

TRACKING PUBLIC POST-SECONDARY
ENROLLMENT PATTERNS OF MISSOURI
A+ PROGRAM-ELIGIBLE GRADUATES

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Doctor of Education

by
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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

TRACKING PUBLIC POST-SECONDARY
ENROLLMENT PATTERNS OF MISSOURI
A+ PROGRAM-ELIGIBLE GRADUATES

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and hereby certify that, in their opinion, it is worthy of acceptance.

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DEDICATION

To my parents, Jim and Judy Galbreath, for their unconditional and unwavering support. They taught me that the pursuit of knowledge is noble, that learning should be savored, that education is a privilege to be treasured, that opportunities are infinite for those who can simultaneously dream and embrace hard work, that satisfaction for a job well done accrues only to those who risked the most and got the dirtiest, that those with privilege are obligated to contribute, that anything worth doing, is worth doing right, and that one's name should be associated first with integrity.

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ABSTRACT

The Missouri A+ Schools Program is primarily a high school improvement program, which includes a post-secondary financial incentive to encourage student participation. This statewide cohort study tracked a Missouri A+ Schools Program cohort's in-state public post-secondary experience. The study was grounded in post-secondary access literature and previous studies of statewide scholarship programs. Particular emphasis was placed on the influence of student demographic characteristics (Pell-eligible, racial/ethnic status, and first-generation) upon post-secondary enrollment patterns.

The A+ Schools Program incentive stipulates enrollment at a Missouri two-year public institution. The findings suggested that the majority of A+ students were not Pell-eligible, first-generation, or minority. However, the proportion of students who enrolled in post-secondary education between demographic groups was quite similar. The researcher noted that enrollment flow was directed to two-year institutions. Measures of academic preparation accounted for more variance in enrollment choices than demographic characteristics.

Minority students were found to be the most at-risk demographic group. Pell-eligible students were also found to be at-risk. However, there were no significant findings with regard to first-generation students. Rather, first-generation students performed at or above rates of students who were not first-generation. Overall, measures of academic preparation were stronger indicators of student enrollment behaviors than were demographic characteristics.

CHAPTER ONE

Introduction

This study tracked the statewide public post-secondary enrollment patterns of the 2002 Missouri's A+ Schools Program cohort graduates for three years beyond their high school graduation in order to understand the longitudinal effects of the A+ Schools Program on post-secondary enrollment patterns. Additionally, this study explored the relationship between student demographic characteristics and enrollment in a Missouri two-year public institution. Further, this study sought to explore potential unanticipated effects of this program in Missouri's public post-secondary sector.

The Missouri A+ Schools Program was developed in 1993 to improve high school graduates' opportunities through enhanced high school preparation and increased post-secondary access (A+ Schools Program Primer, n.d.). One of the primary goals of the A+ Schools Program is to "open new doors to higher education" (DESE A+ Fact Sheet, 2004) for those students who "might otherwise be unable to attend college" (DESE FY2005 budget, p. 11). "Students who graduate from a designated A+ School may qualify for state-paid assistance to attend any public community college or career technical school in the state" (DESE A+ Fact Sheet, 2004). A+ Program tuition subsidies are not provided to graduates enrolled in four-year institutions (DESE A+ Fact Sheet, 2004; Outstanding Schools Act, 1993).

The first A+ high school graduates were eligible to enter the post-secondary system in 1997 (House Committee on the A+ Schools Program, 1999). The number of program participants has grown each year and considerable state resources have been

invested. The A+ Schools Program reports that more than 40,500 Missouri high school graduates were considered A+-eligible in 2006 (Growth in the A+ Schools Program, n.d.). Additionally, the Missouri legislature has allocated more than \$185 million for the program between fiscal years (FY) 1995 and 2007 (M. Bartwell, personal correspondence, April 24, 2007; Growth in the A+ Schools Program, n.d.).

