

# **A Framework for Reducing the College Success Gap and Promoting Success for All**

**Commissioned Report for the  
National Symposium on Postsecondary Student Success:  
Spearheading a Dialog on Student Success**

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## INTRODUCTION

This report develops a conceptual model for understanding student success and identifying ways to reduce gaps in success across income, class, and racial/ethnic groups. Our goal is to inform the development, implementation, and evaluation of policy and practice rather than to identify particular policies or programs that will ensure success for all students.

Over the past 50 years, federal and state governments, colleges and universities, and other organizations have developed and supported numerous policies and practices designed to promote student success. Among the most extensive and visible efforts are the federally sponsored programs established under the Higher Education Act of 1965, as amended, including the federal Pell Grant Program, Stafford student loan program, and TRIO programs.

Despite the substantial investment in these and other programs, gaps in student success persist. Regardless of definition, student success varies across groups. For example, rates of college enrollment and bachelor's degree attainment continue to be lower for students from lower income than higher income families and for African American and Hispanic than for White students (NCES, 2004). Students from more humble origins are still not only less likely than other students to go to college, but when they do enroll, are also concentrated in lower quality, less prestigious, and less costly postsecondary educational institutions. Their fellow students at these institutions exhibit lower levels of persistence to the degree and that confer less distinct advantages in the labor market (Thomas & Perna, 2004).

Efforts to identify the most effective policies and practices for ensuring success for all students and reducing "success gaps" are limited by at least three factors. First, existing policies and practices generally focus on discrete components, aspects, or predictors of student success with no attention to other forces or processes that also influence it. These policies and practices, typically developed in isolation, are not usually comprehensive or coordinated with other efforts. For example, student financial aid programs are typically designed to address the inability to pay for college but not other barriers that limit college enrollment and persistence, including academic preparation. Institutional programs that are designed to promote retention of college students typically focus only on the barriers to persistence with no attention to enrollment processes. Similarly, research generally examines the relationship between particular predictors and discrete measures of student success (e.g., the effects of financial aid on college enrollment). As a result, little is known about the relative effectiveness of different approaches or the ways in which policies and practices interact to influence student success.

Second, efforts by policymakers, practitioners, and researchers to improve student success are hampered by the absence of a clear, consistent, and comprehensive definition of such success. Numerous books, reports, and journal articles examine various aspects of what might be considered student success. A Google search revealed 212 items with the phrase "college student success" in the title. This high level of attention to, and range of outcomes that fall under, a student success umbrella is not surprising given the breadth of outcomes that are associated with higher education. As an example, Bowen (1997) offered a thoughtful cataloging of the many outcomes of higher education, organizing them under the broad headings of 1) cognitive learning, 2) emotional and moral development, 3) practical competence, 4) direct satisfactions and enjoyment, and 5) avoidance of negative outcomes.

Third, policymakers and practitioners who attempt to use findings from prior research as tools to improve student success must first reconcile the broad array of theoretical and methodological approaches that characterize such research. Research on aspects of student success employs a variety of conceptual frameworks, often defined by particular disciplinary perspectives (e.g., sociology, economics, or psychology) and units of analysis (e.g., students, schools, or states). Certainly, the use of numerous theoretical and methodological approaches has the potential benefit of producing a more comprehensive understanding of student success. However, the diversity of approaches also means that the body of research on student success is characterized by wide-ranging, and sometimes inconsistent, findings. This unwieldiness and inconsistency necessarily frustrates attempts to identify, develop, and sustain a program of policies and practices that may raise the level of success for all students and lead to a reduction in student success gaps.

### **Purpose**

Tremendous scholarly attention has been directed at the goal of improving “student success.” Based on a review of largely discrete existing bodies of literature, this report proposes an overarching framework that policymakers, practitioners, and researchers can use to develop, implement, and evaluate policies and practices for addressing persisting racial/ethnic and socioeconomic gaps in student success. The framework brings order to the wide array of approaches that only when considered together, provide a comprehensive understanding of how policymakers and practitioners can more effectively intervene to promote student success. The framework assists policymakers, practitioners, and researchers by describing avenues and approaches to effective development, implementation, and evaluation of policy and practice rather than identifying a “single bullet” theory, method, policy, or practice.

While somewhat similar in spirit, the approach to, and results of, this report differ in important ways from the Social Science Research Council (SSRC, 2005) project *Transitions to College: Theory to Practice*. Both our report and the work of the SSRC involve examinations of the literature in particular fields and specialties. The substantive review of the literature that the SSRC commissioned for its report may be somewhat more comprehensive than ours, since their project covered 10 fields and specialties and ours includes 4 (education, psychology, sociology, and economics), and theirs reviewed scholarly research published between 1984 and 2003, while ours is limited to research between 1995 and 2005.

The work of the two efforts differs primarily in terms of the use of the reviews. A primary goal of the SSRC project was to produce a report specifying research questions in the areas of preparation, access, paying for college, and retention/success. For each of the four areas, the report summarizes what is known and unknown from research about the outcome and gaps in knowledge about the outcome and specifies five or six questions to guide future research. One appendix to the SSRC final report lists 3 areas for future research for each of the 10 areas (American history, anthropology/ethnography, demography, economics, education research K–12, education research 13+, human development, law/legal studies, political science, and sociology) and its specialties. A second appendix offers five to eight research suggestions for each of five “dimensions or aspects of transitions issues that are meaningful frames of analysis: students, parents/families/communities, institutions, policy/evaluation, and system-level analyses” (p. 6).

Rather than providing an agenda for future research on a specific set of outcomes or for particular “frames of analysis,” our report produces a conceptual model that specifies how

different “frames of analysis” separately and together shape student success. The model improves understanding of the ways multiple areas of research can be brought together to generate a more comprehensive and complete understanding of the broader student success processes for different groups of students. In addition, our report responds to the SSRC (2005, p. 21) recommendation “for a more conceptual and reflective approach to notions of access, retention, success, and opportunity that takes into account the multiple pathways that individuals take to postsecondary attainment and acknowledges the variability of how these terms are defined by different consumers, communities, and policymakers.” While the SSRC report is targeted at researchers, our report is intended to directly benefit policymakers and practitioners.

After defining student success and explaining our procedures, this report describes the results of a multidisciplinary examination of the theoretical and methodological approaches that researchers have used to inform knowledge and understanding across a range of student success outcomes. Then, the report presents and describes the proposed conceptual model that ties this work together. The report concludes with recommended uses of the model for policy, practice, and further research.

### **Literature Review**

This report does not provide a comprehensive review and synthesis of what is known from research about student success. Our intention is not to update or replicate the excellent substantive syntheses that exist (e.g., Feldman & Newcomb, 1969; Pascarella & Terenzini, 1993, 2005). Instead, this report complements the extant substantive syntheses (e.g., Feldman & Newcomb, 1969; Pascarella & Terenzini, 1993, 2005) of “how college affects students” by developing a framework to study how policymakers and practitioners intervene to improve outcomes for students and eliminate gaps in outcomes among students.

Our approach to developing this framework assumes the centrality of disciplinary perspectives for understanding student success—perspectives that vary in terms of their foci, assumptions, conceptual models, and empirical orientations. Psychological theories describe the ways students’ attitudes, motivations, and goals shape their behaviors. Sociology includes functional, critical, and interactionist theories that describe social forces that advantage some students while disadvantaging others. Economic theory explains the ways students make decisions to invest various resources in their postsecondary education.

Of particular interest in this review are the ways in which focus, conceptualization, and operationalization inform understanding of redundancies and blind spots in our knowledge across disciplines. Conceptual and operational elements of research on student success outcomes have many dimensions. Because disciplinary norms guiding decisions about appropriate foci, conceptual frames, and empirical approaches to research differ, we expect disciplinary variance in the perspectives and conclusions about student success outcomes. In every discipline, research design, data collection, and analysis reflect a researcher’s response to a number of underlying philosophical questions that define what might be seen and what might be ignored in the inquiry. These epistemological elements are fundamentally related to disciplinary identities themselves.

To develop the framework, we rely on the literature not for a traditional review and synthesis but for a description of the characteristics of and approaches to the research that has been conducted in various disciplines. Although we offer examples of research on specific questions, the literature review does not describe what particular studies have found to be the

most important predictors of particular outcomes. Rather, it identifies the theoretical and methodological approaches that researchers have used. The results of this review inform the development of an overarching conceptual model of student success.

### **Definition of Student Success**

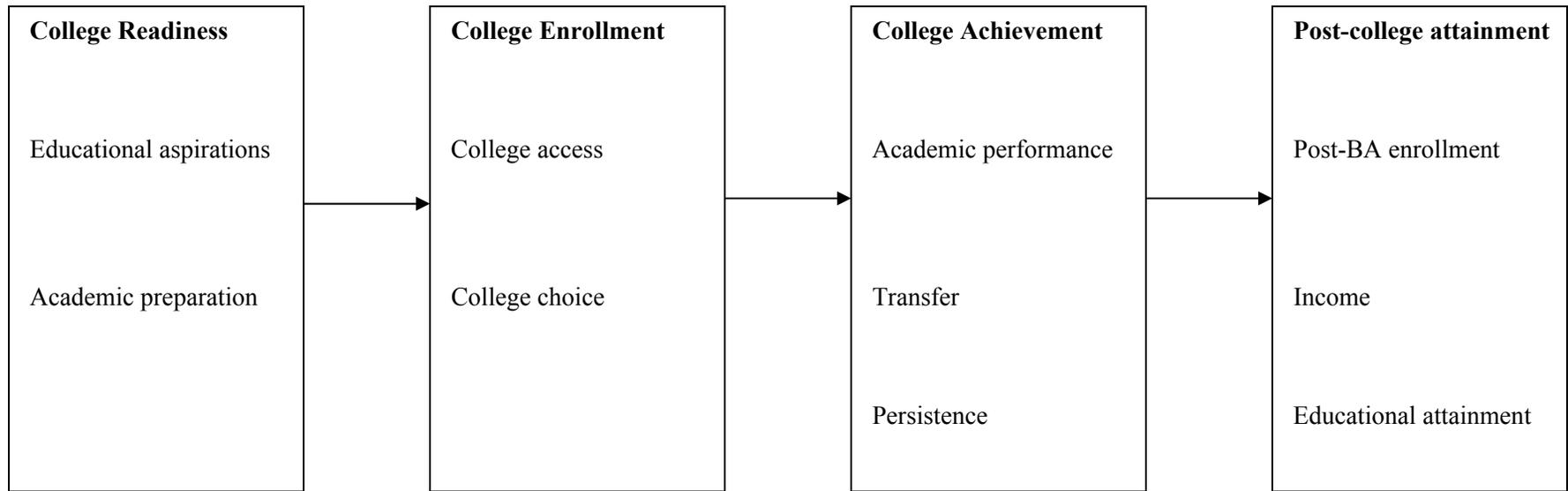
To produce this report, we reviewed literature that examined 10 indicators of student success representing 4 key transitions in a success process (figure 1). Reflecting our goal of identifying a framework to guide policymakers, practitioners, and researchers, we define student success as the completion or maximization of these indicators. The first transition involves becoming ready for college, and is measured by educational aspirations or expectations and academic preparation for college. The second transition, marked by enrollment into college, is measured by college access and college choice. The third transition, college achievement, is represented by academic performance in college, transfer among institutions, and persistence to program or degree completion. The final transition, post-college attainment, is measured by enrollment in graduate and professional schools, income, and educational attainment.

Our focus on these 10 indicators of educational attainment is consistent with the weight that policymakers give to these measures in accountability systems. For example, in its state-by-state report card, the National Center for Public Policy and Higher Education (2004) awarded grades to states in the following categories: academic preparation for success in college, participation and enrollment in college, affordability, persistence and degree completion, and benefits (e.g., educational attainment, income, and other benefits). While learning is also a stated category, most states received an incomplete, reflecting the National Center's conclusion that appropriate indicators of this outcome do not currently exist for all states.

This definition of student success emphasizes certain outcomes over others, that is, all students should enroll in college, persist to program or degree completion, enroll in and complete advanced degree programs, and earn high incomes. Not all individuals have, should have, or will ever have these goals. Nonetheless, many policies and practices are directed toward achieving these outcomes, and, despite these efforts, the shares of students who accomplish these outcomes vary systematically across socioeconomic, racial/ethnic, and gender groups. Indeed, much of existing work on student success outcomes describes wide variance of these distributions.

