Student Aid and Its Role in Encouraging Persistence

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Overview and Research Questions

The study of college student persistence has become increasingly important during the past decade. Although the current postsecondary educational context provides ample reasons to be concerned about this topic, the most compelling reason is rooted in social equity. When institutions admit students, they should also be making a simultaneous commitment to help students achieve their educational goals. This is not to suggest that students have no role or responsibility in achieving their goals but to assert that institutions share this responsibility. Access to postsecondary education is achieved not solely by admitting students, but also by enhancing their odds of earning a degree or certificate. Without degree completion, access to postsecondary education provides fodder for critics who ask whether our colleges and universities promote upward mobility or perpetuate inequities based on class and race.

There are also more instrumental reasons to be focused upon the issue of college student retention and degree attainment. Several proposals have emanated from federal policymakers calling for the use of college graduation rates as an indicator of educational quality (Adelman, 1999; American Association of State Colleges and Universities, 2002; Gold and Albert, 2006). In addition, the *U.S. News and World Report's* annual publication of *America's Best Colleges* uses freshman-to-sophomore persistence rates and 6-year graduation rates as part of its formula for ranking colleges. During the past 25 years, hundreds of studies have tested assumptions of theories of student departure. Some examples include the following: Bean, 1990; Mallette and Cabrera, 1991; Pascarella et al., 1983; Stage 1989; Tinto, 1993; and Williamson and Creamer, 1988. In addition to efforts to test the models of Vincent Tinto (Braxton et al., 1997; Cabrera et al., 1990; Halpin, 1990; Hurtado and Carter, 1997; Milem and Berger, 1997; Nora et al., 1990; Tierney, 1992) and John Bean (Andreu, 2002; Farabaugh-Dorkins, 1991; Himelhoch et al., 1997; Stahl and Pavel, 1992), there is a growing body of literature that examines the effects of student financial aid on student persistence (e.g., Cabrera et al., 1992; DesJardins et al., 2002a; Dowd and Coury, 2006; DuBrock and Fenske, 2000; Paulsen and St. John, 2002; St. John et al., 1996; Singell and Stater, 2006). These studies represent a diverse set of foci. Some studies consider the effects of federal financial aid on

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persistence (Cofer and Somers, 1999; DuBrock and Fenske, 2000), while others look at the impact of state financial aid programs (Long, 2002; St. John et al., 2001). Yet others investigate the effects of institutional financial aid on persistence and graduation rates (Desjardins et al., 2002a; Lichtenstein, 2002; Singell, 2004).

The study of the effects of student financial aid on persistence and graduation rates is particularly important given the increasing public policy focus on student financial aid programs. There is a growing sense that our federal, state, and institutional financial aid programs have become so complex and have been enacted to achieve such different goals that they no longer serve students, public policy goals, or institutions very effectively (Archibald, 2002; Kane, 1999; Mercer, 2006). Recently, Secretary of Education, Margaret Spellings, observed, "[t]he reality is – no matter the costs, the wealthy can pay. But for low-income, mostly minority students, college is becoming virtually unattainable. Chuck Vest, former MIT President, put it this way: 'In this country, you are better off being rich and dumb than poor and smart'" (U.S. Department of Education, 2006, ¶36).

This chapter provides a comprehensive review of the extant research on how student financial aid affects undergraduate student persistence and graduation. For more than 3 decades, scholars and practitioners have speculated on the extent to which financial aid increases the odds of students completing their degrees. Much of the early research and writing on student persistence does not mention financial aid. The original Tinto model of student persistence (1975) that has been so influential in shaping research on this topic does not mention finances or financial aid. Through much of the 1980s and 1990s, the common belief among campus practitioners concerned with student retention was that students who indicated finances as the reason they were dropping out were simply offering a socially acceptable reason, and that other concerns, such as poor academic performance, a lack of social integration, or homesickness, were more likely their real reasons for withdrawing. Bean's model of student attrition (1983) identifies student finances as a potential reason for dropping out, but it is arguably the consistent, ongoing research agenda of Edward St. John that began to shed light on the impact of the financial status of students and their families and the role of financial aid on student persistence. In the last 15 years, there has been a dramatic increase in research on the effects of financial aid on student persistence. Beginning with Bean's theory, throughout this chapter we consider a range of ways in which financial aid can directly and indirectly influence persistence and degree completion.

Despite the growth in research in this field, however, important areas of student aid and student persistence have received relatively little attention. We acknowledge this at the outset in order to trace the broad outlines of this landscape – what the literature has explored extensively and what it has not. The primary interest of policymakers is to understand the impact of financial aid on the probabilities that aspiring students, regardless of income, will matriculate and graduate from a postsecondary educational institution. Surprisingly, perhaps the most important limitation of research on the effects of financial aid on retention is that there are very few studies of the effects of financial aid on graduation. Because the process

toward graduation is longitudinal and difficult to analyze empirically over time, almost all studies reviewed in this chapter examine either the effects of financial aid on persistence from the first to second year of postsecondary education or the impact of aid on persistence from one semester to the next. Thus, while we know a good deal about the impact of financial aid on persistence, we know relatively little about the impact of aid on graduation. In addition, there is a dearth of research on the effects of financial aid on students enrolled in 2-year colleges, of loan debt on persistence and graduation, and of merit aid. Another collective limitation of research in this area is that too little attention has been given to how various design elements of financial aid programs contribute to student persistence. For example, despite the level of interest that has been generated by policymakers in front-loading, only one study has been undertaken on its potential to affect persistence.

Finally, we note one important additional caveat. Few studies adequately control for self-selection or the endogeneity of aid, a problem that we address later in this chapter. Without controlling for factors that may make students more likely to apply for aid, it is difficult to determine the unique effect of aid on persistence. Moreover, we look here only at persistence. Thus, it is difficult to estimate the potential impact of financial aid in encouraging many low- and moderate-income students to enroll in postsecondary education. And once they are enrolled, we are confident that many students who might not have otherwise matriculated succeed and graduate as the result of intrinsic motivation, institutional support, and financial aid. Thus, we acknowledge at the outset that our findings may understate the overall effects of financial aid. Nevertheless, this review of research on the impact of financial aid on student persistence provides a comprehensive and systematic overview of what we know about this important topic.

This study looks broadly at types of financial aid programs studied in recent decades – and the structure of those programs – to synthesize current understandings of how student aid affects undergraduate persistence and graduation, and searches the published literature to identify some of the less-studied effects of student debt on persistence and graduation. We apply a theoretical frame that – much aligned with the goals of the nexus studies (St. John et al., 1996; St. John et al., 2005) – acknowledges the interconnection between students' college experiences and the social and economic contexts that condition their interactions with, and participation in, colleges and universities and that lead ultimately to their academic success. The following research questions are addressed:

1. *Framing the landscape.* How have studies defined student persistence and student financial aid? What theoretical and methodological problems and what approaches to them characterize the study of how financial aid affects persistence? How do these features affect what we know?
2. *A synthetic view of the impact of aid on persistence*. What is the summative knowledge of the relative effects of grants and loans on within-year persistence, continuous enrollment, and graduation? For example, do grants and loans exert similar effects on persistence as on graduation? Are the effects of these aid programs the same

for full-time, traditional-age students on residential campuses as they are for older, commuting students?
3. *Special topics: Merit aid, loans, and programmatic elements.* How does merit aid affect student persistence and graduation? What special complexities inform our understanding of the effects of loans? How do programmatic elements figure in the research on student aid and persistence?
4. *Debt*: *Does it matter?* While many studies have looked at the relative effects of loans versus grants on persistence, fewer studies have examined (a) the effects of the amount of debt on academic success outcomes and (b) the influences on student persistence and graduation from the interactions of debt with student and institutional characteristics.

Methods

To answer these questions, we conducted an extensive review of published research on these topics. Table 1 shows the scope of our search and our approach. Our search incorporated sources published in 1991 or later. Federal, state, and institutional financial aid policies were shifting around that time (e.g., with the 1992 Higher Education Act (HEA) reauthorization) and we chose this time frame in order to capture concurrent changes in financial aid programs and research on them. We found more than 100 studies and papers released during the last 16 years, including several literature reviews. We gave priority to empirical work and reviews of research presented in peer-reviewed journals but also included work published as research reports that we judged to be relevant (e.g., National Center for Education Statistics (NCES) reports, materials from the National Association of Student Financial Aid Administrators (NASFAA) and the Association for Institutional Research (AIR)). This process yielded a set of 74 articles, chapters, and monographs for our in-depth review.

Due to our systematic approach, we are confident that the rich set of sources at the center of our review represents the mainstream analysis and social research discourse on the role of student aid in persistence over the last 16 years. A study group of five researchers trained in higher education research, sociology, public policy, and applied economics met in a series of discussions to identify important threads in this body of literature. Using *Atlas.ti* software to track and organize our analyses, we then coded and annotated our summaries according to the themes and questions that had arisen from our series of discussions. Following good qualitative research practice, we also remained alert and open to newly emerging themes as we worked our way through this phase (Marshall and Rossman, 1999; Miles and Huberman, 1994). The systematic analytical and interpretive work established through research memos and annotated summaries enabled us to identify unanticipated questions and to identify some of the problems with the current range of research conducted on the effects of financial aid on student persistence. It allowed us also to discover gaps in the literature and to reflect upon methodological issues endemic to this area of research.