From 1998 to 2002, the percentage of students aged 18-24 enrolled in Missouri two-year institutions increased from 56% to 61%, but the percentage of students aged 18-24 enrolled in Missouri four-year institutions increased only from 80% to 81% (CBHE, 2004). This age group is important to this study as A+ Program graduates must use their financial incentive within four years of high school graduation (A+ Questions & Answers, 2005). However, between fall 2003 and fall 2004, there was a slight increase in first-time, full-time freshman headcount at Missouri public four-year institutions and a slight decline in first-time, full-time freshman headcount at Missouri public two-year institutions (CBHE, 2005). Overall headcount in the Missouri statewide post-secondary system increased very slightly from fall 2003 to fall 2004, but has increased by 11.5% since fall 2000 (CBHE, 2005). Existing research has not fully addressed the characteristics of the populations represented in those changing post-secondary enrollment patterns (Barbis, 2003; Jochems, 2004; Lee, 2003; Marble & Stick, 2004; Podgursky et al., 2004).

Additionally, previous research on similar statewide, merit-based scholarship programs has revealed significant disparities in effects upon post-secondary access for various populations. “Research is critical to clearly understand the outcomes, and unintended consequences, of such programs” (Marin, 2002, p. 113). Further, in

discussing statewide merit scholarships, Marin (2002) suggested that “additional research is needed on specific student populations” (p. 114).

No comprehensive analysis of the post-secondary enrollment patterns of A+ Schools Program students that includes student demographic characteristics has been conducted since the program’s implementation over a decade ago. Thus, it is not known how A+ Schools Program graduates access and participate in post-secondary education. Consequently, it is not known if the A+ Schools Program post-secondary access intent is being met.

Using data collected by state education agencies to track the post-secondary enrollment patterns of A+ Schools Program graduates could provide state- and institution-level policymakers with information about enrollment characteristics and trends. Understanding current post-secondary enrollment patterns and the relationship between student demographic characteristics and enrollment in a Missouri public institution in light of the A+ Schools Program is important for understanding the longitudinal effects on public post-secondary access in Missouri and for exploring potential unanticipated effects of this policy on the public post-secondary sector.

Conceptual Framework

Policy results from the process of transforming and accomplishing intentions (Hall & McGinty, 1997). However, the policy process does not exist in an isolated environment, buffered from and immune to other influences such as changing policy actors, stakeholder expectations and interpretations, economic situations, environmental conditions, and interactions with other policies (Behrens & Gray, 2001; Cooper, 2002; Fowler, 2004; Goldrick-Rab & Mazzeo, 2005; Hall & McGinty, 1997; Perna & Titus,

2004; Phelan, 2000; Morgan, 1997; Placier, Hall, McKendall, & Cockrell, 2000; Sorrel, 2003). Unforeseen or unanticipated responses often arise as policies are implemented and mature. These unintended effects must be considered when assessing policy outcomes (Cooper, 2002; Fowler, 2004; Hall & McGinty, 1997; Sorrel, 2003).

Capacity policies, such as education policies, are used to drive long-term improvements to a population's capacity to benefit from a public investment (Fowler, 2004; McDonnell & Elmore, 1987; Sorrell, 2003). State-level education policies are developed and implemented when a need is identified in the populace that can best be met with an investment of the state's substantial resources in order to make a "major, permanent change in the functional ability of an individual or an organization" (Fowler, 2004, p. 254). Investments that address statewide economic and workforce preparation concerns are examples of capacity policies. Along with intended policy outcomes, some of these policies may have unanticipated or unintended effects, particularly when the policies "enacted at one level" (Goldrick-Rab & Mazzeo, 2005, p. 109) have implications for the entire educational system.

The Missouri A+ Schools Program was enacted at the secondary level through its focus on improving secondary education. Although one of the program goals was to increase access to higher education for Missouri's public high school graduates by strengthening their academic preparation for college and providing funding for up to six semesters of post-secondary education at selected institutional types (DESE A+ fact sheet), the locus of educational improvement was secondary education. As Perna and Titus (2004) have noted, "Few researchers have explored the extent to which state public policies toward K-12 education influence the enrollment of students at different types of

higher education institutions” (p. 505). This statement is illustrated with the A+ Schools Program: its effect upon higher education in Missouri has not been studied. It is not known if Missouri post-secondary enrollments have increased overall as a result of this program and if they have increased in public community colleges and career technical schools in particular. An increase in enrollment at these institutions by traditional-age high school graduates may have affected enrollment in public four-year institutions, lowering their first-year enrollments but increasing their percentage of two-year college transfers.

