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Putting and Keeping Students on Track: Toward a Comprehensive Model of College Persistence and Goal Attainment

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Jeremy Burrus, Diane Elliott, Meghan Brenneman, Ross Markle, Lauren Carney, Gabrielle Moore,
Anthony Betancourt, Teresa Jackson, Steve Robbins, Patrick Kyllonen, and Richard D. Roberts
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Abstract

Despite near universal acceptance in the value of higher education for individuals and society, college persistence rates in 4-year and community colleges are low. Only 57% of students who began college at a 4-year institution in 2001 had completed a bachelor's degree by 2007, and only 28% of community college students who started school in 2005 had completed a degree 4 years later (National Center for Education Statistics, 2011). To address this problem, this paper identified 3 goals. The first was to review the extant literature on persistence in higher education. The second was to develop a working model of persistence informed by our literature review. This resulted in a model centered on 3 basic categories of variables: those that *put you on track* towards persistence, those that *push you off track*, and those that *keep you on track*. The final goal was to outline a research agenda to develop student-centered assessments informed by our model, and we conclude with a discussion of this agenda.

Key words: persistence, retention, higher education, dropout, attrition

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A college degree has value. Research has suggested that college attendance improves verbal, quantitative, communication, critical thinking, and moral reasoning skills (e.g., Pascarella & Terenzini, 2005). Furthermore, education has been linked to lower unemployment rates, greater job satisfaction, decreased reliance on social support and public assistance programs, lower rates of obesity, and higher reported levels of voting and volunteerism (Baum, Ma, & Payea, 2010). Attainment of a college degree is an important factor in improving one's earnings and financial security. Recent evidence showed the median earnings of bachelor's degree recipients working full-time year-round in 2008 was \$55,700, which was \$21,900 more than the median earnings of high school graduates (Baum et al., 2010). Further, research by Autor (2010) indicated that the return to additional years of education in terms of higher wages has increased over time, and that each year of education adds more to wages than previous years.

Increases in the opportunity to participate in higher education and the positive benefits mentioned above have led to an upsurge in enrollments across all institutional types. However, persistence to degree completion has been a consistent problem for both the individual and the institution (Lloyd, Tienda, & Zajacova, 2001). The most recent information from the *Digest of Education Statistics* (National Center for Education Statistics, 2011) showed that only 57% of degree-seeking students who began college at a 4-year institution in 2001 had completed a bachelor's degree by 2007 (6 years after starting). Similarly alarming statistics have been found for community college students, where only 27.5% of the 2005-starting cohort had completed a degree at any institution 4 years later (National Center for Education Statistics, 2011). Likewise, only 36% of community college students obtain a certificate, associate's degree, or bachelor's degree 6 years after initial enrollment (Bailey, Leinbach, & Jenkins, 2006). To provide more detail, Table 1 provides freshman retention rates for the 2006–2007 academic year, organized by the Carnegie Classification of institutions in higher education (National Center for Educational Statistics, 2011).

Equally sobering, these aggregate figures mask disparities in education attainment by gender, race/ethnicity, and institutional type. For instance, only 35% of African American males who began at 4-year institutions in 2001 had completed a degree by 2007, while only 19% of African American males who began community college in 2005 had completed a degree by 2009 (National Center for Education Statistics, 2011). And for-profit institutions showed even lower rates of degree attainment (22% of all students and 16.5% of all African American students who

began in 2002; National Center for Educational Statistics, 2011). Such poor attainment rates, along with rising college costs and public dissatisfaction with higher education, have sparked public concern for college persistence. President Obama (2010) has articulated a goal of returning the United States to the world's highest proportion of college graduates per capita by 2020. This goal is by no means trivial, effectively signaling that the United States will need to produce an additional 8 million college graduates within the next 8 years.

One path toward achieving this goal will be to improve college persistence and ultimately graduation rates. Although 70 years of research on persistence has already been conducted (Braxton & Lee, 2005), current persistence rates suggest that more research is needed to identify the factors most strongly associated with persistence

In the pages that follow, we provide an overview of the extant literature on college persistence. We do this with the goal of identifying not only what is known, but also what is unknown. That is, what questions remain unanswered and what can we do to address them in terms of research, practice, and/or policy? Several comprehensive reviews of college persistence are available (e.g., Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006; Pascarella & Terenzini, 2005; Seidman, 2005), and to some extent this is a companion piece that attempts both to synthesize this body of literature and provide an overarching model in moving forward. To this end, we begin this literature review by defining persistence. We then discuss two prevailing persistence frameworks and review eight factors that have been empirically linked to persistence. Next, we define a working model of persistence based on our review of the literature. We conclude with suggestions for future research and recommendations for educational policy.

Defining Persistence

Defining persistence is not a straightforward task partly because different perspectives yield varied definitions (Pascarella, 1982). For example, persistence can refer to a student who continues enrollment by participating in any form of higher education under the jurisdiction of a state or national system (Tinto, 1982). By the same token, from an institutional perspective, persistence can be more narrowly defined to refer to a student who continues enrollment at any single institution. From the individual student perspective, persistence can refer to the continuation of enrollment at any institution of higher education, local, national, or international. With such a protean construct, compiling statistics and measures of incidence is thus a nontrivial task.

Table 1***Integrated Postsecondary Education Data System 2007 First-Year Retention Rates by Carnegie Classification***

Type of institutions	Number of institutions	Full-time retention rate, 2007
Total	5,888	68.0
Research universities (very high research activity)	96	89.5
Special focus institutions: medical schools and medical centers	3	85.3
Research universities (high research activity)	100	79.4
Baccalaureate colleges: arts & sciences	276	78.4
Special focus institutions: schools of engineering	7	77.3
Special focus institutions: other health professions schools	37	77.0
Doctoral/research universities	70	73.9
Special focus institutions: other special-focus institutions	10	73.4
Master's colleges and universities (larger programs)	331	72.3
Special focus institutions: schools of art, music, and design	98	71.0
Special focus institutions: faith-related institutions	159	70.9
Associate's: public special use	10	70.6
Master's colleges and universities (medium programs)	181	69.5
Master's colleges and universities (smaller programs)	119	68.7
Baccalaureate colleges: diverse fields	342	66.0
Associate's: public 4-year primarily associate's	17	65.5
Associate's: private for-profit	483	63.5
Associate's: private not-for-profit	96	62.2
Associate's: private not-for-profit 4-year primarily associate's	19	61.7
Associate's: public suburban-serving multicampus	100	60.1
Associate's: public suburban-serving single campus	109	59.4
Baccalaureate/associate's colleges	114	58.8
Associate's: public rural-serving large	141	58.2
Associate's: public urban-serving multicampus	148	57.1
Associate's: private for-profit 4-year primarily associate's	65	56.2
Associate's: public rural-serving medium	306	55.8
Tribal colleges	31	55.7
Special focus institutions: other technology-related schools	52	55.6
Associate's: public rural-serving small	137	54.4
Associate's: public urban-serving single campus	32	54.3
Associate's: public 2-year colleges under 4-year universities	53	53.3
Special focus institutions: schools of business and management	51	47.1

Transfer students add considerably to this definitional conundrum. The very act of transferring, which from an institutional perspective is considered a failure to persist, can also be considered persistence if that student transfers to another institution within a state system. Indeed, the act of transferring itself may represent an extreme form of persistence (Adelman, 1999). Consider those students who transfer to a university with a more rigorous academic program or who move to care for a family member, without giving up their studies. In short, persistence may vary depending context and whether intra-institutional movements are taken into consideration.

Even trying to define persistence within specific contexts can be challenging. For instance, take the perspective of the institution. Many institutions refer to persistence to denote continued enrollment over time; however, such a perspective fails to distinguish between voluntary withdrawal and withdrawal for lack of academic progress. Another commonly used definition within institutions is *firstyear persistence rate*, which denotes students who return for a second year. However, this definition fails to consider how well students are performing. A student who returns for a second year on academic probation is technically persisting, but under problematic circumstances. For this reason, it has been recommended that studies of college persistence contain measures of both continued enrollment and progress toward degree completion (e.g., Adelman, 1999). Such a distinction facilitates establishment of the types of behaviors and interventions that most directly influence persistence, maximizing understanding of how and why students persist.

Underscoring the difficulty in defining persistence, Berger and Lyon (2005, p. 7) defined eight terms that describe the voluntary or involuntary decision to remain in school:

- Attrition—failing to reenroll in consecutive semesters,
- Dismissal—not permitted to continue by the institution,
- Dropout—setting a goal of achieving a baccalaureate or associate’s degree and not completing it,
- Mortality—the failure of students to remain in college until graduation,
- Persistence—the desire and action of a student to stay within the system of higher education from beginning year through degree completion,
- Retention—the ability of an institution to retain a student from admission through graduation,

- Stopout—temporary withdrawal from an institution or system, and
- Withdrawal—departure of a student from a college or university campus.

Each of these terms is potentially important for our review. We settle on employing the term *persistence* in the current paper for two reasons. First, it is more commonly used in research than many of the other terms. Second, the ultimate goal of the review is to develop a research agenda informing the development of student-centered assessments, and persistence tends to be a student-centered, rather than institution-centered, term.

Theories of Persistence

The persistence literature relies predominately on two frameworks for understanding student departure: Tinto’s *theory of student departure* (1975, 1987) and Bean’s *model of student attrition* (1980, 1983). Although each model stems from a unique theoretical basis (e.g., Tinto’s model stems from theories of suicide, Bean’s from employee turnover), both models highlight the importance of background characteristics and student experiences on campus.

Theory of Student Departure

The theory of student departure (Tinto, 1975, 1982, 1987, 1993) emphasizes the role of postmatriculation campus-based interactions and integration on persistence. The essence of the theory of student departure is that persistence is a function of a longitudinal process of interactions between students and faculty, staff, and peers in academic and social settings (Tinto, 1993). Positive interactions and involvement in academic and social settings provide students with the means to understand and assimilate to institutional norms (termed *integration*), leading to a heightened commitment to completing college and to the institution itself. Conversely, negative experiences and factors that limit campus involvement weaken intentions and commitments and increase the likelihood of departure. Simply put, “other things being equal, the higher the degree of integration of the individual into the college, the greater will be his/her commitment to the specific institution and the goal of college completion” (Tinto, 1975, p. 96). A representation of the theory of student departure model is given in Figure 1.