Table 1 Approach to identifying sources

Resources searched		Search terms/strategies applied
Bibliographical databases	ERIC	College students, student financial aid, and persistence
		College students, financial aid, and graduation
		College students, persistence, and debt (financial)
	Education Full Text	College students, student financial aid, and persistence
		College students, financial aid, and graduation
		College students, student financial aid, and retention
	IngentaConnect	College students, student financial aid, and persistence
		College students, financial aid, and graduation
		College students, student financial aid, and retention
	JSTOR	College students, student financial aid, and persistence
		College students, financial aid, and graduation
		College students, student financial aid, and retention
	ProjectMuse	College students, student financial aid, and persistence
	ProQuest	College students, student financial aid, and persistence College students, student financial aid, and retention
	WebofKnowledge	College students, student financial aid, and persistence College students, student financial aid, and retention
	WorldCat	College students, student financial aid, and persistence College students, student financial aid, and retention
Internet resources	Google Scholar	"College students" "Student financial aid" "Persistence" "College students" "Student financial aid" "Student retention"
	NASFAA Web site bibliography database	Persistence; retention
	AIR Web site: Publications and IR	Persistence; retention
Print resources	Higher Education: Handbook of Theory and Research, Vol. 1–21	Searched tables of contents by hand for relevant pieces
	Reference lists of major studies: Pascarella and Terenzini, 2005; and others yet to be selected	Searched tables of contents by hand for relevant pieces

To draw conclusions across contradictory findings, it is of course often necessary to distinguish which studies to rely on more than others. In summarizing articles, we noted methodological features that we thought spoke of the relevance of a piece for this review, and also of its general quality or usability in the study. First, in terms of relevance, because our focus was on the relationships between aid and persistence, we put less stress on studies that looked primarily at college access or that provided mainly descriptive results. In our general methodological evaluations, we noted the quality of authors' approaches to data and their interpretations of the results. We valued a more subtle and differentiated view in these areas over approaches that took the adequacy or meaning of data for granted or that argued less critically for the claims made from the results. As we noted earlier, central problems of interest for this project included the question of the endogeneity of aid eligibility and of the indirect effects of aid. These questions imply specific analytical techniques for their solution, including multistage regression, longitudinal inquiry, structural equation modeling, and instrumental variable techniques.

Using these comments and cues, we categorized studies by relevance and quality vis-à-vis their use for this specific project. Certainly, we do not claim these categorizations as absolute pronouncements on the general quality of each piece. Rather, we adopt the view that such evaluations are most precise and useful when contextualized and oriented toward a specific purpose. Through this method, we arrived at set of 32 highly relevant, high-quality studies on which we base some of our observations.

Framing the Landscape: How Have Studies Defined Student Persistence and Student Financial Aid?

Defining Persistence

It is important to note at the outset that there is a great amount of research on persistence that does not emphasize the role of financial aid. Efforts to incorporate finances into persistence research reach back through Bean's early work (1983), in which he notes that the opportunity to work and earn money can create an external environmental pull that increases the odds of dropping out. Moving from Bean's early work on, more complex understandings of costs, financial aid, and other variables have emerged throughout the 1990s (Cabrera et al., 1992; St. John et al., 1991) and also in the current activity of St. John and colleagues' nexus studies and other research reviewed here. Through each generation of research on this topic, analytic techniques have moved from simple regressions to structural equation modeling into logistic regression and more recently into multistage modeling.

Looking across the work on student persistence, however, we see a distinct and notable thread of research that focuses primarily on financial aid variables in modeling persistence. Inclusion of college experience variables in these models is somewhat

limited. Grade point average (GPA) and full-time status are common measures used to stand for college experiences (e.g., Somers, 1995). Going a bit more in depth, St. John et al. (2001) include institution type and housing status. Lichtenstein (2002) incorporates number of semesters residing in on-campus housing. That two separate research threads have developed means it is difficult to get a full picture of the role of financial aid in persistence. Only a few attempts have been made to bring the two threads together (e.g., Cabrera et al., 1992; St. John et al., 2000a). In general, however, the college experience variables included have often been superficial measures of college experience at best, and because of the questionable causal relationship with persistence, these proxies for college experience constructs are fraught with problems. This drawback reflects the limitations of the available secondary data; nevertheless, it has ramifications for how we are able to use the research to draw conclusions about our central questions.

Research on student persistence has defined the central construct in a number of ways in the course of studying the effects of financial aid. Prevalent conceptions of persistence include fall-to-fall persistence, first-to-second-year reenrollment (Bresciani and Carson, 2002; DuBrock and Fenske, 2000; St. John et al., 1991), and within-year persistence (e.g., Cofer and Somers, 1999, 2000; Hu and St. John, 2001; Paulsen and St. John, 2002; St. John et al., 2001; Somers, 1995; Somers et al., 2004). Somers (1995) utilizes both within-year and year-to-year persistence as outcomes. Studies of community colleges incorporate transfer, return, and reenrollment into definitions of persistence (e.g., Battaglini, 2004; Dowd and Coury, 2006). Other studies examine persistence as ultimately defined by graduation (Alon, 2005; Stinebrickner and Stinebrickner, 2003; Singell and Stater, 2006). Since degree completion is the goal of both students and policymakers, the effects of financial aid on graduation would have the most utility for this chapter. Despite recommendations noted in the literature (DesJardins et al., 2002a; St. John and Starkey, 1995), one of the shortcomings of inquiry on the impact of financial aid on persistence is that most studies do not look at the effects of aid on persistence longitudinally. This is not a criticism of the research that has been undertaken; constructing longitudinal studies of the effects of financial aid is often impossible because of limitations in data sets, and only recently have analytical approaches utilized in other fields been applied to this impact of financial aid upon graduation. Within-year and year-to-year studies of persistence reflect the basic conventions of relevant theories and are empirically justifiable, but they also have limits in their ability to help us understand how aid plays a role in helping students progress to graduation.

Data Sources and Scope of Studies

These studies have taken place in a variety of institutional settings and have used a range of databases. Table 2 shows notable examples of studies and their data sources. Each of these types of data sets offers different strengths and weaknesses. National data sets typically have a robust set of student background variables and standardized definitions of federal, state, and institutional financial aid. Several

Table 2 Data sources and scope of studies

National databases	**NPSAS**	
	Cofer and Somers, 1999	
	Cofer and Somers, 2000	
	Cuccaro-Alamin and Choy, 1998	
	Dynarski and Scott-Clayton, 2006	
	Kaltenbaugh et al., 1999	
	Paulsen and St. John, 2002	
	St. John et al., 1994	
	St. John et al., 2005	
	Somers et al., 1999	
	Somers et al., 2004	
	Turley, 2005	
	BPS	
	Cuccaro-Alamin and Choy, 1998	
	Dowd and Coury, 2006	
	Gladieux and Perna, 2005	
	HS&B	
	St. John et al., 1991	
	College and Beyond	
	Alon, 2005	
	NLSY	
	Dynarski, 2003	
State databases	**Georgia**	
	Cornwell and Mustard, 2004	
	Henry et al., 2004	
	Long, 2002	
	Indiana	
	Hu and St. John, 2001	
	St. John et al., 2001	
	Missouri	
	Pantal et al., 2006	
	Ohio	
	Bettinger, 2004	
Institutional databases	Braunstein et al., 2000	Li and Killian, 1999
	Bresciani and Carson, 2002	Lichtenstein, 2000
	Cabrera et al., 1992	Singell, 2004
	DesJardins, 2001	Singell and Stater, 2006
	DesJardins et al., 2002	Somers, 1995
	Herzog, 2005	Stinebrickner and Stinebrickner, 2003
	Lam, 1999	

databases (e.g., Beginning Postsecondary Students (BPS), High School and Beyond (HS&B), and National Longitudinal Survey of Youth (NLSY)) are also longitudinal, enabling researchers to track the effects of financial aid over time. This makes it possible to examine how various forms of financial aid interact with student background characteristics and types of institutions to influence student persistence. The weaknesses of these databases include the following limitations:

(1) they may lack sufficient sample sizes to examine the effects of specific state financial aid programs, (2) they do not allow for the examination of the effects of institutional aid programs at a specific college or university, and (3) large national databases typically lack sufficient measures of the effects of college experience variables (such as academic and social integration) that have been found to be strong predictors of persistence. The first National Postsecondary Student Aid Study (NPSAS:87) includes GPA, hours of required instruction per week and remedial course-taking (NPSAS, 1987). NPSAS:96, however, includes more detailed measures of institutional climate and educational experiences.