Unintended Effects

One possible unintended effect of the A+ Schools Program could be creating transfer students in larger numbers than previous to the program. A+ students may only utilize their A+ financial incentives at approved Missouri public two-year institutions and area career and technical schools. As A+ students complete two-year programs or exhaust their A+ financial incentives, they have the option of transferring to a four-year school. Transfer students are often considered an at-risk student population (Clark, 1960; Dougherty, 1987; Hills, 1965; Karabel & Astin, 1975; Laanan, 2000; Rosenbaum, 1976; Rouse, 1993; Sacks, 1997; Townsend, 1995). Any movement between institutions necessitates a transition period and acculturation process for students as they adapt to a new environment with different expectations and cultures (Tinto, 1993). Students transferring from a two-year to a four-year institution are frequently ill-prepared for a transition to what is often perceived as a more rigorous academic and less personalized climate (Townsend & Wilson, 2006a). Poor academic and social engagement during the transition period can lead to “transfer shock” (Hills, 1965) when transfer student

achievement dips sharply during the first term at the receiving institution. Some students are able to adjust and re-calibrate their academic achievement in subsequent terms.

Others may leave the institution with a sense of failure.

Recent research related to the A+ Schools Program's college-going rates by Lee (2003) suggests that a second unintended effect of the program could be the effect of diverting students who could and would have initially attended four-year institutions to initial enrollment in two-year institutions. Researchers consider this phenomenon the diversion effect (Baker & Velez, 1996; Brint & Karabel, 1989; Cabrera, LaNasa, & Burkum, 2001; Clark, 1960; Dougherty, 1987; Pascarella & Terenzini, 1991; Rouse, 1993, 1998). This diversion may be problematic for those initially desiring a baccalaureate because some research has found that baccalaureate degree-seeking students who qualify to enroll initially in a four-year school, but choose instead to enroll in a two-year school, are 15-20% less likely to complete a baccalaureate degree than if they had initially enrolled in a four-year school (Pascarella & Terenzini, 1991, 2005).

The potential diversion effect on A+ Schools Program graduates who would have started at a four-year school is of concern. The net educational attainment of these A+ Program graduates could be lower than the net educational attainment of their non-A+ counterparts who start at a four-year school. Lessened formal educational attainment of some A+ Schools Program graduates would appear to be counter to the A+ Schools Program, as well as state economic and educational capacity, goals.

A third possible unintended effect has to do with whether the A+ Schools Program's financial incentive is making a difference in the ability of low-income students to access post-secondary education. While A+ Program graduates are expected to apply

for federal financial aid and to use other federal grant monies before using the A+ financial incentive, there are no financial eligibility restrictions for the A+ financial incentive based upon family income. The A+ Schools Program was designed, in part, to encourage post-secondary participation for student populations that historically had low participation rates because of affordability concerns (House Committee on the A+ Schools Program). However, because the A+ financial incentive pays only for tuition and 50% of book costs at qualified two-year public institutions and is paid only after other grant monies are applied (A+ Questions & Answers, n.d.), low-income students eligible for substantial Pell grants may receive little or no actual A+ funding. Additionally, A+-eligible students who desire an associate-level degree but who live too far from a qualified associate degree-granting institution to make commuting feasible and affordable may find other college-related costs prohibitive because A+ funds can only be applied to tuition and books.