Defining student success in terms of these discrete outcomes also oversimplifies the work of postsecondary educational institutions. The list of 10 indicators of student success is not exhaustive and excludes many attributes and outcomes that may characterize a "successful" student. In particular, the literature review does not include attention to outcomes that policymakers may deem to be intermediary, including academic preparation prior to high school, choice of major field, career search activities, and choice of career field. Use of these 10 indicators of educational success is driven largely by our interest in addressing the needs of policymakers and practitioners, and thus our definition of success focuses on outcomes that higher education institutions commonly report through official government channels (e.g., IPEDS) and the media (e.g., general newspaper accounts and rankings such as those published by *US News & World Report*). Moreover, although based on a specific and limited list of outcomes, the proposed framework may be applicable to a wide range of other outcomes, especially those that may mediate the outcomes that are the focus of this report.

**Figure 1. Key transitions and indicators of student success**



## **Procedures**

With the goal of capitalizing on the best existing thinking and research on the components of student success, we limited the review to articles that examined at least one of the indicators of success and were published in top economics, education, psychology, and sociology journals. Guided in part by the results of the SSRC review of literature, we focus on these disciplines because of their high levels of scholarly attention to indicators of student success. Appendix A provides more information about the steps that we used to conduct the literature review and details the findings of this review.

## **Characteristics of the Literature on Student Success**

The review of the literature (see Appendix A) identifies six conclusions about the work in these fields that is relevant to student success:

- The relative attention to student success in articles published in top journals varies across the disciplines we examined.
- Even within disciplines, there exists variation on the aspects of student success examined.
- A wide variety of theoretical approaches to understanding student success exist, and they vary by disciplinary perspective.
- Methodological approaches and sources of data for exploring student success also vary and, as one might expect, are somewhat tightly bound to the theoretical stance employed.
- The unit of analysis varies by disciplinary and theoretical approach.
- Attention to differences in student success across groups varies across the areas we examine.

## **Characteristics of the Proposed Conceptual Model of Student Success**

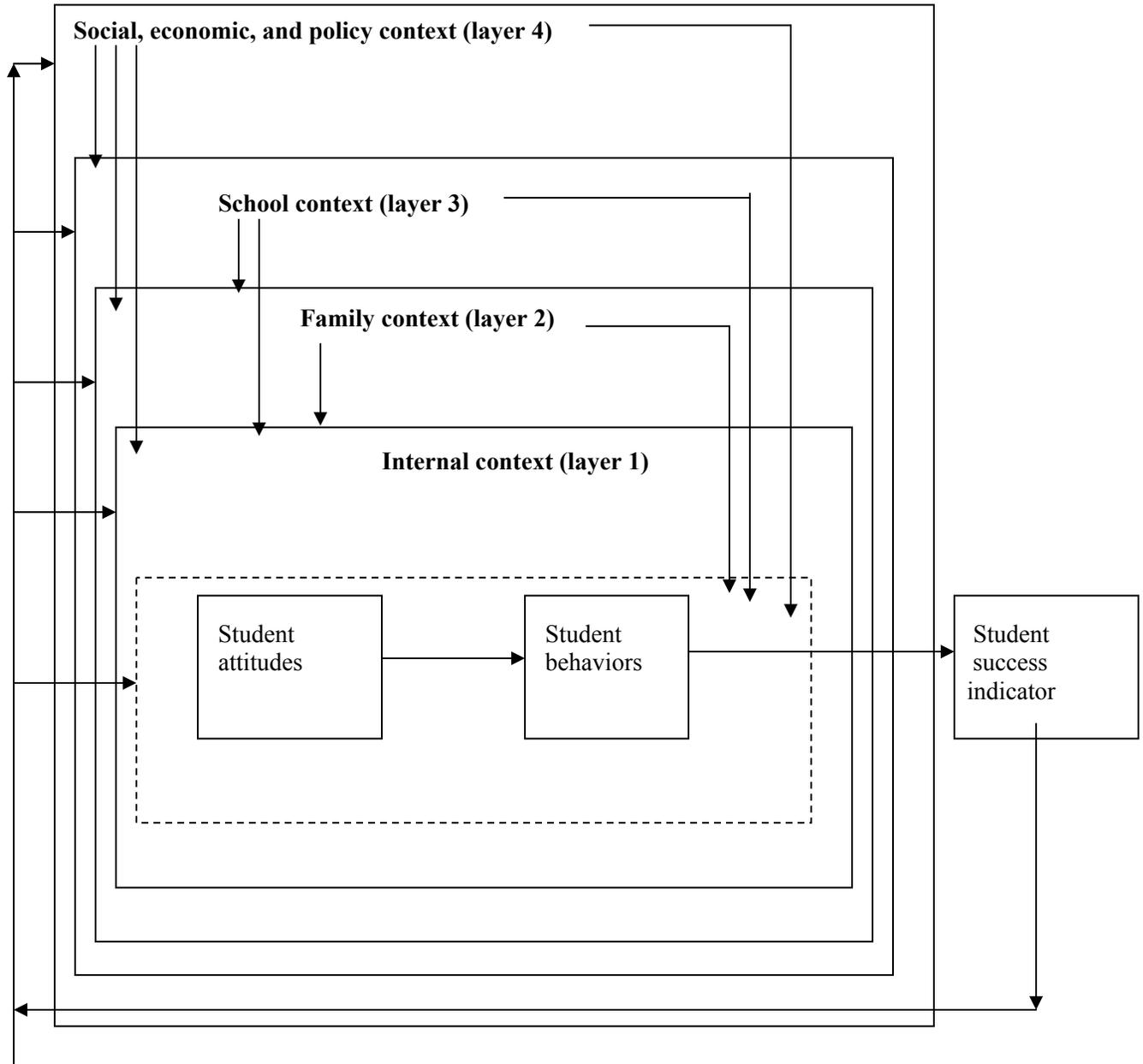
Research on student success is characterized by a range of substantive foci and theoretical and methodological approaches. Alone, each approach offers insights into the processes and forces that contribute to student success. Considering these varying approaches together, however, produces a more comprehensive understanding of the ways in which policymakers and practitioners can intervene to promote student success. Understanding of student success is enhanced by drawing on the many existing substantive, theoretical, and methodological perspectives, rather than stressing just one.

Reflecting the guiding assumptions and central conclusions from our review of research, we propose a conceptual model, not a theory, for understanding student success. This model incorporates both commonalities and differences across theoretical and methodological approaches to student success into an overarching conceptual model (figure 2). The model is generic, in the sense that it can be used to understand any of the 10 indicators of student success shown in figure 1.

An expansion and refinement of the conceptual model that Perna (2006) developed based on her review and synthesis of research on college access and choice, the proposed model has six defining characteristics: three deal with the process of student success; the other three deal with how student success is studied. Together, they build on the six central conclusions from the literature review:

- Student success is a longitudinal process.
- Multiple theoretical approaches inform understanding of student success.
- Student success is shaped by multiple levels of context.
- The relative contribution of different disciplinary and area perspectives to student success varies.
- Multiple methodological approaches contribute to knowledge of student success.
- Student success processes vary across groups.

**Figure 2. Proposed conceptual model of student success**



SOURCE: Adapted from Perna (2006).

### **Student Success is a Longitudinal Process**

The literature review demonstrates that although disciplines vary in relative attention to particular student success indicators, consideration of multiple disciplines together shows the range of student success indicators that mark students' movement through the four success transitions. Because researchers tend to examine discrete indicators of student success, however,

individual studies of student success obscure the extent to which success in one indicator contributes to success in other indicators.

Despite the absence of direct research, the proposed conceptual model assumes that student success is a longitudinal process that is marked by the four key transitions (see figure 1). In other words, the model assumes that student success is a process that begins with college readiness, moves on to college enrollment and then to college achievement, and culminates in postgraduate and labor market experiences. The longitudinal nature of the process is suggested by the use of a feedback loop in figure 2. The feedback loop (from the student success indicator back to the various layers of context) indicates that information about attainment of any of the indicators in figure 1 shapes the process for attaining other indicators of student success. Thus, the feedback loop shows that a student's internal context, as well as family, school, and policy context, are shaped, in part, by the attainment of other indicators of student success.

### **Multiple Theoretical Approaches Inform Understanding of Student Success**

The literature review demonstrates the range of theoretical perspectives that researchers have used to inform understanding of the student success indicators. Consistent with this finding, the proposed conceptual model assumes that student success is best understood when multiple theoretical perspectives are considered.

While articles published in top journals in psychology, sociology, and economics tend to rely only on perspectives derived from their particular discipline, a few articles in the top journals in education utilize conceptual models that draw on multiple theoretical perspectives. For example, several studies on college enrollment and choice illustrate the strengths of models that incorporate aspects of economic theories of human capital and sociological notions of cultural and social capital (e.g., Freeman, 1997; Paulsen & St. John, 2002; Perna, 2000, 2004).

Other scholars recognize the benefits of drawing on multiple theoretical perspectives to examine college enrollment (e.g., Perna, 2006; St. John & Paulsen, 2001). Based on their review of the role of theory in finance-related analyses, St. John and Paulsen (2001, p. 555) concluded that, "Social and cultural theories are also important for the study of higher education finance because they provide an alternative, more complete explanation of the role of non-monetary factors that foster and inhibit access." Perna (2006) concluded in her review of research on college student enrollment that no one perspective is sufficient for understanding differences across groups in two indicators of student success: college access and choice. Similarly, Manski (1993) demonstrated the strengths of a conceptual model (the Social Learning Proposition) that draws on constructs from both economics and sociology. He argued that economic approaches offer a framework for understanding decisionmaking but are limited by their failure to examine the nature of information that is available to decisionmakers. On the other hand, sociological approaches shed light on the ways in which individuals gather information, but do not identify the ways in which individuals make decisions based on this information (Manski, 1993). By considering multiple theoretical lenses together, research can address the limitations that are present in any one perspective.

### **Student Success is Shaped by Multiple Levels of Context**

The review of the literature illustrates that although the vast majority of research utilizes the student as the unit of analysis, research that uses multiple units of analysis provides additional

insights into the student success process. Consistent with this finding, the proposed conceptual model assumes that student success is determined by an individual's internal context and multiple external layers of context. The review of research consistently shows that students make decisions and take actions that influence their success. But, the decisions that students make, and the behaviors in which they engage, are shaped not only by student's own characteristics but also by multiple levels of context (Perna, 2006).

The proposed conceptual model assumes that student behavior cannot be fully understood without attention to the context in which the student lives. More specifically, the proposed model assumes that student decisions are shaped by four nested contextual layers. The multilayered nature of the proposed model recognizes the possibility of interactions between layers. For policymakers and practitioners, the most challenging interactions are likely those that render particular policies and programs effective in promoting success for only some groups of students.

Because of its attention to multiple layers of context, the proposed model facilitates an examination of student success from different perspectives and units of analysis. For policymakers and practitioners, the three most important units of analysis are students, the K–12 and higher education institutions they attend, and the public policies and programs that help shape student and institutional behaviors. Incorporating different units of analysis is critical, given variations in each unit's definition of success. Clearly, students have goals that are not always consistent with the goals of institutions, and institutions have goals that are not necessarily consonant with the goals of policymakers. Thus, students, institutions, and policymakers may evaluate success quite differently.

### **The Relative Contribution of Different Disciplinary and Area Perspectives Varies**

One finding from the review of research pertains to variation across the four disciplines in the relative attention in top journals to the 10 indicators of student success. Reflecting this variation, the proposed conceptual model assumes variation in the contribution of different disciplinary perspectives to current knowledge of student success, as well as to understanding of the particular forces that shape student success at each layer of the model. The discussion of the contribution of the disciplines to the four layers in the next section illustrates this variation.

### **Multiple Methodological Approaches Contribute to Knowledge of Student Success**

The research review also showed that understanding of student success is informed by a variety of methodological approaches and sources of data. The proposed conceptual model recognizes the benefits of this diversity of methodological approaches and data sources, and is intended to be tested using multiple methods. The proposed model allows for qualitative approaches that probe particular aspects of student success predictors, processes, or indicators, as well as quantitative examinations of relationships among variables within or across particular layers of context.

Because of the explicit identification of the role of various layers of context, the model may also be productively used for studies that involve a range of sources of data, including single institution, state, and national samples. With the specification of layers of context, the proposed conceptual model also provides a framework for organizing literature that involves varying sources of data.

## **Student Success Processes Vary Across Groups**

Finally, although the degree of attention varies across disciplines, a substantial share of articles in top journals in all four disciplines is concerned with variations across groups in student success processes. By recognizing the role of multiple layers of context, the proposed conceptual model assumes that the path to student success is not universal but may vary across racial/ethnic, socioeconomic, and other groups based on differences in culture, family resources, local school and community structures and supports, economic and social conditions, and public policies (Paulsen & St. John, 2002; Perna, 2006; St. John & Asker, 2001). Like “the student choice construct” (Paulsen & St. John, 2002; St. John & Asker, 2001) and Perna’s (2006) model of college enrollment, the proposed model assumes that student success is determined, at least in part, by an individual’s “situated context.” Because the “situated context” varies across individuals, multiple routes may lead to success (Perna, 2006).