State databases make it possible to scrutinize the effects of specific state aid programs. For example, St. John and colleagues have conducted several studies on the effects of the Twenty-first Century Scholars Program in Indiana (St. John et al., 2001, 2006). Similarly, several studies of Georgia's Helping Outstanding Pupils Educationally (HOPE) scholarship program draw on state-level databases (e.g., Cornwell and Mustard, 2004; Henry et al., 2004; Long, 2002). These databases also enable researchers to track the associations between financial aid and the longitudinal movement of students from 2- to 4-year institutions, as well as other forms of transfer and reverse-transfer behaviors. Inherent in state databases are some limitations: (1) they often lack data elements for institutional financial aid programs, (2) they typically incorporate insufficient measures of academic and social integration at the institutional level, and (3) they do not track students who transfer to out-of-state institutions.

Using institutional data, investigators have been able to conduct longitudinal studies of the effects of institutional financial aid programs on student persistence (Cabrera et al., 1992; DesJardins et al., 2002a; Herzog, 2005; Singell and Stater, 2006). Unlike federal or state databases, institutional databases sometimes include measures of constructs typically used in student retention research, such as academic and social integration (Lichtenstein, 2002; Perna, 1998; Cabrera et al., 1992). This permits the comparison of the effects of aid with other theoretical constructs found to be associated with student persistence and graduation. Institutional studies also permit scholars to compare the effects of merit- and need-based financial aid (DesJardins et al., 2002; Herzog, 2005; Lichtenstein, 2002; Singell, 2004; Singell and Stater, 2006; Somers, 1995). However, institutional databases also have limitations, including the lack of information as to whether students who leave the campus are in fact dropping out or are transferring to another institution (Chen, 2008). Moreover, the inherent constraints of institutional data can complicate researchers' efforts to examine how forms of campus-based aid programs affect persistence across institutions. Notably, however, a recent study by Singell and Stater (2006) has overcome this limitation by the use of data from three public flagship institutions.

Most of the campus-based studies were conducted at 4-year institutions. Relatively few studies focus on the effects of financial aid on persistence at community colleges; notable among these are studies by Cofer and Somers (1999), Dowd and Coury (2006), and Turley (2005). In addition, many of the studies that use state or federal financial aid programs focus most of their attention on students attending 4-year colleges and universities. Indeed, apart from a few studies of commuting institutions, including studies by Braunstein et al. (2000), Cabrera et al. (1992),

Somers (1995), and St. John et al. (2000b), there is a relative dearth of research on students enrolled at commuting institutions.

It is instructive to consider the scope of current studies from an overview perspective. Studies of individual institutions (e.g., Dubrock and Fenske, 2000; DesJardins et al., 2002a) or of multiple individual institutions (Singell and Stater, 2006), for example, write out of their analysis variation in institutional practices. In studies using federal databases, on the other hand, authors might control for institutional types – contrasting 4-year institutions with 2-year colleges, for example (Cofer and Somers, 1999).

Defining Aid

A principal question at the center of this literature is the choice to define aid as a dichotomous variable representing receipt of aid or as a more or less continuous measure representing the amount of aid. The preponderance of studies reviewed examine simple receipt of aid – aid in general and in various categories (e.g., grants, loans, merit-based, need-based). Examples include studies by Cabrera et al. (1992), Gladieux and Perna (2005), and Hu and St. John (2001). There have been critiques of this approach (DesJardins et al., 1999, 2002a), and indeed a smaller set of studies has examined the effects of student financial aid on persistence as measured by the amount awarded (e.g., St. John et al., 2005; Singell and Stater, 2006; Somers et al., 2004). A notable thread of studies incorporates measures of both receipt and amount into their models (see, for example, Alon, 2005; DesJardins et al., 2002a; Paulsen and St. John, 2002). As an interesting extension of the dichotomous measures, a few studies examine aspects of delivery by looking at packaging. St. John et al. (2000b), for example, consider types of aid included in packages, examining the effects of grant-only packages separately from the effects of loans alone or of packages that combine grants and loans together. Citing St. John's approach, Braunstein et al. also look at packages combining grants, loans, and work-study in different configurations (2000, p. 196). More recently, Chen (2008) has argued that greater differentiation of aid by type is necessary, for example, distinguishing Perkins and Stafford loans from parent or private loans, because students have differing liquidity constraints, price elasticity, and debt aversion and therefore are likely to respond differently to different forms of aid.

Categories of Aid

Studies using federal or state databases often use categories of aid defined as grants, loans, or work-study. While simple consideration of these categories characterizes a great proportion of the work in this area (e.g., Cofer and Somers, 1999; Dowd and Coury, 2006; Gladieux and Perna, 2005; St. John et al., 2005), variations on the theme highlight some interesting points. Bresciani and Carson (2002), for example, consider all categories of "gift aid" – all grants and (presumably merit-based)

scholarships – together. However, this raises the question of whether these subcategories of gift aid can meaningfully be measured together. A smaller set of studies is focused on merit- versus need-based aid. In comparing merit- versus need-based aid and focusing on student characteristics in the process, some studies (e.g., Singell and Stater, 2006) implicitly emphasize as the most salient categorization for study the ways and mechanisms by which policy categorizes students as "deserving" or "not deserving" aid. This underlying categorization may tap into problematic philosophical ramifications for equity, but may offer insights regarding the broader political support for financial aid programs. Still other studies frame their inquiry by looking at specific programs (Dynarski, 2002, 2003; Herzog, 2005; St. John, 2004a), and others (as an extension of this) look at the relevant aid policy arena – federal (Cofer and Somers, 1999; DuBrock and Fenske, 2000; Wei and Horn, 2002), state (e.g., Long, 2002; St. John, 2004a; St. John et al., 2001), or institutional (e.g., DesJardins, 2001; Lichtenstein, 2002; Singell, 2004). Just as many studies consider merit- and need-based grants as subcategories of grants, so too do several studies examine subsidized and unsubsidized loans as separate subcategories (e.g., St. John, 2004b).

A few studies look beyond the presence and amount of financial aid in an attempt to capture effects of aid that authors term "indirect" and/or "intangible" (Cabrera et al., 1992; St. John et al., 2000a). These studies build from the assumption that students' experience of financial aid includes both an objective component (i.e., the availability of resources) and a subjective component (encompassing students' perceptions of expenses, resources, and ability to pay). In this way, the authors incorporate finances into the range of students' positive and negative college experiences, which in turn influence their persistence decisions. Specifically, St. John et al. (2000a) concluded that these intangible effects of financial aid bear on institutional commitment; they also explore (tentatively) how students' perceptions of, and experiences with, financial aid play into academic and social integration – drawing students toward, or away from, campus activities and courses.

Conceiving the objects of study in multiple different ways reflects the underlying assumptions and goals of the researchers. At the same time, it also reflects the conventions and data limitations that shape persistence research as a whole. A multiplicity of frames is likely a sign of healthy diversity in this line of thought. However, if researchers rarely reach outside their own disciplines or fields of study, they reinforce the existing dispersion of threads within this research and lose opportunities for meaningful advances in our understandings of these complex phenomena.

Theoretical and Methodological Frames

The Limitations of Data and Data Sets

One of the most vexing problems researchers confront in studying aid is associated with lack of variability in aid awards and problems with comparability across states. For example, at the federal level, Pell Grants are so pervasive among full-time,

low-income students that it is impossible to conduct a rigorous study of the effects of Pell Grants on enrollment and reenrollment decisions. As we note later in this chapter, one of the advantages of using state or institutional data sets is that they often contain more detailed information than national data sets about students and the range of financial aid awards they receive. This enables researchers to explore the effects of aid more systematically. When a state, for example, has enacted a major aid program such as the HOPE Scholarship in Georgia or the Twenty-first Century Scholarship in Indiana, researchers can examine the program's impact on students in the state. A major limitation with these examples, however, is that we cannot compare the effects of such aid programs across states. We encounter the same problem when trying to study the effects of institutional financial aid programs.

The Endogeneity of Aid Eligibility and Loans

Another key problem financial aid researchers working in this area have identified is the question of whether aid eligibility and receipt of aid are independent of factors that may also influence college persistence – factors such as (a) race/ethnicity, (b) willingness to incur debt, or (c) familial, cultural, and social values. These questions surrounding the independence of aid as an explanatory variable and the direction of causality – known also as endogeneity and self-selection bias – make it difficult to disentangle the true effects of aid on persistence. Moreover, what variables – such as motivation or systemic discrimination – are we unable to account for if we include aid as an independent variable when modeling persistence? A basic assumption of financial aid research is often that aid eligibility is determined independently of other explanatory variables *and* that we have not omitted key variables from the model. This problem of the inherent endogeneity of aid eligibility – and the related one of self-selection – can mask the true effects of aid on student persistence.

Alon treats this question most explicitly in her 2005 study, in which she attempts to assess the net effect of aid dollars on college graduation and to explain mis-specification in prior research as rooted in endogeneity bias. Using instrumental variable probit models, she finds the dollar amounts of aid in each category to significantly increase the likelihood of graduating from college. Conversely, simple probit models (those not including instrumental variables for aid eligibility) show that dollar amounts of each kind of aid are significantly and negatively related to graduation from college. While Alon takes an exceptionally visible position on this question, perhaps, researchers in other threads engage with the issue implicitly at the same time. Studies that employ single-stage logistic regression, for example, and that incorporate dichotomous variables signifying eligibility or receipt of aid intentionally or implicitly take the position that receipt of aid does not introduce endogeneity bias to a damaging degree.