Previous research has found that the “bigger the percentage of a high school’s graduates entering a Missouri public post-secondary institution, the higher the probability of that high school participating in A+ program” (Lee, 2003, p. 99). This suggests that A+ financial incentives could be funding graduates from high schools that have historically overcome affordability concerns and had higher post-secondary participation rates. Additionally, Lee found that “the benefits of the A+ Program seem to go to academically, rather than economically marginal students” (p. 157). A+ graduates in families with incomes of less than \$18,000 and students of color were less likely than middle-income, White students to take advantage of the A+ financial incentives and enroll in public two-year post-secondary programs. Further, more than 30% of the 2001

A+ graduates reported family incomes of more than \$50,000, while 18% reported family incomes of less than \$24,000 (Lee). In fact, in percentage terms, there were fewer A+ graduates with family incomes of less than \$24,000 than in Missouri high schools in general (Lee). This finding suggests that the financially marginalized students for whom the A+ Schools Program financial incentive was primarily targeted are not participating in the A+ Program and, subsequently, in post-secondary education at the same rate as students who traditionally accessed post-secondary education at higher levels and who are presumably more likely to have the ability to pay regardless of the A+ financial incentives. In essence, the A+ Schools Program may be subsidizing the tuition of students who may already have the means to pay for post-secondary education. Similar effects have been noted with other statewide merit aid programs (Binder & Ganderton, 2002; Cornwell, Mustard, & Sridhar, 2003; Dynarski, 2002, 2004; Heller, 2002, 2004, 2005; Stranahan & Borg, 2004).

Because of the dependent relationship of programs to policy, program effectiveness should be measured against program goals (Fowler, 2004) in the context of the dynamic social system in which it occurs (Sorrell, 2003). Consequently, these potential unanticipated effects should be considered in an assessment of the program's impact on post-secondary access. However, it is difficult to measure the impact of long-term economic and educational policies because the precision of the policy objectives is low, various stakeholders will select and weigh criteria differently, and immediate outcomes are often not evident in an investment that will take years to realize (Sorrell, 2003).

Literature Review

Since the focus of this research is on the post-secondary enrollment aspect of the A+ Schools Program, the context and environment in which this policy has been implemented is important. Therefore, a review of relevant statewide conditions and concerns during the time the A+ Schools Program was developed follows.

During the late 1980s and early 1990s, the State of Missouri commissioned a number of studies aimed at forecasting future workforce needs. Those studies predicted a shift away from the industrial and traditional agrarian economy to a service and knowledge economy that would require more advanced levels of formal education. An analysis of the educational levels of the state's citizenry revealed a general deficit and the need to focus and streamline the current education system to more appropriately address these deficiencies. Subsequently, the state developed a number of statewide policies intended to improve the quality and coherence of the K-16 system and to improve post-secondary access.

These new education policies included raised mathematics standards in the K-16 curriculum, institutional mission review and differential admissions standards for public post-secondary institutions, enhanced post-secondary technical education, statewide inter-institutional transfer and articulation expectations, and the A+ Schools Program (Blueprint for Higher Education, 1995; DESE A+ Fact Sheet, 2004; MDHE Admissions Standards, 2004; MDHE Missions and Roles, 2004; Missouri Credit Transfer Guidelines, 2005; Missouri K-16 Coalition, 1999; Technical Ed Now, 1996). The Missouri Department of Elementary and Secondary Education (DESE) and the Missouri

Department of Higher Education (MDHE) directed implementation of these policies, which have dramatically altered the Missouri public K-16 education environment.

The A+ Schools Program

Led by the efforts of Governor Mel Carnahan, Missouri established the “A+ Schools Program” through the passage of the *Outstanding Schools Act of 1993* (Missouri Senate Bill 380, §14, 1993). The original focus of the A+ Program was twofold: (1) eliminate the traditional three-track (college preparatory, general diploma, and technical) high school curriculum, and (2) re-tool Missouri’s vocational career training and encourage vocational preparatory students to extend their educational experience by seeking post-secondary vocational credentials at Missouri two-year institutions.

Accordingly, the A+ Program was aligned with other components of the Missouri *Outstanding Schools Act* and other state vocational technical initiatives, the federal School-to-Work Opportunity Act of 1994, and the developing federal Carl D. Perkins Vocational and Technical Education Act of 1998. A+ Program oversight was assigned to the Missouri Department of Elementary and Secondary Education’s Vocational Education director. However, during Missouri Senate Bill 380 legislative planning and implementation meetings, the A+ Schools Program post-secondary participation incentives were expanded beyond post-secondary vocational training to include all public post-secondary two-year certificate or degree offerings (R. McCampbell, personal communication, September 11, 2006).