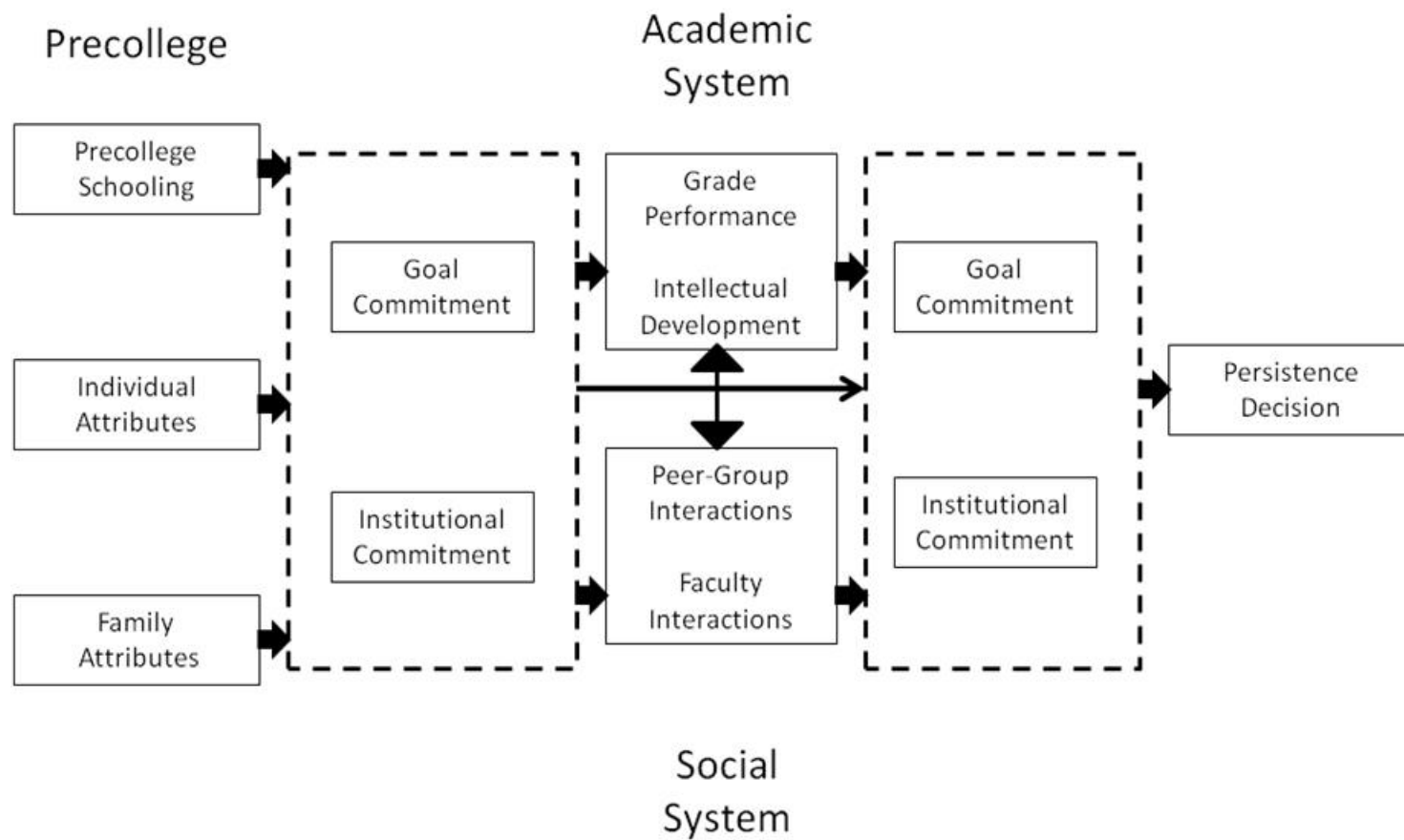


Figure 1. Theory of student departure model.

Terenzini and Pascarella (1980; see also Cabrera, Castenada, Nora, & Hengstler, 1992) validated the model, showing it is a conceptually useful framework for thinking about the dynamic nature of persistence. However, the model has also received considerable criticism. One criticism of the model is its emphasis on integration. Integration perspectives stress an underlying notion that acculturation is necessary (Hurtado & Carter, 1997) and assume there is a single uniform set of values and attitudes in an institution (Tierney, 1992). Thus, the central premise of integration is that students must relinquish previously held values and adopt the dominant values of an institution. Such a perspective can marginalize minority and nontraditional students whose beliefs and attitudes may run contrary to the dominant values (Hurtado & Carter, 1997). For minority students in particular, the notion that integration relies on the successful abandonment of cultural values that may be central to personal identity calls into question the validity of these models.

Indeed, the model appears to have limited applicability with those students classified as *nontraditional* (Maxwell, 1998; Rendon, Jalomo, & Nora, 2000). As originally described, the model excludes external factors such as finances and encouragement from friends and family, which can exert effects on commitment, integration, and ultimately persistence. Braxton and Lee (2005) decomposed the model into 13 propositions and investigated whether *reliable relationships* have been established in the literature for each proposition. A relationship was considered reliable if it had been studied at least 10 times, with at least seven studies finding significant relationships. They found that reliable relationships were established for 13 of the propositions for residential colleges and universities, whereas reliable relationships were established for none of the propositions for commuter colleges and universities. Thus, although the theory of student departure is by far the most influential model in persistence research, it seems that there is room for considerably more research designed to establish both its validity and utility.

Bean's Model of Student Attrition

A competing perspective to the theory of student departure is Bean's (1980, 1983) *model of student attrition*. Unlike the theory of student departure, which was based on traditional college students, Bean's model was generated to account for external factors that affect the persistence of nontraditional students. These factors, many of which are beyond the control of an institution, affect students by putting pressure on their time, resources, and sense of well-being

(Rovai, 2003). However, conceptually, Bean's model is very similar to the theory of student departure in that it emphasizes the ways in which background characteristics and interactions with an institution influence satisfaction, commitment to degree completion, and persistence (Bean, 1980, 1983). Bean's model stresses that student interactions and integration combine with subjective evaluations of the educational process, institution, and experience to directly influence satisfaction and indirectly influence intentions to persist (Himmelhoch, Nichols, Ball, & Black, 1997). Simultaneously, external factors over which the institution has no control, such as opportunity to transfer, family commitments, and financial constraints, directly influence intentions to leave and drop out. Thus, external, attitudinal, and interaction factors collectively influence departure or persistence. A representation of Bean's model is given in Figure 2.

Bean's model has been shown to explain 23% of the variance in student satisfaction and from 44% to 48% of the variance in student persistence (Bean, 1983; Bean & Metzner, 1985; Cabrera et al., 1992). Bean's model has also been validated on nontraditional student populations including adult learners (Bean & Metzner, 1985), historically black college and university students (Himmelhoch et al., 1997), distance learners (Rovai, 2003), and community college students (Sandiford & Jackson, 2003).

Many researchers have noted similarities between the models (e.g., Hossler, 1984) in that they understand persistence as a complex set of interactions from which students gauge whether a successful match between them and the institution exists. In fact, Cabrera et al. (1992) examined the overlap between Tinto's model, the theory of student departure (Tinto, 1987), and Bean's (1983) model of student attrition and concluded that many of the constructs in each model underscored the same concept. However, Cabrera et al. (1992), in their comparison of the two models, determined that the theory of student departure was more robust because 70% of the theory of student departure hypotheses were validated in comparison to 40% of the student attrition model hypotheses. That said, the student attrition model accounted for more variance in student intent to persist (60% vs. 36%) and persistence (44% vs. 38%; Cabrera et al., 1992).

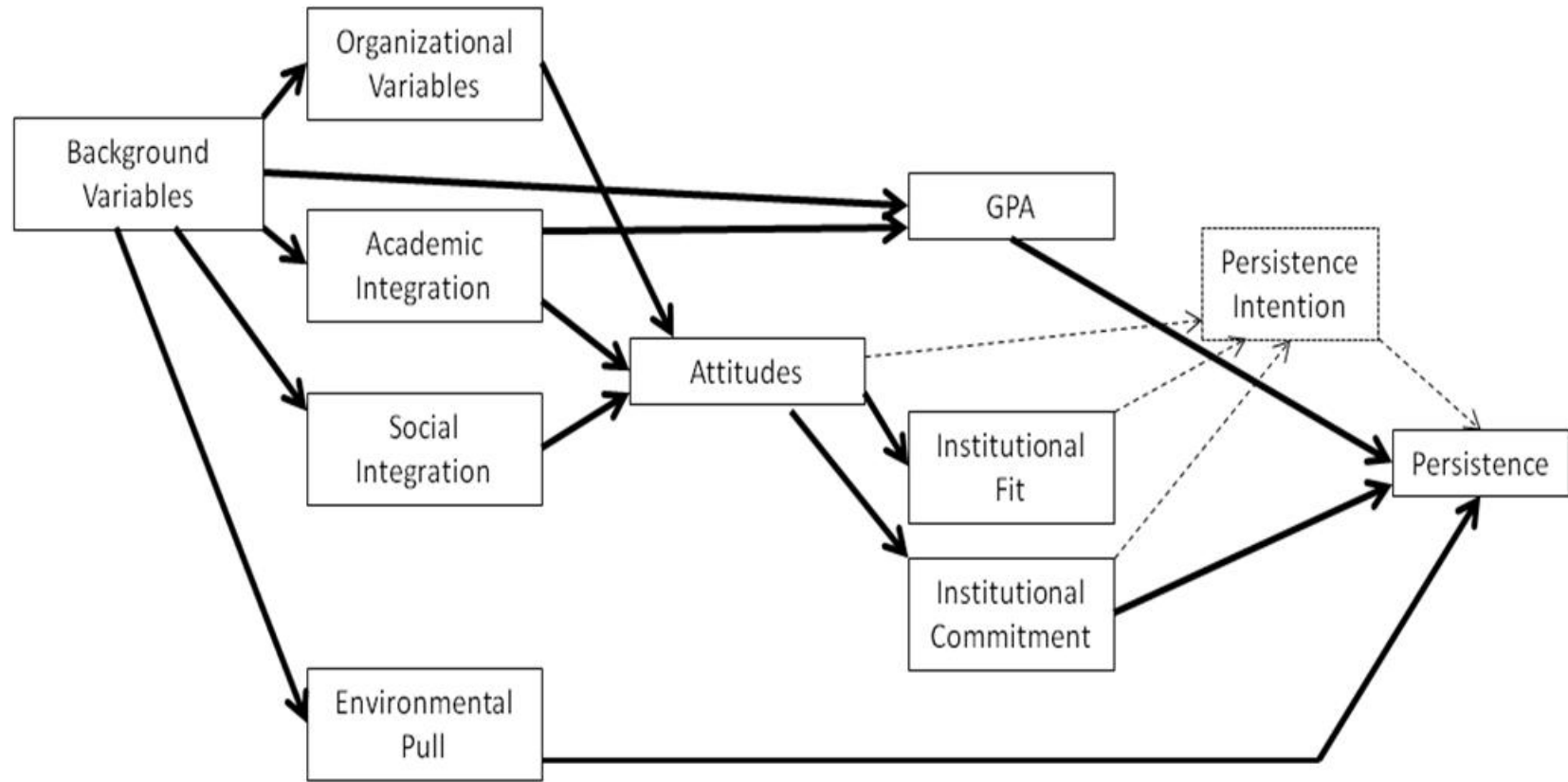


Figure 2. Model of student attrition.

Together, the two theoretical perspectives on student persistence provide a holistic accounting of the key factors that shape what students are prepared to do when they get to college and influence the meanings they make of their experiences (Kuh et al., 2006). In other words, the theories emphasize “a series of academic and social encounters, experiences, and forces ... [that] can be portrayed generally as the notions of academic or social engagement or the extent to which students become involved in (Astin, 1985) or integrated (Tinto, 1975, 1987, 1993) into their institution’s academic and social systems” (Pascarella & Terenzini, 2005, p. 425). Thus, we organize this review of the literature to reflect the characteristics common to both models.

Eight Common Factors of Retention Research

In a brief review of the persistence literature, Bean (2005) identified nine factors—more commonly denoted as *themes*—of persistence research. We follow this basic structure, but eliminate one of his factors, *intentions*, as a separate factor. Because intentions are closely related to goals, the commitment factor encompasses them. Thus, the eight factors we review are (a) institutional environment factors, (b) student demographic characteristics, (c) commitment, (d) academic preparation and success factors, (e) psychosocial and study skills factors, (f) integration and fit, (g) student finances, and (h) environmental pull factors.

A summary of these factors is provided in Table 2. In the sections that follow, each of these constructs is reviewed in isolation, along with relevant literature supporting or questioning their importance to student persistence and success. Where possible, we determine conceptual overlap, redundancies, and some empirical issues that need to be addressed in the future to provide a better understanding of these themes and their various components.