## **Layers of the Proposed Conceptual Model**

Drawing on the literature reviewed for this report, the following sections describe examples of what is known about the contributions of each layer of the model to various indicators of student success. Given the parameters of the review (e.g., attention only to articles published in top journals in four disciplines), the substantive consideration of each layer is designed to be illustrative rather than comprehensive. Thus, this presentation illustrates the range of forces that policymakers, practitioners, and researchers should consider in the development, implementation, and evaluation of policy, and in further research, rather than provides an exhaustive assessment of the forces at all layers of context that contribute to all indicators of student success.

### **Layer 1—Internal Context**

At its core, student success is determined by the attitudes and behaviors of individual students. Layer 1 of the model focuses on the cognitive and motivational processes that shape an individual’s behaviors. Our review reveals that knowledge of the relationship between student attitudes and indicators of student success is dominated by work in psychology. Even the relatively small number of relevant articles in other disciplines and fields are centrally informed by psychological theories and frames. Psychology differs from the other disciplines included in this review in its decided focus on the individual’s mental processes and behaviors, which define layer 1 of the model.

### **Education**

Only a small number of articles in top education journals examine the ways in which student attitudes shape their success, and they tend to draw on psychological constructs. For example, one article shows that students’ academic performance in college is shaped by cognitive skills (as measured by test scores), as well as by noncognitive variables, including motivation and use of self-regulated learning strategies (Ruban & McCoach, 2005). Other work stresses the contribution of self-efficacy to students’ academic achievement. In a review and synthesis of prior research, Pajares (1996) concluded that self-efficacy beliefs shape student effort and perseverance, which in turn, influence subsequent academic performance. In other educational

research, performance was viewed as a function of self-worth beliefs related to mathematics and gender (Stage & Kloosterman, 1995).

## **Psychology**

Most of the articles that are published in top psychology journals inform understanding of the ways in which constructs such as achievement motivation, self-efficacy, and stereotype threat contribute to student success.

A few articles focused on aspects of self-regulated learning, particularly perceived academic control and other strategies that regulate motivation. Research suggests that perceived academic control is positively related to final course grades, and that students with high academic control and high preoccupation with failure receive the highest grades (Perry, Hladkyj, Pekrun, & Pelletier, 2001). Students with high academic control not only receive higher grades, but also exert more effort, experience less anxiety, have greater motivation, tend to monitor progress in achieving goals, and perceive greater control over course assignments (Perry et al., 2001). Other research shows that students' strategies for regulating their motivation are related to their goal orientation (Wolters, 1998). The use of intrinsic regulation strategies was more common among those with mastery goal orientations, while use of extrinsic regulation strategies was more common among those with performance goal orientations (Wolters, 1998). High school students with autonomy orientations (i.e., those who tended to participate in academic activities that they believed to be important to themselves) had more positive academic experiences, while students with control orientations (i.e., those who tended to participate in academic activities that they believed to be important to others) had lower academic performance and commitment (Wong, 2000).

A substantial number of articles examined the contribution of students' goals to their academic performance. This research consistently supports a "multiple-goals" perspective, whereby mastery goals promote interest (Harackiewicz, Barron, Tauer, Carter, & Elliot, 2000; Harackiewicz, Barron, Tauer, & Elliot, 2002), performance goals promote grades (Elliot & Church, 1997; Harackiewicz et al., 1997, 2000, 2002), and performance-avoidance goals reduce academic performance (Elliot & Church, 1997). The positive relationship between performance goals and academic achievement appears to be mediated by such variables as persistence on task (Elliot, McGregor, & Gable, 1999), effort, self-efficacy, goal level (VandeWalle, Cron, & Slocum, 2001), and achievement motivation (Barron & Harackiewicz, 2001), while the negative relationship between performance-avoidance goals and academic achievement appears to be mediated by test anxiety (Elliot & McGregor, 1999) and disorganization (Elliot, McGregor, & Gable, 1999).

Research consistently shows that academic self-efficacy, optimism, and hope are positively related to students' academic performance (Brackney & Karabenick, 1995; Chemers, Hu, & Garcia, 2001; Gibbons, Blanton, Gerrard, Buunk & Eggleston, 2000; Snyder, Shorey, Cheavens, Pulvers, Adams, & Wiklund, 2002). The effects of such "trait-like" characteristics as general self-efficacy, goal orientation, and cognitive ability on academic achievement may be mediated by such "state-like" characteristics as task-specific self-efficacy (Chen, Gully, Whiteman, & Kilcullen, 2000). Psychopathology (i.e., psychological disorders including anxiety and substance abuse disorders) is negatively related to students' academic performance directly (Svanum & Zody, 2001) and indirectly through self-efficacy and resource management (Brackney & Karabenick, 1995).

With only a few exceptions (e.g., Cullen, Hardison, & Sackett, 2004), research consistently shows that stereotype threat contributes to gaps in academic performance between Blacks and Whites (Brown, Chamsangavej, Keough, Newman, & Rentfrow, 2000; Gonzales, Blanton, & Williams, 2002; Steele & Aronson, 1999), women and men (Brown et al., 2000; Brown & Josephs, 1999; Gonzales, Blanton, & Williams, 2002; O'Brien & Crandall, 2003), and students with and without mental illness (Quinn, Kahng & Crocker, 2004). A self-evaluative threat, stereotype threat is assumed to negatively influence performance when an individual's focus is diverted from performing a particular task to worrying that low performance will confirm a negative stereotype about a group to which the individual belongs (Steele & Aronson, 1995). The negative effects of stereotype threat on performance may be reduced by other psychological characteristics, particularly a coping sense of humor (Ford, Ferguson, Brooks, & Hagadone, 2004).

Other research shows the negative effects of particular experiences for African Americans. A longitudinal study of African Americans at one predominantly White institution showed that grades declined over the period of the study for students who had high levels of race-related rejection sensitivity (i.e., who "anxiously expect, readily perceive, and intensely react to rejection in situations where rejection is possible") (Mendoza-Denton, Downey, Purdie, Davis, & Pietzrak, 2002, p. 896). Other research suggests that compared to other African American high school students, those who had positive feelings about their racial group and viewed race as important to their identity had higher rates of college enrollment, while those who felt few connections to their racial group and had negative beliefs about their racial group had lower rates of college enrollment (Chavous, Hilken-Bernat, Schmeelk-Cone, Caldwell, Kohn-Wood, & Zimmerman, 2003).

Articles in psychology journals also include attention to differences in academic performance between women and men, describing gender differences in rates of Advanced Placement test-taking and performance (Stumpf & Stanley, 1996) and explaining that gender differences in SAT math scores are attributable, in part, to gender differences in mental rotation ability and math self-confidence (Casey, Nuttall, Pezaris, & Benbow, 1995; Casey, Nuttall, & Pezaris, 1997). High-control women, but not high-control men, have lower quality academic experiences (Wong, 2000), and women have higher test anxiety and higher grade point averages than men among both undergraduate and graduate students (Chapell et al., 2005).

A small number of articles suggest linkages via students' perceptions between the internal layer of context and the school context. For example, one study suggested that increased perceptions of "situational constraints" (i.e., quantity and quality of resources available to support learning) indirectly reduce academic performance by reducing students' performance goals (Villanova, 1996). A second study showed that undergraduates' academic achievement is positively related to students' beliefs about school, particularly their predisposition toward the learning context (Larose & Roy, 1995).

## **Sociology**

Relatively little work published in top sociology journals examines cognitive processes defining the internal context of success indicators. One notable exception, related to the work in psychology by Perry et al. (2001), identified the components of an academic work ethic among college students and showed how an academic work ethic is related to student performance and to characteristics of institutions attended (Rau & Durand, 2000). The latter authors concluded that there is a strong relationship between disciplined study—as captured by their academic ethic

measure—and academic performance. Their conceptualization of an academic ethic (a direct descendant of Shils's (1997) conceptualization) is captured by a “student worldview that emphasizes diligent, daily, and sober study” (p. 19). They show that intensity of drinking is negatively associated with college GPA and, as university faculty would hope, that the number of hours devoted to study is positively associated with GPA. Rau and Durand (2000) were also able to demonstrate distinct behavioral groupings of students that are directly related to grade performance. Among other findings, their analysis suggests the pervasive negative influence of unchecked bacchanalian subcultures that serve to undermine student academic performance and the overall intellectual climate found across the range of colleges and universities in America.

### **Economics**

Aside from work only loosely coupled to the cognitive dimensions defining layer 1 of our model, the economics journals we reviewed yielded little insight into layer 1 interests. An example of work loosely bearing on those interests is that of Jacob (2002), who modeled the influence of noncognitive skills on the gender gap in college participation. Jacob concluded that noncognitive skills, such as the inability to pay attention in class, to work with others, or to organize and keep track of homework, continue to influence college enrollment patterns even after controlling for high school performance and aptitude.

### **Layer 2—Family Context**

The family context recognizes that both within and outside of the home, families can “manage” their children's experiences to promote various indicators of student success (Furstenberg, Cook, Eccles, Elder, & Sameroff, 1999; McDonough, 1997; Perna & Titus, 2005).

### **Education**

A substantial share of articles in education show that student success is related to students' sociodemographic characteristics, particularly socioeconomic status, race, and ethnicity. Educational research consistently shows that even after taking into account other variables, socioeconomic status is positively associated with such measures of student success as choice of institution attended (Astin & Osguera, 2004; Perna & Titus, 2004; Teranishi et al, 2004) and graduate school enrollment (Walpole, 2003; Zhang, 2005a). Educational research also shows that the predictors of such indicators as predisposition to college (Hamrick & Stage, 1998), college enrollment (Heller, 1999), college grade point average (Hoffman & Lowitzki, 2005), and plans for graduate school (Pascarella et al., 2004) vary by racial/ethnic group, with students from most racial groups systematically performing less well than White students. While fewer studies examine variations within broad racial/ethnic categories, the small amount of available research shows that such indicators as choice of institution attended vary by ethnicity within a particular group (e.g., Asian Pacific American, Teranishi et al., 2004).

Other articles examine the contribution of parental involvement to such indicators as college enrollment (Perna, 2000; Perna & Titus, 2005) and the role of family background in shaping impressions and realities of attendance and choice constraints (Paulsen & St. John, 2002). A review of this corpus of work reveals that sociologically oriented explanations of influences of home, peers, community, and school dominate the mechanisms defining processes that tend to compound advantage and disadvantage as they relate to student success in college.

## **Psychology**

A number of articles show the influence on student success of the family context. Among the relevant aspects of the family context are strength of ties to parents, parenting style, and parents' job security. The sole qualitative psychological article suggests that students' plans are shaped, at least in part, by the tension between increasing autonomy and sustaining ties to parents and other loved ones (Shilkret & Nigrosh, 1997). Other research shows that students' academic achievement is influenced by parenting style, although the relationship appears to be weaker for college seniors than for other students (Glasgow, Dornbusch, Troyer, Steinberg, & Ritter, 1997; Strage & Brandt, 1999). An exploratory study suggested that when students perceive job insecurity among their parents, the students themselves experience cognitive problems, and these problems reduce their academic performance (Barling, Zacharatos, & Hepburn, 1999).

Other research published in top psychology journals shows that the relationship between aspects of the family context and student success varies based on parents' educational attainment, ethnicity, and immigrant status. Research shows variations based on parents' educational attainment and ethnicity in the effects of parental involvement on 11th grade students' educational and occupational aspirations (Hill et al., 2004) and students' academic achievement (Hong & Ho, 2005). Other research shows that compared with students from U.S.-born families, students from immigrant families have higher academic motivation (which promotes academic achievement) but greater family demands (which reduce academic achievement) (Tseng, 2004).

## **Sociology**

Sociologists have made a number of important contributions to our understanding of the influence of family characteristics on student success. Cheng and Starks (2002) employed a symbolic interaction frame to examine the differential role of significant others on the educational expectations of students from different racial groups. Symbolic interaction focuses on the ways in which personal identity is developed through the interaction with others. The Cheng and Starks work points to processes through which the influences of significant others are conditioned by race. Central to their findings is the idea that the power of specific significant others (e.g., parents, teachers, or friends) to influence expectations about education varies across racial groups.