A+ funds, generated by a state lottery, were first appropriated by the Missouri General Assembly in 1994 (House Committee on the A+ Schools Program, 1999). The A+ Schools Program goals include improving high school achievement and completion

rates, encouraging good citizenship through school volunteerism and drug prevention, and increasing the college-going rate (T. Barnes, personal communication, April 16, 2007; Outstanding Schools Act, 1993). The primary goal of the A+ Schools Program is to assure that all high school students are well prepared to pursue advanced education and employment. This goal is to be achieved through three secondary goals that form the cornerstones of the A+ Program: “raise academic standards in secondary schools, open new doors to higher education, and introduce high school students to the teaching profession” (DESE A+ Fact Sheet, 2004). Through the more clearly articulated post-secondary preparatory curricula and student tuition assistance of the A+ Schools Program, Missouri intended to provide improved and more evenly distributed statewide access to appropriate post-secondary education for Missouri high school graduates (T. Barnes, personal communication, April 16, 2007).

There were two primary incentives for participation in the A+ program. Substantial grant funding for curriculum enhancements provided the primary incentive for high schools. These grants were eliminated in 2001 in response to the state budget crisis, but schools can still apply and be accepted into the A+ Schools Program (A+ Schools website, n.d.). State-paid assistance, in the form of six semesters of free tuition, general fees, and up to 50% of book costs at any public community college or career technical school in Missouri, is the primary incentive for student participation (A+ Schools website, n.d.). Only students who graduate from an approved A+ Program high school and who meet the A+ Program eligibility criteria are eligible for the program financial incentives. A+ high school students must graduate with a 2.5/4.0 GPA, maintain at least a 95% attendance rate, perform 50 hours of unpaid tutoring or mentoring for

younger students, and maintain a record of good citizenship in order to meet initial post-secondary eligibility (A+ Schools Program website, n.d.). Eligibility requirements at the post-secondary level include enrolling full-time in an eligible Missouri public community college or vocational technical school and maintaining a 2.5/4.0 GPA. While students are expected to apply for federal financial aid and to use other grant monies before the A+ financial incentives, there are no eligibility restrictions for the incentive based upon family income.

Between FY 1995 and 2007, the Missouri legislature allocated more than \$185 million for the A+ Schools Program (Growth in the A+ Schools Program, n.d.). These allocations funded the curriculum improvement grants to high schools and the post-secondary financial incentives for A+ Program graduates. The first A+ Schools Program graduates were eligible to enter Missouri's post-secondary institutions in 1997.

According to an A+ Schools Program report, "more than 65,000 students have qualified to receive the A+ financial incentive since the program's inception...and more that 28,000 eligible students have utilized at least one semester of the financial incentive" (A+ Fact Sheet, 2006). These figures are substantial enough to impact Missouri post-secondary enrollment patterns.

Economic Changes Affecting the A+ Schools Program

The state economic and post-secondary tuition environment plays a crucial role in the fiscal well-being of public post-secondary institutions. The economic conditions through much of the 1990s were considered a boom time nationally for higher education. Missouri enjoyed similar economic conditions and strong revenue growth (Jones, 2003). In the period from 1992-2002, state appropriations increased 25% per student and state

grant aid per student increased 39% (Losing Ground, 2003). During that same time period, tuition at Missouri public two-year schools increased 109% and at public four-year schools 58% (Losing Ground, 2003). Post-secondary institutions in Missouri were enjoying unprecedented cash flow.

However, new state programs developed during good economic times often compete with existing programs for scarce funding when the economy takes a downturn (James, 2003). The A+ Schools Program, authorized in 1993 and appropriated in 1994, was developed during flush economic times. In 2002, a substantial downturn in the federal and state economies and significantly reduced state revenues caused Missouri legislators to employ desperate cost-cutting measures in order to balance the state budget. As a result, state appropriations to higher education decreased severely between FY 2002 and 2003 (Losing Ground, 2003). In response to significantly reduced state appropriations, Missouri post-secondary institutions dramatically increased tuition rates (Losing Ground, 2003). These changes in state funding circumstances and climate have resulted in a more a chaotic state education policy and program environment in which the A+ Schools Program has had to compete for increasingly scarce funds and resources.