Another difficult problem when studying the effects of our current financial aid system is that students and their families are unlikely to exercise much discretion regarding grant aid – either in accepting the grant or in the amount of the award – but there is the opportunity for a great deal of discretion in both of these areas when

making decisions about loans. This raises the question of whether behavior surrounding loans correlates with student persistence outside the model used in the analysis – i.e., whether loans are exogenous to the study of financial aid. To date, little advancement has been made on this topic. DesJardins et al. (2006) note that "less progress has been made in another key area: the assumption, explicit or implicit, that financial aid is exogenous" (p. 384). Because of the complex interplay of privilege, opportunity, and conditioned action in society, the question of endogeneity bias becomes an inherent controversy in the study of financial aid and persistence in college.

The Problems with Aggregating Across Institutional Types

Some studies (Bettinger, 2004; Kaltenbaugh et al., 1999; St. John et al., 2005) look at the effects of financial aid across institutional types; however, we think this is risky. Scholars have established that students who enroll in community colleges are more price-sensitive (Dynarski, 2000) and often enroll in community colleges because they are less expensive (Dougherty, 1992; Kearney et al., 1995; Townsend, 2001). Comparing the effects of financial aid among some populations known to be more or less price-sensitive is likely to produce unreliable results. There may be times when researchers and policymakers are interested in exploring how opportunities differ, for example by gender or ethnicity, across 2- and 4-year institutions. However, unless there is a clear purpose, there is good reason to be cautious about combining data on students who are enrolled in these two sectors. We are likely to learn more about the effects of financial aid when scholars carefully consider the known characteristics of different student populations.

The Limited Time Perspective of Aid Effects and Student Persistence

The temporal nature of persistence is implicitly recognized in the extant literature on educational attainment (e.g., Bean, 1980; Braxton and Lien, 2000; Pascarella and Terenzini, 1980; St. John, 1992; St. John et al., 1996; Tinto, 1975, 1982, 1988). Yet despite acknowledging the longitudinal nature of persistence, most researchers continue to approach analysis of the effects of financial aid in cross-sectional fashion. In fact, relatively few persistence studies employ methods that incorporate temporal aspects into their conceptual and analytic models (DesJardins et al., 2002b). Moreover, cross-sectional approaches to modeling longitudinal processes artificially constrict variables – such as financial aid – that change over time. St. John et al. draw attention to the time-varying nature of explanatory factors of student persistence, noting that "changes over time in financial aid packages can influence students' academic and social integration processes, as well as their subsequent persistence decisions" (St. John et al., 2000a, p. 41). To address this

need education scholars have begun applying event history analysis techniques developed in other fields to the study of persistence (Chen, 2008; DesJardins et al., 1994, 2002a, b, 2003; Doyle, 2006).

Talking Across Disciplines

One final observation on this body of research centers on the wide range of disciplinary frameworks employed to study the effects of financial aid on persistence. Addressing this problem in a recent essay in the Educational Policy Institute's *Weekly Review*, Usher (2007) notes that economists and sociologists, as well as scholars from education, and policy analysts all approach the study of financial aid from different perspectives and with different methodologies that "often talk past one another and miss opportunities for mutual enlightenment" (p. 1). For example, Singell and Stater (2006), in a two-stage analysis of the effects of financial aid on matriculation and persistence, indicate that financial aid has no impact on persistence and posit that both merit- and need-based aid attract students with unobservable characteristics that make them more likely to persist. It is possible, however, that once students are enrolled, financial aid has an indirect effect on their integration, which in turn exerts a positive influence on their persistence. All three of the institutions in the Singell and Stater study are residential, a type of institution known to be more likely to foster student integration.

The tendency of many researchers to read little outside their discipline is unfortunate. Taking stock of findings across studies often reveals consistent but varied patterns, and researchers' richer and more nuanced familiarity with other studies could strengthen their contributions to this important topic. As Usher (2007) suggests, researchers looking at financial aid should broaden their perspectives in order to advance our study of student financial aid. Perhaps more important, from the vantage point of an effort to improve student financial aid policy, we owe it to students and their families to develop a rich and nuanced understanding of financial aid programs. This can best be done by reaching across the boundaries between disciplines and applied fields of study. Undertakings like the Rethinking Student Aid Study Group and this chapter can contribute to this broader view.

A Synthetic View of the Impact of Aid on Persistence

Our discussion of the effects of student financial aid on persistence begins with some broad general observations about the effects of aid. We then provide a fuller, more detailed of the effects of grants, student loans, and college work-study. As we have already noted, one of the major obstacles to reaching definitive conclusions is the wide variation in the databases and methods employed to examine the effects of financial aid. There have been no studies that attempt to systematically replicate

previous investigations. Edward St. John and Patricia Somers and their colleagues stand out in this area of inquiry as researchers who to examine the effects of financial aid on persistence have employed many of the same methods consistently over time. In addition, it is only in the last 5 or 6 years that more advanced econometric techniques have been applied to this line of inquiry. So few studies of this recently emerging type have been conducted that it is premature to draw many firm conclusions from them as a group. Therefore, in the remainder of this section we outline the effects of financial aid on persistence and identify the key findings and limitations of studies of aid and persistence. As we consider the effects of financial aid broadly throughout this section, we also pay attention to differential effects of aid depending on the following characteristics of the studies:

1. Whether the measures of student aid were based on a dichotomous coding of any forms of aid (i.e., was financial aid received or not?) or whether varying amounts of aid were coded as a continuous variable
2. Whether the analyses drew on national, state, or institutional databases

We also considered tracking differences by type of institution (2-year or 4-year, or residential, or commuter) but found that there is an insufficient number of studies that make these distinctions.

Across our central group of highly relevant, high-quality studies (Alon, 2005; Bettinger, 2004; Braunstein et al., 2000; Bresciani and Carson, 2002; Cabrera et al., 1992; Cofer and Somers, 1999, 2000; Cuccaro-Alamin and Choy, 1998; DesJardins et al., 2002a; Dowd and Coury, 2006; DuBrock and Fenske, 2000; Gladieux and Perna, 2005; Henry et al., 2004; Herzog, 2005; Hu and St. John, 2001; Ishitani and DesJardins, 2002; Lam, 1999; Lichtenstein, 2002; Perna, 1998; St. John, 1998; St. John et al., 1991, 1994, 2000b, 2001, 2005; Singell, 2004; Singell and Stater, 2006; Somers, 1995; Somers et al., 1999, 2004; Turley, 2005), results suggest that student financial aid – defined as receipt and/or amount of aid (without distinguishing between types of aid) – has a positive impact on student persistence. Drawing on the same set of studies, we found that one or more forms of financial aid has a positive impact on student persistence. However, we also noted that in most instances the amount of student financial aid accounts for relatively small amounts of the variance in student persistence. We did not find distinctive differences in findings based on financial aid being treated as a dichotomous or continuous variable or based on differences across the types of databases used in these analyses.

After reporting the *simple* summative evidence of our review of the impact of financial aid on persistence, our analysis quickly becomes more complex. For example, various authors forward different interpretations of positive, negative, or nonsignificant results. Finding a positive relationship between some form of financial aid and persistence is intuitive – and its interpretation is straightforward. Often, however, authors also interpret a nonsignificant finding as an indication that financial aid has a positive effect on persistence. In these analyses, nonrecipients of aid are seen as being ineligible for need-based financial aid and as not needing loans. Because aid recipients are compared with nonrecipients of aid, these studies interpret nonsignificant results as indicating that financial aid has equalized the opportunity

to persist among needy and no-need students (see, for example, St. John et al., 1994). St. John and colleagues have argued that this is an appropriate reading, and multiple scholars have agreed with their work. More recently, however, other researchers have offered different interpretations of nonsignificant findings (see, for example, Alon, 2005; DesJardins et al., 2002a; Dowd and Coury, 2006). Complicating the situation further, there are differences in the data sets and the analytical techniques employed in these studies, making it difficult to offer a definitive judgment on this issue.

However, other studies' results have found some forms of financial aid actually negatively associated with persistence. For example, St. John et al. (1994, 2005) report negative relationships between financial aid and persistence and interpret this finding as evidence that financial aid was insufficient and, thus, was an important factor in determining persistence. We were not fully persuaded by this argument – that increasing financial aid effectively increases the odds that students will drop out. After reviewing the full results of the analysis we posit that other factors could influence these counterintuitive findings. The interpretation of the authors may indeed be correct, but with few examples of such findings we are cautious and suggest this line of interpretation needs further examination.

Grants

In considering the effects of grants on student persistence, we do not differentiate the effects of merit- or need-based aid or federal, state, and institutional forms of grants. Because of widely noted and consequential increases in the use of merit aid, we devote a separate section later in this chapter to comparing the effects of merit- and need-based student financial aid. Several studies that consider the impact of grant aid aggregate all forms of grants in their analyses. Looking across this set of highly relevant, high-quality studies, we find that most report either positive or nonsignificant findings, suggesting that grants have an impact on the propensity of students to persist (e.g., Alon, 2005; Bettinger, 2004; DesJardins et al., 2002a; Dowd and Coury, 2006; DuBrock and Fenske, 2000; Herzog, 2005; St. John et al., 1991, 2005; Singell and Stater, 2006). Looking at the variables and data sources analyzed in these studies, we detected no patterns based on the measurement of financial aid (dichotomous or continuous) or by the type of database employed, confirming the conclusion of Pascarella and Terenzini (2005) that empirical results are similar whether measured as (dichotomous) receipt of a grant or as dollar amount.