Some research shows the role that families play in determining the future paths of their children and, ultimately the degree to which those future paths may reduce or magnify stratification in broader society. Conley's (2001) account of the role of family wealth in college attendance and completion showed that traditional models of attainment have ignored the role of family wealth, focusing instead on less useful measures of family income. This type of analysis taps a longstanding sociological interest in the long-term advantages conveyed through the intergenerational transfer of wealth. Other sociological research focuses on families and high schools and the ways in which family background can determine students' preparation for college and range of choices available. For example, Attewell (2001) argued that families seek to maximize the quality of schooling available to their children, often with the hope of improving their chances for college success. He showed that this pursuit on the part of the family may actually be counterproductive in terms of chances for admission to high-quality colleges. Other research showed that family background has an important influence on high school performance and college enrollment (e.g., Muller & Schiller, 2000; Conley, 2001; Crosnoe, 2001; Cheng & Starks, 2002; Karen, 2002; Hofferth, Boisjoly, & Duncan, 1998). This influence is channeled through increased parent involvement (Crosnoe, 2001), noneconomic (cultural) byproducts of

family wealth (Conley, 2001), the influence of significant others (Cheng & Starks, 2002), and the social networks and cultural connections of parents (Hofferth, 1998).

Most of the sociological literature is dominated by either an exclusive cultural reproduction framing or some type of contrast between the reproduction models and mobility models. While reproduction models place primacy on the binding role of social origins, mobility models focus on the degree to which social status can change over the course of the lifetime. Education is a central feature in both models, serving as a reproductive mechanism in the former and a democratizing mechanism in the latter. A notable example of such a contrast is Aschaffenburg and Maas's (1997) examination of the role of cultural capital on school success. In that work, they test competing mobility (DiMaggio, 1982) and reproduction theories (Bourdieu and Passeron, 1977) and conclude that the mobility model is dominant, but the reproduction model is the more important in terms of college enrollment.

### **Economics**

Economists have also examined the contribution of parents' occupation to the indicators of student success. Research in this area has shown that compared to peers with traditionally employed parents, young people from families with family-owned businesses generally have lower academic performance during high school and are less likely to enroll in college (Davila & Mora, 2004). Ease of intergenerational transfer of these family-owned businesses was presumed to discourage academic engagement in high school and diminish college-going aspirations of children in these entrepreneurial families (Davila & Mora, 2004). In other work addressing the occupational background of families, Siegfried and Getz (2006) developed a novel analysis of college choice patterns of students from families with at least one parent who works on a university faculty. Of interest to the authors was the degree to which these students may be advantaged by additional information about college quality that would be transmitted by their more knowledgeable parent(s). While failing to provide a causal explanation, Siegfried and Getz note that students in their sample are more likely to attend research universities and selective liberal arts colleges than are their peers from nonacademic families.

Family structure is also the focus of research by economists. For example, Ver Ploeg (2002) isolated the effects of displaced children on the likelihood of college enrollment and degree attainment. While previous researchers have explained this disadvantage as a function of the typically diminished income of broken homes, Ver Ploeg (2002) controlled for income and revealed a net negative effect of such circumstance.

Beyond the structural characteristics of families, economists have devoted attention to the economic behavior of families with children in college. For example, Bodvarsson and Walker (2004) found that students whose parents pay for a substantial proportion of the costs associated with tuition and living expenses have lower GPAs, are more likely to fail courses, and are less likely to persist to the baccalaureate than students who bear the lion's share of these costs themselves through work and/or personal savings.

### **Layer 3—School Context**

The literature we examined reinforces the utility of conceptualizing school context as a seamless continuum from primary school through college. This view enables the identification

and understanding of compounding effects associated with educational resources, academic preparation, and educational orientations that are necessary for success at the college level.

### **Education**

Educational research demonstrates that some measures of student success are associated with the characteristics of the high school attended, while other measures are related to the characteristics of the higher education institution. For example, studies show that high school context is directly related to college. Factors such as high school quality and ethnic mix shape students' opportunity for college, and these high school influences are known to vary by racial background (Perna, 2000). Other work showed that choosing to attend a historically Black college or university (HBCU) rather than a predominantly White institution (PWI) is related, at least in part, to the characteristics of the high school attended and students' experiences there (Freeman, 1999). High schools with well-developed guidance and advising programs have also been shown to be influential on subsequent college enrollment behaviors and institutional choices (Plank & Jordan, 2001; Tierney & Jun, 2001).

Research in top educational journals shows that higher education institutional characteristics such as single-sex, race, and quality contribute to student success. Based on a review of research, Mael (1998) concluded that academic achievement is higher for students who attend a single-sex institution (junior high school, high school, as well as college) rather than a coeducational institution. Other research suggests that success varies in part based on whether a student attends an HBCU or a PWI, with Black students having more positive experiences at HBCUs than at PWIs (Fleming, 2002; Fries-Britt & Turner, 2002). The quality of the higher education institution attended is positively related to such indicators of student success as graduate school enrollment and degree completion as well as earnings (Zhang, 2005a, 2005b), and institutional expenditure patterns are related to students' self-reported gains in various aspects of college performance (Toutkoushian & Smart, 2001).

Other educational research focuses on the contribution to student success indicators of particular programs or experiences at an institution. Using an experimental design, Nagda et al. (1998) found that participation in an undergraduate research opportunity increased rates of persistence through graduation, especially for African Americans with academic achievement below the median. Other research suggests that participating in community service is positively related to such indicators as graduate school enrollment and degree attainment (Astin, Sax, & Avalos, 1999). Further, academic achievement improves when a student participates in some form of peer assessment (Topping, 1998) or in an intervention designed to enhance study skills (Hattie, Biggs, & Purdie, 1996). For science, mathematics, engineering, and technology courses and programs, academic achievement and persistence increase when the student engages in some form of small-group learning (Springer, Stanne, & Donovan, 1999).

### **Psychology**

A small number of articles in top psychology journals shed light on the influence of the institutional context on student success. These articles generally illustrate the ways that particular interventions or experiences contribute to various aspects of student success. For example, one study showed that the negative effects of stereotype threat on female students' math performance are reduced when students learn of a "disconfirming example," e.g., a female role model in math performance (Marx & Roman, 2002). Another study showed that by building

interpersonal skills and educational aspirations, participating in extracurricular activities contributes to higher levels of educational attainment at age 20 (Mahoney, Cairns & Farmer, 2003). A third study showed that students who request and receive personal psychological counseling have higher retention rates than students who request but do not receive counseling (Wilson, Mason, & Ewing, 1997). And among students with high levels of emotional and psychological stress, an intervention that requires students to write about the stress prevents a decline in grade point average (Lumley & Provenzano, 2003).

Providing students with a decisionmaking aid that helps them to identify the reasons for their decision was also found to improve students' satisfaction with their choice of college (Kmett, Arkes, & Jones, 1999). Other research suggests that students' SAT verbal scores (but not course grades) depend in part on their relative skill with multiple-choice rather than essay examinations (Bridgeman & Morgan, 1996).

### **Sociology**

The sociology literature pertaining to school context also tends to focus on structural antecedents to postsecondary student success indicators. Much of this research focuses on theoretical tensions between cultural reproduction and social mobility. Karen (2002) painted a powerful picture of stratified opportunity, showing that while disadvantaged students begin with a lower chance of college continuation, those that do go on most often enroll in less selective institutions that provide fewer academic support resources—institutions that have also been shown to confer lesser returns in the post-graduation labor market (Thomas, 2000; Thomas & Zhang, 2005).

The process through which students are advantaged as a result of their K–12 experiences is an important interest of sociologists. The effects of ultracompetitive high school environments that many parents seek for their children have been scrutinized by Attewell (2001) and Espenshade, Hale, and Chung (2005). Attewell's analysis (also cited in our consideration at layer 2 of the model) suggested that these schools may penalize students given the probability that a high performing student will not be ranked at the top of the class due to intense academic competition. This “frog-pond” effect was revisited by Espenshade, Hale, and Chung (2005), who reaffirmed Attewell's (2001) findings—with the important qualification that the overall performance of students in these schools generally outweighs any disadvantage resulting from lower ranking due to the intensity of competition.

Alon and Tienda (2005) and Hurtado and Carter (1997) addressed issues of “fit” among minority and Latino students, respectively. Alon and Tienda (2005) developed a nuanced model to estimate the success rates of minority students attending highly selective institutions, and concluded that when modeled properly, the rates of success of minority and nonminority student at these institutions is the same. In contrast, Hurtado and Carter (1997) found that Latino students' sense of belonging on 4-year campuses after transfer from 2-year schools is not as strong as that of their peers who enrolled as native freshmen at the 4-year institutions.

While the majority of work in sociology addresses issues related to the process by which schools structure opportunities for success at the postsecondary level, a few studies examine program effectiveness within colleges. Two studies of interest have already been cited as examples of work addressing issues in layer 1 of our model. The first is Rau and Durand's (2000) examination of the academic work ethic and its relationship to academic performance. While the idea of an ethic clearly relates to layer 1, the study also provided insight to how colleges could

best foster this ethic on their campuses. Collier (2000) was concerned with the impact of capstone course experiences on the development of student identity, which is in turn linked to academic performance. Similar to Rau and Durand, Collier offered a consideration of what colleges might be able to do to make these programs effective on their campuses. Additional sociological work on program effects includes Deil-Amen and Rosenbaum's (2002) examination of "stigma free" remediation programs at 2-year colleges. Using a qualitative approach, they concluded that the stigma-free programs can work, sometimes too well. They note that some students failed to develop a realistic sense of their abilities and therefore held unrealistic expectations about their future academic opportunities. Regina and James (2004) examined differences between 2-year for-profit and not-for-profit schools programs in maximizing employment possibilities for their graduates. They concluded that community colleges could benefit from institutionalizing their employment processes in ways that are similar to their for-profit counterparts.

### **Economics**

School effects are an important domain of study in economics. Much of the economics literature in this layer addresses the role of years, type, and quality of education on subsequent indicators of student success. A review of literature published in top economics journals suggests three themes pertaining to the relationship between institutional characteristics and practices and the student success indicators: interplay between 2-year and 4-year institutions; economic returns to institutional characteristics; and the effects of institutional packaging of financial aid on retention and degree attainment.

Economists have devoted significant attention to understanding differences between and relationships among influences of 2- and 4-year institutions. The sub-baccalaureate labor market was the focus of Grubb (2002a, 2002b), who, through reviews and his own empirical analysis, concluded that while there is little effect of course taking by itself, there is a significant return to completion of sub-baccalaureate credentials in certain areas. Alfonso, Bailey, and Scott (2005), however, showed that "occupationally" oriented students are less likely to complete their degree programs and call attention to mission ambiguity in today's community colleges. Other researchers focused on the difference in returns among 2- and 4-year graduates (e.g., Kane & Rouse, 1995) concluding that, relative to high school graduates, an earnings premium exists at each level of attainment and, to a lesser degree, for those leaving college without a degree (Grubb, 2002a; U.S. Census Bureau, 2004).

The role of the 2-year school in determining aspirations, transfer behavior, and completion has been the focus of a number of researchers in the economics literature. Ehrenberg and Smith (2004) developed a useful evaluation scheme for states to use in determining the degree to which 4-year institutions graduate 2-year transfer students. Their framework calls attention to the role of the 2-year schools in academic preparation and the responsiveness of 4-year institutions to the needs of these transfer students. Leigh and Gill (2003, 2004) showed how 2-year schools enhance educational aspirations of their graduates and improve their probabilities of baccalaureate attainment. Taken together, Sandy, Gonzalez, and Hilmer (in press) and Gonzalez and Hilmer (in press) showed that 2-year colleges democratize opportunity and improve the likelihood of baccalaureate attainment for Hispanic students in particular. They explained the lower rates of baccalaureate attainment by students who transfer from 2-year institutions as a function of their propensity to transfer to lower quality 4-year institutions rather than because of inadequate preparation at the 2-year level (Gonzales & Hilmer, in press). Surette (2001) focused on gender differences in 2- to 4-year transfer, but failed to arrive at a plausible explanation for the persistently lower rate of transfer and completion among women than men.

While Kane and Rouse (1995) focused on 2- and 4-year rates of return, Arias and McMahon (2001) focused on an improved model for estimating private rates of return (which they claim have been seriously underestimated in most of the economics literature). Looking beyond direct wage benefits, Eide and colleagues (1998a, 1998b) considered the option value that more selective colleges confer on their graduates and argued that a sole focus on wage premiums obscures the larger picture of benefits accruing to graduates from more prestigious schools.

