic constraints. Inquiry that compares the two approaches (Cabrera, Castaneda, Nora, and Hengstler, 1992) indicates that a higher percentage of causal linkages embedded in Tinto's model are confirmed, but Bean's model explains more total variance. For the purposes of the current study, several developments in this line of inquiry merit consideration.

First, the logical construction of both models holds that both initial commitments and commitments held at the time of the inquiry have an influence on retention. Both Bean (1982, 1990b) and Tinto (1975, 1987) frame the concept

of "commitment" as meaning commitment to the institution in which students are currently enrolled. For our purposes, the reason why a student chooses to attend a college can be conceived of as related to this initial commitment process, while the student's current postsecondary aspirations can be viewed as analogous to her commitment at a later point in time. Variables related to the reasons for choosing a college and current aspirations are typically included in national databases. Thus, based on the extant body of institutional persistence research, it is possible to conceive of a logical link between college choice and persistence.

Second, institutional research has not always concluded there is a linkage between financial aid and persistence. Tinto's logical model does not consider these variables and he generally considers finances as an excuse for dropping out, rather than a cause: "The citation of financial stress as a reason for withdrawal is sometimes a polite way of describing one's displeasure with the charades of one's social and/or intellectual life within the institution" (Tinto, 1987, p. 158). While we do not dispute this possibility, we suspect that students make these choices within the context of the academic marketplace. They may decide a particular college may not be worth the cost, given their degree of personal satisfaction. The nexus construct provides a means of exploring this interaction. By focusing on the nature of the initial commitment—the reasons for attending—it may be possible to move from conjecture about these interrelationships to an informed understanding.

More recently, institutional studies have begun to develop methodologies for investigating the effects of attitudes toward financial support and the receipt of financial aid (Cabrera, Nora, and Castaneda, 1992) as well as the effects of actual prices and price subsidies on persistence (St. John, 1992; Somers, 1992). As these lines of inquiry progress, it will be possible to investigate more fully this linkage in institutional studies. Further, national studies document a linkage between satisfaction and cost of attendance (Cabrera, Stampen, and Hansen, 1990) as well as between actual prices and persistence (St. John, 1990b). Thus, in spite of the fact that there is still some lingering ambiguity about whether and how finance influences persistence, there is ample reason to consider the influence of financial factors on persistence, both in national and institutional studies.

Third, the linkage between institutional persistence research and managerial processes in higher education has become quite explicit and direct. Those who propose persistence models also consider their implications for practice, a phenomenon that has been especially true for research on academic and social integration processes (Bean, 1990a, 1990b; Tinto, 1987). More recently, authors have proposed linkages between research on the effects of student aid and changes in institutional pricing and aid packaging behavior (St. John, 1992; Somers, 1992). Therefore, these theory-practice linkages are important to the reconstruction of theoretical perspectives on student choice research.

The development of theory to guide national persistence studies has been more recent. Most national persistence research has focused on, or at least explicitly considered, the influence of student aid on persistence. Early studies (Astin, 1975; Peng and Fetters, 1978; Terkla, 1985) clearly established a link between student aid and persistence, but used inconsistent measures of persistence. More recently, researchers have based reconstructed logical models for national persistence research on an understanding of developments in institutional models and research, especially the research adapting Tinto's model (e.g., Cabrera, Stampen, and Hansen, 1990; St. John, Kirshstein, and Noell, 1991; Porter, 1990). These reconstructed models have been further adapted to examine within-year persistence using NPSAS-87 (Andrieu and St. John, 1993; St. John, Andrieu, Oescher, and Starkey, 1994; St. John and Starkey, 1994, 1995). Thus, there is now a well-developed conceptual basis for national research on persistence that adapts the logical constructs used in institutional models. Three specific developments in this line of inquiry merit consideration in the development of a reconstructed financial impact model that examines the nexus between college choice and persistence.

First, an examination of the alternate ways in which aspiration variables have been specified and interpreted provides a basis for constructing a logical linkage between college-choice variables and persistence. Many of the studies that used the National Longitudinal Study of the High School Class of 1972 (NLS-72) and/or the High School and Beyond Study (e.g., Carroll, 1987; St. John, 1989, 1990b; St. John, Kirshstein, and Noell, 1991; Terkla, 1985) used postsecondary aspirations as measured in high school. Consequently, these studies examined the influence of early commitment decisions on a subsequent sequence of persistence decisions.

In contrast, the studies that have used NPSAS-87 used postsecondary aspirations derived from a question asked after the students had made their reenrollment decisions (e.g., Andrieu and St. John, 1993; St. John, Andrieu, Oescher, and Starkey, 1994). These recent studies essentially examined the influence of current commitments on persistence. The former analyses consistently find that students with higher aspirations persist better (e.g., St. John, 1989; St. John, Kirshstein, and Noell, 1991), while the latter studies find that students with long-term aspirations are more likely to drop out (e.g., Andrieu and St. John, 1993; St. John, Andrieu, Oescher, and Starkey, 1994), a phenomenon that appears related to the fact that some students who plan to eventually finish, stop out for a semester or so for financial or other reasons.

By integrating finance-related, college-choice variables into a persistence study using NPSAS-87, it is possible to construct a model that has both an indicator of early commitments (the reasons for choosing a college) and current commitments (aspirations after the reenrollment decision). This would carry forward an aspect of the two approaches to assessing the effects of commitment

embedded in the dominant institutional persistence models, while exploring the nexus between the college-choice process and persistence.[5]

Second, national studies indicate that prices as well as price subsidies influence persistence (Andrieu and St. John, 1993; St. John, 1990b; St. John, Andrieu, Oescher, and Starkey, 1994). They also indicate that tuition and living costs explain more variance in persistence than any other single factor (Lyn, 1993; St. John, Andrieu, Oescher, and Starkey, 1994; Starkey, 1994). These persistence studies essentially use "market" models that provide insight into how cost differentials—differences in tuition charges, student aid packages, and living costs in institutions across the country—influence decisions to complete the academic year. They provide insights into how college costs influence persistence that cannot be gained in single-institution studies.

Initial inquiries into the influence of college-choice variables on persistence indicate that the reasons students choose to attend a college interact with prices. Further, recent exploratory studies examine the influence of college-choice variables on persistence and find that these variables interact with prices (Fine, 1992; Tynes, 1993; Starkey, 1994).[6] Thus, an analysis that focuses specifically on the influence of finance-related reasons for choosing a college on persistence decisions could not only provide more insight into the nexus between college choice and persistence, but also provide insight into how the higher education market influences students' choices.

Third, national persistence research, like institutional studies, has direct implications for practice. In fact, national persistence research has focused on the effects of finances on persistence in part because there is a large public investment in student price subsidies. National research that explores the nexus between college choice variables and persistence also has potential application, which is to inform policymakers in colleges and government agencies about how their pricing and student aid packaging influence choice processes.

Thus, we not only are positing that a college-choice nexus exists, but that the particular nature of the nexus can be better understood by examining the relationship between specific reasons for choosing a college and persistence decisions. Given the current status of college-choice and persistence research, we hypothesize that two specific manifestations of the nexus merit examination: (1) the influence of social and academic reasons for choosing a college on these integration processes; and (2) the influence of the finance-related reasons for choosing a college on the ways students respond to financial-market forces.

Given the current state of data collections, the first category of interactions is most appropriately examined in institutional studies that focus on these processes. The second type of interaction, the influence of finance-related choice variables on persistence, is appropriately examined using national data, because national databases contain information on cost differentials that is not available in institutional studies. Any institutional analysis of this finance nexus would

not be able to capture the influence of market forces, unless it contained price information for every alternative college considered by currently enrolled students when they made their persistence decisions.

A STUDY OF THE COLLEGE CHOICE-PERSISTENCE NEXUS

This initial study of the nexus between college choice and persistence is described in two sections. First the research approach used in the study is presented, then the research findings are discussed.

A Study of the Choice-Persistence Nexus

In order to examine the nexus between the college-choice and persistence decisions of college students, a model was adapted from other recent national research on student persistence (Andrieu and St. John, 1993; Carroll, 1987; Lyn, 1993; St. John, 1989, 1990b; St. John, Andrieu, Oescher, and Starkey, 1994; St. John, Kirshstein, and Noell, 1991). In the reconstructed financial-impact model, persistence decisions are a function of a set of student background variables, a set of finance-related reasons for college-choice decisions, a set of indicators of college experiences, current postsecondary aspirations, and an extensive set of financial factors (prices, price subsidies, housing costs, and other living costs, such as food and travel expenses).

The purpose of this study is *not* to examine either persistence or choice; rather, it is to examine the choice-persistence *nexus*. A meaningful inquiry into the choice-persistence nexus requires a model that combines strong measures of a set of factors that influence persistence decisions with measures of a set of parallel factors that influence college choice decisions. The theoretical rationale for selecting finance-related factors was articulated in the earlier background and literature review section. The availability of finance-related data that meet the parallel factors requirement is articulated below.

The NPSAS-87 data are a national database and one of the most prominent and useful features is that the database provides an extensive set of market-based monetary measures of the primary components of the cost of college attendance. This makes it possible to construct a substantial "financial-impact" or price-response model of persistence. Furthermore, the availability of a set of finance-related reasons for college choice that parallel the market-based measures of college costs, provides a meaningful context in which to make an initial inquiry into the choice-persistence nexus. The availability of some indicators of student background, college experiences, and postsecondary aspirations also makes it possible for this model to have some fundamental grounding in salient features of conventional persistence-process research, such as initial commitment, institutional integration, and current commitment.

As explained in the previous section, reasons for choosing a college can be conceived of as related to initial or early commitments to an institution (and its particular academic and social processes). On the other hand, current educational aspirations, expressed after reenrollment decisions have been made, can be viewed as analogous to student goal and/or institutional commitments at a later point in time. In between, social and academic integration processes are at work. Although somewhat limited by the unavailability of comprehensive measures, NPSAS provides some indicators of social and academic integration.

As a result of their college experiences, including their successes and failures with academic and social integration, students make a calculation about whether to reenroll in their current college, to stop out, to prepare to transfer, to transfer, or to drop out. This study tests whether this second stage of the persistence-decision process is influenced by "market" factors: the prices students pay compared to other available options (price differentials) and differences in other costs associated with continued enrollment in another setting (living cost differentials). Consequently, we conceived of finances as something that students consider after they have assessed the value of the college experience. Thus, we assess how students make a judgment as to whether their college experience is worth the cost. This mental calculation is examined as a secondary part of the persistence-decision process.