College Work-Study

Among the highly relevant, high-quality studies, 14 find the effects of college work-study to be either positive or nonsignificant (Alon, 2005; Braunstein et al., 2000; Cofer and Somers, 1999, 2000; DesJardins et al., 2002a; Dowd and Coury,

2006; DuBrock and Fenske, 2000; Hu and St. John, 2001; Perna, 1998; St. John et al., 1991, 1994, 2001; Somers, 1995; Somers et al., 1999, 2004) and, thus, these studies interpret college work-study as enhancing the odds of recipients' persistence. In some examples, work-study has the largest effect – or one of the largest effects – compared with any of the financial aid variables (Alon, 2005; Cofer and Somers, 1999; DesJardins et al., 2002a). In his review of research on the effects of college work-study on persistence, St. John (2004b) notes that recent research has shown a decline in the effects of college work-study and posits that this is because college work-study wages have not kept up with cost-of-living increases.

For researchers, college work-study is an intriguing form of financial aid. Astin (1975) reports that students working on campus were more likely to persist. Since that time, several scholars studying financial aid – St. John et al. (2001), for example – have suggested that one of the positive effects of college work-study might be that it helps students "socially integrate into higher education communities and further help[s] increase student persistence" (p. 423). In addition, DesJardins et al. (2002a) find that the positive effects of work-study on student persistence – like those of grants and loans – diminish after the first 2 years. Overall, the evidence suggests that college work-study exerts a positive influence on student persistence, but the relative strength of the effects of work-study remains unclear. Nevertheless, because of its potential positive impact on student integration, this form of student financial aid deserves more consideration.

Integration Variables

Relatively few studies that examine the effects of financial aid on persistence also include measures of variables that are typically employed to examine the interplay of student characteristics, their aspirations, and their interactions with the campus environment to influence student withdrawal. Theoretical models and empirical studies advanced by Tinto (1975, 1993), Bean (1983), Pascarella and Terenzini (1980, 1983, 1994, 2005), and Braxton (2000, 2004) are representative of these lines of inquiry. Although Bean's model (1983) posits that financial factors can influence persistence, these two lines of research are seldom brought together, in part because few data sets have robust indicators of student integration variables and financial aid variables. However, there are a small number of studies that include solid measures of students' collegiate experiences and robust measures of student financial aid. Analyzing an institutional data set, Cabrera et al. (1992) use structural equation modeling to explore the joint effects of student integration variables and student financial aid. They report that student integration variables have stronger direct effects on persistence, but that financial aid has an indirect effect on student integration constructs and, thus, on student persistence. More recently, Herzog (2005) has used institutional data to examine the effects of a new large state scholarship program. He finds that college experiences improve the odds of persisting, while financial aid variables incorporated in the same model show nonsignificant results (p. 906). In addition, Lichtenstein (2002) also reports that

student integration variables exert the strongest impact on student persistence. These studies demonstrate the importance of considering the subtle and indirect effects of financial aid. In addition to Cabrera et al., St. John et al. (2001) and Braxton and colleagues (Berger and Braxton, 1998; Braxton, 2000; Braxton et al., 1997) have noted that financial aid has indirect effects on many student integration constructs found in both the Tinto (1975, 1993) and Bean (1983) models. Thus, the direct effects of aid may be less robust and the indirect effects may be more robust than reported in studies lacking measures of student integration. This would also help to explain why the effects of college work-study could be stronger than the dollar value of awards alone might suggest.

In support of this kind of thinking, a similar line of research is emerging that may demonstrate that the amount of financial aid students receive has a small, positive, indirect effect on student engagement (St. John, March 25, 2007, personal conversation). Rather than looking at the traditional student integration variables used in persistence research, efforts are being made to determine the impact of financial aid on many of the standard measures of student engagement used in instruments like the National Survey of Student Engagement. Thus, new and emergent lines of inquiry suggest that – while the effects of financial aid on college outcomes may be positive – accounting for the extent of student interactions with the institutions they attend shows effects to be even smaller, and likely also indirect.

Research on Aid and Persistence: Conclusions

As we noted in our introduction, study limitations sometimes stem from data limitations. Potentially more troubling, however, is the finding that some studies apply the same analyses to the same data sets but report different results. Using NPSAS:87 data, Paulsen and St. John (2002) report that grants have no effect on within-year persistence, while Cofer and Somers (2000) find that grants have a strong positive effect on persistence (Alon, 2005). Dowd and Coury (2006) have provided a thoughtful critique of many financial aid studies, noting that previous research had arrived at inconsistent results and that some critics have attributed these inconsistencies to a lack of self-selection controls and to endogeneity bias in cross-sectional studies of aid and persistence (pp. 37–38). In addition, Alon (2005) raises the possibility that aid recipients (both need-based and merit aid recipients) are not identical even when all observable background characteristics are controlled for – and recommends the use of an instrumental variable technique to address this potential problem.

Researchers have only recently started to address these central questions and controversies more systematically in studies of financial aid and student persistence. DesJardins et al. (2002a) use an institutional data set and control for more student characteristics to model the longitudinal effects of financial aid. Alon (2005) uses instrumental variable probit models in her analyses. In a study that is another case in point, Singell and Stater (2006) use a combined data set from three residential

state flagship institutions and employ a two-stage analytic approach to examine the effects of financial aid, first on enrollment and then on persistence. With results showing no independent effects of financial aid on persistence, they conclude that institutional merit aid attracts students with characteristics that make them more likely to persist. Using a data set from a single campus, Braunstein et al. (2000) have modeled enrollment and retention separately and find, similarly, that financial aid has an impact on the enrollment decision, but not on subsequent reenrollment decisions. As noted earlier in this chapter, Singell and Stater (2006) do not identify specific student attributes that could explain the persistence rates of students who receive need-based aid. Rather, they suggest that need-based aid attracts students with unobservable traits associated with a propensity to persist. We focus on this study because we think it might be linked to both new analytical approaches to examining student financial aid and to research that includes student integration variables. It is possible that one of the explanations for both of these studies is that both merit- and need-based aid have an indirect effect on student persistence through student integration constructs, especially since all four campuses in these two studies are residential institutions. However, it is also possible that, as Alon (2005) suggests, recipients of financial aid are not identical to nonrecipients, even when all observed background characteristics are accounted for in the model.

In summary, our review of research on (a) total aid received, (b) the effects of grants (undifferentiated by need or merit), and (c) college work-study suggests that each of these has a small positive impact on persistence. We also found important contradictions and shortcomings in the research. In the course of this project, we found that the studies on this question use a variety of data sets, many different analytic techniques, and different definitions of variables (sometimes even when they have used the same data sets). Because we found no efforts to replicate studies we cannot be confident that any differences in findings across studies were the results of shifts in financial aid policies and practices – as opposed to differences in the definitions of variables or in the use of dissimilar analytic techniques. At times authors of studies also interpret similar results in dissimilar ways. In addition to these primary concerns, we found, looking across the extant research, that there are very few studies that focus on student persistence at community colleges or at commuter institutions. Moreover, despite notable exceptions (Lichtenstein, 2002; St. John et al., 2005), not many studies focus on the effects of financial aid on the persistence of students of color. As Chen (2008) notes, there is ample reason and growing evidence to support the assertion that the effects of aid differ by race/ethnicity and income. After considering the recent methodological advances in the study of the effects of financial aid on persistence, we leave this section with the following conclusions:

1. The global effects of financial aid in most instances are (taking into consideration the differential effects of student interactions with the environments at individual campuses) small, positive, and probably indirect.
2. Not surprisingly, we conclude that more student financial aid has a larger impact on student persistence than less aid. Some investigations not only look at the

effect of individual financial aid programs (grants, loans, college work-study) but also at the effects of combining one or more other aid programs. These results are more likely to report positive effects for financial aid. St. John et al. (2001), for example, using a database from the State of Indiana, note that the receipt of any two forms of scholarship has a larger effect on persistence than only one form of aid. Herzog (2005) finds that the receipt of a large state scholarship has a greater effect on persistence than any other form of financial aid. Larger amounts of financial aid are likely to reduce unmet need. (With merit aid it is possible that financial aid packages can even exceed student need.) Thus, it is not surprising that larger amounts of aid increase student persistence.

3. Among the types of financial aid we examined, college work-study has a consistently strong impact on student persistence.
4. Unobserved student characteristics may often play a role in determining the likelihood that a student will persist until graduation. Thus, these unobserved effects need to be accounted for through instrumental variable analytic techniques.