Pricing and the influence of financial constraint in attendance decisions and college choices has also received a great deal of attention in the economics literature. For example, financial constraint has been shown to play a lesser role in college choice at the application stage than students' sense of institutional fit (Toutkoushian, 2001). Analyzing application behavior, Toutkoushian concluded that students' sense of ability relative to that of the student body at colleges in a potential choice pool plays a larger role in deciding where to apply than does their sense of affordability. While a significant amount of work has been devoted to understanding the effects of financial aid and subsidies on student attendance patterns more broadly, the literature at layer 3 reveals interest in institutional behaviors relating to aid and subsidies that can influence student attendance. Singell (2004) and Kerkvliet and Nowell (2005), for example, examined the role of aid in persistence and arrived at different but not conflicting conclusions: aid matters, but its impact depends on the context of the institution and the degree to which students are influenced by their perceptions of opportunity costs.

#### **Layer 4—Social, Economic, and Policy Context**

The social, economic, and policy context recognizes that numerous external forces also influence student college choice, both directly and indirectly through other layers of context (Perna, 2006). Among the potentially influential forces are social conditions (e.g., societal norms), economic conditions (e.g., unemployment rate), and public policies (e.g., establishment of a new state-sponsored, non-need-based grant program).

#### **Education**

A small number of articles in educational journals illustrate the role of the policy context in shaping student success. Some research showed that aspects of such state public policies as tuition, financial aid, appropriations, and K–12 academic preparation are related to college access and choice (Heller, 1997, 1999; Perna & Titus, 2004), while other research showed that racial/ethnic stratification in college enrollment increased in one state despite the presence of various higher education policies (Perna, Steele, Woda, & Hibbert, 2005). K–12 educational reform, challenges to affirmative action, and changed student demographics appear to shape college admissions processes (Sireci, Zanetti, & Berger, 2003). While desegregation initiatives are typically associated with increased enrollment of Black students in predominantly White colleges, one study showed that desegregation initiatives and demographic changes appear to have contributed to greater enrollment of White than Black students at one historically Black college (Brown, 2002).

#### **Psychology**

Very few articles published in top psychology journals inform understanding of the contribution of the social, economic, and policy context to student success. One exception

(Davie, Spencer, Quinn, & Gerhardsetin, 2002) showed the role of the media in shaping student success, suggesting that by activating stereotype threat, stereotypic commercials contribute to lower math performance among women than men.

### **Sociology**

Sociological inquiry at layer 4 tends to focus on the structural forces behind larger societal inequities that may be related to higher education. Some of this work focuses on occupational gender segregation and its relationship to persistent gender bias in students' choice of major (e.g., Bradley 2000). Other work attempts to account for observed increases in women's participation in science and engineering fields. For example, Ramirez and Wotipka (2001) suggested that increased participation in science and engineering fields is simply a function of increased participation overall by women. More refined analyses of gender bias in occupations and earnings conclude that women's choices of major limit their occupational choices, and that women are more likely to find themselves in lower paying government and nonprofit jobs (Roska, 2005). Roska's (2005) work also showed that despite lower pay in these jobs, women tend to be more rapidly elevated than men to management positions.

### **Economics**

Economists have also made significant contributions to our understanding of issues connected to layer 4 of the model. Representative work addressed the role of state aid policies in college choice (Niu, Tienda, & Cortes, in press) and how education-related debt influences employment decisions (Minicozzi, 2005) and educational attainment (Monks, 2001). Supply and demand are dominant themes in work related to this layer. For example, supply and demand issues related to regulation and state appropriations for higher education present challenges for state struggles to maintain enrollment levels. Berger and Kostal (2002) argued that as demand inevitably declines when tuition increases, that states must choose between reducing supply through further reductions in appropriations or increasing regulation of colleges and universities. Additional research considered effects of public financing of K–12 schools (Deke, 2003) and the role of financial aid (Dynarski, 2002; Keane, 2002; Ichimura & Taber, 2002).

## **Implications of the Proposed Conceptual Model**

The persistence of socioeconomic, racial/ethnic, and gender gaps in many dimensions of success suggest that traditional approaches to understanding sources of such gaps are insufficient. The importance of identifying effective policies and practices for improving success and reducing gaps in success is underscored by projected demographic changes. In short, these projections suggest that the populations that will experience the greatest growth in the coming years will be the populations that currently experience the lowest levels of student success, i.e., students from low-income families and Hispanics (Western Interstate Commission on Higher Education (WICHE), 2005). Between 2001–02 and 2007–08, the representation of Hispanics among public school enrollments is expected to increase from 17 percent to 21 percent (WICHE, 2005).

Rather than identifying a panacea for raising student success for all students and reducing student success gaps among students, the proposed conceptual model offers a framework for working toward these goals. The framework offers a guide to the development, implementation,

and evaluation of policies and practices that are related to student success. While existing policies, practices, and research generally focus on discrete aspects of student success, the proposed conceptual model encourages policymakers, practitioners, and researchers to view any student success intervention or indicator as part of a broader and longitudinal student success process. The model also assumes that incorporating and drawing on multiple theoretical and methodological approaches results in a more complete understanding of the complexity of student success processes and indicators.

### **Recommendations for Policymakers and Practitioners**

The proposed conceptual model offers at least four suggestions for policymakers and practitioners who seek to improve success for all students and to reduce gaps in success among students. The suggestions offer guidance for the development and implementation of policy and practice.

First, policymakers and practitioners should recognize that policies and practices are enacted through multiple layers of context. Therefore, to reduce gaps in student success across groups, they need to acknowledge the limitations on success that may be imposed by a student's situated context. Clearly, the effectiveness of policies and practices depends on how these policies and practices are interpreted and enacted, as well as transmitted through various levels of context. The effectiveness of a particular policy or practice must be assessed in terms of the layers of context that inform the student's understanding of the program or policy and that encourage or limit students' participation. Thus, as reflected by the conceptual model, policymakers and practitioners must realize the tension between the roles of student agency and structure—that is, the ways in which the broader structure of social and educational opportunities shapes the range of options students view as realistic.

As an example, the federal government supports the student financial aid programs that are authorized by the Higher Education Act in an effort to increase student access to college (i.e., one indicator of student success). However, the programs' effectiveness in accomplishing this goal depends on the ways in which the programs are enacted through various levels of context. Students' use of federal financial aid is likely shaped not only by the availability of the aid, but also by the extent to which higher education institutions and schools provide information to the student about the availability of the aid (layer 3) (Perna, 2006). Students' use of federal financial aid is also likely shaped by the extent to which they and their families are able to gain access to information about financial aid (layers 1 and 2), and the extent to which students define college as a realistic option (layer 1) (Perna, 2006).

Second, policymakers and practitioners should develop and implement policies and programs that function in an interaction with other policies and programs and with characteristics of the schools, families, and students. Federal and state policymakers as well as K–12 and higher education leaders have developed numerous policies and programs that are all designed to address a particular aspect of student success. Typically policies and programs are developed individually, with little coordination among policies and programs. In addition, individual policies and programs are typically designed to address discrete indicators of student success.

A good example of the lack of coordination among policies with similar goals can be found in the efforts of some states to require that students pass a high-stakes examination as a requirement for high school graduation. Four-year colleges and universities typically require students to take a different test, such as the SAT or ACT, as a requirement for admission. The

structure and content of the high school exit exams and college entrance exams are typically developed in isolation. Both tests are designed to promote academic preparation and assess academic achievement. However, the lack of alignment or coordination of policies surrounding use of these exams means that students graduate from high school under a set of expectations that may be needlessly disconnected from the realities that most will experience in entering college—a disconnect that may in part explain the heavy subscription to remedial courses during the first year of college (Kirst & Venezia, 2004).

Third, policymakers and practitioners should also recognize that because multiple layers of context inform student success, no single approach to policy or practice will improve success for all students or reduce gaps in success among them. Policies and programs that recognize variations in the various layers of context are likely to be more effective than policies and programs that emphasize a one-size-fits-all approach.

As an example, research suggests that financial aid promotes college access and choice for many students. However, particular forms of financial aid, especially loans, are less effective in promoting college enrollment and choice for some groups of students than for others. More specifically, differences in use of loans to finance college costs appears to have contributed to lower enrollment rates for Hispanics and American Indians than for Whites (ECMC Group, 2003). African Americans, American Indians, and Hispanics are more likely than Whites to enroll in lower cost postsecondary educational institutions without borrowing even after controlling for socioeconomic characteristics (ECMC Group, 2003)

Finally, policymakers and practitioners should support a program of research that tests aspects of the conceptual model using multiple methods and drawing on multiple theoretical perspectives. Despite the large number of studies that examine various aspects of student success, our review of research identified few studies that used multiple units of analysis or theoretical perspectives. In addition, few articles included attention to understanding the contribution of multiple layers of context to the effectiveness of policies and programs.

### **Recommendations for Researchers**

This report demonstrates that knowledge of student success has been shaped by scholars in a range of disciplines. In many ways, this scholarship has been motivated by disciplinary interests in the psychological, social, and economic behaviors of students. Indeed, much of the research reviewed for this report focuses on student success indicators primarily as a means to test theories about broader relationships that occupy the attention of scholars in a particular field, with no more than a secondary interest in identifying practical ways to improve student success.

Therefore, although a rich corpus of research on student success exists, it has largely evolved in the context of specific disciplines that are interested in a much wider range of issues, and that utilize constructs that are less concrete than those that would readily promote a theory of student success or even a more policy-relevant understanding of student success indicators. Consider, for example, how scholars in different fields approach the issue of student persistence. Economists emphasize the roles of cost and benefits, price response, credit constraints, and labor market opportunities in shaping persistence behavior. Sociologists emphasize the relationship between ties to specific student reference groups and persistence, and variations in these relationships by race, class, and gender. Psychologists emphasize individual achievement motivation, self-efficacy, and the cognitive dimensions of academic performance that are presumed to inform persistence behavior. Each perspective approaches a specific student success

outcome (i.e., persistence) as a vehicle for better understanding concepts that are central to the particular discipline.

In order to provide the empirical foundation for developing policies and programs that promote student success, academic researchers must bridge the disconnect between their approaches and the needs of policymakers. Given the range of disciplinary approaches that are used and the applied nature of the research, researchers in the field of education are well-positioned to lead efforts that not only reflect the orientations of academic scholars but also address the need of policymakers to identify practical ways to improve student success.

This report offers a conceptual framework for guiding a systematic program of research on student success. Future research should examine the usefulness of the model for 1) bridging research and policy, 2) incorporating insights from a range of methodological approaches and sources of data, 3) understanding other indicators of student success, and 4) developing multi- and interdisciplinary approaches to understanding student success.

First, a primary purpose of future research should be to test the extent to which the proposed conceptual model can be used to develop and implement policies and practices that more effectively promote success for all students and reduce success gaps among students. While the conceptual model presented in this report was developed based on a review and synthesis of research, the model has yet to be tested empirically. Research is required to more fully specify, and then test, the relationships that operate within particular aspects of the model, including the contribution of each layer to student success and interactions within and between layers. For example, research should examine how multiple institutional policies and practices (e.g., remediation, financial aid, advising) together and uniquely promote particular aspects of student success. Research should also examine the ways in which federal financial aid policies (layer 4) are enacted by institutions (layer 3) to shape students' aspirations, enrollment, performance, and degree attainment (layer 1).

Second, future research should test the relationships identified in the proposed conceptual model using a range of methodological approaches and sources of data. The small share of qualitative studies identified in our research review should not be interpreted as a conclusion about the relative contributions of this method for understanding student success. Qualitative inquiry is essential to understanding the processes that link predictors of student success to various indicators of student success within particular contexts. Although qualitative research is often viewed as descriptive under the humanist or postmodernist traditions, this view neglects the long and critical evolution of qualitative inquiry and its role in the development of theory. In short, the inductive dimension of theory development "fundamentally depends on watching people in their own territory and interacting with them in their own language" (Kirk & Miller, 1986, p. 9). Less concerned with generalization, qualitative approaches are inherently valuable in situating relationships in native and often essential contexts. Used together to connect the inductive-deductive chain that informs good research, both qualitative and quantitative approaches will enhance our understanding of student success.

Qualitative inquiry may be effectively used, for example, to gain insight to the ways in which families with different cultural backgrounds promote college opportunity for their children. While exhaustive inventorying and detailing of the policies and programs aimed at encouraging college going can provide an accurate accounting of the programs that policymakers have put in place, the examination of such data does not capture the situated context in which students and their families view, understand, and use these programs. Qualitative research can serve as a powerful vehicle for understanding the field of forces that shapes intended users' understandings

of policies that are often created at a great distance from the location at which an influence is sought.