Institutional Environment Factors

Characteristics of institutions that may affect persistence include structural features and programs aimed at helping student adjustment. In general, after controlling for student characteristics, most of the effects of institutional characteristics on student success are relatively trivial or inconclusive (Pascarella & Terenzini, 2005). Some structural characteristics, however, are consistently claimed to relate to measures of student success and persistence and are discussed here. These are *institutional size*, *institutional selectivity*, and *public versus private status*.

Table 2***Common Factors, Definitions, and Examples Studied in Persistence Research***

Factors	Definition	Examples
Institutional environmental factors	Institutional structural features as well as programmatic offerings at the institution	Institutional size, student advising, orientation programs, first year seminars
Student demographic characteristics	Demographic information about the student	SES, gender, race, ethnicity, first generation status
Commitment	The extent that students feel committed to their current institution and the goal of earning a degree	Institutional commitment, educational aspirations
Academic factors	Academic ability, previous academic performance, and preparation	Academic preparation, rigor of high school curriculum, and academic success in high school and college
Psychosocial and study skill factors	Factors often referred to as <i>noncognitive</i> or <i>motivational</i> ; skills related to organizing and completing schoolwork and preparing for tests	Self-efficacy, personality, time management
Integration and fit	Students' overall attachment and sense of belonging and connection to a college environment	Academic integration, perceptions of intellectual development, social integration, involvement in extra-curricular activities
Student finances	The extent to which financial hardship affect persistence, including role of loans, financial aid, and grants	Financial hardship, aid in the form of scholarships and grants, loans, work-study
Environmental pull factors	The collection of forces beyond the control of the institution that can affect persistence decisions at any time	Family obligations, parental loss of job, divorce, the need to work while in college

Note. SES = socioeconomic status.

Institutional Size

Institutional size has a small and indirect negative relationship with persistence and degree completion (Pascarella & Terenzini, 2005). The relationship is indirect because it seems to impact persistence and degree completion by modestly effecting how a student perceives faculty and peer interaction and the institutional environment as a whole (Kuh et al., 2006). The

relationship of institutional size to persistence appears too small to merit further attention. However, in a recent meta-analysis involving 7,704 students, Robbins et al. (2004) found that the number of students enrolled at an institution correlated with persistence at $-.01$. This result is all the more powerful because all correlations in this meta-analysis were corrected for measurement error in both the predictors and criterion measure (see Table 3).

Institutional Selectivity

Beginning pursuit of a baccalaureate degree at a 4-year rather than an open-access 2-year institution increases the odds of degree completion from 15% to 20% (Pascarella & Terenzini, 2005). The effect of institutional selectivity persists, even when controlling for academic ability (Velez, 1985). This is key, given that more able students generally attend more selective institutions. Initial matriculation at less prestigious institutions is associated with lower rates of baccalaureate completion (Brint & Karabel, 1989), while matriculation at elite colleges significantly increases the likelihood of degree completion (Alfonso, 2006; Synder, 1987). However, it is not clear whether this difference is attributable to differences between institutions or reflects initial background factor, academic preparation, or personal attribute differences.

Public Versus Private Status

In their review, Pascarella and Terenzini (2005) concluded that private schools held a small advantage over public schools in terms of persistence. However, this effect essentially disappears when controlling for student background characteristics. Recently, Bowen, Chingos, and McPherson (2009) contrasted graduation rates at public flagship and private institutions. They found that while 6-year graduation rates were comparable, 4-year graduation rates were 20% and 14% lower at public schools than at Ivy League and liberal arts colleges, respectively. One possible cause for differences may be that the higher tuition rates charged by private colleges serve as a strong motivation to complete within 4 years (Bowen et al., 2009). Another possible cause may be related to more generous financial aid packages. Because private colleges tend to have large endowments, they are able to provide generous aid packages to low-income students, alleviating financial pressure, which allows them to complete in a more timely fashion (Bowen et al., 2009). Much of this research is also plagued by the difficulty of disentangling institutional effects from student factors prior to students entering school.

Table 3***True-Score Correlations of Factors Included in Robbins et al. (2004) Meta-Analysis With GPA and Persistence***

Factor	Definition	ρ_g	ρ_p
Achievement motivation	One's motivation to achieve success; enjoyment of surmounting obstacles and completing tasks undertaken; the drive to strive for success and excellence	0.303	0.066
Academic goals	One's persistence with and commitment to action, including general and specific goal-directed behavior, in particular, commitment to attaining the college degree; one's appreciation of the value of college education	0.179	0.340
Institutional commitment	Students' confidence in and satisfaction with their institutional choice; the extent that students feel committed to the college they are currently enrolled in; their overall attachment to college	0.120	0.262
Perceived social support	Students' perception of the availability of the social networks that support them in college	0.109	0.257
Social involvement	The extent that students feel connected to the college environment; the quality of students' relationships with peers, faculty, and others in college; the extent that students are involved in campus activities	0.141	0.216
Academic self-efficacy	Self-evaluation of one's ability and/or chances for success in the academic environment	0.496	0.272
General self-concept	One's general beliefs and perceptions about him/herself that influence his/her actions and environmental responses	0.046	0.050
Academic-related skills	Cognitive, behavioral, and affective tools and abilities necessary to successfully complete task, achieve goals, and manage academic demands	0.159	0.366
Financial support	The extent to which students are supported financially by an institution	0.201	0.188
Size of institution	Number of students enrolled at an institution	N/A	-0.010
Institutional selectivity	The extent that an institution sets high standards for selecting new students	N/A	0.238

Note. Definitions are taken from Robbins et al. (2004; pp. 269–270). GPA = grade point average; ρ_g = true-score correlation predicting GPA (fully corrected for measurement error in both the predictor and criterion); ρ_p = true-score correlation predicting persistence (fully corrected for measurement error in both the predictor and criterion).

Student Demographic Characteristics

A multitude of background characteristics have been empirically linked to college persistence. Persistence theories hypothesize that background characteristics are particularly important in student persistence because they affect how students engage, interact, and integrate into college environments (e.g., Bean, 1980; Tinto, 1987). In the paragraphs below, we focus on five student demographic characteristics that appear especially predictive of persistence: *age*, *gender*, *race and ethnicity*, *socioeconomic status (SES)*, and *first generation student status*.

Age

Although status as an older or nontraditional student is generally considered to affect one's persistence, particularly in the community college sector, studies have shown inconsistent results. For instance, some studies found a negative relationship between age and community college persistence, indicating increases in age were associated with significantly reduced persistence (Brooks-Leonard, 1991; Hagedorn, Maxwell, & Hampton, 2002; Lanni, 1997; Windham, 1995). Conversely, one recent study employing 21 community colleges found that older students were more likely to obtain their 2-year degree than younger students are (Porchea, Allen, Robbins, & Phelps, 2010). There are several possible reasons for the contradictory findings. Some researchers have suggested older students are more likely to be juggling multiple responsibilities, including work and family obligations, which limits time allocated for schooling (Home, 1998; Jacobs & Berkowitz-King, 2002). Yet, other researchers have suggested older students are more likely to persist because they have greater financial resources for funding their college studies (Elman & O'Rand, 1998) and are more likely to understand the economic benefits associated with additional schooling (Spannard, 1990). These studies suggest older students begin their studies with greater commitment to the goal of earning a degree that positively impacts their persistence over the long-term. Collectively, these findings suggest that there might be a nonlinear relationship between age and persistence—a notion substantiated by a study in which students were divided into three age groups: those under 19, 20–24, and 25 or older (Feldman, 1993). Results indicated that students most likely to drop out were in the 20–24 age range and students in the 25 and older category were the most likely to persist.

Gender

Research on the relationship of gender to persistence has also produced somewhat inconsistent results. Although some researchers have reported that females are more likely to persist in college than males (e.g., Astin, 1975; Peltier, Laden, & Matranga, 1999), other research has found that gender does not predict persistence when controlling for other variables (e.g., St. John, Hu, Simmons, & Musoba, 2001). Still other research has found that gender interacts with variables such as race and whether one has children to predict persistence (e.g., Leppel, 2002; Murtaugh, Burns, & Schuster, 1999). Overall, it seems that the effect of gender is small. One recent study of 147,999 students from 106 institutions found that females persisted to the second year at only a slightly higher rate than males (86.3% versus 85.7%; Mattern & Patterson, 2009). Even so, gender remains an important variable to capture in both the policy and research realm, because, as demonstrated in latter sections, it serves as a powerful mediator and/or moderator on a host of persistence themes.

Race and Ethnicity

Race and ethnicity appear to be associated with college persistence (e.g., Astin, 1997; Peltier et al., 1999; Reason, 2003). To illustrate, Figure 3 displays 4-year degree attainment rates by race/ethnicity as indicated by data from the National Student Clearinghouse and the Cooperative Institutional Research Program's Freshman Survey from 2004 (DeAngelo, Franke, Hurtado, Pryor, & Tran, 2011). In general, research indicates that Asian-American and White students are more likely to persist than students from other racial groups are (Kao & Thompson, 2003; Murtaugh et al., 1999). However, the relationship of race and ethnicity to persistence is more complex than it might appear at first blush. For instance, Murtaugh et al. (1999) found that differences in persistence between races largely disappeared when they controlled for variables such as college major, high school grade point average (GPA), and college GPA. Indeed, this research suggests that much of the relationship of race and ethnicity to persistence may be spurious (see also D. A. Allen, 1999). To account for the unique factors detracting from the persistence of different minority groups, below we provide some further details relevant to each group.

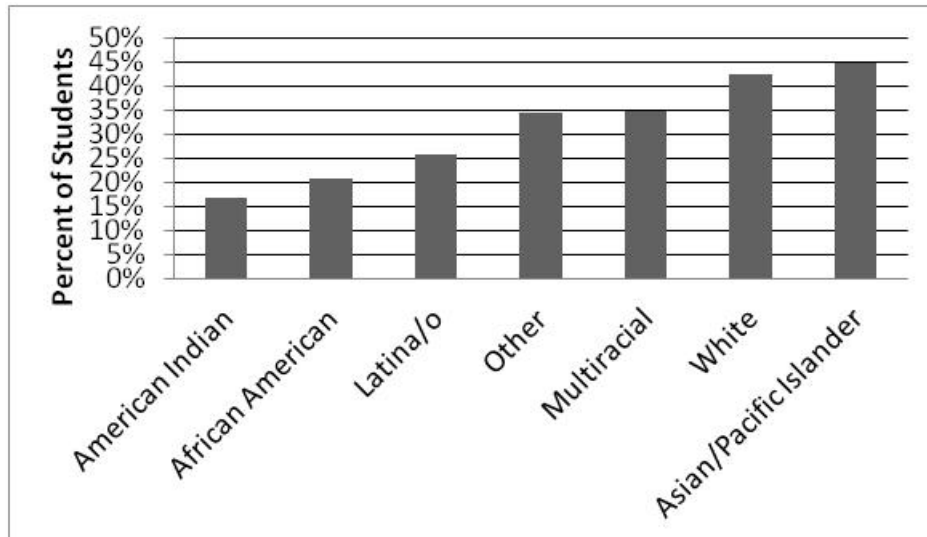


Figure 3. Four-year degree attainment rates by race/ethnicity.