Special Topics of Note: Merit Aid, Loans, and Programmatic Elements

The Special Case of Merit Aid

In an effort to extend our work on the effects of financial aid on persistence, we looked closer at the unique effects of merit- and need-based aid. As evinced in the high levels of attention currently focused on merit aid (e.g., Mathews, 2005; Farrell, 2007), this is an important topic of consideration. Our efforts to examine the effects of merit- and need-based aid are limited by a number of factors. First, it is difficult to tease out the full differences between merit- and need-based aid. Avery and Hoxby (2004), for example, report that named scholarships have an impact over and above the actual dollar value of a merit scholarship. Some studies look at the effects of state programs, such as Georgia's HOPE Scholarship program, while others look at the effects of institutional merit aid. As we have already noted, the design of many of the data sources employed in this work does not allow researchers to differentiate between merit- and need-based aid. Furthermore, given our comments about student integration variables, we also note that no studies that isolate the unique effects of need- or merit-based aid include measures of student integration variables. With these introductory caveats, we consider the differential effects of merit- and need-based aid.

Interestingly, although we have reported that some studies find nonsignificant or even negative results on grants in general (i.e., without distinguishing between need-based and merit-based aid), our review of the distinctive effects of merit- and need-based aid reveals primarily positive relationships between either form of aid and persistence (Battaglini, 2004; DesJardins et al., 2002a; St. John, 1998, 2004a; St. John et al., 2005; Singell, 2004; Singell and Stater, 2006; Somers, 1995, 1996;

Turner, 2001). Only three of these studies, those by Somers (1995, 1996) and Singell and Stater (2006), report other than positive relationships of both merit- and need-based aid with persistence. Before continuing with an explanation of these collective findings, we note that unlike the group of studies we reviewed for other sections of this chapter, most of these studies are based on institutional databases rather than state or national databases. Institutional databases often provide a more robust set of measures for (a) student characteristics and (b) forms of financial aid than other available databases. This pattern alone deserves further consideration. Also interesting are Somer's findings that merit aid at urban commuter institutions is negatively associated with persistence. Somers posits that this negative relationship is possibly the result of top students with merit aid electing to transfer because they have a low number of "high-ability" classmates. This finding suggests that individual institutions' use of merit aid can result in attracting high-scoring students who may not ultimately fit in with a lower-scoring student body, and that the resources and opportunities of more prestigious institutions may be too attractive for these higher-scoring students to ignore.

Introducing a more nuanced understanding of the effects of grants, Herzog (2005) looked at a large state grant program and determines that the effects on student persistence disappear by the end of the first year. Similarly, two recent studies shed further light on the longer-term workings of merit aid. In a single-institution study, DesJardins et al. (2002) report that merit aid has one of the largest effects on student persistence but that the effects diminish after the first 2 years. Singell and Stater (2006) conclude that: "[a]verage merit-based aid was positively associated with graduation. Merit aid has no effect on graduation in the absence of selection controls, but its coefficient rises from nearly zero to approximately 6 p.p. and becomes significant in the selection model" (p. 394). They also report that need-based aid does not show an impact on persistence after its effects on enrollment are taken into consideration. More research on the effects of state merit aid programs is clearly needed. In total, without regard to methods, these studies' findings suggest that both merit- and need-based aid exert a positive influence on persistence and that the impact of merit aid appears to be stronger. However, Singell and Stater's (2006) work raises the possibility that merit aid's most important contribution to persistence may be to attract students who are more likely to persist.

Overall, these studies draw us toward some interesting conclusions that extend beyond just merit- and need-based aid. Perhaps most important, the finding that institutional studies include better indicators of all student aid programs suggests that our understandings of the effects of aid on persistence might be different if we had more robust indicators for all forms of financial aid. Pursuing this line of reasoning, the institutional studies that do not follow cohorts of students over time also tend to report that student loans have an impact on persistence, whereas longitudinal studies do not find a relationship between financial aid and reenrollment rates. This raises the possibility that the effects of loans dissipate over time as the result of student integration variables. The problems associated with studying the effects of student aid already identified may also explain why the effects of student loans are so varied in our review.

The Effects of Loans on Student Persistence

In our review of the extant literature, we found mixed signals on the effects of loans on college student persistence. As in all areas of this research, studies are defined by many pivotal choices: whether financial aid variables are treated as dichotomized or continuous variables, whether authors aggregate or disaggregate subsidized and unsubsidized loans and various forms of aid packages, and whether studies include aid thresholds. All of these distinctions lead naturally to differential findings and interpretations across the studies we considered. As a result, even a conventional approach to interpreting the empirical findings limits our ability to generalize the results. Inconclusive findings about the role of loans in the student persistence process make us more cautious in assessing the effectiveness of the federal loan system. In this section, we first report on the studies that use receipt of financial aid as a dichotomous variable, and then we report the results from investigations that are able to construct a continuous variable around the receipt of financial aid.

The dichotomized handling of loan variables is more likely to indicate that loans have negative or nonsignificant effects on student persistence. Examining whether students actually accept loans or not allows us to better understand how borrowers differ from nonborrowers in their persistence decisions. In general, loans appear not to predict persistence. Li and Killian (1999), in their analysis of a Midwestern research institution, indicate that educational loans negatively influence student persistence rate. Dowd and Coury (2006), using BPS:90–94 data, demonstrate that among students attending public community colleges, borrowers (students receiving loans) are less likely than nonborrowers to persist into their second year and that taking out loans is not related to attaining an associate's degree. Perna (1998), investigating full-time undergraduate students with the same data source (BPS:90–94), finds that borrowing does not significantly promote persistence behavior; neither (a) aid packages consisting of predominantly loans nor (b) aid packages combining loans with grants has a significant impact on persistence relative to no aid.

Since many college students rely on multiple sources of aid, a number of studies have attempted to examine the role of aid with each type of aid package. A longitudinal analysis of the High School and Beyond (HS&B) 1980 senior cohort show the positive impact of loans on year-to-year persistence (St. John et al., 1991). Relying on loans only or receiving loans with other types of aid promote student persistence in some measure. However, aid packages including loans appear not to be effective in many instances. St. John and associates find, in a study based on NPSAS:87, a neutral effect of loans on within-year persistence. As in some of the research on grants, they conclude that a finding that the impact of loans is nonsignificant means that the persistence rates of students relying on loans alone or of students who have aid packages including loans with other types of aid does not differ from the persistence rates of those who have no aid packages (St. John et al., 1994). In addition, the authors examine possible interaction effects between tuition and loans as a sole source of aid. When tuition is included in the model, loans show a neutral effect on persistence, while in models that do not incorporate tuition, loans

as sole source of aid have exerted a negative impact. In this instance, St. John and colleagues conclude that "when students at high-price colleges received loans as their only form of aid, they were less likely to persist" (p. 473).

Most of the institutional studies based on cohort analyses also report that aid packages including loans do not increase likelihood of persistence. St. John (1998) examines two cohorts consisting of sophomores and juniors at a private university in Washington State. All aid packages are nonsignificant in the 1992 cohort. Among the 1993 cohort of students, students with loan-plus-work aid packages are less likely to persist than their counterparts with no aid package. Braunstein et al. (2000) investigate year-to-year persistence using two cohorts, 1991/92 and 1993/94, at Iona College. Relative to students who do not receive any financial aid, recipients of all aid packages show nonsignificant effects on their persistence decisions from aid. Bresciani and Carson (2002) also report the neutral effect of loans as a component of aid packages. Their empirical investigation of four cohorts of freshmen at North Carolina State University shows that the percentage of loans included in aid packages is not associated with persistence decisions. Focusing on a public urban university, St. John et al. (2000b) compare students with various types of aid packages with students who receive no aid at four different points in time. Receiving loans only, or having aid packages including loans with grants, promoted within-year persistence in 1990/91. Aid packages consisting of loans and grants had a positive effect on persistence in 1993/94. However, aid packages including loans did not significantly improve persistence rates in 1996/97 and 1997/98. Herzog (2005) also reports from his analyses on multiyear cohorts of freshmen at University of Nevada that aid packages including loans do not contribute to retaining students.

When we reviewed studies that measure the amount of financial aid, the results were mixed. In balance, however, more papers report that loans have a positive effect on student persistence. Studies that used national databases (e.g., NPSAS) were more likely to utilize the continuous measure of financial aid. Studies based on NPSAS:87 data led by St. John and associates indicate that loans do not play a role in retaining students. An examination of traditional college-age students in 4-year institutions demonstrates that as students borrow more money for college, they are less likely to persist to the second semester (St. John et al., 1994). Based on BPS:90–94 data, Dowd and Coury's study (2006) focuses on community college students, and concludes that as the amount of loans increases, students are less likely to persist to the second year. Interestingly, they find that loans have no significant impact, positive or negative, on attaining associate degrees.

Follow-up studies based on NPSAS data show that the effects of loans vary by income and race. As poor students rely on more loans, they are less likely to persist. The negative effect of loans remain even after controlling for living costs like food and housing. For students from working-class families, loans are negatively associated with within-year persistence. But, when living costs are considered, loans exert no influence on the students' persistence decisions. Loans have neutral effects on middle-income and high-income students, whether or not living costs are considered (Paulsen and St. John, 2002).