Third, future research in education should test the conceptual model using a broader range of student success indicators. The literature review for this report was limited to studies that examined a narrow set of indicators of student success. Nonetheless, attention to a wider range of indicators would likely enhance our understanding of processes that contribute to raising success for all students and reducing gaps in success among students. Future research should test the applicability of the conceptual model for understanding a range of student attitudes and orientations. For example, Collier (2000) finds that colleges can effectively promote their own version of an ideal college student identity through the development and implementation of senior year capstone courses. In a qualitative study, Grant and Breese (1997) conclude that among African American college students, an individual's personal construction of what it means to be marginal has a greater impact on personal satisfaction than the simple state of being marginal. Research should also examine the contribution of the conceptual model for understanding students' K–12 experiences and postsecondary educational experiences. Future research should also consider the usefulness of the conceptual model for examining other indicators of college readiness. The literature on academic tracking in high schools (e.g., Friedkin & Thomas, 1997; Lucas & Berends, 2002; Oakes & Guiton, 1995; Spade, Columa, & Vanfossen, 1997) generally suggests that tracking and ability grouping tend to be particularly problematic for the academic preparation of socioeconomically disadvantaged students.

Finally, research that tests the proposed conceptual model should draw on the disciplinary perspectives that were the basis for this report (i.e., education, psychology, sociology, and economics), as well as other disciplinary and theoretical perspectives. Although little existing research in top history and political science journals examines student success, application of perspectives derived from these disciplines may generate new insights. Moreover, future research should test the ways in which the model may be used to develop interdisciplinary perspectives for understanding student success.

Attempts to test multi- and interdisciplinary perspectives may be informed by efforts in other applied fields, including public administration. Like education, public administration draws on theoretical perspectives from other disciplines to examine problems and guide research. For example, framing the examination in terms of the contribution of educational attainment to earnings, one study in a top public administration journal shows that cognitive skills as measured in high school are related to earnings only indirectly through educational attainment (Murnane, Willett, Duhaldeborde, & Tyler, 2000).

Other articles published in top journals in public administration shed light on the influence on student success of the public policy context, particularly the availability of higher education, affirmative action policies, and state financial aid policies. For example, research shows that enrollment patterns are shaped, at least in part, by the characteristics of a state's higher education system, particularly the relative numbers of 2-year and 4-year institutions and tuition charged by these institutions (Rouse, 1998). Other research shows that affirmative action policies impact minority and majority students differently (Mumpower, Nath, & Stewart, 2002) and that policies that consider class rather than race/ethnicity result in a smaller number of admitted students who are racial/ethnic minorities (Cancian, 1998). Based on their examination of the Georgia HOPE scholarship program, Henry and Rubenstein (2002) concluded that the availability of this merit-based state-aid was associated with higher academic preparation of students during high school and a lower gap in academic achievement between African American and White high school students.

Although well-positioned to adopt interdisciplinary approaches to research on student success, educational researchers must overcome at least two challenges to these approaches. First, educational researchers draw on theories and methods from a wide variety of academic disciplines, but most continue to examine student success indicators from a particular disciplinary orientation. Compared with research in other disciplines, educational research is more outcome than theory focused. However, even in educational research, student success studies are still generally constrained by underlying disciplinary orientations.

A second challenge for interdisciplinary research on student success is that such research is generally less intellectually coherent than research that draws on theories and perspectives from one discipline. Conducting interdisciplinary research requires understanding the varied intellectual motivations of each discipline.

Research that successfully overcomes the challenges to interdisciplinarity will likely yield important insights into the problem of student success. This report shows that the knowledge base for student success consists largely of a collection of disconnected disciplinary inquiries that do not systematically canvas the range of issues and perspectives that perhaps could be more completely and comprehensively inform student success. Moreover, the model suggests that a singular disciplinary approach provides intellectual coherence at the expense of a reductionism that tends to artificially force a reality on the educational context in which success outcomes can be best understood. It would seem that by relaxing the often unrealistic assumptions and constraints that define the coherence of the disciplines, we can achieve a more comprehensive and policy-relevant understanding of student success.

## **Conclusion**

Through a review and critique of research in four disciplines, this report develops a conceptual model to guide policymakers, practitioners, and researchers in their efforts to reduce gaps in student success across racial/ethnic and socioeconomic groups. The model suggests that closing gaps in student success requires recognizing that 1) student success is a longitudinal process; 2) multiple theoretical approaches inform understanding of student success; 3) student success is shaped by multiple levels of context; 4) the relative contribution of different disciplinary and area perspectives to understanding student success varies; 5) multiple methodological approaches contribute to knowledge of student success; and 6) student success processes vary across groups. By recognizing these characteristics, policymakers, practitioners, and researchers will identify more effective approaches to improving student success for all students and reduce gaps in success across groups.

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## APPENDIX A: LITERATURE REVIEW

Other observers have noted the lack of attention to student success by certain disciplines, such as history and political science. In his review of the history literature for the SSRC project, Gelber (2004, p. 2) wrote that, “close-grained historical studies of student experience are still relatively few and far between” and that “[h]istorians generally have not used preparation, access, finance, and completion, or ‘transitions’ as their central lenses for the analysis of higher education.” Similarly, Fogg-Davis (2004, p. 4) wrote in his SSRC review that research in political science focuses on elementary and secondary school preparation, with little attention to “issues of access to postsecondary education, financial considerations, and retention leading to graduation and career launch.” With their attention to societal forces and structures, lenses drawn from history and political science would likely enhance understanding of differences in student success across groups. Nonetheless, the absence of research published in the top journals in these disciplines limits our ability to incorporate these perspectives into our proposed conceptual model and suggests that these disciplines place low priority on the examination of these outcomes.

We limited the review to articles published in top journals for several reasons. First, we assume that the articles in these journals represent the topics, theoretical perspectives, and methodological approaches on which there is the greatest agreement among scholars in the field. Second, because we are not trained in all disciplines, we wanted to apply a uniform and systematic set of procedures for selecting articles to include. Finally, attention only to the top journals limits the scope of the review, increasing its manageability.

As with all selection criteria, however, these criteria necessarily exclude a substantial share of the research. Most importantly, this review likely underestimates the contribution of “minority” viewpoints, i.e., topics, theoretical perspectives, and methodological approaches that are outside the disciplinary mainstream and less widely embraced.

Tables 1 and 2 list the journals in each discipline that we reviewed for relevant articles. We examined journal articles on each of these indicators that were published between January 1, 1995, and June 30, 2005. We identified these top journals using several approaches. First, we used the ISI *2003 Journal Citation Reports, Social Sciences Edition* to identify journals with both the highest numbers of citations and highest “impact factors.” The *Journal Citation Reports* define the “impact factor” as the ratio of the number of citations in 2003 to articles published in 2001 and 2002 relative to the total number of articles published in 2001 and 2002.

**Table 1. Top journals by discipline, as measured by citations and impact factor: 2003**

Discipline	Journal	Citations	Rank	Impact factor	Rank	Recognized by other source
Education	<i>Review of Educational Research</i>	1,323	1	1.69	1	O'Brien (2001)
	<i>American Educational Research Journal</i>	1,175	3	1.64	2	O'Brien (2001)
Psychology, Educational	<i>Child Development</i>	12,358	1	3.32	1	Burgard (2001)
	<i>Journal of Educational Psychology</i>	3,892	2	1.52	9	O'Brien (2001)
	<i>Journal of Counseling Psychology</i>	2,084	3	1.54	8	Burgard (2001)
Psychology, Applied	<i>Journal of Applied Psychology</i>	7,246	1	2.17	1	Burgard (2001)
	<i>Organizational Behavior and Human Decision Processes</i>	3,124	2	1.43	9	Burgard (2001)
Psychology, Developmental	<i>Child Development</i>	12,358	1	3.32	4	Burgard (2001)
	<i>Developmental Psychology</i>	7,520	3	3.32	8	Burgard (2001)
Psychology, Social	<i>Journal of Personality and Social Psychology</i>	25,072	1	3.86	2	Burgard (2001)
	<i>Personality and Social Psychology Bulletin</i>	4,101	2	1.84	8	Burgard (2001)
Sociology	<i>American Sociological Review</i>	5,607	1	2.38	2	Garand & Giles (2003)
	<i>American Journal of Sociology</i>	4,980	2	2.33	3	Garand & Giles (2003)
	<i>Annual Review of Sociology</i>	1,651	5	3.21	1	
Economics	<i>American Economic Review</i>	11,935	1	1.94	8	Garand & Giles (2003)
	<i>Econometrica</i>	9,775	2	2.22	10	

Source: Analyses of ISI Web of Knowledge (2003).

**Table 2. Journals that specialize in higher education by number of citations and impact factor: 2003**

Discipline	Journal	Citations	Rank	Impact factor	Rank	Recognized by other source
Education	<i>Journal of Higher Education</i>	400	22	0.38	51	O'Brien (2001)
	<i>Review of Higher Education</i>	169	59	0.39	49	O'Brien (2001)
Sociology	<i>Sociology of Education</i>	728	11	1.05	14	O'Brien (2001)
Economics	<i>Economics of Education Review</i>	407	73	0.47	97	

Source: Analyses of ISI Web of Knowledge (2003).

Second, because citations are an imperfect method of assessing journal quality, we also consulted articles that discuss the relative importance of journals in different fields. In most cases, these articles confirmed our selection. For example, in education, the *Review of Educational Research* and the *American Educational Research Journal* have higher numbers of citations and impact factors than virtually any other journal in education or educational research (ISI Web of Knowledge, 2003). Similarly, O'Brien (2001) labels the *American Educational Research Journal* and the *Review of Educational Research* as “journal[s] of the century” in educational research.

We also examined articles published on student success in two journals that focus specifically on education (*Economics of Education Review* and *Sociology of Education*), as well as two journals that focus specifically on higher education (*Journal of Higher Education* and *Review of Higher Education*). Although these specialized journals have lower numbers of citations and lower impact factors than the top disciplinary journals (see table 2), other sources recognize the contribution of these publications. For example, in her review of “journals of the century in education,” O'Brien (2001) concluded that the *Journal of Higher Education* is “a key journal for providing scholarly research and practice papers related to postsecondary education” (p. 97) and that the *Review of Higher Education* “provides a respected forum for essays, articles, and reviews” (pp. 97–98).

### Characteristics of the Literature on Student Success

At least six conclusions can be drawn from our review of work in these fields that is relevant to student success:

- The relative attention to student success in articles published in top journals varies across the disciplines we examined.
- Even within disciplines, there exists variation on the aspects of student success examined.

- A wide variety of theoretical approaches to understanding student success exist, and they vary by disciplinary perspective.
- Methodological approaches and sources of data for exploring student success also vary and, as one might expect, are somewhat tightly bound to the theoretical stance employed.
- The unit of analysis varies by disciplinary and theoretical approach.
- Attention to differences in student success across groups varies across the areas we examine.

**Variations in Attention to Student Success**

Attention to student success, as measured by the frequency of relevant articles published in top journals, varies across disciplines. Table 3 shows the number of articles in each journal, in each discipline, that examined an indicator of student success between January 1, 1995, and June 30, 2005. Clearly, the number of relevant articles varies across disciplines, ranging from 24 in sociology, to 50 in economics and 56 in psychology, to 62 in education.

**Table 3. Number of articles that examined an indicator of student success published in top journals between January 1, 1995, and June 30, 2005**

Discipline	Journal	Number of articles
Education	<u>Total</u>	<u>62</u>
	<i>American Educational Research Journal</i>	5
	<i>Journal of Higher Education</i>	24
	<i>Review of Educational Research</i>	6
	<i>Review of Higher Education</i>	27
Psychology	<u>Total</u>	<u>56</u>
	Applied Psychology	
	<i>Journal of Applied Psychology</i>	7
Developmental Psychology	<i>Organizational Behavior &amp; Human Decision Processes</i>	0
	<i>Child Development</i>	3
	<i>Developmental Psychology</i>	4
Educational Psychology	<i>Journal of Counseling Psychology</i>	5
	<i>Journal of Educational Psychology</i>	17
Social Psychology	<i>Journal of Personality and Social Psychology</i>	16
	<i>Personality and Social Psychology Bulletin</i>	4
Sociology	<u>Total</u>	<u>24</u>
	<i>American Journal of Sociology</i>	0
	<i>Annual Review of Sociology</i>	2
	<i>American Sociological Review</i>	2
	<i>Sociology of Education</i>	20

**Table 3. Number of articles that examined an indicator of student success published in top journals between January 1, 1995, and June 30, 2005—Continued**

Discipline	Journal	Number of articles
Economics	<u>Total</u>	<u>50</u>
	<i>American Economic Review</i>	4
	<i>Econometrica</i>	1
	<i>Economics of Education Review</i>	45

Attention to the 10 student success indicators varies not only across the 4 disciplines but also within each discipline. In education, the ten student success indicators are a more common focus of the *Review of Higher Education* (27 articles) and *Journal of Higher Education* (24 articles) than of the *Review of Educational Research* (6 articles) and *American Educational Research Journal* (5 articles). In psychology, two of the eight journals reviewed account for a disproportionate share of the 56 total articles: *Journal of Educational Psychology* (17 articles) and *Journal of Personality and Social Psychology* (16 articles). Relatively few of the articles published in the applied psychology journals or the developmental psychology journals (7 each) examine the student success indicators. Of the four journals in sociology, *Sociology of Education* accounts for 20 of the 24 articles on student success indicators published over this time period. Nearly all of the economics articles are from one of the three journals reviewed, *Economics of Education Review* (45 of the 50 articles in economics).