The NPSAS-87 survey asked students about the degree of importance of a whole range of possible reasons why they might have chosen their college. These can be meaningfully arranged into four rather distinct categories: (1) academic reasons regarding the school's reputation or program offerings; (2) social reasons such as friends attending the school or parents preferring the school; (3) location reasons regarding whether the school was far away or close to home; and (4) financial reasons such as low tuition costs or financial aid received. Academic and social reasons would not permit a meaningful examination of the choice-persistence nexus for two related reasons.

First, since NPSAS-87 does not provide comprehensive measures of academic and social integration processes, academic and social choice variables would fail to meet the parallel factors criterion for a meaningful test of the existence and nature of the nexus. In other words, to assess adequately the nexus between the academic reasons for choosing a college and the academic integration process, or between the social reasons for attending a college and the social integration process, we would need better (and more complete) data on these integration processes.

Second, any included academic and social choice variables may be correlated with unavailable measures of academic and social integration excluded from the model, resulting in biased coefficient estimates. On the other hand, while location variables are outside the scope of the study, financial choice variables would clearly meet the parallel factors criterion for testing the nexus and would

not result in biased estimates because NPSAS provides market-based, monetary measures of many primary components of the cost of college attendance.

Furthermore, both the finance-related reasons for college choice and the monetary measures of costs can be meaningfully classified, from the student's perspective, into categories of "fixed" and "controllable" financial variables. The fixed-cost variables refer to costs that are stable, or "fixed," at a particular point in time, while the controllable-cost variables can be altered through student efforts to economize on their resources. At the point in time when students choose their college, some costs (tuition and student aid) are set by institutions and, therefore, are classified as fixed-cost, college-choice variables. At the same point in time, other cost-related variables (living costs and whether to work while attending) are under the students' control and, therefore, are classified as controllable-cost, college-choice variables.[7] In parallel fashion, the monetary measures include the fixed-cost variables of tuition cost, financial aid, and housing costs; and the controllable-cost variables include food and travel-related living costs. The NPSAS-87 database and sample, model specifications, statistical methods, and study limitations are described briefly below.

NPSAS-87 Database and Sample for the Study

The NPSAS-87 sampling procedure collected student record data in the fall of 1986 and administered questionnaires in the spring of 1987 (Korb, Schantz, and Zimbler, 1989). This makes the data set appropriate for examining the effect of a variety of factors on within-year persistence decisions. A subset of the total NPSAS-87 sample was used in the present study—all full-time students enrolled in four-year colleges and universities, a subsample of 18,836 students. The sample was limited to full-time college students in this initial study of the nexus between college choice and persistence because a recent study of part-time student persistence behavior (using the NPSAS database) revealed notable differences in the persistence behavior of part-time students relative to full-time students (Starkey, 1994).

Model Specifications

The dependent variable in this study is within-year persistence. It was defined in a straightforward manner as reenrollment for the Spring semester after being enrolled in the Fall semester. Other students were considered persisters if they were in their fourth year and had either received a certificate or stated that they had met their educational goals. The persistence variable was coded as a dichotomous outcome measure. All independent variables and their coding are specified in Table 1 and are discussed briefly below.

Most of the independent variables were coded as either individual dichot-

TABLE 1. Variable Coding

Variable	Coding
STUDENT BACKGROUND	
Ethnicity	
African American	1,0
Hispanic	1,0
Gender	
Male	1,0
Mother's Education	
Less/H.S.	1,0
Some Col.	1,0
College	1,0
Master's	1,0
Advanced	1,0
Age	
Years Old	year of age
Marital Status	
Married	1,0
High School	
GED	1,0
No H.S. Deg.	1,0
Employment	
Working	1,0
Dependency Status	
Independent	1,0
Income	
Lower (insert range)	1,0
Upper Middle	1,0
Upper	1,0
COLLEGE CHOICE	
Fixed Costs	
Financial Aid	1,0
Low Tuition Cost	1,0
Tuition & Fin. Aid	1,0
Controllable Costs	
Low Living Cost	1,0
Could Work	1,0
Living Cost & Work	1,0
COLLEGE EXPERIENCE	
Private	1,0
On Campus	1,0
Years in College	
Sophomore	1,0
Junior	1,0
Senior	1,0

TABLE 1. *Continued*

Variable	Coding
Grades	
Below C	1,0
Mostly C	1,0
Mostly A	1,0
ASPIRATIONS	
Some College	1,0
Master's	1,0
Advanced	1,0
FINANCIAL	
Fixed Costs	
Grant $	Actual $/1,000
Loan $	Actual $/1,000
Work $	Actual $/1,000
Tuition $	Actual $/1,000
Housing Costs $	Actual $/1,000
Controllable Costs	
Food/Travel Costs $	Actual $/1,000

omous variables or into design sets of dichotomous variables. Only age and all the financial variables were continuous variables. The *student background* variables were ethnicity, gender, mother's education, age, high school, and marital status. The effect of ethnicity was measured by separately comparing students with African-American and Hispanic backgrounds to other students with neither of these backgrounds. Gender differences were assessed by comparing male with female students (male = 1, female = 0).

Mother's education was used in the model rather than either parents' education or father's education based on both empirical and logical considerations. Prior research has found that mother's education predicts persistence better than either parents' education or father's education (St. John, Kirshstein, and Noell, 1991). More importantly, there are logical reasons why mother's education should have a greater influence: (1) many students are from single-family homes headed by mothers and (2) mothers are generally more directly involved than fathers in helping children with their homework.

Sets of dichotomous variables were used to assess the impact of mother's education and income. Mother's education and income were treated as distinct sets of design variables, instead of as a single SES measure, for four reasons: (1) the two variables often have distinct effects on persistence (St. John, Kirshstein, and Noell, 1991; St. John, Andrieu, Oescher, and Starkey, 1994); (2) neither income nor mother's education has a consistent linear logistic relationship with persistence (Andrieu, 1991; St. John, Andrieu, Oescher, and Starkey, 1994); (3) treating income as a set of design variables provides a control for the

fact that most aid is awarded based on financial need, something that may not be adequately controlled for when a single SES measure is used (St. John, 1991; St. John, Kirshstein, and Noell, 1991); and (4) the use of sets of design variables for income and mother's education improves the ability to predict persistence, compared to the use of a single continuous variable for income and mother's education (Andrieu, 1991). For mother's education, educational achievements of less than high school degree, some college, college degree, master's degree, and advanced degree were compared to completion of a high school degree or GED. Age was assessed to be a linear continuous variable and the effect of marital status was assessed by comparing married with unmarried students (married = 1, unmarried = 0).

A design set of two dichotomous variables was used to examine the effect of high school experience. Students with no high school degree and those with GEDs were compared to students with high school degrees. NPSAS-87 does not include other high school experience variables, such as measures of pre-college ability (e.g., entrance test scores or grades). This issue is addressed in the limitations section below.

Income was coded as a design set of dichotomous variables in which students in lower, upper-middle, and upper income groups were compared to those in the lower-middle income group ($11,000–$29,999). Income provides a measure of actual parent income (for dependent students) or personal and spousal income (for independent students) for the prior tax year. This measure would be family income during the senior year for most students who were traditional college-age freshmen. Since prior year's income is used in the calculation of financial need by federal aid programs, it is appropriate to use this measure of income in a study of the effects of college costs and subsidies on persistence.

Dependency status and whether the student was working were recoded as single dichotomous variables comparing independent with dependent students (independent = 1, dependent = 0) and employed with unemployed students (employed = 1, unemployed = 0). These two variables provide further indicators of the current economic status of the student.

The effects of the finance-related reasons for *college choice* were assessed using two design sets of dichotomous variables. The first set examined the choices related to "fixed" costs and the second set examined the choices related to "controllable" costs. In the fixed-cost design set, students who rated financial aid received but not low tuition, or low tuition but not financial aid received, or both financial aid and low tuition, as "very important" were compared with students who rated neither factor as important. In the controllable-cost design set, students who rated low living costs but not ability to work, or ability to work but not low living costs, or both low living costs and ability to work, as "very important" were compared with students who rated neither factor as important.[8]

A number of indicators of *college experiences* related to social and academic integration processes were included. Single dichotomies were used to compare students who lived on-campus with those who lived off-campus (on-campus = 1, off-campus = 0)[9] and to compare students attending private institutions with those attending public institutions (private = 1, public = 0). A design set of dichotomous variables was coded to compare students who were sophomores, juniors, and seniors with those in their freshman year. Another set of design dichotomies was coded to examine the impact of college grades. Students who had less than a C average, those with mostly Cs, and those with mostly As were compared with students who obtained mostly B grades. Grades were transformed to a design set because grades do not have a linear logit with persistence (St. John, Andrieu, Oescher, and Starkey, 1994) and the use of the design set improves the model's ability to predict persistence (Andrieu, 1991).

Aspirations were not treated as a student background variable in this study. The NPSAS-87 "aspirations" question was asked of students after they had made their reenrollment decision; therefore, it assessed long-term goals or commitment to degree attainment. This measure is similar to that used by Cabrera, Stampen, and Hansen (1990) to measure goal commitment. A design set of three dichotomous variables was coded to assess the impact of various levels of individual postsecondary aspirations among college students: students expressing plans to complete some college, master's, and advanced degrees were compared with students who planned to attain bachelor's degrees.

Four types of market-based, monetary measures of *financial* variables were examined: tuition; financial aid of three types—grants (including scholarships), loans, work study; housing costs, including measures for both on-campus and off-campus residents; and other living costs—food and travel expenses. The actual dollar amounts were divided by 1,000. This adjustment produces easily interpreted estimates of responsiveness to various components of college costs that can be readily applied in financial planning activities. In our analysis we treated housing costs, as well as tuition and student aid, as fixed costs. At the particular time when reenrollment decisions are made, housing costs are "fixed" due to on-campus housing contracts, off-campus apartment leases, and the fact that the decision to move has high financial costs. In contrast, food and travel costs are treated as "controllable" because they relate to lifestyle choices students make while they are in college.

Statistical Methods

For this study, logistic regression was chosen as the most appropriate estimation procedure for a number of reasons. The logistic probabilistic distribution is consistent with the *S*-shaped distribution that is characteristic of dichotomous or binary outcome variables such as persistence. The logistic function also appro-

priately satisfies the constraint that the conditional mean of the equation must range between 0 and 1, permits the use of both discrete and continuous regressors, and avoids violation of assumptions such as homoscedasticity that are associated with the direct application of widely used linear models (Aldrich and Nelson, 1984; Hosmer and Lemeshow, 1989).