Students have been significantly impacted by these troubled economic times as federal and state need-based aid has not kept pace with increased post-secondary costs (Baum & Payea, 2003; Callan, 2001). It is possible that A+-eligible students have responded to the allure of three years of free two-year college tuition differently than prior to the economic downturn as these uncertain economic conditions and soaring post-secondary costs have continued. Perhaps more A+-eligible students have chosen the two-year college incentive and either completed their post-secondary experience with a

certificate or associate degree or, as a cost-saving measure, transferred to a four-year institution after exhausting their A+ incentive.

Beyond the financial and economic challenges faced by the state and students, there are individual student characteristics that can affect post-secondary access.

Student Characteristics Affecting Post-secondary Access

A variety of student demographic characteristics affect the likelihood of students entering and completing post-secondary education, whether with or without A+ funding. These characteristics include race/ethnicity, income status, and level of parental education.

Race/Ethnicity. Many minority students face impediments to post-secondary education. Some of these barriers arise from inequities in educational preparation that can result from poverty and discrimination (Camara & Schmidt, 1999; Henriksen, 1996; Hoschild, 2003; Perna, 2005; Sacks, 1997). Subsequently, minority students, in the aggregate, participate and persist in post-secondary education and attain college degrees at lower rates than their non-minority counterparts (Astin & Oseguera, 2004; Camara & Schmidt, 1999; Heller, 2001; Mumper, 1996; Perna & Titus, 2004; Perna, Steele, & Hibbert, 2005; Sacks, 1997).

Low income status. Family income plays a crucial role in post-secondary access. Post-secondary education requires a substantial and immediate investment in long-term pay-offs. These immediate investments come in the form of tuition, fees, associated costs, and foregone earnings. The real and associated costs of attending college disproportionately affect low-income students, who are less likely to have the immediate financial resources or be able to forego or delay earnings (Callan, 2001; Camara &

Schmidt, 1999; Corrigan, 2003; Heller, 2001; Mumper, 1996; Paulsen & St. John, 2002; Perna & Titus, 2004; Podgursky et al., 2004).

First-generation college students. First-generation college students are “at a distinct disadvantage in gaining access to post-secondary education” (Chen, 2005, p. iii). Those who do gain access are considered an at-risk post-secondary population that struggles to maintain enrollment and earn a degree (Choy, 2001; Nunez & Cuccaro-Alamin, 1998; Pike & Kuh, 2005; Terenzini, et al., 1996; Warburten, Bugarin, & Nunez, 2001). First-generation college students are more likely to “delay post-secondary entry, begin at a two-year institution, and attend part time and discontinuously” (Chen, 2005). These characteristics have been shown to negatively impact post-secondary persistence and attainment (Astin, 1993; Choy, 2001; Corrigan, 2003; Dougherty, 1987; Nunez & Cuccaro-Alamin, 1998; Pike & Kuh, 2005; Terenzini, et. al., 1996; Terenzini, Cabrera, Bernal, 2001; Warburten, Bugarin, & Nunez, 2001).

There is a great deal of interconnectedness among these characteristics. First-generation college students are more likely to be from low-income families and minorities and are typically academically under-prepared (Chen, 2005; Perna, 2005). Each of these layers adds another barrier to post-secondary access. The A+ Schools Program is intended to break down affordability barriers and increase post-secondary access for students with these characteristics by “opening new doors to higher education” (DESE A+ fact sheet).