### Variations in Aspects of Student Success Examined

A review of the literature published in top journals also reveals variation in relative attention to different aspects of student success. Together, articles in different disciplines and areas cover the range of student success indicators that mark students' success through the four transitions, from college readiness to college entrance, college achievement, and post-college attainment transitions.

The most frequently examined student success indicator in the literature we reviewed for this report is academic performance during college (70 articles), followed by college access and enrollment (39 articles), and persistence or degree completion (32 articles) (table 4 – note that because some articles examine more than a single outcome, the totals in table 4 may exceed the number of articles identified in table 3). Academic performance is a particularly common indicator in psychology journals. Forty of the 70 articles examining academic performance are in psychology journals. Education journals also include substantial attention to academic performance in college (21 articles), while sociology (6 articles) and economics (3 articles) include relatively little attention to this indicator.

College access or enrollment is the most common student success indicator in economics (16 articles) and sociology (11 articles) journals. Income or earnings is the second most common indicator in economics journals (11 articles). Persistence, the third most frequently examined indicator, is a relatively more common area of interest in education (15 articles) and economics (10 articles) than in other disciplines.

**Table 4. Student success outcomes examined in articles in top journals in various disciplines between January 1, 1995, and June 30, 2005**

Outcome	Discipline	Number of articles
Academic preparation for college	<u>Total</u>	<u>9</u>
	Education	1
	Psychology	5
	Sociology	0
	Economics	3
Educational aspirations	<u>Total</u>	<u>21</u>
	Education	9
	Psychology	6
	Sociology	2
	Economics	4
College access or enrollment	<u>Total</u>	<u>39</u>
	Education	11
	Psychology	1
	Sociology	11
	Economics	16
College choice	<u>Total</u>	<u>14</u>
	Education	7
	Psychology	1
	Sociology	1
	Economics	5
Academic performance	<u>Total</u>	<u>70</u>
	Education	21
	Psychology	40
	Sociology	6
	Economics	3
Persistence/degree completion	<u>Total</u>	<u>32</u>
	Education	15
	Psychology	4
	Sociology	3
	Economics	10
Graduate school enrollment	<u>Total</u>	<u>15</u>
	Education	10
	Psychology	0
	Sociology	2
	Economics	3

**Table 4. Student success outcomes examined in articles in top journals in various disciplines between January 1, 1995, and June 30, 2005—Continued**

Outcome	Discipline	Number of articles
Income or earnings	<u>Total</u>	<u>17</u>
	Education	2
	Psychology	0
	Sociology	4
	Economics	11
Educational attainment	<u>Total</u>	<u>9</u>
	Education	0
	Psychology	2
	Sociology	5
	Economics	2

**Variations in Theoretical Approaches to Student Success**

Each discipline offers a distinct array of theoretical approaches to understanding student success. Table 5 summarizes the relative prevalence of different theoretical approaches in the four disciplines (note that because some articles employ multiple theoretical approaches, the totals in table 5 may exceed the number of articles identified in table 3).

**Table 5. Theoretical perspectives used to examine student success in articles in top journals in various disciplines**

Discipline	Theories and constructs	Number of articles
Education	Economic:	
	Economic model of determinants of income	1
	Economic theories of public sector	1
	Expected utility	1
	Human capital	2
	Sociological:	
	Habitus and cultural capital	7
	Bourdieuian field analysis	1
	Network	1
	Psychological:	
	Cognition and meta-cognition	1
	Motivation and cognition	2
	Predictive validity	1
	Self-efficacy	1
	Social cognitive theory of self-regulation	1

**Table 5. Theoretical perspectives used to examine student success in articles in top journals in various disciplines—Continued**

Discipline	Theories and constructs	Number of articles
	Public policy:	
	Affirmative action rationales	1
	Multiple theories	
	Human capital + social and cultural capital	3
	Human capital + consumer theory	2
	Conceptual models	
	3-phase model of college choice	2
	I-E-O	2
	Involvement "theory"	1
	Tinto's model of student departure	8
	Tipping point theory	1
	Weidmann's socialization model	1
	Bean social integration model	2
	No theory articulated	25
Psychology	Achievement motivation and goal theory	12
	Stereotype threat	11
	Parenting practices & relationships	6
	Personality traits (Big Five, self-efficacy)	2
	Control (perceived academic control, control-mastery, self-determination)	3
	Perceived social/cultural context	2
	Psychopathology, stress, test anxiety	3
	Cognitive theories	5
	Attributional style	1
	Hope theory	1
	Interpersonal competence	1
	Self-enhancement bias	1
	Social comparisons	1
	Social dominance theory	1
	Test/construct validity	1

**Table 5. Theoretical perspectives used to examine student success in articles in top journals in various disciplines—Continued**

Discipline	Theories and constructs	Number of articles
	Tinto's model of academic and social integration	1
	Other (including not articulated)	4
Sociology	Cultural reproduction (capital)	10
	Human capital	2
	Status attainment	7
	Social network	2
	Marginality theory	1
	Symbolic interaction	1
	Self-efficacy	1
Economics	Human capital theory	32
	Consumer theory	7
	Economic – broadly	17

### Education

Not surprisingly, journal articles in education draw on theoretical perspectives from various disciplines, particularly sociology (9 of 68 articles). Smaller numbers draw on psychological theories (6 articles) and economic theories (5 articles). The most common sociological perspectives used in educational journals draw on notions of cultural capital (7 of the 9 articles), while the most common economic perspectives employ human capital theory (2 of the 5 articles), and the most common psychological perspectives involve aspects of cognitive theories (4 of 6 articles). Twenty-five articles in educational journals do not articulate a guiding theoretical perspective.

A theory is a “system for explaining a set of phenomena by specifying constructs and the laws that relate these constructs to each other” (Borg & Gall, 1989, p. 25), while a conceptual model is a specification derived from a body of research about the relationships among variables. Likely reflecting the applied nature of the field, a notable share of articles published in education journals utilizes a conceptual model rather than a theoretical approach (17 articles).

A small number of articles published in education journals draw on a conceptual model that reflects multiple theoretical perspectives. Focused on indicators of student college choice, these studies stress the strengths of conceptual models that incorporate aspects of both economic human capital models and sociological notions of cultural and social capital (e.g., Freeman, 1997; Perna, 2000, 2004). These models assume that students’ educational decisions are determined, at least in part, by their habitus, or the system of values and beliefs that shapes an individual's views and interpretations (Paulsen & St. John, 2002; Perna, 2000, 2004; St. John, Paulsen & Carter, 2005).

Both qualitative and quantitative research demonstrates the merits of using an integrated conceptual model for examining enrollment decisions. Freeman's (1997) qualitative study revealed that African American high school students believe that both economic and sociocultural factors restrict the college enrollment of African Americans. Specifically, Freeman found that African American high school students were uncertain about their ability to pay the short-term costs of attending and about whether the long-term economic benefits of attending would exceed the costs—the elements of a human capital investment model. Interviewees also pointed to the potential influence of structural barriers (e.g., physical conditions of the schools attended by African Americans), social capital (e.g., interest and assistance from teachers and counselors, African American role models), and cultural capital (e.g., believing at an early age that pursuing postsecondary education is a realistic option).

By reflecting differences in expectations, preferences, tastes, and certainty about higher education investment decisions, measures of social and cultural capital appear to be particularly important for understanding differences across groups in college enrollment decisions that are not explained by human capital investment models. Using logistic regression analyses of data from the National Educational Longitudinal Study (NELS), Perna (2000) found that measures of social and cultural capital, such as parental involvement, parents' expectations for the child's education, encouragement from school personnel, and college-going rates for students attending the same high school, improved the explanatory power of a traditional econometric model of college enrollment that included only measures of gender, race, financial resources, and academic preparation and achievement. Moreover, measures of cultural and social capital played a relatively more important role in explaining the college enrollment decisions of African Americans and Hispanics than of Whites (Perna, 2000).

## **Psychology**

As a discipline, psychology comprises many subfields and specialties, including applied, developmental, educational, and social. In general, psychologists are interested in understanding the influences on student success of cognitive processes and attitudes. Table 5 shows that the most common theoretical perspectives for informing psychological examinations of student success are achievement/motivation and goal theory (12 articles) and stereotype threat (11 articles).

A substantial share of psychology articles adopts an achievement/motivation or goal theory approach. This perspective generally assumes that academic performance is influenced by students' achievement goals, and that achievement goals are a product of personality traits, particularly achievement motivations. The two primary types of achievement goals are mastery/work goals and performance/competitiveness goals, although some researchers also consider performance avoidance/fear of failure goals. Achievement/motivation theories generally assume, and research generally shows, that students who are motivated to master or learn material tend to adopt mastery goals, while students who are motivated to demonstrate competence or better achievement than their peers adopt performance goals (e.g., Harackiewicz, Barron, Tauer, Carter, & Elliot, 2000; Harackiewicz, Barron, Tauer, & Elliot, 2002). Students who fear failure tend to adopt performance avoidance goals, whereby they exert minimal effort to complete requirements.

## Sociology

While including attention to a number of theoretical perspectives, a plurality of sociology journal articles address cultural reproduction theories (10 of 24 articles) (table 5). While the field of social psychology and work in the area of symbolic interaction oftentimes consider cognitive processes that inform human behavior, these perspectives are considered in only a small number of articles on student success in our review (1 on symbolic interaction; 1 on marginality theory).

Theories of cultural reproduction focus on the ways that familial and class advantage are transferred from generation to generation, thus strengthening advantages enjoyed by previous generations and further stratifying the broader society. Strictly considered, cultural reproduction models treat social class as a primary determinant of children's future status and often cast education as a means by which existing class structures are reinforced rather than relaxed. For example, reproductionists point out that poor children are more likely to be systematically exposed to educational experiences that shape their expectations and behaviors in ways that prepare them for lower status occupations than their more affluent peers who receive qualitatively different (i.e., superior) educational training and community support. Some of the most highly regarded sociologists (e.g., Coleman, et al. 1966) have devoted significant attention to the role of education in social stratification and occupational attainment processes. Despite the prevalence of reproductive frameworks in this research, the vast majority of contemporary studies in sociology journals affirm the democratizing effect of education—that is, most of the published work either assumes that education can overcome class constraints or explicitly models the ways in which this process occurs for students at different positions in the class structure. Most research we reviewed implicitly acknowledges advantages associated with educational attainment.

Undergirding much of the evolution in sociological thinking about the role of the family is the work of French sociologists Jean-Claude Passeron and Pierre Bourdieu. Their seminal *Cultural Reproduction and Social Reproduction* (1973) developed the idea of cultural capital—forms of skill, knowledge, or education, that give advantage vis-à-vis higher status in society—and cultural reproduction, the process through which social status is passed on through generations. Passeron and Bourdieu argued that education played a critical role in the transmission of generational advantage and disadvantage. While this work is outside the scope of our analysis, it exemplifies one of the more popular approaches to understanding variance in student success outcomes.

An element of sociological theories about the role of the family in student success is habitus, or the “system of lasting, transposable dispositions which, integrating past experiences and actions, functions at every moment as a matrix of perceptions, appreciations, and actions” (Bourdieu, 1973, p. 83). Bourdieu advanced the idea that more could be learned from understanding the unique elements of the process forming students' predispositions and aspirations (which, in turn, then inform perceptions and behaviors) than can be determined by simply examining those predispositions and actions directly. Focusing on gender differences in K–12 cocurricular engagement, Dumais (2002) provided a good example of the ways in which family environments influence the school activities that are directly related to college-going.

While the education literature includes invocations of the habitus concept, the absence of direct references to this construct in the sociological literature likely reflects at least two major concerns. First, as Dumais (2002) and Kingston (2001) pointed out, the concept of habitus is ill-defined theoretically, thereby limiting proper measurement. Second, and perhaps more problematically, many have questioned the applicability of the concept of cultural capital in the

United States—a nation-state decidedly less class-based than France of the 1960s (see Lamont & Lareau (1988) for a critique on this dimension).