African Americans. Although recent decades have seen an increase in the number of minority students enrolling in higher education institutions, African Americans continue to enroll in lower numbers (Aud, Fox, & KewalRamani, 2010) and are more likely to drop out without earning a credential (Berkner, He, & Cataldi, 2002; Porchea et al., 2010). Strayhorn (2008) suggested that the lack of academic and, more importantly, social integration for African American students, especially on predominantly White campuses, is the most significant predictor of whether these students are likely to persist until graduation. In addition, sense of belonging has also been suggested as a major predictor of minority retention (Hausmann, Schofield, & Woods, 2007). Another important challenge to persistence for African American students is financial support. According to Aud et al. (2010), African American students received the highest percentage of financial aid compared to other racial/ethnic groups of students, with 92% of fulltime African American students receiving financial aid in 2007–2008. As we will discuss, financial aid has some meaningful positive relationship with persistence, suggesting this as a powerful policy lever for this ethnic group.

Latinos. Overall, Latinos display the lowest college graduation rate of all minority groups (Arbona & Nora, 2007). In terms of precollege experiences, the complex relationship between poor academic preparation for college and limited language proficiency appears to be a source of Latino college attrition (Gándara, 2005; Goldrick-Rab, 2010). Another possible reason for poor completion rates of Latinos appears to be the overrepresentation of Latino students in

nonselective and less selective institutions. Latino students in particular appear to be disproportionately represented in community colleges (Arbona & Nora, 2007; Nora, Rendón, & Cuadraz, 1999). As discussed previously, much evidence has shown that college selectivity and degree completion are correlated (e.g., Bowen & Bok, 1998; Fry, 2004; Velez, 1985). Even when they have the academic preparation necessary to be admitted to selective colleges, Latinos enroll in less selective institutions, which is termed *underenrollment* or *undermatching* (Fry, 2004). Finally, family culture, obligations, and environmental factors external to the college context appear to play a role in Latino persistence (Nora, 2003; Nora, Cabrera, Hagedorn, & Pascarella, 1996). In particular, financial constraints appear to influence not only college choice but also persistence. Lacking appropriate financial resources, many Latino students are pulled away from campuses (Cabrera, Nora, & Castaneda, 1993; Logerbeam, Sedlacek, & Alatorre, 2004; Stampen & Cabrera, 1988).

Asian American and Pacific Islanders. Asian American and Pacific Islanders constitute the fastest growing college-going minority group (Teranishi, 2004). They tend to persist at higher rates than Whites (Chan & Hune, 1995). However, more recent research shows there are large disparities in degree attainment among the various ethnic groups that comprise the Asian American and Pacific Islanders racial category. According to Yeh (2004), research has shown that East Asians (i.e., Chinese, Korean, Japanese) and Asian Indians persist at higher rates than Southeast Asians (i.e., Vietnamese, Cambodian, Hmong, Laotian) and Pacific Islanders (i.e., Hawaiians, Samoans, Guamanians). Clearly, both in terms of research and policy, future efforts need to provide more fine-grained information for this ethnic group.

Socioeconomic Status (SES)

SES seems to be an important predictor of persistence and, ultimately, degree attainment, as SES sets the stage for students' academic performance by directly providing resources at home and indirectly providing the social capital necessary to succeed in school (Coleman, 1988). The meta-analysis of Robbins et al. (2004) found a correlation of .23 between SES and persistence. Additionally, Adelman (2006) found a correlation between SES and degree attainment, controlling for academic resources, educational aspirations, and a host of other variables. Consistently, moving upward from one SES quintile to another produced, on average, over a 6% increase in the likelihood of receiving a college degree. It is also important to note that

recent research employing 50 institutions found that the effect of SES on persistence was fully mediated by first year GPA (Westrick & Robbins, 2012).

The relationship of SES to persistence may be more complex than the previous paragraph suggests, however. For example, Paulsen and St. John (2002) conducted one of the more comprehensive studies of SES and higher education that we encountered in reviewing the literature. Though there was a relationship between SES and persistence, it was not always the direct relationship that most would hypothesize, as there were several significant interaction effects. For instance, women from low-income families were less likely to persist than men—a relationship moderated by differing gender goals. That is, given that low-income families are more likely to be single-parent families, women are often motivated to leave school in order to seek employment opportunities. The authors concluded that much of the research into SES treats this variable, let alone its relationships with educational outcomes, far too simply. Economic, social, and cultural factors may play differential roles in determining student persistence. As well, institutions need to be more adept at monitoring how changes in financial policy (e.g., means of funding, such as shifts from grants to loans) might affect incoming students differentially according to their social class.

First-Generation Student Status

College students whose parents did not attain a college degree, known as *first-generation students*, are less likely to persist in college than students whose parents attained a degree (Choy, 2001). Other definitions of first-generation students include those students whose parents' highest level of education is high school or less (e.g., Nunez & Cuccaro-Alamin, 1998). First-generation students are more likely to attend less selective and 2-year colleges (Kojaku & Nuñez, 1998). They also tend to be older than the average college student (24 years old or older), come from the lowest family-income quartile, are less likely to have taken the SAT/ACT, and are more likely to work while in college (Kojaku & Nuñez, 1998). Each of these characteristics is associated with lower rates of persistence. Furthermore, even after controlling for these and other related factors such as parental support, educational aspirations, and academic preparation, first-generation status is still related to lower rates of persistence (Choy, 2001). We believe, however, that future research could further disentangle the effect of first-generation status from SES.

Commitment

Theoretical models emphasize that persistence is partially based on goals and commitments established prior to matriculation. There are two forms of commitment that set the stage for subsequent persistence: goal commitment and institutional commitment. Goal commitment refers to an individual's willingness to achieve a particular objective, in this case, a college degree. It is often conceived of as educational aspirations (Tinto, 1993). Institutional commitment refers to an individual's dedication and allegiance to a particular institution or the desire to achieve the goal of a degree in a particular setting. Both institutional and goal commitment are influential in persistence because regardless of institutional caliber, some level of effort and ambition is necessary to achieve degree completion. In addition, goal and institutional commitment are thought to influence how students integrate themselves into college (D. A. Allen & Nora, 1995). While both institutional and goal commitments are mediated by student ability, individuals who exhibit both are more likely to persist to graduation (Terenzini, Lorang, & Pascarella, 1981).

Understanding the effects of both institutional and goal commitment can be important in categorizing different types of students. That is, institutional commitment and goal commitment are important factors of college persistence because they help distinguish between persisters (high aspirations, high goal commitment, and high institutional commitment), transfers (high aspirations, high goal commitment, and low institutional commitment), and dropouts (low aspirations and low goal commitment; Tinto, 1987). Thus, in developing a comprehensive model of persistence it appears essential to measure both types of commitment.

Goal Commitment

Goal commitment and educational aspiration refer to the extent the student is committed to the goal of earning a degree (Bean, 2005) and have been said to foreshadow student success (Perna & Titus, 2005). A student with a strong commitment to the goal of earning a degree will actively engage with faculty and peers and seek out assistance when confronted by obstacles (Tinto, 1993). Conversely, a student with low commitment to the goal of earning a degree may likely drop out. Research has shown that goal commitment exerts a positive and significant effect on persistence (Cabrera et al., 1993; Terenzini et al., 1981). Supporting this finding, the Robbins et al.'s (2004) meta-analysis found that academic goals correlated with persistence at .34 (see Table 3).

Studies suggest that aspirations and commitment to the goal of earning a degree vary considerably by student characteristics. For instance, although Billson and Terry (1982) found no differences in the educational aspirations of first- and second-generation students, more recently, Terenzini, Springer, Yaeger, Pascarella, and Nora (1996) and Choy (2001) reported that first-generation students had lower educational aspirations than their second-generation counterparts. Naumann, Bandalos, and Gutkin (2003) found that for first-generation students, educational aspirations were the best predictor of first-semester GPA, which suggests that aspirations may be particularly relevant to the longitudinal persistence of under-represented students.

Institutional Commitment

Institutional commitment indicates the extent to which a student is attached to the college or university (Bean, 2005). Empirical models of persistence emphasize that institutional commitment can be evaluated both prior to entry and after matriculation. Preentry institutional commitment is hypothesized to influence how a student interacts with peers and the level of effort exerted in assimilating to college norms (Tinto, 1993). Postmatriculation institutional commitment relates to student satisfaction with institutional choice (Strauss & Volkwein, 2004).

Research has shown that students' commitment to the institution at the end of their first year of college is a strong predictor both of students' intent to persist (Bean, 1983) and of student persistence itself (Strauss & Volkwein, 2004). Similarly, in their meta-analysis, Braxton and Lee (2005) found a reliable relationship between postentry commitment to the institution and persistence. The Robbins et al. (2004) meta-analysis examined postmatriculation institutional commitment and found that it correlated with persistence at .26 (see Table 3). Similarly, there has been empirical support for the relationship between institutional commitment in relation to academic integration (Braxton, Duster, & Pascarella, 1988; Pascarella & Terenzini, 1983), social integration (Cash & Bissel, 1985; Pascarella & Terenzini, 1983; Stage, 1989), and first-semester GPA (Naumann et al., 2003).

Academic Preparation and Success Factors

Academic abilities, generally reflected in GPA or scores on standardized tests (e.g., SAT, ACT), are strongly associated with students persisting (Bean, 2005). This section discusses four specific academic factors and their relationship to persistence: Ability, precollege academic

performance, preparation, and college grades. Although very similar, each represents a unique component of a student's ability to succeed in the classroom.

Certainly there are other academically relevant factors that relate to students' success, such as their course experiences or the extent to which their interests and majors align. However, determining the unique effect of these factors is often difficult. For instance, students who enroll in developmental (also referred to as *remedial*) coursework persist toward degree completion at lower rates than those that do not, but this finding is confounded by the lower academic ability of those developmental students. Thus, we have chosen to focus on these four factors.

Ability and Precollege Academic Performance

Academic ability and academic performance in high school are two related factors that impact college persistence. Students' academic ability relates to notions of crystallized intelligence (see Roberts & Lipnevich, 2011) and is measured in situations where students are elicited to perform optimally (e.g., standardized admissions tests). Academic performance refers to typical demonstrations of ability in academic settings and is most often manifested as a student's GPA. Given the complexity of performance in the classroom setting, preparation often includes factors such as motivation, organization, and timeliness (J. D. Allen, 2005; Brookhart, 1993; Burke, 2006).

A host of studies have supported the relationship between academic ability and persistence in both 4-year and community colleges (e.g., J. D. Allen, Robbins, Casillas, & Oh, 2008; Burton & Ramist, 2001; Mattern & Patterson, 2009; Richardson, Abraham, & Bond, 2012). Similarly, academic performance has been shown to predict persistence in both settings (D. A. Allen, 1999; J. D. Allen et al., 2008; DeBerard, Spielmans, & Julka, 2004; Porchea et al., 2010; Robbins et al., 2004). Interestingly, there is some evidence that the relationship between academic ability and persistence beyond the first year is fully mediated by performance in college (Westrick & Robbins, 2012). In some cases, performance has been shown to predict persistence better than ability (e.g., DeBerard et al., 2004; Porchea et al., 2010; Robbins et al., 2004). These differences could be explained by the multifaceted nature of performance mentioned above. Performance requires not only ability, but also particular attitudinal sets and organizational skills (i.e., psychosocial factors) that could play a larger role in student persistence.