According to studies based on NPSAS:87 data, loans do not exert significant influence on African American students (Kaltenbaugh et al., 1999; St. John et al., 2005). The amount of loans was negatively associated with persistence decisions for White students. When living costs are held constant, loans are not influential for this group (Kaltenbaugh et al., 1997; St. John et al., 2005). In contrast, Somers and colleagues find that loans help African American students to persist (Somer et al., 1999). Using NPSAS:96 data, they compare within-year persistence behaviors between two racial groups. For African American students, loans are found to promote persistence, whereas White students' persistence decisions are not responsive to changes in the amount of loans.

Somers and Cofer use NPSAS:87, 93, and 96 data for their persistence work and find that loans have a positive impact on student retention (Cofer and Somers, 1999, 2000; Somers et al., 1999, 2004). Based on St. John's theoretical framework, Somers and Cofer developed a persistence model they employ to study the effects of debt burden on persistence. Overall, they demonstrate that all types of financial aid are effective. Loans appear to promote persistence behavior across the subpopulations. The positive influences of loans apply to all student populations, except White students, including African Americans, first- and continuing-generation students, as well as students enrolled at 2-year and 4-year institutions, and public and private institutions. Alon's study (2005), based on data from 22 institutions, incorporates the use of a simple probit model which produces significant and positive results on the role of loans (measured as dollar amount) in increasing college students' graduation rate. However, in subsequent analyses using instrumental variable probit models, she finds that applying for and receiving loans decreases the probability of graduation. As a direction for future research, she suggests separating the effect of aid eligibility from the impact of aid money received on academic outcomes.

Many institutional studies also use continuous variables to study the effects of loans, and likewise provide mixed findings. Somers (1995, 1996) conducted her research at an urban, commuter institution. Her results indicate that loans promote within-year persistence but do not affect year-to-year persistence. Lam (1999) investigates factors affecting time-to-degree among students in a large urban public university. Students relying on loans alone take the least time to complete their programs, relative to students with other types of aid. Braunstein et al. (2000) finds that increases in the amount of loans do not influence student persistence at Iona College. In her analysis of the 1998 cohort of full-time Hispanic students at the University of New Mexico, Lichtenstein (2002) concludes that loans have no direct effect on persistence and negatively influence college grades. In contrast, DesJardins et al. (2002a), in one of their studies on freshmen at the University of Minnesota, find that loans reduce the risk of dropping out during the first year. However, the effect of loans relative to other types of financial aid appear to be very modest. It is worth noting that the loan measure used in this study consists of predominantly unsubsidized loans. The researchers expect that the positive impact of subsidized loans is likely to be larger than that of unsubsidized ones.

Regarding the mixed findings of the impact of loans, Dowd and Coury (2006) suggest that the effects of loans be disaggregated into four components: (1) the economic and academic characteristics associated with eligibility, (2) the risk of loan repayments or default, (3) self-selection into loan-taking, and (4) cost subsidies. Recent empirical studies show that subsidized loans and unsubsidized loans have differential effects on student persistence. Singell (2004) demonstrates that subsidized loans increase both enrollment and reenrollment decisions among applicants and enrollees, respectively, at the University of Oregon. Alternatively, the amounts of unsubsidized loans negatively affect enrollment decisions among the admitted applicants, and do not influence reenrollment decisions among enrollees. Herzog (2005), in his study based on multiple cohorts of freshmen enrolled at a public research university in Nevada, finds that the first-semester or second-semester amount of unsubsidized loans increases dropout risk (decreasing the probability of persisting), whereas the amount of subsidized loans received does not significantly influence persistence decisions.

Reviews of research in this area consistently note a lack of consensus about how student financial aid affects persistence across racial/ethnic groups. Baker and Vélez (1996) state that most types of aid contribute to the persistence of students of color but single out loans in particular as an exception. While research on this question remains scant, several recent studies support this conclusion (Lichtenstein, 2002; Somers et al., 1999; St. John et al., 2000b). Conclusions on the question of how loans – and aid in general – affect student persistence across race and ethnicity are further confounded by the relatively higher concentrations of students of color in institutions with lower retention rates overall.

Because loans have to be repaid, the possibility of self-selection bias influencing any analysis of the impact of student loans is great. In addition, researchers who aggregate unsubsidized and subsidized loans introduce additional sources of error because the characteristics of the recipients of each form of loan can be quite different. Moreover, studies that analyze data on students enrolled in 2-year and in 4-year institutions jointly risk introducing similar problems into their analyses because these two groups of students are likely to show systematic differences in price-sensitivity and aversiveness to loans.

As we have noted, the evidence on the effects of loans is more mottled than the cumulative record on other topics. In studies that use dichotomous measures of aid and in those that employ continuous measures of the amount of aid, some studies report that loans either have no effect or a negative impact, and others report that loans have a positive effect. If we assert that treating aid as a continuous variable provides a more rigorous measure of the effects of loans on persistence, the tenuous evidence seems to suggest that loans *may* have a positive impact on persistence. However, given the number of studies with competing findings, a more conservative conclusion may be warranted: student loans appear to have a small or negligible effect on persistence. In addition, our findings indicate that debt has a negative effect on student persistence. Moreover, given the range of databases, and differences in how loans have been measured (dichotomous or continuous; unsubsidized,

subsidized, or aggregating both forms of loans), this is an area where more work is needed in order to reach a strong conclusion.

Program Design Elements: What Makes a Difference?

In recent months, public policymakers have called considerable attention to the need to simplify the process of applying for financial aid. Secretary Spellings' unfavorable comparison of the Free Application for Federal Student Aid (FAFSA) form to the standard 1040 income tax form is by now famous (U.S. Department of Education, 2006). In addition, Senator Kennedy has recently called for simplification of the federal application process: "Today, 1.5 million lower-income students who are likely eligible for Pell Grants are not receiving them because these students don't apply for federal student aid. It's clear that the difficulty of filling out the FAFSA is a major cause" (2007). If simplifications and design improvements of financial aid forms can help make college more accessible, it is logical that such changes might also help increase student persistence. For this reason, we made an effort to see if there are studies that examine the effects of program design elements on student persistence.

Not surprisingly, given the requirements of such an undertaking, very little research has been done on how design elements of aid programs affect student persistence. What research there is focuses primarily on enrollment (e.g., see Kane's (1999) simulations). St. John (2004b) includes a review of design elements among other things, but his primary focus is not on the effects of design elements on student persistence.

Because there are so few studies that examine this question, the evidence is meager, though intriguing. DesJardins et al. (2002a), using an institutional data set, model the effects of front-loading and financial aid strategies that eliminate all loans. Simulating the "Princeton" approach, they find that eliminating loans has a modest positive effect on reenrollment. Ultimately, however, they report that a "modified" form of front-loading – one that provides loans equal to the value of scholarships originally awarded in the third, fourth, and fifth years of enrollment, while front-loading all scholarship aid to the first 2 years – is most effective of the three scenarios tested. The authors' simulation of "pure" front-loading of scholarships to the first 2 years of enrollment also produces a modest, though smaller, positive effect.

One of the most interesting findings among these studies shows empirical support for the conclusion that large, visible programs that are easy to understand and that incorporate extensive information and early commitments of aid have a small, positive effect on persistence. Programs such as Georgia's HOPE, Indiana's Twenty-first Century Scholars, Social Security Tuition Benefits, and Nevada's Millennium Scholarship compare favorably with programs that provide similar amounts of money but through multiple sources (multiple forms of grants, subsidized and unsubsidized loans, and college work-study). Herzog (2005), writing on the Millennium Scholarship program, supports this point:

> [A]fter re-enrolling in spring, freshmen who depend solely on the state funded Millennium Scholarship are twice as likely to return compared to students with combined aid packages. Being able to count on one, comparatively reliable source of support, which covers the entire tuition, may be a distinct advantage to students who like to avoid having to rely on multiple, less certain funding sources that involve a greater amount of application paperwork. (p. 917)

Overall there is little evidence on this topic, thus, it is impossible to make conclusive statements. However, given the level of current interest, more simulation work like that of DesJardins et al. (2002a) should be encouraged and funded. In addition, research results indicate that the expansion and replication of programs that combine early commitment of aid with a far-reaching but simple structure would likely enhance student persistence.

Debt – Does It Matter?

Most of the reviewed literature on debt load reveals that as the amount of debt increases, the probability of persisting at a 4-year college decreases (Cofer and Somers, 1999; Dowd and Coury, 2006; DuBrock and Fenske 2000; Somers et al., 1999, 2004; Somers and Cofer, 1997). However, when we reviewed the evidence in more detail, exceptions and mixed results became noticeable. While some studies look directly at the effects of debt for further study and graduate degree attainment, such studies were not reviewed because the main focus of this report centers on undergraduate persistence. Other studies provide moderate to weak empirical evidence in relation to persistence and loan debt.

Cofer and Somers (1999) looked at the loan programs and their effects on within-year persistence in general. Their study reveals that for 2-year institutions high debt is negatively associated with persistence for the NPSAS:93 cohort. However, it is positively associated with persistence for the NPSAS:96 cohort for 2-year institutions. This increased effect for 2-year institutions is attributed to the broadened availability of unsubsidized loan programs. For the NPSAS:96 cohort low debt is negatively associated with persistence and the authors speculate that students might be leaving because of academic problems or to reduce cost and debt accumulation. Debt burden at all levels is significantly and negatively associated with persistence decisions of students attending 4-year colleges.