Logistic regression can provide estimates of the effects that various factors will have on the probability of a particular outcome, such as persistence. The coefficient estimates for all variables were converted to changes-in-probability measures (delta-*p* statistics) using a method recommended by Petersen (1984). The delta-*p* statistic for each of the dichotomous variables in the model provides an estimate of the change in the probability of persistence for students that have the characteristic being measured by the dichotomous variable. For continuous variables (e.g., age and all financial variables), each delta-*p* statistic is an estimate of the change in the probability of persistence associated with a one-unit change in the independent variable. For example, tuition is measured in $1,000 units. Therefore, a delta-*p* of $-.025$ indicates that, all else being equal, a $1,000 differential in tuition would be associated with a 2.5 percent change in the probability of persistence.

The sequential approach to logistic regression was used to "step-in" sets of variables in a way that permits a meaningful examination of both the direct effects of variables on persistence, as well as their interactions with the variables entered in successive steps. Seven sets of variables were sequentially examined. The first four sets were entered in a sequence that parallels the order in which students pass through well-established stages of persistence behavior. Background or precollege factors were entered first, a step comparable to an attainment study. The second step added college-choice variables, conceived of as dimensions of students' initial or early commitments. College experiences, including available indicators of social and academic integration, were entered next, followed by current aspirations, conceived of as a measure of students' later commitments. These combinations of variables would be similar to persistence studies that focus on persistence and do not consider aid or prices. The final three sets of variables were all comprised of market-based, monetary measures of financial factors. Since the purpose of this study was to examine the nature of the choice-persistence nexus, this sequence was used in order to provide the most unbiased estimates possible of the direct effects of financial factors on persistence decisions, as well as to examine their interactions with other factors, particularly the two sets of finance-related choice variables.

Wald chi-square tests of significance are conducted for the coefficient estimates on each variable in each logistic analysis. Furthermore, several goodness-of-fit measures are presented for each model estimated—the Somer's *D* statistic, the -2 log likelihood (log L) statistic, and the pseudo-R^2 (calculated by subtracting the -2 log L statistic for the model from the -2 log L statistic for

the model containing the intercept only, and then dividing the difference by the -2 log L statistic for the model containing the intercept only).[10]

Limitations

First, the NPSAS-87 database did not include measures of precollege student ability such as high school grades or entrance test scores that have been used in many persistence studies. The importance of such variables in the specification of a persistence model is somewhat diminished in the face of the growing evidence that precollege ability is important in predicting persistence in the early college years, but its importance diminishes or even disappears and college grades emerge as the relevant measure of academic ability for predicting persistence in the later college years (Cabrera, Stampen, and Hansen, 1990; St. John, Kirshstein, and Noell, 1991; Stampen and Cabrera, 1986). College grades, of course, are available in NPSAS-87 and are used in the present study to measure the impact of academic ability on persistence. Based on these reasons, as well as previous research using NPSAS-87, it appears that inclusion of the two specified variables that are available in NPSAS-87 (high school degree and GED) has been sufficient to illustrate that high school experience has an influence on persistence (St. John, Andrieu, Oescher, and Starkey, 1994). While the inclusion of more complete measures of high school experience would probably improve the prediction of persistence, there is no reason to suspect that the inclusion of these missing variables would change the results of our analysis of the finance-related choice variable or the financial market measures.

Second, although NPSAS-87 did include some indicators of the social and academic integration processes in the Tinto and Bean frameworks—such as on-campus residence, attendance at private colleges, years in college, and college grades (all included in this study)—comprehensive measures of social and academic integration were not available. However, the potential bias in the coefficient estimates in this study due to the unavailability of such measures is likely to be small. The model developed for this study is a financial-impact model that is specifically designed to examine the nexus between financial reasons for college choice and financial influences on persistence. The financial factors in this study are market-based, monetary measures that vary widely across institutions and markets in the national sample. Any bias in the coefficient estimates for the financial factors used to explore the nexus that is due to omitted relevant integration variables requires that such variables are correlated both with persistence and with the type of market-based, monetary measures used in this study. Although such a relationship is theoretically possible, we are aware of no study that has yet demonstrated any relationship between comprehensive integration measures and market-based, monetary measures of financial factors like those used in this study.

The great majority of studies using such comprehensive integration measures are institutional studies. In well-crafted institutional studies, researchers can only develop financial measures such as whether or not various financial aid packages were awarded or attitudes toward financial support or the cost of attendance, all within the context of the cost structure and policies of a single institution (see, for example, the recent work of Cabrera, Nora, and Castaneda, 1992). However, these cannot capture the price and subsidy effects of variations in national and regional market-based differentials for various components of the cost of college. This is true because most institutions have a single tuition schedule for full-time students and, therefore, there would not be sufficient variation for a tuition variable included in a typical institutional study.

Thus, based on extant evidence, as well as the reasons articulated here, we assume that any minor interactions (and associated upward bias in estimates) that might take place between comprehensive integration measures and this study's market-based financial measures would be more than offset by the substantial estimates of the impact of costs in this study.

Furthermore, we are aware of no prior study that has included both finance-related reasons for college choice and comprehensive measures of social/academic integration. However, in this study, when the college experience (two social and two academic integration) variables are added to the model, there are some changes in the significance of the effects on persistence of some choice variables. This suggests that the NPSAS-87 integration measures available for this model appear to be sufficient to generate some evidence of meaningful interactions. Although the unavailability of more comprehensive integration measures raises the theoretical possibility of bias, the lack of extant evidence in the literature makes it impossible to make any empirical argument regarding the existence or direction of potential bias in the estimates on these choice variables.

Third, although there were some missing values for each of the variables included in the study and students with missing values for one or more variables had to be excluded, the number of missing values in NPSAS-87 is small. These missing values were assumed to be randomly distributed.

Fourth, NPSAS-87 was a sample of students identified in the fall semester and, therefore, was not representative of college students who enroll in the spring semester. This could have been a more serious problem in a study of students attending two-year colleges and proprietary schools where more students enroll in the spring semester. However, in four-year colleges most students enroll in the fall semester and there is attrition during the academic year. Furthermore, students who enrolled in a college at the beginning of the fall semester, but dropped out before the time of data collection in the first half of the fall semester, were not included in the sample. This means some very early-semester dropouts were excluded from the analysis.

Fifth, when a sample student is at extremely high or low values on other independent variables, the validity of the estimated effect of the variable on the probability of persistence (delta-p) is reduced. The delta-p measure is of questionable validity when sample members are at extremes on other variables. This condition warrants the use of caution in the application of the delta-p statistic in extreme cases.

Findings

Sequential logistic regressions (stepping-in sets of variables related to the factors included in the logistic model) have been used previously to examine the interactions between factors that influence enrollment (St. John, 1991) and persistence (e.g., Andrieu, 1991; St. John, Andrieu, Oescher, and Starkey, 1994; St. John, Kirshstein, and Noell, 1991; Starkey, 1994). The present study considered the influence of seven factors on within-year persistence by full-time undergraduates in four-year colleges: background, college choice, college experiences, aspirations, prices and price subsidies, housing costs, and other living costs (food and travel).

In the sequential logistic analysis (Table 2), variables related to these factors were added in a sequence of seven steps. The addition of each set of variables added to our ability to predict persistence. With each step, the Somer's D and the pseudo-R^2 increased, as the -2 log L decreased, all of which indicates an improved capacity to predict persistence. In our discussion of each step, we consider the effects of each set of variables separately, including how the prediction of persistence changed as a result of adding the new set of variables and how the set of variables interacts with other sets of variables introduced in subsequent steps.

Student Background

Student background has a direct effect on within-year persistence, but also interacts with the influences of student choice, college experience, and living costs. The pseudo-R^2 and Somer's D are modest in the first step, but given the changes in significance and sign of background variables across the subsequent steps, it is apparent that student background has a substantial indirect influence on persistence.

First, three background variables were significant and positively associated with persistence across all steps. African Americans were consistently more likely to persist (by about 1.5 percentage points) than students of other races (excluding Hispanics); males were consistently more likely to persist than females; and GED graduates were consistently more likely to persist than students with high school degrees. These variables had only slight interactions

TABLE 2. Sequential Logistic Analysis of Within-Year Persistence by Full-Time Students in Four-Year Colleges

FACTOR/ VARIABLE	Step 1 Background DELTA p	SIG.	Step 2 College Choice DELTA p	SIG.	Step 3 College Exp. DELTA p	SIG.	Step 4 Aspirations DELTA p	SIG.	Step 5 Tuit. & Aid $ DELTA p	SIG.	Step 6 Housing Costs DELTA p	SIG.	Step 7 Food & Travel Costs DELTA p	SIG.
STUDENT BACKGROUND														
Ethnicity														
African Am.	0.0149	.01	0.0150	.01	0.0131	.01	0.0154	.01	0.0147	.01	0.0107	.05	0.0168	.01
Hispanic	0.0065		0.0067		0.0015		0.0024		0.0007		−0.0049		0.0056	
Gender														
Male	0.0102	.01	0.0105	.01	0.0084	.01	0.0097	.01	0.0100	.01	0.0132	.01	0.0152	.01
Mother's Education														
Less than HS	0.0002		−0.0000		−0.0003		−0.0052		−0.0024		−0.0042		0.0051	
Some College	−0.0074	.05	−0.0069	.1	−0.0057		−0.0041		−0.0051		−0.0018		0.0009	
College Degree	−0.0109	.01	−0.0099	.05	−0.0068		−0.0037		−0.0037		−0.0039		−0.0021	
Master's	−0.0112	.05	−0.0097	.01	−0.0046		−0.0022		0.0057		0.0121	.1	0.0123	.1
Advanced	−0.0110		−0.0094		−0.0023		−0.0070		0.0086		0.0149	.1	0.0128	
Age														
Years Old	0.0011	.01	0.0011	.01	0.0006	.1	0.0005		0.0000		0.0008	.1	−0.0005	
Marital Status														
Married	0.0126	.01	0.0118	.01	0.0096	.05	0.0092	.1	0.0003		0.0157	.01	−0.0012	
High School														
GED	0.0208	.01	0.0206	.01	0.0163	.05	0.0153	.1	0.0178	.05	0.0262	.01	0.0332	.01
No H.S. Deg.	0.0021		0.0021		−0.0029		−0.0053		−0.0067		−0.0048		−0.0059	
Employment														
Working	0.0080	.01	0.0005		−0.0061	.1	0.0049		−0.0055		−0.0076	.05	−0.0005	
Dependency Status														
Independent	−0.0109	.05	−0.0125	.01	−0.0147	.01	−0.0132	.01	−0.0133	.01	0.0181	.01	0.0093	
Total Income														
Lower	0.0016		0.0021		0.0003		0.0000		−0.0006		0.0008		−0.0074	
Upper-Middle	−0.0043		−0.0047		−0.0023		−0.0027		−0.0061		−0.0043		−0.0034	
Upper	−0.0092	.05	−0.0096	.05	−0.0063		−0.0059		−0.0085		−0.0008		−0.0101	
COLLEGE CHOICE														
Fixed Costs														
Fin. Aid			−0.0043		0.0016		0.0004		0.0080	.1	0.0035		−0.0051	
Low Tuit.			−0.0064		−0.0083	.05	−0.0065		−0.0085	.05	−0.0089	.05	−0.0138	.01
Tuit. & Aid			−0.0065		−0.0001		0.0002		0.0082		0.0064		0.0019	