Academic Preparation

Academic preparation is a contextual, school-level factor that considers the extent to which a student's educational environment has been academically rigorous. Just as with ability, rigor is a widely accepted and intuitive determinant of success: Students who take more academically challenging classes in high school are more likely to do well in college. In two studies of national longitudinal databases, Adelman (1999, 2006) emphasized the importance of a rigorous high school curriculum: "[T]he academic intensity of the student's high school curriculum still counts more than anything else in precollegiate history in providing momentum toward completing a bachelor's degree" (2006; p. xviii). Specifically, Adelman found a strong relationship between the level of high school math completed and college degree attainment. In fact, the relationship between math completion and degree attainment exceeded that of GPA, standardized test scores, or SES. In addition, recent work found that those who took rigorous courses in high school were more likely to earn a bachelor's degree than those who took less rigorous high school courses (Long, Conger, & Iatarola, 2012).

College Grades

In their review of the research on persistence, Pascarella and Terenzini (2005) concluded that college grades are likely the single best predictor of persistence. For example, one study of 8,867 college freshmen revealed that students with a first-quarter GPA of under 2.0 had a 57% chance of persisting past the first year of college and a 33% chance of persisting to the fourth year, whereas students with a first quarter GPA of over 3.3 had a 91% chance of persisting past the first year and a 78% chance of persisting to the fourth year (Murtaugh et al., 1999). Furthermore, Adelman (1999) found that grades predicted degree completion above and beyond several other factors, such as demographic characteristics and financial aid. Some research suggests, however, that grades are more highly related to persistence to the second year than to persistence to later years (DesJardins, Ahlburg, & McCall, 1994; cf. Pascarella & Terenzini, 2005).

In addition, more recent research suggests that the effects of many often-studied persistence-related variables are mediated by first year academic performance (J. D. Allen & Robbins, 2010; J. D. Allen et al., 2008; Westrick & Robbins, 2012). In the Westrick and Robbins (2012) study, the relationships of ACT score, high school GPA, and SES to persistence to the second year were fully mediated by first year GPA. In addition, the effect of first year GPA on third year persistence was stronger than the effect of second year GPA on the third year.

Likewise, J. D. Allen and Robbins (2010) found that the effect of student motivation, precollege educational achievement and academic performance, and family income on degree attainment was mediated by first year academic performance for both 2- and 4-year college students.

Psychosocial and Study Skill Factors

Much work has been conducted on the relation between psychosocial and study skills factors (PSF) to college persistence. Robbins and colleagues (2004) conducted an extensive meta-analysis on several of these factors. The final list of PSFs reviewed included: *achievement motivation, academic goals, academic self-efficacy, general self-concept, and academic-related skills*. The entire list of factors included in the meta-analysis can be seen in Table 3 above.

The meta-analysis was conducted using 109 studies and persistence was defined as the length of time students stayed enrolled in school. Table 3 provides definitions of the PSFs (Robbins et al., 2004, p. 267), and true-score correlations predicting GPA and persistence from each skill (pp. 269–270). Below, we briefly describe the results of the meta-analysis for each of the PSFs. Several PSFs were good predictors of both GPA and persistence. It is important to note that that these bivariate relationships obscure the previously discussed fact that other research has found that the effect of most of these variables on persistence is fully mediated by first year GPA (J. D. Allen & Robbins, 2010; J. D. Allen et al., 2008; Richardson, Abraham, & Bond, 2012; Westrick & Robbins, 2012).

Achievement Motivation

Achievement motivation was defined as one's stated motivation to achieve success, enjoyment of surmounting obstacles and completing tasks undertaken, and the drive to strive for success and excellence. Some representative measures of achievement motivation are the achievement needs scale (Pascarella & Chapman, 1983) and the achievement scale of the college adjustment inventory (Osher, Ward, Tross, & Flanagan, 1995). As can be seen in Table 3, achievement motivation is positively related to both GPA and persistence, although the relationship with persistence is not strong.

Academic Goals

Academic goals are commitment to action, including general and specific goal-directed behavior, in particular, commitment to attaining the college degree. It also refers to one's perception of the value of a college education. Representative measures of academic goals include the goal

commitment scale (Pascarella & Chapman, 1983), the long-range goals scale of the noncognitive questionnaire (Tracey & Sedlacek, 1984), and the valuing of education scale (Brown & Robinson Kurpius, 1997). Academic goals, which differ from most of the measures here in that they ask respondents to state concrete objectives rather than express agreement with subjective statements, were one of the strongest predictors of persistence of all PSFs examined and also predicted GPA. Academic goals provided incremental validity over SES, high school GPA, and ACT/SAT in the prediction of persistence ($\Delta R^2 = .083$). In addition, a recent meta-analysis of 241 datasets found that grade goals correlated with college GPA ($r = .59$; Richardson et al., 2012), an important finding given the strong relationship with first year GPA and persistence.

Academic Self-Efficacy

Academic self-efficacy refers to the self-evaluation of one's ability and/or chances for success in the academic environment. Like academic goals, these tend to be measured by agreement with behaviorally anchored statements, rather than with subjective statements. Representative measures included measures of academic self-efficacy (Chemers, Hu, & Garcia, 2001), academic self-confidence (Ethington & Smart, 1986), and course self-efficacy (Solberg et al., 1998). For example, on a typical self-efficacy item, a student might rate how confident they are that they can write a term paper or do well on exams. Academic self-efficacy was also one of the strongest predictors of persistence of all PSFs examined and very strongly predicted GPA. As with academic goals, it provides incremental validity over SES, high school GPA, and ACT/SAT in the prediction of persistence ($\Delta R^2 = .045$). Furthermore, the Richardson et al. (2012) meta-analysis found that academic self-efficacy ($r = .28$) and performance self-efficacy ($r = .67$) were both significant predictors of college GPA. Performance self-efficacy is measured by items such as "What is the highest GPA that you feel completely certain you can attain?" (p. 356).

General Self-Concept

General self-concept refers to a student's general beliefs and perceptions about him or herself that influence his or her actions and environmental responses. Self-concept is similar to self-efficacy but differs in level of generality. Self-efficacy usually refers to one's confidence that he or she can complete specific tasks, whereas self-concept refers to general feelings about one's self (e.g., self-esteem). Representative measures of general self-concept included the Rosenberg self-esteem scale (White, 1988), the self-confidence scale (W. R. Allen, 1985), and

the self-concept scale (Williamson & Creamer, 1988). An example item from the self-esteem scale is: “I feel I have a number of good qualities.” Although general self-concept was positively related to persistence and GPA, the relationships were small.

Academic-Related Skills

Academic-related skills refer to cognitive, behavioral, and affective tools and abilities necessary to successfully complete tasks, achieve goals, and manage academic demands.

Academic-related skills included time management, study skills and habits, leadership, problem solving, coping, and communication. These skills have been found to be strongly related to persistence and also GPA (Crede & Kuncel, 2008, Poropat, 2009; Richardson et al., 2012; Robbins et al., 2004). Furthermore, they provide incremental validity over SES, high school GPA, and ACT/SAT in the prediction of persistence ($\Delta R^2 = .103$; Robbins et al., 2004).

Integration and Fit

Institutional integration refers to a sense of fitting in with others at a college (Bean, 2005). Integration is largely determined by interactions with others on campus, and through these interactions, students are socialized into college norms. College persistence can arise out of a longitudinal process of interactions between individuals with given attributes, skills, resources, prior educational experiences and dispositions, and other members of the academic and social systems of the institution (Tinto, 1993). Positive experiences reinforce persistence through heightened intentions and commitments of both college completion and commitment to institution. Negative experiences weaken intentions and commitments, which ultimately lead to departure. Thus, persistence is viewed as a process of *academic* and *social* integration and fit leading to establishment of competent membership in academic and social campus communities.

Academic Integration and Fit

Academic integration develops through the formal and informal relationships between students and faculty and relates to a student’s involvement in the academic domains of an institution (Tinto, 1993) and has been empirically linked to the persistence of 4-year college students (Pascarella & Terenzini, 1983; Terenzini & Pascarella, 1980; Terenzini et al., 1981). Academic integration is thought to manifest itself through a student’s academic performance or GPA (Cabrera et al., 1993; Pascarella & Terenzini, 1983; Stage, 1989; Terenzini et al., 1981),

satisfaction with faculty interactions (Pascarella & Terenzini, 1983; Stage, 1989; Strauss & Volkwein, 2004; Terenzini et al., 1981), and perceptions of intellectual development and growth (Cabrera et al., 1993; Pascarella & Terenzini, 1983; Strauss & Volkwein, 2004; Terenzini et al., 1981). Research has also shown that frequent student interaction with faculty leads to positive outcomes, such as reinforcement of a student's initial goals, strengthened commitment to graduate (Pascarella & Terenzini, 1991), positively perceptions of the campus environment, and increased degree completion (Kuh et al., 2006; Lampion, 1993; Pascarella & Terenzini, 2005).

Social Integration and Fit

Social integration is considered a function of the nature and quality of interactions with peers and faculty, as well as a student's social involvement in a college environment (Tinto, 1993). In their extensive review, Pascarella and Terenzi (2005) concluded that studies have consistently supported peer influence as a positive force on persistence. For instance, Gerdes and Mallinckrodt (1994) found that through peer interactions, students were able to establish a social support network helping them cope with stresses associated with adjusting to the college environment. Similarly, Kalsner and Pistole (2003) found that perceptions of insufficient social support have been linked with student departure (Mallinckrodt, 1988). Peer relations can be particularly important in large institutions where students are prone to feelings of isolation and anonymity and may have greater adjustment issues (Chickering & Reisser, 1993).

Other researchers have stressed the importance of social involvement and participation in extra-curricular activities in college persistence (Astin, 1975; Gerdes & Mallinckrodt, 1994). The Robbins et al. (2004) meta-analysis also found that social involvement correlated with persistence at $r = .216$ (see Table 3).

Less is well known about how these integration and fit factors might be related to student personality and related noncognitive factors. In the dominant model of personality traits, the Big Five Factor model (see e.g., Poropat, 2009; Kyllonen, Lipnevich, Burrus, & Roberts, in press), two factors—agreeableness (one's tendency to act in a cooperative, friendly, and collegial manner) and extraversion (one's tendency to be outgoing, social, and gregarious)—may actually serve as drivers for a student's propensity toward integrating with the college environment. Further research is clearly needed to explore the role of personality in the integration process.

Student Finances

With college costs having increased 300% in the past 20 years, it should come as no surprise that a student's ability to pay for college plays an important role in persistence (Bean, 2005). Financial aid programs, beginning with the Higher Education Act of 1965, have allowed for greater access to higher education, especially for minority and low SES students. Students can receive financial aid in the form of grants, scholarships, work-study, and student loans. These types of financial aid, as well as the institution's tuition and the student's unmet needs, affect persistence.

Financial Aid

In general, financial aid is associated with higher persistence and graduation rates (The Pell Institute, 2004). The meta-analysis of Robbins et al. (2004) found that financial support, or "the extent to which students are supported financially by an institution" (p. 267) was correlated with persistence at .188 (see Table 3). Financial aid especially helps low-income and minority student persist (St. John, 2002; Swail, 2003). Financial aid is also associated with higher persistence in community college, which is a popular choice among lower income students (Goldrick-Rab, 2010). In reviewing 300 studies, Goldrick-Rab (2010) concluded that scholarships and need-based grants (such as Pell grants) might be beneficial for promoting persistence in community college.

However, Pascarella and Terenzini (2005) stated that there are mixed results when looking at the effect of scholarships and grants on persistence, and it is less clear *which type* of aid is most helpful. Some research finds that grant aid is positively related to persistence (e.g., Astin, 1993; Dynarski, 1999; U.S. General Accounting Office, 1995). By contrast, DesJardins, Ahlburg, and McCall (2002) found that over a 7-year period, grants had no relationship with persistence, while scholarships did. Though there are a wide variety of relationships between financial aid and persistence, Pascarella and Terenzini (2005) stated that studies finding a positive relationship between grants and/or scholarships and persistence are more frequent than studies finding a negative relationship.