Dowd and Coury (2006) also note that, ceteris paribus, loans received in the first year have a negative impact on persistence to the second year. However, loan-taking or the amount of loans show no significant influence in associate degree attainment. DuBrock and Fenske (2000) find that about 46% of all enrolled students borrow at some time during college and that the average accumulated debt load of borrowers has risen from US$5,187 in the first year to $16,640 in the fourth year. They also note that total debt load increases the probability of persistence in the first, second, and third years. Although the amount of debt has a positive impact on graduating or reenrolling for the fifth year, it is not statistically significant. The amount of unsubsidized debt is negatively associated with persistence for any year, but the results are not statistically significant.

Somers et al. (1999) claim that African American students and their families view student loan debt as the "price of admission" to the middle class. The situation is different for White students, for whom all levels of accumulated debt load are significantly and negatively associated with persistence decisions. Somers et al. (2004) reveal the same results indicating that all levels of accumulated debt load (high, medium, low) are significantly and negatively related to persistence decisions. In Somers and Cofer's (1997) qualitative study of undergraduate and graduate students, all participating students report the view that their debt would affect their financial decisions after graduation. Students also report feeling considerable pressure to earn more income in order to pay back their loans. Summarizing the literature on debt load and persistence, Turley (2005) also notes that debt load negatively influences persistence decisions of students who attend 2-year colleges.

Foreshadowing the findings on loans' effects on persistence (DesJardins et al., 2002a; Hu and St. John, 2001; St. John et al., 2000b, 2001; Singell, 2004), Simpson (1987) argues that broad use of equitable student loans will help use public resources efficiently. However, he suggests this be done while placing realistic limits on individual debt burden and the number of years for loan repayment.

In total, the preponderance of evidence reported in this section suggests that loan debt has a negative impact on persistence. However, there are too few studies on this topic for us to offer definitive conclusions.

Summing Up

Overview

In this chapter, we have examined the extant research published on the effects of financial aid on student persistence. As a mechanism for controlling for quality, we reviewed only articles published in the most highly respected professional journals, and because financial aid policies have changed so much over time we limited our review to studies published after 1990. Many of our findings are consistent with other reviews of the impact of aid on student persistence (see, for example, St. John, 2004b; Pascarella and Terenzini, 2005). However, this review sheds new light on the effects of financial aid for many reasons. We have looked with particular care at how the types of data sets and the analytical tools employed influence the outcomes of studies of financial aid and persistence. We have also tried to tease out important distinctions – between the effects of need- and merit-based financial aid, for example, as well as the effects of loans and college work-study. In addition, we have searched for evidence that program design features and the amount of student debt might independently influence the effects of financial aid on persistence. These additional dimensions in our approach have enabled us to identify some of the nuances of this line of inquiry that to date have not been fully revealed or explored.

In summing up we discuss the effects of student financial aid on student persistence. We qualify our conclusions with words like "it appears," "in most cases," or "the preponderance of evidence" because not all studies report similar findings and we cannot be certain of how data limitations, types of analyses, or even the time frame of the studies may account for some of these findings.

The evidence from our review demonstrates that all forms of grants, in most instances, have a positive influence on student persistence. This conclusion, however, would require more research in order to state this with certainty. The cumulative evidence suggests that both grants and college work-study have a greater positive impact on persistence than loans. There are fewer studies that examine the unique effects of work-study but it is possible that college work-study has an even greater impact on persistence than grants. When we isolate the unique effects of merit- and need-based grants, both types of aid appear to have a more positive impact than shown in studies that treat all forms of grant as a single variable. The studies that look separately at both forms of grants primarily use institutional data sets as opposed to state or national data sets, and this may at least in part explain why we found these differences. It is important to state explicitly our finding that the receipt of larger amounts of financial aid has a greater positive impact on persistence than smaller amounts of aid. This finding sets the stage for a subsequent conclusion we advance later in this summary.

Some of the differences we found between national and state studies, in comparison to institutional studies, raise the possibility that richer understandings of the full range of financial aid to which students have access lead to different results. It suggests that future efforts to use national or state databases need to focus on developing detailed understandings of the nature of the awards that students receive.

When we turn our attention to the effects of loans and debt, an interesting pattern emerges. First, our review suggests that loans do not have a pronounced effect on student persistence. When considered in tandem with the conclusion that debt has a negative impact on persistence, our findings suggest that loans, at least as currently structured, are not a good financial aid tool for enhancing student persistence.

Digging Deeper and Thinking More Broadly

As we probed deeper into the literature, other patterns emerged to inform our understanding of the impacts of student financial aid on student persistence. Some of the investigations undertaken in the last 7 years have employed more complex analytical techniques such as two-stage models, time series analyses, or the use of instrumental variable techniques which appear to reveal more intricate relationships. There are too few of these studies, however, to make definitive statements based on them. Collectively, they suggest that financial aid may have its greatest impact on the initial enrollment decisions of students. To the extent that aid has an impact on

persistence, the effects are more pronounced in the first and second years of college. These newer studies lead to two possible, more nuanced explanations of the effects of financial aid. When we add measures of student integration, the effects of financial aid may be more indirect than direct; that is to say, adequate financial aid may enable students to be more engaged in activities that lead to greater academic or social integration. Alternatively, the results may reveal that financial aid simply attracts students that possess unobservable characteristics that make them more likely to persist. It is also possible that both of these explanations are to some extent accurate. One suggestion we offer is for scholars to make more specific note of the limitations of their analyses. Given the potential effects of student integration variables and the need to better account for self-selection, both scholars and consumers of these studies need to resist sidestepping more complicated explanations for how financial aid impacts persistence.

Our investigation also raises many questions about the definitions of persistence, the construction of financial aid variables, and the use of a wide range of analytical techniques. We found no studies that are direct attempts to replicate previous studies. We found studies in which authors use the same data and very similar analytical techniques, but arrive at significantly different results because of seemingly slight differences in the treatment of variables. We also found instances in several studies in which a failure to be more inclusive in examining previous research on the effects of aid results in unnecessarily limiting insights into the strengths and limitations of these investigations.

We searched for evidence that design features of financial aid might exert an influence on persistence. There are few studies that examine this question, so the evidence is meager, but intriguing. As we note earlier in this chapter, DesJardins et al. (2002a) find that replacing loans with scholarships in the same amount does have a modest positive effect on reenrollment. But this single study conducted at a public flagship institution is not representative of the types of institutions where the majority of students are currently enrolled. Thus, without a great deal more research, policymakers lack sufficient information about the potential benefits of front-loading.

Though the record is limited, we found evidence that points to the conclusion that large, visible, and easy to understand financial aid programs have a small positive effect on student persistence when compared with programs that provide similar amounts of money but through multiple sources (multiple forms of grants, subsidized and unsubsidized loans, and college work-study). Although not enough research has been conducted on the persistence effects of programs like those mentioned in our review, each of these programs (HOPE, Millennium, and Twenty-first Century Scholars) combine elements of aid programs that have been found to influence student persistence. However, it is unlikely that the federal government will be able to find the resources necessary to launch a large-scale, national, single-source grant program. Although it is beyond the warrant of this chapter to explore this in detail, we posit that income-contingent repayment and loan forgiveness programs may be viable alternatives to a large-scale national grant program. This future-oriented approach could offer income-contingent repayment plans or loan forgiveness

programs that help reduce the risk aversion resulting from uncertain future repayment abilities and financial capabilities (Kane, 1999). Under this approach, individual students would have more discretion and self-efficacy in financing their college education, which could enhance their educational motivation and attainment. Such a program could help to offset some of the problems that undermine the effectiveness of loans as a form of financial aid and could be viewed as a large single-source financial aid program.

Final Policy Recommendations

Our review of the impact of financial aid on persistence leads us finally to some policy considerations:

1. However large or small the effects of financial aid on persistence, grants have a more positive impact than loans.
2. Although more research should be done on college work-study, there is sufficient evidence to indicate that it may be a promising tool for enhancing persistence and that it deserves more institutional and public policy attention.
3. Although we have few studies in this area, there is an intriguing pattern of findings suggesting that large single-aid-source programs may have more impact than the myriad federal programs that currently exist.
4. As currently structured, loan programs have a small or negligible impact on persistence from year to year and debt has a negative effect on persistence. If one of the policy goals of financial aid is to enhance student persistence, loans are a poor vehicle for achieving this objective. Our review leads us to propose, furthermore, that income-contingent repayment and loan forgiveness programs would help to offset some of the problems that undermine the effectiveness of loans as a form of financial aid.
5. Overall, financial aid has a positive effect on persistence. However, the effect sizes seem most likely to be small and indirect. In addition, because there are so few studies that deal with issues of self-selection and problems with the endogeneity of some forms of financial aid, we acknowledge that it is likely that there is a sizable number of students who would not have enrolled in postsecondary education without assurances of financial aid and that, once enrolled, many of these students persist and graduate.

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