Controllable Costs																
Low Liv. C.			−0.0023		−0.0061		−0.0051		0.0078		−0.0171	.01	0.0072			
Could Work			0.0188	.01	0.0083	.05	0.0069	.1	0.0005		−0.0087	.05	0.0010			
Living & Work			0.0152	.01	0.0010		0.0000		−0.0058		−0.0180	.01	−0.0058			
COLLEGE EXPERIENCE																
On Campus					−0.0456	.01	−0.0456	.01	−0.0453	.01	−0.0414	.01	−0.0440	.01		
Private					0.0069	.05	0.0078	.05	0.0423	.01	0.0398	.01	0.0337	.01		
Year in College																
Sophomore					−0.0087	.05	−0.0075	.05	−0.0022		0.0127	.01	0.0244	.01		
Junior					−0.0134	.01	0.0101	.01	−0.0033		0.0138	.01	0.0258	.01		
Senior					−0.0320	.01	−0.0272	.01	−0.0287	.01	−0.0283	.01	−0.0335	.01		
Grades																
Below C					0.0292	.01	0.0272	.01	0.0238	.01	0.0225	.01	0.0222	.01		
C Avg.					−0.0033		−0.0053		−0.0077	.01	−0.0068	.1	−0.0048			
A Avg.					−0.0267	.01	−0.0245	.05	−0.0280	.01	−0.0311	.01	−0.0244	.1		
ASPIRATIONS																
Some Coll.							0.0297	.01	0.0288	.01	0.0279	.01	0.0261	.01		
Master's							−0.0167	.01	−0.0158	.01	−0.0124	.01	−0.0122	.01		
Advanced							−0.0232	.01	−0.0186	.01	−0.0177	.01	−0.0189	.01		
FINANCIAL																
Fixed Costs																
Grant $									−0.0036	.01	−0.0003		0.0024			
Loan $									−0.0034	.05	0.0038	.05	0.0025			
Work $									−0.0120	.05	−0.0083		−0.0118	.05		
Tuition $									−0.0262	.01	−0.0247	.01	−0.0190	.01		
Housing $											−0.0396	.01	−0.0209	.01		
Controllable Costs																
Food/Travel $													−0.0463	.01		
Baseline P	0.9535		0.9535		0.9535		0.9535		0.9535		0.9535		0.9535			
Model N	18,836		18,836		18,836		18,836		18,836		18,836		18,836			
Somer's D	0.186		0.225		0.619		0.647		0.776		0.888		0.944			
Pseudo-R^2	0.0153		0.0211		0.1556		0.1733		0.2612		0.4152		0.5943			
−2 LOG. (df)	7304.203	(17)	7261.129	(23)	6263.794	(31)	6132.085	(34)	5480.18	(38)	4338.002	(39)	3009.513	(40)		

with other sets of variables, as indicated by slight variations in the size of the delta-*p* statistics across the models. These findings are consistent with prior studies of within-year persistence.

Second, mothers' education had a negative association with persistence in the first two steps, but interacted with college experience variables and living costs and had a slight positive association with persistence in the final two models. The negative association between mothers' education and persistence—the fact that students with mothers with some college, college degrees, and master's degrees were less likely to persist than those whose mothers had high school educations—changed when college experience variables were added to the model in the third step. A plausible explanation for this interaction is that some students with mothers with college educations may have dropped out in preparation to transfer (i.e., students with A grades were less likely to persist), a prospect discussed below. The fact that the higher levels of mothers' education had a slight positive association with persistence in the final two steps also indicates that living costs may have contributed to this pattern of withdrawal. Further, the fact that there is a positive association between mothers' education and persistence in the final model is consistent with prior research (Pascarella and Terenzini, 1991).

Third, while age had a positive and significant association with persistence in the first three steps, it decreased in significance when college experience entered the model and ceased being significant when aspirations were considered. In the initial step, when only background was considered, each year of age differential increased the probability of persistence by 0.1 percentage point, or each decade increased the probability of persistence by about one percentage point. We suspect that age became insignificant when aspirations entered the equations because older students persist better because they have shorter-term goals. We reach this conclusion because students with shorter-term goals were more likely to persist, an issue discussed further below. It should be noted that there is also an interaction between age and housing costs. Age had a slight positive correlation with persistence when housing costs were considered (step 6), but ceased being significant when other living expenses were added (step 7). Apparently older students have higher fixed housing costs, which would explain why they were more likely to persist when housing costs were considered. However, other living costs mitigate this slight positive association in the final step, probably because adults are better able to control (or plan for) these costs.

Fourth, working was positively associated with persistence in the first step, but ceased being significant when college choice variables were considered. Whether a student was working apparently interacted with the desire to choose a college because it was close to work, which was positive and significant in the second step. It should further be noted that working had a slight negative association with persistence in the third step, but ceased being significant again

when aspirations were considered. This may be because working students are less negatively influenced by academic and social integration processes, a prospect that is beyond the scope of this study. However, given that working ceased being significant again when aspirations were considered, it is also possible that working students with longer-term goals were less likely to persist because they enrolled periodically, perhaps taking courses a semester a year (note that students with longer-term goals were less likely to persist in step 4).

Fifth, independent students were less likely to persist before housing costs were considered (steps 1 through 5), but were more likely to persist when this variable was added (step 6). Apparently independent students (students who were financially responsible for themselves and who applied for aid) were less likely to persist because the aid packages they received were insufficient to cover their fixed living costs. It should be noted that in the Pell grant formula, independent students receive smaller awards than dependent students with similar need. It is also possible that independent students had higher fixed costs than were taken into account in the need analysis formula. It should further be noted that being independent ceased being significant when other living expenses were considered. Apparently independent students either had lower food and travel expenses or were better able to control these other living expenses than other students (dependent students and independent students who did not apply for aid).

Sixth, having a high income was negatively associated with persistence in the first two models, but not in the subsequent two. Apparently students with high incomes were more likely either to take longer to attain their degrees, a possibility especially for older students with high incomes (adult students who did not apply for aid and were not counted as independent), or to drop out in preparation for transfer,[11] a possibility for dependent students from upper-income families. Such "stop-out" behavior, discussed in more depth below, could be in preparation to attend more academically appropriate colleges. In other words some of the social and academic integration experiences not fully captured in this model could influence such behavior.

College Choice

The addition of the financial choice variables improved the model's ability to predict persistence, as indicated by increases in the pseudo-R^2 and Somer's D and the reduction in the -2 log L. Further, while only two of the college choice variables were significant in the first step, five of the college choice variables were significant in at least one subsequent step and there was an apparent interaction between the financial choice variables and each of the subsequent variable sets. The influence of individual college choice variables is considered further below.

First, choosing a college because of the student aid package was significant in only one step, when tuition and student aid first entered the model (step 5). Apparently, this slight positive association was not significant in earlier steps because it was offset by the fact that student aid was not always sufficient to pay the full costs of attending. We base this hypothesis on the following considerations: (1) students were probably more likely to pick private colleges because of aid offers; (2) tuitions were negatively associated with persistence for the first time in step 5 and the size of the delta-*p* for private colleges increased substantially in step 5; and (3) when fixed and controllable living costs were considered (steps 6 and 7), choosing a college for aid was no longer significant. More specifically, some students who chose a private college because of high aid had lower living costs. This raises the possibility that living costs may be related to social integration processes, that perhaps students on financial aid in private colleges cannot fully integrate socially in part because they cannot afford to do the same social activities as other students.

Second, choosing a college because of low tuition charges was negatively associated with persistence in the third step, when college experience variables were first added, and in the three models in which financial variables were added (steps 5–7), but not when aspirations were considered (step 4). We assumed that college choices by students attending public colleges were more likely to be influenced by low tuition (e.g., Paulsen, 1990), because public tuitions were lower. When attending a private college and living on campus were added to the model (step 4), then choosing a college because of low tuition had a slight negative association with persistence. Attending a private college (0.7%) had a slight positive effect and living on campus had a substantial negative effect. The strong negative effects of living on campus probably explain the initial shift in significance of choosing a college for low tuition between steps 2 and 3. However, in the subsequent step, choosing a college because of low tuition ceased being significant because of an interaction with aspirations. Apparently some students who chose college for low tuition had long-term aspirations and students with long-term aspirations were less likely to persist (as discussed below). Further, this variable was again significant and negatively associated with persistence when tuition and student aid were added, and the delta-*p* increased when the two living cost variables were added (steps 6 and 7). Apparently students choosing colleges for low tuition not only had lower tuition but also had lower living costs. In the final version of the model, students who chose a college because of low tuition were 1.4 percentage points less likely to persist than those whose college choices were not strongly influenced by prices and price subsidies.

Third, choosing a college both because of low tuition and student aid was not significant in any version of the model. This reinforces our conclusion that the significance of these variables was related to attending public and private col-

leges. It also suggests that separate analyses of within-year persistence by students in public and private colleges could further illuminate the effects of marketing and pricing strategies in the two sectors.

Fourth, choosing a college to have low living costs was not significant until housing costs were added to the model (step 6), but was not significant when other living costs were added (step 7). Students who chose a college because of low living costs were probably geographically bound: either adults with other responsibilities or youths who lived at home. When housing costs, but not other living costs, were considered, then those who chose colleges for low living costs were 1.7 percentage points less likely to persist than those who did not consider low living costs as important factors when they chose a college. Presumably having low housing costs actually helped these students persist, since in prior models they had the same probability of persisting as other students. Interestingly in the last model, when other living costs were added to the model, choosing a college for low living costs was no longer significant. Presumably these students were less able to plan for and control their food and travel costs.