Work-Study Programs

Financial aid in the form of work-study programs is also associated with higher persistence, as long as the student does not spend too much time working (Adelman, 1999; Beeson & Wessel,

2002; Heller, 2003; Institute for Higher Education Policy [IHEP], 2001; Kodama, 2002). Work-study programs can facilitate student persistence when the employment is aligned with students' academic interests and career goals (IHEP, 2001). Work-study programs may be beneficial because of the social integration and availability to academic opportunities that is associated with such programs, which can further promote persistence (St. John, Hu, & Weber, 2001).

Tuition and Student Unmet Needs

Research has shown that higher tuition is associated with lower student persistence, even when factors such as gender, age, race, and ethnicity are controlled (Cofer & Somers, 1998, 1999; Hippensteel, St. John, & Starkey, 1996; Kaltenbaugh, St. John, & Starkey, 1999; Paulsen & St. John, 1997). High tuition rates can prevent students, especially first-generation college students, from applying to and attending more selective institutions in favor of less selective institutions where persistence rates are typically lower (Goldrick-Rab, 2010). Another factor that impacts persistence is a student's ability to pay tuition, which can depend on a student's unmet needs. Unmet need is defined as the cost of attendance (tuition, fees, and other costs) after accounting for all financial aid and other monetary sources, such as student income and family contributions. Research has shown that in general, students with higher unmet need have a lower chance of persisting (Hippensteel et al., 1996; Kaltenbaugh et al., 1999; Paulsen & St. John, 2002), although we suspect that unmet need may simply be a proxy variable for SES.

Overall, the relationship between student finances and persistence are mixed, and more research is needed to determine the causal nature of the relationship. Research on student finances has been complicated by the many different types of financial aid, the varying amount of financial aid that a student can receive from year to year, and a wide array of factors to control for, such as gender, ethnicity, and age. In general, though, financial aid appears to have a positive effect on persistence, while higher tuition and higher unmet needs have a negative effect on persistence. Even so, given its obvious importance and the varieties of financial aid, there would appear an urgent need for a focused meta-analysis on this topic.

Environmental Pull Factors

Environmental pull factors constitute a collection of forces beyond the control of the student or institution that can pull the student away from academic and social campus environments, affecting persistence decisions (Bean, 2005; Nora & Wedham, 1991).

Environmental pull factors can also include critical life events such as divorce, job loss, and illness; however, there is a paucity of research on the effect of these life events on persistence. These factors are often directly related to persistence, although sometimes they affect persistence indirectly through intention to leave and institutional fit. The most relevant external pull factors are *employment* and *family obligations*, which we discuss below.

Employment

A significant majority of college students work while attending college (Pascarella & Terenzini, 2005). While employment can help lower unmet financial needs, it also limits opportunities for on-campus engagement and time commitment to coursework. Research suggests that the relationship between working and persistence is curvilinear (Pascarella & Terenzini, 2005). An increase in hours worked per week has been associated with poorer academic performance, scheduling issues, and lower persistence rates (Horn & Berktold, 1998). However, working while in school can have a positive effect on student persistence as long as the work is not too time intensive (Choy, 1999; Kuh et al., 2005; Pascarella, 2001). Some research suggests that working less than 15 hours per week is positively related to persistence, whereas working more hours per week is negatively related to persistence (Horn & Berktold, 1998).

Family Obligations

Family obligations, particularly in the form of children, spouse and/or siblings, also have an effect on college persistence. Hypothetically, these factors exert a positive effect on motivation and a negative effect on time (Leppel, 2002) and sometimes operate to offset each other. However, in general, being married, being a parent, particularly a single parent, caring for children including siblings, and delaying entry to college (a factor sometimes associated with being married and having children) are considered risk factors to persistence (Berkner et al., 2002). Despite this, results regarding the impact of marital status and being a parent on persistence are mixed. Astin (1975) found that married men are more likely to complete college, but married women are less likely. However, Leppel (2002) found being married was negatively associated with persistence irrespective of gender. Similarly, some studies suggest that having children positively influences persistence because the need to provide financial support increases aspirations and drive (Grosset, 1991). Other studies have found a positive relationship between

being a parent and persistence, but only for women (Leppel, 2002). Clearly these mixed results suggest the need for more contemporary research on this topic.

Summary and a Working Model

An immense amount of research has been conducted on persistence in higher education. This research has utilized a variety of perspectives. Some research is strictly empirically driven, whereas other research is informed by popular theoretical models developed by scholars such as Tinto (1975) and Bean (1980). In the current manuscript, we summarized the research in persistence by looking at eight factors that are common to each model. Predictors of persistence were found within most themes. Some of the best predictors of persistence identified included student background characteristics (especially SES), previous academic experience, and psychosocial and study skills factors, such as academic goals, self-efficacy, and academic skills. Additionally, one of the crucial lessons learned from the current review was the critical importance of first year college academic performance. Not only is first year academic performance the single best predictor of persistence (Pascarella & Terenzini, 2005), but first year academic performance mediates the relationship of several key factors to persistence, such as standardized test scores, high school grades, SES, student background characteristics, and motivation (J. D. Allen & Robbins, 2010; J. D. Allen et al., 2008; Westrick & Robbins, 2012). Importantly, this mediation effect occurs in both 2- and 4-year institutions.

We concluded that all the factors found to be associated with persistence could essentially be distilled to three categories: (a) things that *put a student on track* toward persistence, (b) things that *push students off track*, and (c) things that *keep students on track*. Below we outline a new working model of persistence that explicates this reasoning. The intention of putting forth a new working model is to provide a more parsimonious model that is generalizable to nontraditional students and a variety of institutional types, that attempts to account for persistence beyond the second year of college, and that incorporates recent research findings.

Working Model of Student Persistence

Our working model is displayed in Figure 4. First, we outline the meaning of the components (i.e., boxes) in the model. Table 4 defines components and provides a list of representative indicator measures that fit into each component. We have attempted to fit all indicators discussed in this review into each component and also include additional indicators that

could fit. The additional indicators represent potentially fruitful areas for future research. Next, we outline the relationships in the working model. These relationships are represented by numbered arrows on Figure 4. The model is based on the assumption that there are three basic factors in persistence: those that put you on track to persist (e.g., preparation, motivation), those that can pull you off track (e.g., out of class stressors), and those that keep you on track (e.g., self-management, social support). These factors interact to influence class performance and persistence.

On the bottom left of the model are characteristics that put a student on track to persist. The first characteristic is *academic preparation*, as indicated by variables such as ACT/SAT scores, high school course rigor, and high school GPA (see Table 4). The second characteristic is *academic motivation and study skills*, or the commitment to, drive toward, and perceived importance of academic success and skills to succeed academically. Academic motivation and study skills are indicated by variables such as conscientiousness, self-efficacy, goal commitment, interests, and study skills. We hypothesize that, independent of the presence of other factors, a student high in these characteristics would have a strong tendency to persist to graduation.

Countervailing forces to these characteristics are real-world experiences that divert attention, time, and other resources from educational pursuit. These experiences are reflected in the *out-of-class stressors* box on the upper-right section of the model. These out-of-class stressors can include important life circumstances such as having family obligations; breaking up with a spouse, girlfriend, or boyfriend; encountering a death in the family; or having health problems.

On the top left of the model are the factors that help keep students on track to persist. These are factors associated with how students handle the stress generated both by school and out-of-class stressors. First, there is *social support*, or the perceived availability of external resources to support academic success, which includes family support, financial aid, and institutional and climate factors. Institutional factors are included because some institutions (e.g., private schools) foster climates that can help students develop a strong social support system, which should be helpful in dealing with stress. Next is *self-management*, which is sensitivity to stress and the ability to anticipate and respond to pressure and stress. This includes coping styles, optimism, and emotional stability. As the work of Robbins and his colleagues has demonstrated, the model posits that the effect of these variables on persistence is mediated by college performance, as indicated by annual college GPA.

Table 4***Potential Construct Fit Within Model Components***

Component	Definition	Representative indicators
Academic preparation	Status of achievement and effort to learn as reflected in high school GPA	ACT/ <i>SAT</i> ^{ab} High school course rigor ^a High school GPA ^a
Academic motivation & study skills	Commitment to, drive toward, and perceived importance of academic success and skills to succeed academically	Academic goals ^a High school course rigor ^a Academic self-efficacy ^a Attitudes toward school Career fit Conscientiousness Goal commitment ^a Institutional commitment ^a Instrumental motivation Intentions ^a Interests ^a Metacognition Need for cognition Openness to experience Procrastination Study skills ^a Time management ^a
Social support	Perceived availability of external resources to support academic success	Academic integration ^a Campus climate Developmental education ^a Family support Financial aid ^a Social integration ^a Student faculty contact Student support programs
Self-management	Sensitivity to stress and the ability to anticipate and respond to pressure and stress	Agreeableness Coping styles Core self-evaluations Emotional stability Extraversion Optimism Test anxiety
Out-of-class stressors	Events that are incongruent with the goal of persistence	Family obligations ^a Employment ^a Financial pressure ^a Health Other life events
College performance	Academic performance in college	GPA

^a Discussed in the literature review.

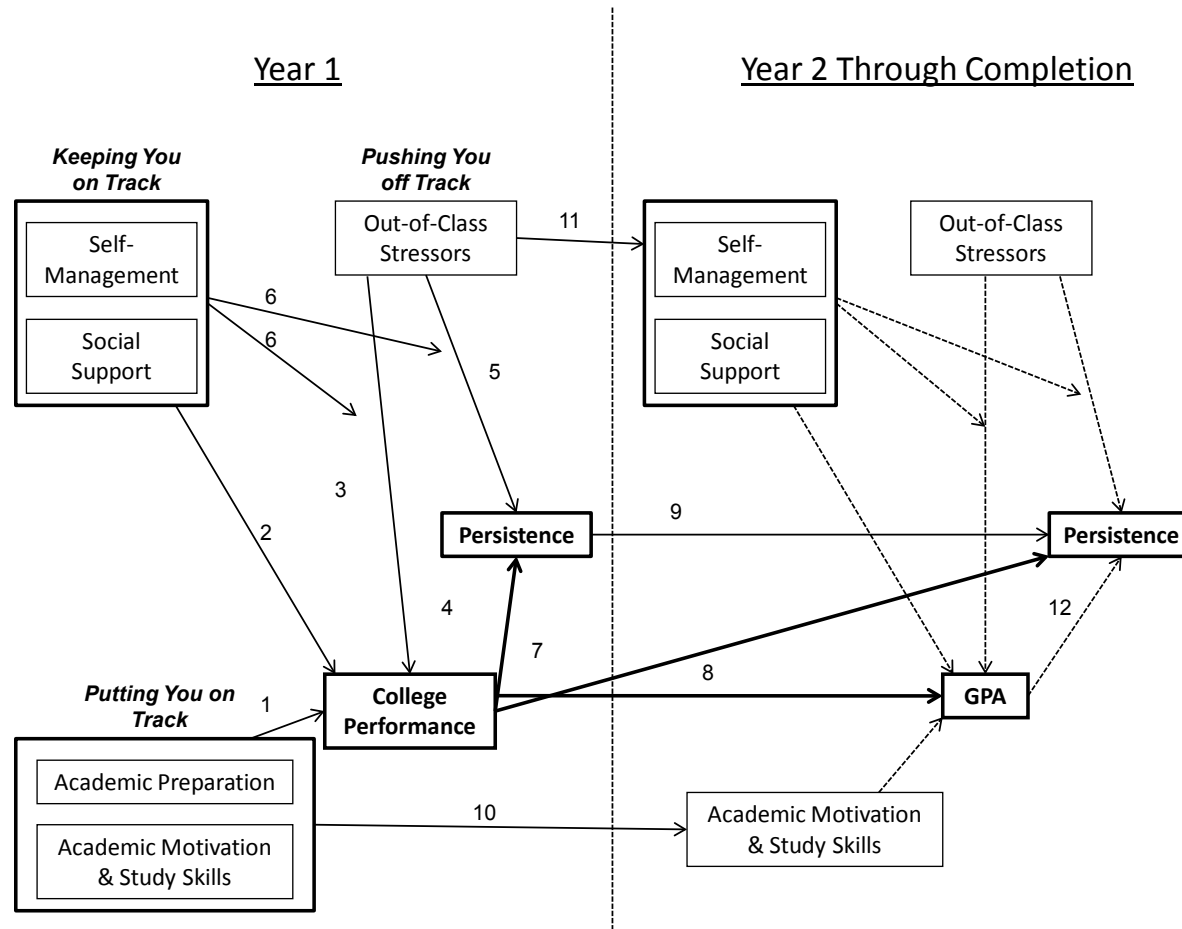


Figure 4. Working model of student persistence. The model assumes that the relationships depicted in the Year 2 Through Completion section will be repeated in Years 3 to graduation. The numbers on the arrows correspond to the numbered list of relationships provided in this section.