The A+ Schools Program was expected, in part, to improve post-secondary access for those students who “might otherwise be unable to attend college” (DESE A+ Fact Sheet, 2004). However, no specific populations, timelines, outcomes, measurable targets,

or criteria were specified, so measuring program impact and outcomes is difficult. In these kinds of situations, researchers have often used proxy measures of policy outcomes as a way to approach measuring progress toward policy goals (Perna & Titus, 2004). As research has consistently found that family background impacts post-secondary access opportunities (Astin & Oseguera, 2004; Choy, 1999 & 2001; Heller, 2001a; Karabel & Astin, 1975; Perna, 2005), students' race/ethnicity, parental income, and parental educational attainment can be used as proxy measures of the influence of family background on post-secondary access (Perna & Titus, 2004). Specifying representatives of policy target populations and analyzing their experiences and patterns provides insights on policy impact. Thus, Missouri public post-secondary enrollment patterns of A+ graduates were also examined in terms of students' race/ethnicity, parental income, and parental educational attainment.

Statewide Merit aid Scholarship Programs

In the past fifteen years, a trend toward large-scale, statewide, merit-based scholarship programs has developed (Doyle, 2005). These scholarship programs have flourished as need-based aid has dwindled (Baum & Payea, 2003; Doyle, 2005; Dynarski, 2002, 2003; Hauptman, 2001; Heller, 2001a, 2001b). Georgia's Helping Outstanding Pupils Educationally (HOPE) scholarship, the first and best known of these merit aid programs, was launched in 1993. Since then, fourteen states have developed similar merit aid scholarship programs (Doyle, 2005). Missouri's A+ Schools Program should be considered a merit aid scholarship program as it shares similar eligibility criteria and benefits with other statewide merit aid programs.

Researchers have found that there are consistent similarities between these statewide merit aid programs. Most were promoted by state policymakers as access policies designed to increase post-secondary participation and encourage bright students to attend in-state colleges, which would hopefully lead to keeping bright college graduates in the state as highly productive employees (Binder & Ganderton, 2002; Baum, n.d.; Doyle, 2005; Dynarski, 2002, 2004; Heller, 2005).

The effects of these statewide merit-based programs appear similar, as well. While most are expressly concerned with increasing post-secondary access and attainment, researchers have found that, in most instances, the benefits of these statewide, merit-based aid programs have largely gone to those who are middle- to upper-class White students and who would have attended college anyway (Binder & Ganderton, 2002; Cornwell, Mustard, & Sridhar, 2003; Dynarski, 2002, 2004; Heller, 2002, 2004, 2005; Stranahan & Borg, 2004). Low-income and minority students are at a disadvantage because the eligibility criteria are often based upon academic achievement measures that are known to discriminate against those populations (Dynarski, 2002; Heller, 2005).

Previous Research on the A+ Schools Program

There have been several studies of the A+ Schools Program (Barger, 2000; Jochems, 2004; Lee, 2003; MDHE, 2004; Missouri House Committee on the A+ Schools Program, 1999; Willis, 2003; Worts, 1999). Lee's (2003) analysis of initial college-going rates of A+ graduates found that the initial two-year post-secondary enrollment rates of A+ graduates increased while four-year enrollments decreased, giving rise to concerns regarding net post-secondary attainment. Lee also found that the "bigger the percentage of a high school's graduates entering a Missouri public post-secondary institution, the

higher the probability of that high school participating in A+ program” (p. 99). This finding suggested that financial incentives could be funding graduates from high schools that have historically overcome affordability concerns and had higher post-secondary participation rates. Lee’s research also noted that rural high schools were less likely to become A+ high schools. Additionally, Lee found that “the benefits of the A+ Program seem to go to academically, rather than economically marginal students” (Lee, 2003, p. 157) as A+ graduates in families with incomes less than \$18,000 and students of color were less likely than middle-income, White students to enroll in public two-year post-secondary programs. However, the scope of Lee’s research did not address if and where very low income and minority students do enroll in post-secondary opportunities. Still, this finding suggested that the marginalized students for whom the A+ Schools Program was primarily developed were not utilizing the A+ financial incentive at the same rate as students who already accessed post-secondary education at higher levels and who were more likely to have the ability to pay regardless of the A+ financial incentive.