Fifth, choosing a college because it was close to work was significant and positive (steps 2–4) before the effects of tuition and student aid were added, was not significant when these variables were added (step 5), and was negatively associated with persistence when housing but not other living costs were added (step 6). Apparently, choosing a college because it was close to work was positive in these early steps because working either helped the student pay for the costs of attending or working students had lower tuition costs. However, when tuition and student aid were considered, choosing a college because it was close to work was no longer significant. Further, when housing costs but not other living costs were considered (step 6), choosing a college because it was close to work was negatively associated with persistence. It appears that being able to attend college and work either enabled students to pay for housing costs or they had lower housing costs; when these fixed costs were accounted for, then these students were actually less likely to persist. Apparently the reason they were less likely to persist in this next-to-the-last step was because they had higher, or were more responsive to, other controllable living costs. When these other costs were accounted for (step 7), students who chose a college because it was close to work were not significantly different from students whose college choices were not strongly influenced by controllable financial considerations.

Sixth, choosing a college both because of low living costs and because it was close to work interacted with variables related to college experience, tuition and student aid, housing costs, and other living costs. These students were more likely to persist when background and college-choice variables were considered (step 2); not significantly different from students whose college choice was not

strongly influenced by controllable costs when college experiences (step 3), aspirations (step 4), and tuition and student aid (step 5) were added; less likely to persist when housing costs were considered (step 6); and not significantly different in the final model. These shifts provide further insight into how concern about controllable costs interacts with different aspects of the college experience. The fact that these students were about 1.5 percent more likely to persist than students who were not strongly influenced by controllable costs before college costs were considered indicates that these students reacted to the college experience differently than students who did not consider these factors. It is possible that some of these students stayed close to home so they could try college out. Perhaps some who received less-than-C grades were induced to stay enrolled by policies that made it difficult to reenroll if they dropped out with low grades. We suspect that this shift in the significance is attributable to the fact that those students who received mostly Bs (the comparison group for the grades design set) were more likely to persist.

Further, and interestingly, choosing a college because of controllable costs interacted with the two living cost variables: housing costs and other living costs. All three of the controllable-cost, college-choice variables were not significant when only tuition and aid were considered (step 5), but were significant and negative when only housing costs were considered (step 6), and were not significant when other living costs were added (step 7). Clearly these students were sensitive to both types of costs. Apparently students who chose colleges because of costs had lower housing costs and either had higher other living costs or were more responsive to these costs.

These findings on the direct effects of financial college-choice variables and on their interactions with other types of variables confirm our hypothesis that the specific nature of the initial commitment merits examination in persistence research. Specifically in this study we found numerous interactions between finance-related college-choice variables and college costs. These suggest inquiry into other aspects of the college choice-persistence nexus would have merit. However, a model that considers all these possible interactions—between social reasons for choosing a college and social integration and between academic reasons for choosing a college and academic integration—may have been too complex to incorporate into a single logistic model (given that our final model includes 40 variables). Rather, we suspect that inquiry into various aspects of the nexus would be useful.[12]

College Experiences

College experience variables added substantially to the ability to predict persistence. The pseudo-R^2 increased by 13 percentage points and the Somer's D jumped by nearly 40 percentage points, indicating that college experience had a

substantial influence on persistence. Further, several of the college experience variables interacted with other variables in the model.

First, living on campus had a consistently negative association with persistence in all of the models in which it was included, decreasing the probability of reenrollment in the spring by about 4.5 percentage points. The size of the delta-*p* decreased only slightly when housing costs were included, indicating that costs were not the only reason for this phenomenon. Instead, issues related to social integration may be the cause of this phenomenon. Thus, to the extent that these students claimed that they dropped out because of housing costs, they could be using finances as a "polite excuse," as Tinto argued.

Second, attending a private college had a consistent positive association with persistence, although the size of the effect increased substantially when tuition and student aid entered the equation. Students attending a private college were less than one percentage point more likely to persist before tuition was added. Students attending private colleges were 4.2% more likely to persist when tuition and aid were considered without the living cost variables. Thus, the positive aspects of attending private colleges had been repressed in the prior model due to costs.

Third, while being a senior was consistently negatively associated with persistence across all versions of the model in which it was included (decreasing the probability of persistence by about 3%), the influence of being a sophomore or junior changed once the living cost variables entered the equation. Sophomores and juniors were less likely than freshmen to persist before the financial variables were entered into the model. However, when housing costs were entered (step 6), both of these year-in-college variables shifted to having a positive association with persistence. Both sophomores and juniors were about 2.5 percent more likely than freshmen to persist when all cost variables were included (step 7). What explains this reversal? Apparently sophomores and juniors were more likely than freshmen to have unexpected living costs influence their decisions to withdraw. This may also explain why some students who were in good academic standing and who aspired to complete their degrees dropped out (or rather stopped out) of college.

Fourth, grades had a curvilinear relationship with persistence. Students with below-C grades were more likely to reenroll in the spring, perhaps because of institutions' policies that made it difficult for students to reenroll if they dropped out during mid-year with low grades. In contrast, students with all As were less likely to persist. This supports the hypothesis that some students dropped out in preparation for transfer. The fact that the effect of having As remained consistently negative, reducing the probability of persistence by at least 2 percent across all models, supports this argument. However, it is also possible that some students were preparing to transfer to less expensive colleges, a hypothesis supported by the fact that the size of the delta-*p* changed

substantially in the last three models. In fact, the delta-p for having As increased when fixed costs—tuition (step 5) and housing (step 6)—were added, increasing to 3.1 percent. Further, when controllable costs were entered, the delta-p for having As dropped to 2.4 percent. Thus, it appears that some of the students with A averages who dropped out were able to control tuition and their housing expenses, but found that other living costs (food and travel expenses) were too high to enable them to enroll continuously.

Further, there was a slight interaction between receiving mostly C grades and the financial variables. Students with mostly C grades were less likely than students with B averages to persist only when the two sets of fixed-cost variables were added to the model (steps 5 and 6), but not when controllable costs were added. It is possible that given a set level of expenses, students with C averages were slightly more likely than students with B averages to run into problems managing their controllable expenses (travel and food). We reach this conclusion because this variable ceased being significant in the final step, when these controllable costs were entered in the model.

This analysis raises interesting questions about the interactions between the academic integration process and the way students respond to the financial conditions they face. It appears that some students with A grades and C grades decided that economizing on food and travel costs to stay in an expensive college was not worth it. On one level, these actions could be viewed as excuses for dropping out, that is, for not integrating academically and/or socially. On another level, it could be argued that these students were actually weighing the costs and the benefits of their continuous enrollment. In other words, it is possible that an individual's experiences in college interacted with her financial decisions about whether continued enrollment was worth the cost. This interpretation suggests that the economic calculations students made were not only related to an abstract notion of eventual economic returns, as human capital theory implies, but also to a more concrete set of experiences in college.

Current Aspirations

The inclusion of current aspirations improves the quality of the model, increasing the pseudo-R^2 from 15.6 to 17.3, and improving the other model indicators slightly. Thus, based on pseudo-R^2 values, current aspirations appear to explain more variance than student background, but substantially less than the college-experience variables. Aspirations also explain about the same amount of variance as the college-choice variables.

NPSAS-87 asked students what their aspirations were after they had made their decisions to persist or drop out. Interestingly, current aspirations were inversely related to persistence. Students who aspired to attain only some college were consistently more likely to persist than students who aspired to attain

only bachelor's degrees. In contrast, students who aspired to attain master's and advanced degrees were consistently more likely to drop out than students who aspired to obtain a bachelor's degree. Further, the delta-*p* statistics for advanced degrees were consistently larger than for master's degrees, indicating a slightly larger probability of dropping out.

These findings tend to support the argument that some students who dropped out of college were either preparing for transfer or taking longer to attain their degrees because of cost. Further, both types of behavior could be related to costs, given the large direct effects of cost-related variables (discussed below) and the extent to which other variables interacted with the college-choice variables (discussed above).

Prices and Price Subsidies

When tuition and student aid were entered into the model (step 5), the pseudo-R^2 increased from 17.3 percent to 26.1 percent, indicating a substantial reduction in error. The Somer's *D* and -2 log L also improved substantially. Thus, prices explained a substantial portion of the within-year attrition. Each thousand dollars of tuition differential decreased the probability that a student would persist by 2.6 percent, although the size of the delta-*p* decreased when the other two cost variables entered the equation.

The three price subsidy variables included in step 5 were *negatively* associated with persistence. Earlier studies that had used NPSAS-87 to examine within-year persistence had similar findings (St. John, Andrieu, Oescher, and Starkey, 1994; St. John, Oescher, and Andrieu, 1992; St. John and Starkey, 1995). The authors of these studies argued that the cause of this phenomenon was the fact that student aid was inadequate to meet needs and explored various ways of measuring the effects of unmet need. The present study added further support to this hypothesis, given that none of these variables were negative when other living costs were added to the model.

Housing Costs

Housing costs, the other major fixed cost facing most college students, had a substantial direct effect on within-year persistence. When housing costs were added to the model in step 6, the pseudo-R^2 jumped from 26.1 percent to 41.5 percent and the other model indicators also showed substantial improvement. Thus, housing costs explained more variance in within-year persistence by full-time college students than any other set of variables previously considered, including college experience. In combination, prices and housing explained about twice the amount of variance as was explained by college experience (college experience increased the pseudo-R^2 by 13.4 percent, while housing

costs plus the price variables increased it by 24.2 percent). This further indicates that college costs had a real effect on persistence.

The direct effects of housing costs were also substantially larger than the direct effects of tuition charges. Each $1,000 of differential in housing costs reduced the probability of persistence by 3.9%. Thus, colleges that maintained higher housing costs and required students to live on campus could be undermining their ability to retain students.

Further, housing costs interacted with the effects of student aid. When housing costs were added to the equation, grants and work shifted from having a negative association with persistence to being neutral and loans shifted from having a negative association to having a slightly positive influence. These findings support the argument made in earlier studies that used NPSAS-87 to examine persistence, that the negative association between aid variables and persistence was attributable to the costs of attending college and, by extension, the average package was insufficient in 1986–87 (St. John, Andrieu, Oescher, and Starkey, 1994; St. John, Oescher, and Andrieu, 1992; St. John and Starkey, 1995.

Additionally, the fact that loans were positive in this step was probably related to the fact that loans were more readily available than grants in the late 1980s (Hearn, 1993; Lewis, 1989), rather than to differences in the effects of the two forms of aid. Indeed, another recent study indicated that Pell grants were regressive, when parental ability to pay was taken into account (Minnesota Higher Education Coordinating Board, 1994). Thus, the decline in federal grants could have become especially problematic by the late 1980s. Apparently, needy students had to be willing to borrow if they wanted to persist in the college of their choice.