Relationships among model components are indicated by numbered arrows. Each arrow with a number represents a unique relationship. Relationships are repeated in the Year 2 Through Completion section of the model. These relationships are detailed below:

1. Academic preparation and academic motivation and study skills affect college GPA. These relationships are well established in the literature (e.g., Crede & Kuncel, 2008; Richardson et al., 2012; Robbins et al., 2004).
2. Social support and self-management affect college performance. Although these relationships may be less well established in the literature, there is some evidence that these variables should positively influence class performance. For example, students who feel fully integrated into campus life should perform better than those who do not (e.g., Pascarella & Terenzini, 1983; Stage, 1989; Terenzini et al., 1981).
3. Out-of-class stressors affect college performance. Those who have attention and resources taken away from their studies should perform worse in class than those who can pay full attention to school (e.g., Horn & Berktold, 1998; Robbins et al., 2004).
4. College performance predicts persistence. College grades are the best predictor of persistence (Pascarella & Terenzini, 2005). Furthermore, the model depicts that the effects of academic preparation, academic motivation and study skills, social support, and self-management on persistence are mediated by first year GPA. This is consistent with recent research by Robbins and colleagues (e.g., J. D. Allen & Robbins, 2010; J. D. Allen et al., 2008; Westrick & Robbins, 2012).
5. Out-of-class stressors also affect persistence directly. Those who have attention and resources taken away from their studies should persist at a lower rate than those who can pay full attention to school. At times, those with severe out-of-class stressors (for example, severe financial, medical, or personal crises) will fail to persist even if they are performing well in school (e.g., Berkner et al., 2002; Leppel, 2002; Robbins et al., 2004). For example, even a student with a perfect GPA may be forced to drop out of school if he or she loses the ability to pay tuition.
6. Social support and self-management moderate the relationship of out-of-class stressors to GPA and persistence. The relationship of out-of-class stressors to

performance and persistence should depend on one's ability to handle stress. There are several types of resources that may be available. For example, financial and emotional support from one's parents and coping in a task-focused rather than avoidant way can help one deal with stress. There is some evidence that shows that coping styles are related to college academic performance, commitment, and the experience of academic stress (e.g., Bray, Braxton, & Sullivan, 1999; MacCann, Fogarty, Zeidner, & Roberts, 2011; Smith & Renk, 2007). Additionally, one study found that coping styles predicted Latino student persistence in community college (Lesure-Lester, 2003). Finally, Eaton and Bean (1995) stated that coping is, "the sum of behaviors an individual uses to achieve academic and social integration" (p. 622).

7. First year college GPA predicts second year persistence (and persistence to Year 3 to completion). One recent study found that the predictive strength of first year GPA on third year persistence was stronger than the predictive value of second year GPA on third year persistence (Westrick & Robbins, 2012).
8. First year GPA predicts second year GPA (Westrick & Robbins, 2012).
9. Persistence to the second year predicts persistence to the third year.
10. Academic performance and academic motivation and study skills in the first year predict second year academic motivation and study skills. Relationships 8–10 also follow from the well-known maxim that past behavior is the best predictor of future behavior (e.g., Ouellette & Wood, 1998).
11. First year out-of-class stressors predict second year social support and self-management. Out-of-class stressors during the first year of school can impact the resources one has available to cope with new stressors in the second year of school. For example, out-of-class stressors in the first year can drain family financial support and make it more difficult for one to manage his or her time when new stressors come up in the second year (e.g., Paulsen & St. John, 2002).
12. Second year GPA predicts persistence to the third year. This is also consistent with recent research findings of Westrick and Robbins (2012). This relationship should be repeated for the third year through graduation.

Putting and Keeping Students on Track Working Model: Further Explication

A few points of clarification about the model (Figure 4) are in order. First, the relationships from first year college performance to first and second year persistence and second year college performance are bolded because, as noted in the review, the research of Robbins and his colleagues (J. D. Allen & Robbins, 2010; J. D. Allen et al., 2008; Westrick & Robbins, 2012) suggests that effect on persistence of most of the variables we are interested in is mediated by first year GPA, and first year GPA is a strong predictor of persistence to the third year. Second, several of the relationships in the Year 2 Through Completion section of the model are represented by dashed lines. (These include (a) the effect of out-of-class stressors on GPA and persistence and how self-management and social support affects each of those relationships; (b) the effect of self-management and social support, as well as the effect of academic motivation and study skills, on GPA, and (c) the effect of academic motivation and study skills on GPA). As far as we can tell from our review, these are relationships that have been rarely studied and represent fruitful areas for future work. Finally, for the sake of simplicity, we stop the model at Year 2 through Completion. However, this does not mean that persistence outcomes, such as third year completion, time-to-degree attainment, and getting a job in one's intended career path are unimportant. We hypothesize that the model can easily be extended, such that it follows the same basic structure of the current model, to also predict these other outcomes. Our decision to limit this to only 2 years was simply for the sake of clarity; representing all such years and outcomes would lead to an especially complex graphical representation of the model.

Advantages of the New Working Model

We believe there are some advantages to considering this model when generating new research studies. As these studies are conducted, the model may be revised to more accurately represent the new data. Some advantages of considering the proposed model in new research are provided below.

First, Tinto's (1975) model has been criticized as not applicable to the experiences of students who do not attend traditional 4-year institutions, such as community and commuter college students. Further, Bean's model (1980) has been found to heavily overlap with Tinto's (Cabrera et al., 1992). We believe that the new model's emphasis on stress and coping is much more applicable to the everyday, real-life experiences of students of all demographic characteristics and students attending different types of institutions. In this sense, our model does

share some similarities with the theorizing of Bean, who emphasized the role of coping in the process of integration.

A second advantage of the model is that it attempts to outline the longitudinal process of persistence beyond the second year. Previous models make no attempt to model year-to-year persistence. Specifically, we use recent research findings to demonstrate how first year performance has a long-lasting effect on persistence. In addition, we model how out-of-class stressors may impact social support and self-management from year to year, which can then impact one's response to future stressors in subsequent years.

Another advantage is that the model introduces new measures in component categories that are promising avenues for future research not covered in our review of the extant persistence literature. Additional research can be conducted on the relationship of these components to persistence. These measures include instrumental motivation (e.g., What good will come of my graduating from college?), coping styles, test anxiety, and life events. Finally, we note that several of the relationships indicated in the model could use stronger empirical backing. For example, the moderating relationship of social support and self-management on persistence requires further examination, as does the relationship of out-of-class stressors to future social support and self-management resources.

A Future Research Agenda

In order to evaluate and enhance the working model, a programmatic line of research could be conducted over the course of several years. These research needs can be classified into three categories: *immediate*, *intermediate*, and *long-term*. The following research directions reflect both implications of the proposed working model and needs identified by outside researchers of persistence in higher education. Because of space limitations, we focus on only a few of the most salient future directions in the current paper. These research directions are outlined in Table 5.

Immediate Research

Below we outline what we consider two critical, promising areas of persistence research that could be conducted starting immediately and completed within 3 years. These include studies of *differing institutional types*, and research on *relationships of demographic characteristics* on persistence.

Differing institutional types. Most research on persistence has been conducted with a single institution setting. In order to determine whether factors predict persistence over a number of different kinds of institutional settings and over a range of academic and student climates and cultures, research has to be conducted employing samples from several institutions at one time. Social integration, for example, might be more predictive of persistence in highly selective institutions, with climates that encourage social interaction among peers and where academic preparation is not an issue for persistence, than in colleges that do not.

The need for multi-institutional studies is especially important in community colleges. For example, Wortman and Napoli's (1996) meta-analysis (described previously) on community college academic and social integration included only six studies, the majority of which were single-institution studies. Although that particular study is now 16 years old, very few multi-institution community college studies have been conducted since its publication. One notable recent exception is Porchea et al. (2010; also described above), who studied 21 community colleges. Furthermore, Achieving the Dream (2011), which is dedicated to improving outcomes for community college students, including improving persistence, is also conducting multi-institution studies of community colleges. Achieving the Dream keeps a database, with data from a large consortium of community colleges, which includes student demographic data, student academic preparation, financial aid data, student performance, and student outcomes (i.e. degree or certificate attainment, transfer to another college). These data are publicly available and useful for answering some of the questions in which researchers may be interested. Answering other questions, however, will require new multi-institutional data collections.

In addition, there is also a need for research on persistence in commuter and urban colleges and universities. Students at commuter colleges and universities are less likely to have the opportunity to socially engage with campus life than students at residential colleges and universities have. Because of this factor, a different set of variables may be influential in predicting persistence at commuter colleges and universities. For example, external and internal coping resources may be much more predictive of persistence in commuter colleges than they are in residential colleges because students who attend these types of schools may experience more out-of-class stressors. However, there is currently a dearth of research on these types of institutions.

Table 5

Summary of Proposed Research Directions and Example Research Questions to Be Answered

	Immediate (1–3 years)	Intermediate (3–5 years)	Long-term (6 years and beyond)
	Differing institutional types Research questions: Are predictors of persistence found in previous research generalizable across institutions? What differences make a difference? Do the same factors predict persistence consistently across different types of institutions (e.g., community colleges; commuter colleges)?	Longitudinal research Research questions: What variables predict retention to the fourth and fifth years? What mediates the relationship of first year psychosocial factors and later year persistence?	Assessment development for community college Research questions: What new assessments are most promising for predicting community college persistence, as compared to 4-year college persistence? What innovations in assessment design need to be crafted to optimize such instruments?
39	Relationship of demographic characteristics to persistence Research questions: How are SES, race, education generational status related to persistence within and across institutions?	Behavioral compliance Research questions: Are the persistence rates of students who comply with academic demands (e.g., attend class, participate in class) higher than for those students who tend not to comply?	Persistence interventions Research questions: Are there interventions that are more effective than existing interventions at improving persistence? What are promising approaches to their design?
-		New assessment methods Research questions: Can validity threats of existing measures such as low test-taking motivation and socially desirable responding be addressed with innovative new assessments (e.g., forced choice methods)?	Developmental education Research questions: To what extent does performance in developmental education courses predict persistence?