More common in sociology are articles that draw from a more generalized version of cultural reproduction (e.g., Karen, 2002; Schleef, 2000). Schleef (2000) highlighted the importance of parental occupational status and the transmission of associated values to maintaining cross-generational social status. Karen (2002) illuminated the contribution of family and cultural influences to the quality of students' college choice sets. Both Schleef and Karen demonstrated the importance of family to educational attainment and maintenance of social class position.

### **Economics**

When examining the 10 indicators of student success, neoclassical economists generally focus on understanding the ways that individuals allocate resources to maximize their interests, and accordingly, the most common economic perspectives for understanding student success draw on human capital theory (32 of the 56 economics articles) (table 5). A smaller number of articles (7) address consumer theory. While behavioral economists attend to the cognitive and emotional elements of decisionmaking, few economics articles utilize these perspectives to examine student success. Most economists working with success indicators rely on assumptions found in rational choice theory—assumptions that obviate direct examinations of the underlying cognitive dimensions of individuals' choices.

The microeconomic theory framing much of the work on student success indicators assumes the existence of rational actors who can identify a range of outcomes and associate each with a value (e.g., money, time). Debate exists among economists about this assumption of actor rationality, as shown by a cursory review of the literature on bounded rationality, for example (e.g., Simon, 1957; March, 1994; Elster, 1983; Gigerenzer & Selton, 2001).

Consumer theory deals with the ways that economic agents (e.g., students) prioritize, and ultimately choose between, real or imagined alternatives. These choices involve economic concepts of indifference and budget constraint, income, and availability of substitutes. Consumer theory is often used in research that examines the relationship between affordability and such indicators of student success as enrollment and persistence (e.g., Siegfried & Getz, 2006).

Human capital theory is frequently used to guide economic inquiry focusing on the private economic returns to education (e.g., Averett & Burton, 1996; Monks, 1997). Almost universally attributed to Becker (1993) and Mincer (1974), the human capital theory assumes that when individuals make investments in their stock of skills, they will be rewarded in the labor market.

Although a dominant frame in much of the literature in economics, human capital has several weaknesses for examinations of indicators of student success. First, the traditional human capital framework relies on signals such as educational credentials to provide employers with a gauge of an individual's potential value. Such signals have been shown to be loosely coupled with the general and specific knowledge assumed to be valued by employers (Becker, 1993). Second, traditional human capital theory ignores market imperfections that are manifest in realities such as race and gender discrimination (Leontaridi, 1998). A third challenge for this rational-actor model in economics concerns the availability of information in decisionmaking (Gintis, 1978). Little direct attention to these issues is paid in the economics literature on student success indicators.

**Variations in Methodological Approaches and Sources of Data**

Regardless of discipline, the most common methodological approach in articles examining student success is quantitative rather than qualitative. Of 192 articles identified in table 3, only 10 utilized qualitative methodologies and 11 articles were literature reviews, and another 175 articles that used quantitative methodologies (table 6 – note that because some articles employ multiple methods the totals in table 6 may exceed the number of articles identified in table 3). Qualitative methodologies are relatively more common in education (5 of 62 education articles identified in table 3) and sociology (4 of 24 sociology articles in table 3) than in psychology (1 of the 56 psychology articles in table 3) and economics (none of 50 economics articles in table 3).

**Table 6. Methodological approaches to student success in articles in top journals in various disciplines**

Method	Discipline	Number of articles
Descriptive	<u>Total</u>	<u>9</u>
	Education	4
	Psychology	5
	Sociology	0
	Economics	0
Correlational	<u>Total</u>	<u>149</u>
	Education	50
	Psychology	35
	Sociology	16
	Economics	48
Causal/experimental	<u>Total</u>	<u>17</u>
	Education	1
	Psychology	15*
	Sociology	0
	Economics	1
Qualitative	<u>Total</u>	<u>10</u>
	Education	5
	Psychology	1
	Sociology	4
	Economics	0
Literature review	<u>Total</u>	<u>11</u>
	Education	6
	Psychology	0
	Sociology	4
	Economics	1

\*Five of the psychology articles in this category include at least two studies, at least one that uses experimental design and one that uses a correlation design.

Quantitative methodologies may be classified into three paradigms: descriptive, correlation, and causal. The most common quantitative research design in research examining student success is correlational, involving such analytic techniques as regression analyses, path analyses, and structural equation modeling. Across the four disciplines, 149 of 192 articles used correlational designs (table 6). Correlational designs are especially common in articles published in education journals (50 of 62 articles), sociology journals (16 of 24 articles), and economics journals (48 of 50 articles). A smaller share of articles in psychology used correlational designs (35 of 56 articles).

Within the correlational paradigm are quantitative studies that are concerned with particular statistical issues. For example, a small number of the psychology articles focused on assessing the psychometric properties of measures, including measures of biographical data (Oswald, Schmitt, Kim, Ramsay, & Gillespie, 2004) and race-based rejection sensitivity (Mendoza-Denton, Downey, Purdie, Davis, & Pietrzak, 2002). In economics, four articles focused on improving statistical estimations of relationships driving indicators of student success. These economics articles demonstrate the implications of failing to statistically address such issues as self-selection (e.g., Arias & McMahon, 2001; Ichimura & Taber, 2002).

Experimental designs, i.e., designs that generate conclusions about causal relationships, are relatively common among articles published in psychology journals but rare in journals in other disciplines. Table 6 shows that 15 of the 56 articles in psychology use experimental designs. A notable share of articles in psychology journals include two or three studies, including five articles with at least one study using a correlational design and one using an experimental design (Barron & Harackiewicz, 2001; Brown et al., 2000; Cullen, Hardison & Sackett, 2004; Ford, Ferguson, Brooks, & Hagadone, 2004; Robins & Beer, 2001). In contrast with the relative prevalence in psychology, only one article in education (Nagda, Gregerman, Jonides, von Hippel, & Lerner, 1998) used an experimental design with random assignment of students to treatment and control conditions. A single quasi-experimental design was identified in the economics literature (Dynarski, 2002). None of the articles in the sociology journals in our review employed an experimental design.

Reflecting the range of research designs, the sources of data also vary across the four disciplines. Consistent with the applied nature of the field, articles in education journals generally draw on a broader range of sources of data than articles in psychology, sociology, and economics. Educational research includes use of the large-scale national datasets that are sponsored by the U. S. Department of Education (e.g., National Educational Longitudinal Survey of 1988 eighth graders, Beginning Postsecondary Student Survey, Baccalaureate & Beyond), as well as the Cooperative Institutional Research Program (CIRP) that is sponsored by UCLA's Higher Education Research Initiative. Other studies utilize data from IPEDS, other multi-institutional samples (e.g., Pascarella, Pierson, et al., 2004), and state systems of higher education. A smaller number of quantitative studies draw on data from a single institution, while qualitative studies utilize purposively selected samples of students (e.g., Freeman, 1999; Fries-Britt & Turner, 2002).

Psychology articles tend to use data from students attending a single institution, with a substantial share of studies drawing data from students enrolled in sections of one course (e.g., introductory psychology). One article in psychology involved testing hypotheses about gender differences in the relationship between spatial skills and mathematics performance using four different samples of students (Casey, Nuttall, Pezaris, & Benbow, 1995). A smaller number of psychology studies utilized multi-institutional but not national samples, such as African American students attending four public high schools in one school district (Chavous et al., 2003), students

attending high schools in California and Wisconsin (Glasgow et al., 1997), and students (along with their SAT and college grade data) attending 13 institutions (Cullen, Hardison, & Sackett, 2004).

In sociology and economics, virtually all studies capitalize on the availability of data from a small number of national surveys of students. Among the most common sources of data in both sociology and economics journal articles are national datasets that are sponsored by the U.S. Department of Education, particularly the Beginning Postsecondary Student Survey, National Educational Longitudinal Study of 1988 eighth graders, and High School and Beyond. A smaller share of studies draws on data from the National Longitudinal Study of Youth, the Panel Study of Income Dynamics, and the Current Population Survey.

When appropriately weighted, national datasets provide information about nationally representative samples of students. Explicit attention to issues of weighting and sample design varied across the areas we reviewed. Articles in sociology and economics were more attentive to explicit consideration of weighting issues than was the research using secondary data in education. Sample design issues, including side effects of using large-scale secondary datasets, were rarely addressed in the literature that we reviewed (see Thomas & Heck, 2002, or Stapleton & Thomas, forthcoming, for an overview of possible biases associated with sampling).

While relatively uncommon in sociological journals, a notable share of articles in economics journals used institutional data. For example, Ehrenberg and Smith (2004) used data from the higher education system in the state of New York, Singell (2004) used data from Oregon colleges, and Kerkvliet and Nowell (2005) used data from institutions in Oregon and Utah. While providing more limited generalizability, institutional data may enable greater precision in model specification and greater depth of variables than national data.

### **Variations Across Disciplines in the Unit of Analysis**

In research examining the 10 student success indicators, the vast majority of the articles in education (55 of 62 education articles identified in table 3), psychology (56 of 56 articles), sociology (20 of 24 articles), and economics (46 of 50 articles) used the student as the unit of analysis (table 7— note that because some articles examine more than one unit of analysis the totals in table 7 may exceed the number of articles identified in table 3).

While all of the psychology articles used the student as the unit of analysis, a small number of articles in other disciplines utilize units of analysis other than the student. Table 7 shows that one education article and two economics articles used the institution as the unit of analysis, while one education article and one economics article used the state as the unit of analysis. One article in education used multiple units of analysis (i.e., student and state). Perna and Titus (2004) used multilevel analyses to account for the inclusion of both the student and the state as units of analysis and found that measures of four types of state public policies (direct appropriations to higher education institutions, tuition, financial aid to students, and elementary and secondary education) were related to the college enrollment patterns of 1992 high school graduates.

**Table 7. Unit of analysis in articles in top journals in various disciplines**

Unit	Discipline	Number of articles
Student	<u>Total</u>	<u>177</u>
	Education	55
	Psychology	56
	Sociology	20
	Economics	46
Institution	<u>Total</u>	<u>3</u>
	Education	1
	Psychology	0
	Sociology	0
	Economics	2
State	<u>Total</u>	<u>2</u>
	Education	1
	Psychology	0
	Sociology	0
	Economics	1
Study	<u>Total</u>	<u>10</u>
	Education	5
	Psychology	0
	Sociology	4
	Economics	1
Multiple	<u>Total</u>	<u>3</u>
	Education	1
	Psychology	0
	Sociology	1
	Economics	1

**Variations in Attention to Differences Across Groups**

Articles in top journals also vary across disciplines in terms of their relative attention to understanding differences in student success across groups, and the level of attention devoted to different groups. Attention to variations in student success across groups is relatively common in education articles, with 61 examinations of subgroup differences (table 8 – note that because some articles address differences across in more than one area the totals in table 8 may exceed the number of articles identified in table 3). Education articles include roughly equal levels of attention to differences in student success by gender (13 articles), race/ethnicity (18 articles), socioeconomic status (17 articles), and institutional type (13 articles).

**Table 8. Attention to differences across groups in articles published in top journals in various disciplines**

Group	Discipline	Number of articles
Gender	<u>Total</u>	<u>53</u>
	Education	13
	Psychology	22
	Sociology	9
	Economics	9
Race/ethnicity	<u>Total</u>	<u>49</u>
	Education	18
	Psychology	9
	Sociology	10
	Economics	12
Socioeconomic status	<u>Total</u>	<u>51</u>
	Education	17
	Psychology	0
	Sociology	16
	Economics	18
Institution	<u>Total</u>	<u>35</u>
	Education	13
	Psychology	0
	Sociology	6
	Economics	16

Across all four disciplines, gender, socioeconomic status, and race/ethnicity are the most common foci of subgroup examinations, as gender differences were examined in 53 articles, socioeconomic status in 51 articles, and race/ethnicity in 49 articles. Psychology articles account for nearly half of the examinations of differences in student success by gender (22 of 53 articles addressing gender differences). Of the 31 psychology articles that included examinations of group differences, 22 focused on gender differences and the remaining 9 focused on differences across racial/ethnic groups.

Although none of the psychology articles examined differences by socioeconomic status, socioeconomic status differences were a focus in 17 education articles, 16 sociology articles, and 18 economics articles. Differences in student success across racial/ethnic groups were a relatively more common area of interest in education (18) than in psychology (9), sociology (10), and economics (12).

A smaller number of articles, 35, examined differences in student success based on the characteristics of the higher education institution attended. Differences in student success by institutional type were relatively more common in economics (16 articles) and education (13 articles) than in psychology (0 articles) and sociology (6 articles) (table 8).

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