Other Living Costs

Food and travel costs were separated from housing costs in this analysis because they are "controllable." A separate examination of these variable costs gives insights into a set of financial issues that have not been previously examined in persistence research.

When these variable costs were added in the last step of the sequential model, the pseudo-R^2 jumped to 59.4 percent and the Somer's D jumped to 94.4 percent, both of which are quite high for a persistence study. The -2 log L also improved substantially, indicating a better model fit. Indeed, this variable explained more variance than any other variable or set of variables in the model. In combination, the financial-related variables explained substantially more variance than all of the other variables in the model, including college experience. The three sets of financial variables (combined in step 7) increased the pseudo-R^2 from 17.3 percent to 59.4 percent (a 42.1 percent increase), indicating that finances were the major cause of within-year attrition.[13]

Further, it should be noted that the variable living costs had a larger direct effect on within-year persistence than any of the other finance variables. Specifically, each $1,000 differential in annual food and travel expenses decreased the probability of persistence by 4.6 percent. Presumably, if college counselors provided better information to students about the importance of controlling these costs, then attrition rates could be reduced. However, such practices would be deemphasized if enrollment managers assumed attrition was not influenced by cost, that finances were merely an excuse for dropping out.

Additionally, there were a couple of changes in the effects of student aid variables in this last step. First, loans ceased being significant, indicating that if students were willing to borrow to pay food and travel costs they were more likely to have continuous enrollment. Second, the amount of work study was negatively associated with persistence in the final step. This finding raised questions about the rate of pay for work-study jobs. If the amount of work study awarded increased, then students were essentially forced to work longer hours at low wages to earn their need-based student aid. So why was work study not significant in step 6, but was significant and negatively associated with persistence in step 7? Apparently work-study students controlled their food and travel costs somewhat better than other students, since they had to work for their money. The only way to solve this problem would be to increase the wage rate, a practice that would reduce the perceived institutional benefit of the federal college work-study program.

CONCLUSIONS AND IMPLICATIONS

This study has three findings that have implications for both the refinement of theories on student-choice processes and the practice of enrollment management. First, the reasons why students chose colleges had both a direct and indirect influence on their persistence decisions. The existence of a college choice-persistence nexus was well established, and the nature of the nexus relationships was substantially clarified in this study. In each step of the analysis, at least one financial-choice variable was significantly associated with persistence. When only background and choice variables were included, choosing a college for work-related reasons was significant and positively associated with persistence. In contrast, in the final step, when all of the college experience and finance variables were considered, choosing a college because of low tuition was significant and negatively associated with persistence, while the other choice-related variables were not significant. In between these steps all but one of the six college-choice variables examined here were significant. The fact that so many changes in the significance of choice variables were observed not only indicated these variables had an indirect effect on persistence, but that the financial reasons for choosing a college interacted with other aspects of the college experience.

Second, we found that some high-achieving undergraduates stopped out. Apparently these decisions were influenced by financial constraints, a desire to transfer attributable to other factors (possibly integration processes), or a combination of the two factors. The analysis indicates that this behavior was partially explained by college experiences. Thus, some of the mid-year stopouts may have been due to an inability to integrate socially or academically. However, there is also compelling evidence that costs influenced these decisions.

Third, college costs had a substantial direct influence on persistence. In particular, the findings indicated that living costs had a substantial direct effect on persistence. Further, when these other costs were included in the analysis, the negative association between student aid and persistence documented in this and other analyses of the effects of student aid on within-year persistence (St. John, Andrieu, Oescher, and Starkey, 1994; St. John, Oescher, and Andrieu, 1992; St. John and Starkey, 1995) ceased to be negatively associated with persistence, a finding that supports the hypothesis advanced in these studies that the negative coefficients for aid variables observed in these studies were caused by the fact that available aid was not adequate to meet financial need.

These findings raised serious doubts that finances were just an excuse for dropping out for academic or social reasons. Rather, it appears that the interaction between finances and academic and social experiences was part of the mental calculation students made about the costs and benefits of their college experience. Financial calculations, as well as academic considerations, not only influenced the enrollment decisions of a large percentage of students (Paulsen, 1990), but these calculations apparently also influenced persistence decisions. However, when students made their reenrollment decisions, they apparently made a mental calculation about whether the quality of their college experiences was worth the cost. The influence of these mental calculations, which may even have been made tacitly, was evident in the interactions between college experience variables and student financial variables, as well as between finance-related choice variables and other variables included in the model. It is certainly possible to interpret this phenomenon—the mental calculations students made about costs and the value of their college experiences—as excuses, especially because financial aid variables did not have the effects that were normally anticipated. However, inclusion of housing and food costs, a variable not previously examined in studies of the effects of student aid, provided insights into the reasons why aid variables did not have the anticipated effect.[14]

Thus, students who did not persist through the academic year were not necessarily low-achieving students or students who did not integrate socially, as much of our current persistence theory implies. Rather some appear to fit the profile of multiple transfer students examined in a recent study: "Respondents were bright, highly motivated individuals who did not hesitate to leave an institution when they judged the costs of remaining to outweigh the perceived bene-

fits of transferring elsewhere" (Kearney, Townsend, and Kearney, 1995, p. 339). Clearly it is important to rethink the link between college choice and persistence on both a theoretical and practical level.

Implications for Theory Reconstruction

These findings have implications for ongoing efforts to refine and reconstruct student-choice theories in higher education. Specifically, the role and nature of early commitments merit scrutiny in the conceptualization of persistence models. More specifically, this study suggests that the college choice-persistence nexus merits further investigation. We found that when students' college choices were influenced by finance-related factors, these precollege calculations continued to interact with the way students evaluated their college experience. This suggests that finances are not just an afterthought in the persistence decision, but an integral part of this decision process.

It is possible that the academic and social reasons for choosing a college also had an influence on their college experience. Specifically, it is possible that the nature of these early commitments (choosing a college for specific academic and/or social reasons) had an influence on the ways students integrated socially and academically. Indeed, the information and image communicated to students in the marketing and recruitment processes may have influenced students to choose a college for academic and social reasons. If the images students held about the quality of experience went unfulfilled, then they may have been more likely to drop out. This phenomenon could be explored by examining the nexus between the social and academic reasons for choosing a college and students' social and academic integration processes. These issues are most appropriately explored in institutional persistence studies.

This study provides evidence that there was indeed a nexus between student choice and persistence, at least in the financial-choice process. It is necessary to use a national market model to investigate this particular nexus, since price differentials do not exist in a single institution. To consider these market effects in an institutional study, it would be necessary to know the costs at all of the other institutions to which each student would consider transferring. Thus, it may not be feasible to adequately assess the effects of costs and perhaps even finance-related choices in a single institutional persistence study. However, institutional research can examine the relationships between the academic and social reasons for choosing a college and the academic and social integration processes. These questions are appropriately examined in institutional studies, since special data collections are needed to address these questions. National research on these topics could be enhanced if more information on academic and social integration processes was incorporated into the National Center for Education Statistics' data collections (future national postsecondary student aid

surveys and longitudinal studies); however, we suspect that such integration measures could be more difficult to interpret in a national study. Therefore, it is appropriate to begin addressing these integration-related nexus questions in institutional studies.

Further, the study findings have implications for ongoing efforts to assess the effects of student financial aid. Much of the literature and reviews conducted prior to the early 1990s (e.g., Jackson and Weathersby, 1975; Leslie and Brinkman, 1988) assumed aid had universal measurable effects. This belief was carried forward in reviews that attempted to reach a conclusion about universal effects (e.g., Jackson and Weathersby, 1975; Leslie and Brinkman, 1988). The findings of this study strongly suggest that the focus of review studies, and indeed of analyses of the effects of student aid and tuition charges, should shift to trying to build a better understanding of what negative and positive coefficients really mean in the particular instances in which they are documented. This study supports those who argue that student aid can have a negative association with persistence when there are insufficient resources to meet financial need (e.g., St. John, Andrieu, Oescher, and Starkey, 1994). It also supports those who argue that the measurable effects of prices and student aid can change over time as a result of changes in pricing policies (Dresch, 1975; St. John and Starkey, 1995) and that a universal measure of student price response cannot be developed because the effects of aid can change over time (Dresch, 1975).

More specifically, there is a need to examine critically extant theory about financial choice. Recent research indicates that the influence of prices is not simply a matter of students responding to net price; rather that students responded to a set of prices and price subsidies (St. John and Starkey, 1995). The finding that the way students responded to prices and subsidies was related to the financial reasons why they chose to attend—a finding of this study—further contradicts pricing theory. The present study adds more evidence to consider in this reconceptualization process. The fact that perceptions and preferences influenced how students responded to prices means that we need to reconceptualize how we conduct, interpret, and use research on the effects of prices. Indeed, the present study suggests the ways that prices are communicated to current and prospective students may be crucially important. It also provides a different slant on federal efforts to regulate information made available to college students. Perhaps better information on costs is more important than information on graduation rates, since costs—and perceptions of costs—influence persistence and graduation.

Implications for Enrollment Management

In the 1980s, enrollment management became an influential force in enabling colleges and universities to maintain competitive positions during a period

when declining enrollments were predicted. Typically enrollment management includes an emphasis on both recruitment and retention and it has used research to conceptualize strategies for improving the admissions and retention yields. However, the fact that the college choice and persistence processes have been separately conceptualized and investigated is problematic for the practice of enrollment management, as it has evolved.

First, the enrollment-management literature places an emphasis on student aid in the marketing process, but not in the retention process. This development has no doubt been influenced by extant theories and research, which have generally deemphasized the influence of financial variables on persistence. Analyses of student aid packages generally indicated that students who were more advanced in the educational process received a larger portion of their aid packages in loans than first- and second-year undergraduates (Astin, 1975; St. John, 1989). The current study suggests that such practices could be problematic for students who chose colleges because of the aid packages they were initially offered.

Second, the restructuring of state strategies for the financing of public higher education has shifted the burden for the costs of attending from taxpayers to students and their families (Kramer, 1993). This development seems especially problematic for African Americans, who are more responsive to prices than whites (Kaltenbaugh, 1993). States and institutions may indeed have a moral responsibility for considering these unintended effects of price differentials when they set tuition charges. In other words, the belief held by many state officials that students do not respond to tuition increases (State Higher Education Executive Officers, 1988) could have contributed to inequities in who has the opportunity to attend and persist in college.