Relationships of demographic characteristics on persistence. There continues to be a need for richer explorations of demographic variables on persistence, especially SES. Although it is clear from the review above that SES is related to persistence, more work is needed to determine the source of this relationship. As Tinto (2006–2007) stated, “much of the research commingles issues of race, education generational status, and income in ways that make it difficult to disentangle the independent effects of income” (p. 12). As such, there is value in research that disentangles/distinguishes SES from other related factors.

Additionally, it is important to conduct more research on how SES and other demographic characteristics interact with institutional interventions, policies instituted by the institution, and developmental education courses to increase persistence (Reason, 2009; Tinto, 2006–2007). As stated above, the increasing demographic diversity of the college-going population means that more students are entering college underprepared, emphasizing the need to conduct further research on the influence of developmental education on students from a range of backgrounds.

Intermediate Research

Below we outline what we consider to be three of the most important areas for persistence research in the next 3 to 5 years. These include the need for *longitudinal research*, research on *behavioral compliance*, and further research on *new assessment methods*.

Longitudinal research. The great majority of research on persistence focuses on retention through the first year (Pascarella & Terenzini, 2005). There is, therefore, a need for research on predicting persistence from freshman year through graduation. This has had a downside, namely focusing on examination of freshman year to the virtual exclusion of examining persistence over the long term. The lack of longitudinal research is surprising, given evidence of dropout rates in the sophomore year (sophomore slump), during which students experience depression, frustration, and dissatisfaction (Lemons & Richmond, 1987). Further, this work is necessary to fully investigate whether the factors related to persistence discussed in this paper directly influence retention or whether their effects are mediated or moderated by other factors (Pascarella & Terenzini, 2005). For example, are the effects of first-year out-of-class stressors on third year persistence mediated by their effect on second year coping resources? Multiple measurements of these factors over time would allow researchers to answer this question more completely. Moreover, longitudinal studies will allow researchers the opportunity

to make causal inferences about the predictors of persistence, with all the benefits this might have for informing educational policy.

In addition, longitudinal studies may reveal that factors differentially predict persistence depending on student characteristics and academic progress. For instance, institutional commitment may uniformly predict persistence irrespective of academic progress for students who do not transfer because the institution remains constant. However, institutional commitment may not be an accurate predictor of persistence for community college students who early in their academic careers express intentions of transferring. For these students, the departure by peers may negatively impact feelings of fit and consequently social integration may be a better predictor of community college persistence in the first 2 years of college.

The lack of longitudinal research beyond first year persistence is especially glaring for research on psychosocial and study skill factors. In one notable exception, the relation of motivation to third year persistence was examined by J. D. Allen et al. (2008), who conducted a 3-year longitudinal study in a sample of 23 four-year institutions. Results revealed that mean scores on academic discipline, commitment to college, and social connection were higher for students who stayed in school or transferred to another school than for students who dropped out. Logistic regressions were conducted controlling for several institution-level variables (e.g., enrollment) and student-level variables (e.g., gender, SES, first year academic performance). Regressions predicting staying in school versus dropping out indicated that college commitment and social connectedness had positive and significant effects on dropping out, although those relationships were small in comparison to the effect of first year academic performance. However, an analysis of whether students transferred or dropped out revealed nonsignificant effects for academic discipline, commitment to college, and social connection.

Behavioral compliance. Despite its intuitive appeal, little research exists on the relationship of the extent that one complies with the behavioral demands of college on persistence. By behavioral compliance, we mean behaviors expected of students, such as attending class, completing homework, and participating in class. These skills are likely related to the study skills variables described in our model. This would fit in the academic motivation component of our model. In what appears to be the only study that investigates behavioral compliance, faculty rated students on homework compliance, class attendance, class participation, and working with peers (Habley, Bloom, & Robbins, 2012). Results revealed that

students with high behavioral compliance dramatically outperformed students with low behavioral compliance on both academic performance and persistence. These results suggest that additional research on behavioral compliance may prove to be an especially fruitful area.

New assessment methods. Most of the previous research on persistence in higher education, especially the research on psychosocial and study skills, has employed traditional Likert-based self-ratings. Here the student rates, for example, his or her agreement on a scale ranging from *strongly disagree* to *strongly agree*. As new assessments designed to predict persistence in college are increasingly emphasized by institutions, the perception that these assessments are consequential for students is likely to emerge (see Lipnevich, MacCann, & Roberts, 2012). Indeed, it seems reasonable to assume that some of these assessments may become *medium stakes*. That is, they may determine student course placement, the need for remediation, and so forth. Students who wish to avoid being placed in remedial courses may thus be motivated to intentionally fake their responses on Likert-based assessments so as to appear more academically desirable (see Ziegler, MacCann, & Roberts 2011). In particular, self-report assessments that measure the academic motivation, study skills, and self-management components of our model may be easily faked: It is easy for a student to say, for example, that he or she is highly motivated to finish college, even if in truth he or she is ambivalent about the value of a college education. One solution to this problem is to develop items that are more difficult to fake.

One potential solution is to employ *forced-choice* items (e.g., Stark, Chernyshenko, & Drasgow, 2011). When answering forced-choice items, students are provided with a pair of statements and are asked to indicate which of the two is most like them (although variations can be created). Generally, these items are equated on social desirability, in order to decrease the chances that students will be able to choose the answer that makes them look the best, rather than the one that most accurately describe them. For example, it may not be obvious to students whether “I set goals” or “I start my work right way” is a better answer. Responses are usually then analyzed using item response theory.

Another potential solution is to employ *situational judgment tests* (SJTs; e.g., McDaniel, Morgesen, Finnegan, Campion, & Braverman, 2001). SJTs present participants with a situation and then ask them how best to, or how they might typically deal with, that situation. Situations can be described using text, video, audio, or perhaps even in video-game simulations. Because

these more closely resemble ability tests (e.g., they can have a best answer), they may be more difficult to fake than typical Likert rating scales. And in fact, Hooper, Cullen, and Sackett (2006) reviewed evidence stating that SJTs are less prone to faking than self-report assessments. Note that one advantage of this methodology is that can be applied to measure a wide variety of constructs and is legally defensible because it requires the acquisition of critical incidents as a first phase in the test development process (see, e.g., Wang, MacCann, Zhuang, Liu, & Roberts, 2009).

Finally, a third option in avoiding faking effects is to have others (e.g., professors, peers) rate students, rather than students rate themselves. One interesting and important aspect of other ratings is that ratings made by others are sometimes more predictive of important outcomes than are self-ratings (MacCann, Wang, Matthews, & Roberts, 2010).

Long-Term Research

Below we outline what we consider to be three of the most important areas for persistence research for 6 years and beyond. This work should build upon the work completed as a result of immediate and intermediate studies. Long-term research should include additional studies on *developmental education*, *research on persistence interventions*, and *assessment development for community college*.

Developmental education. Our review of the literature has certainly demonstrated an inverse relationship between enrollment in developmental courses and success. However, few rigorous, nationally based studies examining the relationship between developmental education and persistence exist. That is, more research is needed on the relationship of each of the following to persistence: varying conceptualizations of *college readiness*, the impact of additional resources (e.g., supplemental instruction, intrusive advising) for developmental students, and the effectiveness of efforts to redesign developmental education. As the number of students enrolling in both community colleges and developmental education continues to increase, so does the need for increased knowledge of the impact of developmental education. A better understanding will help to further illuminate the relationship in our model between academic preparation and college GPA and the indirect relationship of academic preparation to persistence. For example, it may suggest moderators of this relationship.

Persistence interventions. Perhaps one of the most effective ways to test relationships postulated in our model is to manipulate those variables that are amenable to change. In higher

education, these manipulations would come in the form of interventions designed to increase persistence. Robbins, Oh, Le, and Button (2009) recently conducted a meta-analysis of the efficacy of different types of interventions designed to improve persistence. Results revealed that self-management (SM) and academic skills (AS) interventions were most strongly associated with persistence, whereas socialization and first-year experience interventions were more weakly associated with persistence. Note that this is consistent with the formulation of our model, which places a central role both on self-management (the internal coping resources factor) and academic skills (the academic ability factor). The overall effect sizes of the meta-analysis were somewhat small; however, the authors suggested that more efficacious interventions might be created that combine the features of SM and AS interventions. Such an intervention might teach both emotional and self-regulation (the SM component) and also skills such as study skills, note-taking skills, and time management (the AS component).

The Robbins et al. (2009) meta-analysis included very few studies of interventions designed for community colleges; in fact, the authors of the study were not able to take into account many institutional factors at all, such as institution size, selectivity, and percent minority. Future work should focus on designing interventions specific to these different factors. In the community college arena, Achieving the Dream (2011) has begun documenting practices from seven community colleges that seem to be improving persistence. To the best of our knowledge, these practices, however, have not been subjected to peer review nor published in any journals that publish educational research. An initial step to developing an intervention for community colleges might be to synthesize the most promising practices from these seven community colleges.

Assessment development for community college. Finally, our review of the literature suggests that, although several assessments are available that measure most of the components of our model for students of 4-year institutions; there are few assessments that have been developed specifically to assess community college students. For example, an institutional commitment scale specifically designed and validated for community college students would be useful. Determinants of commitment to a community college are likely very different than the determinants of commitment to 4-year colleges and universities, and thus a measure of these determinants would be informative. Of course, many assessments that have been developed to assess students from 4-year colleges and universities can be easily adapted to assess community

college students. However, there may be room to improve several of these assessments, as well, as many constructs in persistence studies tend to be measured with short two-to-three-item scales.

It is important to note that ETS's Center for Academic and Workforce Readiness and Success (CAWRS) is currently working on a research project that has been informed by our working model and that addresses nearly every one of these research needs (it is currently titled the SuccessNavigator project). In this project, we have developed new and innovative assessments of motivation, study skills, social support, and self-management to test our model. Furthermore, this research addresses all research needs outlined in this paper, with the exception of persistence interventions and developmental education, as the newly developed assessment battery was completed by students at several types of institutions during 2012 and 2013. It is our hope that the results of our project will lead to further revision of our working model by using innovative assessment methods that improve upon the measurement of traditional predictors of persistence.

In summary, although several additional directions for future research can easily be identified by viewing our newly proposed model, we have summarized what we believe to be some of the most important directions above. We feel that the completion of this work will go a long way to improving our ability to predict who persists in higher education.

Policy Implications

Our working model of student persistence and the accompanying research agenda are relatively simple but in practice highlight several important issues for policy:

- Creating longitudinal systems for monitoring and improving student persistence starting in middle school and extending into post-secondary school (see Burrus & Roberts, 2012 for a brief review of persistence in school prior to college).
- Understanding the interplay of financial and family pressures and obligations (social capital) with individual student differences in determining academic outcomes.
- Taking a leadership role in promoting effective practices based on comprehensive assessment strategies that can be assimilated into institutional life using data integration platforms that connect the multiple inputs highlighted in our model.

- Understanding the unique and common factors across SES, race, and gender to create increased access and success for all students.

Additional policy implications are likely to come to light as the research outlined in this paper progresses. Clearly, the issues put forth here will be of interest to policy makers across the country.

Conclusion

We began our review by providing facts that supported our statement that a college education has value. It is because of this value that an abundance of research has been conducted on persistence in higher education over approximately the last 60 years. Despite the library of knowledge that has accumulated, there is still much to learn. It is our hope and belief that this review, our proposed model, and the completion of our agenda for future research will result in great strides toward improving persistence in higher education in our country. Such an outcome will benefit the welfare of individual students and society as a whole.

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