Third, the fact that there is a nexus between financial-choice variables and persistence means that more explicit consideration should be given to the implicit contract made when students enroll in college. As long as these two student-choice processes were separately conceptualized, it was possible for institutions to shift their aid-packaging strategies without considering the consequences of this behavior. The assumption that students did not respond to financial conditions in their persistence decisions reinforced this behavior. However, the findings of this study call this practice into question. More explicit consideration should be given to the implicit contract, both as part of marketing strategies as well as in subsequent aid packaging.

Thus, even though some of the theory problems facing researchers who are interested in the college choice-persistence nexus remain unresolved, there are ways policymakers can increase student opportunity (and increase enrollments). At a minimum, institutions and state agencies should give more explicit consideration to the effects of prices and their aid-packaging strategies on student persistence. They can conduct their own analyses of the effects of pricing strategies (e.g., St. John, 1992; Somers, 1992) and assess the effects of alternative

pricing strategies (St. John, 1994). Both types of practices can be used to inform planning and budgeting processes in institutions and government agencies.

More generally those who are engaged in providing direct services to students can exhibit more sensitivity to the financial conditions that confront students. This study strongly indicates that the combination of prices and costs facing students has made it difficult for students to pay their living costs and continue their enrollment, a situation that may be contributing to the lengthening of time it takes the average student to get a college degree. And the recent financial exigencies apparently have contributed to declines in Fall enrollments in some states (Associated Press, 1993). Given this study's finding, that student concerns about prices influence both college choice and persistence decisions, as well as their interactions, a little more understanding of, coupled with increased sensitivity to, these constraints could make the lives of many students a little easier.

NOTES

1. More generally we think that this principle, that the student has the freedom to choose, could be integral to a reconstructed theory of student choice in higher education that includes a wide range of student choices. While such a task is desirable, it is beyond our aims in this article.
2. It should be noted that three initial studies have explored the influence of the reasons why students choose to attend a college on their within-year persistence decisions (Fine, 1992; Starkey, 1994; Tynes, 1993). While these studies found that there was indeed a nexus between the two areas of inquiry, there were both theory and methodological issues that merited more scrutiny and development. This article attempts to fill this gap.
3. Some first-time enrollment studies only look at the final stage: the probability that an admitted applicant will enroll (e.g., Parker and Summers, 1993; Schwartz, 1986). Therefore, they are not explicitly considered here. Nevertheless, the reader is reminded that not all college-choice studies use the stage theory emphasized in this review.
4. A recent study that compared alternate ways of specifying price variables in an analysis of persistence (St. John and Starkey, 1995) found that students respond to a set of prices rather than to a single net price, a finding that raises doubts about the validity of the net-price conceptualization.
5. It should be noted that we are drawing a logical parallel between the concept of early commitment embedded in the Tinto and Bean models and the concept of college choice, as developed above. Specifically we assume that the reasons a student chooses to attend a college give us insight into the nature of the commitment students make to the institutions they attend. In this study we are concerned primarily with the financial reasons for choosing a college. However, this argument can be extended to look at other aspects of the nexus between student choice and persistence (i.e., the interactions between the social and academic reasons for choosing a college and their social and academic integration processes).
6. These studies used a diverse set of student-choice variables in an early step in a sequential set of logistic regressions. They found that the significance and sign (whether the association was positive or negative) changed when tuition and aid amounts were added in a subsequent step in the sequence.
7. Further, the variable of choosing a college because of the opportunity to work while attending appears to clearly refer to off-campus jobs because a preceding item on the student question-

naire referred to chances to get a job *at* the school. In addition, the preceding item regarding getting a job at the school would make a poor financial indicator because its financial dimension is confounded with the influences on academic and social integration associated with working at the school.

8. Further, it should be noted that students who chose their college for academic, social, geographic, and other nonfinancial reasons, and who did not consider financial reasons as important in their choice, are part of the comparison group in our construction of design variables for finance-related reasons for choosing a college.
9. Whether a student lived on campus was included initially in the study because it was needed if we wanted to assess the effects of housing costs on persistence, since students living on campus and off campus face different types of living costs. It was included as a "college characteristic" variable because (1) students who live in residence halls are generally considered to have a different type and quality of college experience than students who live off campus (Pascarella and Terenzini, 1991); and (2) the influence of private colleges interacts with whether students live on campus (Lyn, 1993).
10. NPSAS-87 did not use a simple random sampling design. Their sampling procedures resulted in unequal probabilities of selection for students with particular characteristics. For example, they oversampled various minorities, giving students in such groups a higher likelihood of selection in their sample than nonminorities. To permit correction for such selection biases, the National Center for Education Statistics computed a relative weight for each student that reflects each student's probability of being selected in the sample. These student "weights" are provided as part of the NPSAS-87 database and were used to adjust the student data used in the sample for this study. The relative weight for each student was divided by the average weight for all students in the sample for this study, a procedure that "redistributes the observations to represent the distribution in the population . . . but makes the weights add to n, the sample size for your analysis" (NCES, 1993, p. 3).
11. Note that students with A grades were less likely to persist (step 3). Below we explore the prospect that the negative association for A grades is attributable to preparation for transfer, a conclusion that is consistent with recent research on transfer students (Kearney, Townsend, and Kearney, 1995).
12. Further, a national market model differs in its emphasis from institutional models that focus on integration processes. There should be room for both types of research since both provide insights that are useful to practitioners.
13. The reader should note that if we had more complete measures of social and academic integration, then "college experiences" would probably explain more variance. Nevertheless, financial variables have a substantial impact.
14. NPSAS-87 provided self-reported data on living costs. To our knowledge, such data are rarely available and have not previously been used in persistence research, inhibiting the ability of researchers to measure and interpret the effects of student aid.

REFERENCES

Aldrich, J. H., and Nelson, F. D. (1984). *Linear Probability, Logit and Probit Models.* Beverly Hills: Sage.

Alexander, K. L., and Eckland, B. K. (1974). Sex differences in the educational attainment process. *American Sociological Review* 39(5): 668–682.

Alexander, K. L., and Eckland, B. K. (1975). Basic attainment processes: A replication and extension. *Sociology of Education,* 48(Fall): 457–495.

Alexander, K. L., and Eckland, B. K. (1977). High school context and college selectivity: Institutional constraints in educational stratification. *Social Forces* 56(1): 166–188.

Andrieu, S. C. (1991). *The influence of background, graduate experience, aspirations, expected earnings, and financial commitment on within-year persistence of students enrolled in graduate programs.* Doctoral dissertation, University of New Orleans.

Andrieu, S. C., and St. John, E. P. (1993). The influence of prices on graduate student persistence. *Research in Higher Education* 34(4): 399–426.

Associated Press (1993, December 27). Big decline in enrollment at community colleges. *San Francisco Chronicle*, p. A4.

Astin, A. (1975). *Preventing Students from Dropping Out.* San Francisco: Jossey-Bass.

Bean, J. P. (1980). Dropouts and turnover: The synthesis of a causal model of student attrition. *Research in Higher Education* 12(2): 155–187.

Bean, J. P. (1982). Conceptual models of student attrition: How theory can help the institutional researcher. In E. Pascarella (ed.), *Studying Student Attrition* (pp. 17–33). New Directions for Institutional Research No. 36. San Francisco: Jossey-Bass.

Bean, J. P. (1985). Interaction effects based on class level in an explanatory model of college student dropout syndrome. *American Educational Research Journal* 22(1): 35–64.

Bean, J. P. (1990a). Using retention research in enrollment management. In D. Hossler and J. P. Bean and Associates (eds.), *The Strategic Management of Enrollment* (pp. 170–185). San Francisco: Jossey-Bass.

Bean, J. P. (1990b). Why students leave college: Insights from research. In D. Hossler, J. P. Bean, and Associates (eds.), *The Strategic Management of Enrollment* (pp. 147–169). San Francisco: Jossey-Bass.

Bean, J. P., and Metzner, B. (1985). A conceptual model of nontraditional student attrition. *Review of Educational Research* 55(4): 485–540.

Becker, G. S. (1964). *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education.* New York: Columbia University Press.

Becker, G. S. (1975). *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*, 2nd ed. New York: National Bureau of Economic Research.

Becker, W. E. (1990). The demand for higher education. In S. A. Hoenack and E. L. Collins (eds.), *The Economics of American Universities: Management, Operations, and Fiscal Environment* (pp. 155–188). Albany, NY: State University of New York Press.

Bishop, J. (1977). The effect of public policies on the demand for higher education. *Journal of Human Resources* 5(4): 286–307.

Blau, P., and Duncan, O. (1967). *The American Occupational Structure.* New York: Wiley and Sons.

Braxton, J. M. (1990). How students choose colleges. In D. Hossler, J. P. Bean, and Associates (eds.), *The Strategic Management of Enrollment* (pp. 57–67). San Francisco: Jossey-Bass.

Cabrera, A. F., Castaneda, M. B., Nora, A., and Hengstler, D. (1992). The convergence between two theories of college persistence. *Journal of Higher Education* 63(2): 143–164.

Cabrera, A. F., Nora, A., and Castaneda, M. B. (1992). The role of finances in the persistence process: A structural model. *Research in Higher Education* 33(5): 571–593.

Cabrera, A. F., Stampen, J. O., and Hansen, W. L. (1990). Exploring the effects of ability to pay on persistence in college. *Review of Higher Education* 13(3): 303–336.

Carroll, C. D. (1987). *Student Financial Assistance and Consequences.* Presented at the 147th annual meeting of the American Statistical Association, San Francisco.

Chapman, R. (1979). Pricing policy and the college selection process. *Research in Higher Education* 10(1): 37–57.

Chapman, R., and Jackson, R. (1987). *College Choices of Academically Able Students.* New York: College Entrance Examination Board.

Clark, C. R., and Hossler, D. (1990). Marketing in nonprofit organizations. In D. Hossler and J. P. Bean (eds.), *Strategic Management of Enrollment* (pp. 68–85). San Francisco: Jossey-Bass.

Cohn, R., and Geske, T. G. (1990). *The Economics of Education.* New York: Pergamon Press.

Dresch, S. P. (1975). A critique of planning models for postsecondary education: Current feasibility, potential relevance, and a prospectus for future research. *Journal of Higher Education* 46(3): 246–286.

Ehrenberg, R. G., and Sherman, D. R. (1984). Optimal financial aid policies for a selective university. *Journal of Human Resources* 19(2): 202–230.

Fine, P. L. (1993). The influence of college choice variables on within-year persistence by traditional college-aged students in private four-year colleges. Unpublished predissertation research, University of New Orleans.

Hauser, R. M., Sewell, W., and Alwin, D. R. (1976). High school effects on achievement. In W. H. Sewell, R. M. Hauser, and D. L. Featherman (eds.), *Schooling and Achievement in American Society* (pp. 309–341). New York: Academic Press.

Hearn, J. C. (1984). The relative roles of academic, ascribed, and socioeconomic characteristics in college destinations. *Sociology of Education* 57(January): 22–30.

Hearn, J. C. (1993). The paradox of growth in federal student aid for college students: 1965–1990. In J. C. Smart (ed.), *Higher Education Handbook of Theory and Research* (pp. 94–153). New York: Agathon.

Hosmer, D. W., and Lemeshow, G. S. (1989). *Applied Logistic Regression.* New York: Wiley.

Hossler, D. (1984). *Enrollment Management: An Integrated Approach.* New York: College Entrance Examination Board.

Hossler, D., Bean, J. P., and Associates (1990). *The Strategic Management of College Enrollments.* San Francisco: Jossey-Bass.

Hossler, D., Braxton, J. M., and Coopersmith, G. (1989). Understanding student college choices. In J. C. Smart (ed.), *Higher Education: Handbook of Theory and Resources,* vol. 5, pp. 231–288. New York: Agathon Press.

Hossler, D., and Gallagher, K. S. (1987). Studying student college choice: A three-phase model and the implications for policy-makers. *College and University* 57(3): 207–221.

Jackson, G. A. (1978). Financial aid and student enrollment. *Journal of Higher Education* 49(6): 548–574.

Jackson, G. A. (1982). Public efficiency and private choice in higher education. *Educational Evaluation and Policy Analysis* 4(2): 237–247.

Jackson, G. A., and Weathersby, G. B. (1975). Individual demand for higher education. *Journal of Higher Education* 46(6): 623–652.

Kaltenbaugh, L. P. (1993). The influence of price and price subsidies on the within-year persistence by African-American students. Doctoral dissertation, University of New Orleans.

Kohn, M. G., Manski, C. F., and Mundel, D. S. (1976). An empirical investigation of factors which influence college-going behavior. *Annals of Economic and Social Measurement* 5(4): 391–419.

Korb, R., Schantz, N., and Zimbler, L. (1989). *National Center for Education Statistics Student Financing of Graduate and Professional Education—A Report of the 1987*

National Postsecondary Student Aid Study. U.S. Department of Education, Office of Educational Research and Improvement.

Kramer, M. (1993). Changing roles in higher education finance. In J. P. Merisotis (ed.), *Background Papers and Reports* (pp. 1–50). Washington, DC: National Commission on Responsibilities for Financing Postsecondary Education.

Leslie, L. L., and Brinkman, P. T. (1988). *The Economic Value of Higher Education*. San Francisco: Jossey-Bass.

Leslie, L. L., Johnson, G. P., and Carlson, J. (1977). The impact of need-based student aid upon the college attendance decision. *Journal of Education Finance* 2(Winter): 269–285.

Lewis, G. (1989). Trends in student aid, 1962–63 to 1988–89. *Research in Higher Education* 30(6): 547–562.

Litten, L. H., and Brodigan, D. L. (1982). On being heard in a noisy world: Matching media and messages in college marketing. *College and University* 57(3): 242–263.

Lyn, D. S. (1993). The impact of living in university residential housing on within-year persistence by undergraduate students attending postsecondary institutions. Master's thesis, University of New Orleans.

Manski, C. F., and Wise, D. A. (1983). *College Choice in America*. Cambridge, MA: Harvard University Press.

McPherson, M. S., and Schapiro, M. O. (1991). *Keeping College Affordable: Government and Educational Opportunity*. Washington, DC: Brookings Institution.

Minnesota Higher Education Coordinating Board (1994, August 18). *The Design for Shared Responsibility*, Staff Background Paper Number 3. St. Paul, MN: MHCB.

Moore, R. L., Studenmund, A. H., and Slobko, T. (1991). *Economics of Education Review* 10(4): 311–321.

Murphy, P. E. (1981). Consumer buying roles in college choice: Parents' and students' perceptions. *College and University* 57(Winter): 150–160.

National Center for Education Statistics (1993). A note from the chief statistician. Unpublished document. Washington, DC.

Parker, J., and Summers, J. (1993). Tuition and enrollment yield at selective liberal arts colleges. *Economics of Education Review* 12(4): 311–324.

Pascarella, E. T., Smart, J. C., and Smylie, M. A. (1992). College tuition costs and early career socioeconomic achievement: Do you get what you pay for? *Higher Education* 24: 275–290.

Pascarella, E. T., and Terenzini, P. T. (1980). Predicting freshman persistence and voluntary dropout decisions from a theoretical model. *Journal of Higher Education* 51(1): 60–75.

Pascarella, E. T., and Terenzini, P. T. (1991). *How Colleges Affect Students*. San Francisco: Jossey-Bass.

Paulsen, M. B. (1990). *College Choice: Understanding Student Enrollment Behavior*. ASHE-ERIC Higher Education Report No. 6. Washington, DC: The George Washington University, School of Education and Human Development.

Peng, S. S., and Fetters, W. B. (1978). Variables involved in withdrawal during the first two years of college: Preliminary findings from the National Longitudinal Study of the high school class of 1972. *American Educational Research Journal*, 15(3): 361–372.

Petersen, T. (1984). A comment on presenting results from logit and probit models. *American Sociological Review* 50(1): 130–131.

Porter, O. F. (1990). Persistence in four-year colleges: Are there differences in public and independent institutions? Presented at the Seventh Annual Conference of the NASSGP/NCHELP Research Network, Washington, DC.

St. John, E. P. (1989). The influence of student aid on persistence. *Journal of Student Financial Aid* 19(3): 52–68.

St. John, E. P. (1990a). Price response in enrollment decisions: An analysis of the high school and beyond sophomore cohort. *Research in Higher Education* 31(2): 161–176.

St. John, E. P. (1990b). Price response in persistence decisions: An analysis of the high school and beyond senior cohort. *Research in Higher Education* 31(4): 387–403.

St. John, E. P. (1991). What really influences minority student attendance? An analysis of the high school and beyond sophomore cohort. *Research in Higher Education* 32(2): 141–158.

St. John, E. P. (1992). Workable models for institutional research on the impact of student financial aid. *Journal of Student Financial Aid* 22(3): 13–26.

St. John, E. P. (1994). Assessing tuition and student aid strategies: Using price-response measures to simulate pricing alternatives. *Research in Higher Education* 35(3): 301–334.

St. John, E. P., Andrieu, S. C., Oescher, J., and Starkey, J.B. (1994). Impact of student aid on within-year persistence by traditional college-age undergraduates in four-year colleges. *Research in Higher Education* 35(4): 455–480.

St. John, E. P., Kirshstein, R. J., and Noell, J. (1991). The effects of student financial aid on persistence: A sequential analysis of the high school and beyond senior cohort. *Review of Higher Education* 14(3): 383–486.

St. John, E. P., and Noell, J. (1989). The effects of student financial aid on access to higher education: An analysis of progress with special consideration of minority enrollment. *Research in Higher Education* 30(6): 563–581.

St. John, E. P., Oescher, J., and Andrieu, S. (1992). The influence of prices on within-year persistence by traditional college-age students in four-year colleges. *Journal of Student Financial Aid* 22(1): 27–82.

St. John, E. P., and Starkey, J. B. (1994). The influence of costs and cost subsidies on within-year persistence by community college students. *Community College Quarterly of Research and Practice* 18(2): 201–214.

St. John, E. P., and Starkey, J. B. (1995). An alternative to net price: Assessing the effects of prices on within-year persistence. *Journal of Higher Education* 66: 156–86.

Schultz, T. W. (1963). *The Economic Value of Education.* New York: Columbia University Press.

Schwartz, J. B. (1986). Wealth neutrality vs. higher education: The effects of student grants. *Economics of Education Review* 5(2): 107–117.

Seneca, J. J., and Taussig, M. K. (1987). The effects of tuition and financial aid on the enrollment decision at a state university. *Research in Higher Education* 26(4): 337–362.

Sewell, W. H., and Hauser, R. M. (1976). Causes and consequences of higher education: Models of the status attainment process. In W. H. Sewell, R. M. Hauser, and D. L. Featherman (eds.), *Schooling and Achievement in American Society* (pp. 9–27). New York: Academic Press.

Sewell, W. H., and Shah, V. P. (1967). Socioeconomic status, intelligence, and the attainment of higher education. *Sociology of Education* 40(1): 1–23.

Sewell, W. H., and Shah, V. P. (1968). Social class, parental encouragement, and educational aspirations. *American Journal of Sociology*, 73(5): 559–572.

Somers, P. (1992). A dynamic analysis of student matriculation decisions in an urban public university. Unpublished doctoral dissertation, University of New Orleans.

Stage, F. K., and Hossler, D. (1989). Differences in family influences on college attendance plans for male and female ninth graders. *Research in Higher Education* 30(3): 301–315.

Stampen, J. O., and Cabrera, A. F. (1986). Exploring the effects of student aid on attrition. *Journal of Student Financial Aid* 16(2): 28–40.

Starkey, J. B. (1994). The influence of prices and price subsidies on the within-year persistence by part-time undergraduate students: A sequential analysis. Unpublished doctoral dissertation, University of New Orleans.

State Higher Education Executive Officers Committee on College Costs (1988). *Report on the Costs of Colleges to Students.* Denver, CO: SHEEO.

Terkla, D. C. (1985). Does financial aid enhance undergraduate persistence? *Journal of Student Financial Aid* 15(3): 11–18.

Thurow, L. C. (1970). *Investment in Human Capital.* Belmont, CA: Wadsworth Publishing.

Tierney, M. L. (1982). The impact of institutional net price on student demand for public and private higher education. *Economics of Education Review* 2(4): 363–383.

Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research* 45(1): 89–125.

Tinto, V. (1987). *Leaving College: Rethinking the Causes and Cures of Student Attrition.* Chicago: University of Chicago Press.

Tynes, S. F. (1993). The relationship of social, economic, academic and institutional characteristics to persistence by nontraditional-age students: Implications for counselors. Unpublished dissertation, University of New Orleans.

Villella, E. F., and Hu, M. (1990). College choice as a linking variable between recruitment and retention. *Journal of Marketing for Higher Education* 3(1): 79–88.

Voorhees, R. A. (1985). Financial aid and persistence: Do the federal campus-based aid programs make a difference? *Journal of Student Financial Aid* 15(1): 21–30.

Wolfle, L. M. (1985). Postsecondary educational attainment among whites and blacks. *American Educational Research Journal* 22(4): 501–525.

Zemsky, R., and Oedel, P. (1983). *The Structure of College Choice.* New York: College Entrance Examination Board.

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