In another A+ study, Barbis (2003) compared the high school graduation rates and initial post-secondary enrollment rates of A+ and non-A+ graduates from the Missouri high school class of 2002. This research found that “the A+ Schools Program has had a positive impact on the post-secondary enrollment rate in Missouri” (pp. 69-70). However, the research also found that after “controlling for the effects of [high] school size, socio-economic status, and percentage of minorities in a [high] school,” (p. 70) the A+ Schools Program no longer had a significant effect on post-secondary enrollment rates and suggested that some other factor/s might be responsible for the difference in post-secondary enrollment rates. Additionally, citing literature on residency and travel costs

associated with post-secondary enrollment, Barbis's analysis suggested that geography and distance from a public two-year school may be "significant factors in the post-secondary enrollment rates" (p. 70) of A+ Schools Program graduates. "The distance of an A+ [high] school from the nearest community college may be one of the most significant factors in the post-secondary enrollment rates of high school graduates of the A+ Schools Program" (Barbis, 2003, p. 70).

In a third study, focused on a single post-secondary technical school, Jochems (2004) found that A+ students and non-A+ students were comparable in terms of post-secondary institutional grade point averages (GPAs), enrollment in remedial courses, and institutional graduation rates. A+ graduates did not perform better at a statistically significant rate than non-A+ graduates. Post-secondary GPAs were of particular concern in this research as the mean cumulative GPA of A+ students was lower than the 2.50 minimum required to maintain A+ financial incentive eligibility. Still, Jochems found anecdotal evidence to suggest a positive relationship between the A+ Schools Program and initial post-secondary enrollment rates.

As Barbis (2003) and Lee (2003) have suggested, understanding the post-secondary enrollment patterns of Missouri's A+ Schools Program students is necessary to an assessment of the program's impact on post-secondary access in Missouri.

Post-secondary Enrollment Patterns

Increased post-secondary access is difficult to measure. Simply counting the number of students enrolling in post-secondary institutions is an inadequate measure. Studying disaggregated enrollment data, patterns, and longitudinal trends provides richer, more meaningful perspectives of post-secondary access policy. Some researchers have

contextualized post-secondary access through transfer student enrollment patterns as indicators of educational achievement or attainment (Adelman, 1999a; Astin, 1993; Hearn & Holdsworth, 2002; Karabel & Astin, 1975; Laanan & Sanchez, 1996; Mumper, 1996; Pascarella & Terenzini, 1991; Rouse, 1998; Terenzini, Carbrera, & Bernal, 2001; Tinto, 1993; Townsend, 1995). Others have focused on post-secondary enrollment patterns and attendance paths to measure access (Cabrera, LaNasa, & Burkam, 2001; Chen, 2005; McCormick, 2003; Perna & Titus, 2004; Perna, Steele, Woda, & Hibbert, 2005; Romano & Wisniewski, 2003). This research will study enrollment patterns rather than transfer patterns to include the students who did not enroll initially in a post-secondary institution or who have taken courses only from a single post-secondary institution, as they would not traditionally be considered transfer students. Disaggregating enrollment data and assuming a longitudinal perspective will provide information about the impact of the A+ Schools Program on Missouri public post-secondary institutions.

Statement of the Problem

An examination of post-secondary enrollment patterns of Missouri A+ Schools Program-eligible graduates beyond initial post-secondary participation is absent from the literature. Additionally, while previous research noted a negative relationship between family income and A+ financial incentive eligibility, that relationship has not been explored. Consequently, it is not known if or to what degree the A+ School Program's intended goal of increased access to post-secondary education is being met.

Additionally, Missouri four-year public institutions of higher education have experienced changing student enrollment patterns (MDHE, Statistical Summary, n.d.). The proportion of Missouri high school graduates who enroll initially in Missouri public

four-year institutions has decreased in recent years (Lee, 2003; Marble & Stick, 2004; MDHE, Statistical Summary, n.d.; Mueser, Lee, & Podgursky, 2004). At the same time, increasing proportions of recent high school graduates have been enrolling initially in Missouri two-year institutions (Marble & Stick; 2004; MDHE, Statistical Summary, n.d.). During a time of substantial cuts in the state higher education budget, spiraling operating costs, decreased grant aid, increased competition for students, and declining populations in rural areas, particularly in the traditional college-going age group, changing post-secondary enrollment patterns are of concern for policymakers (Boswell, 2004; Heller, 2001, Holden, 2004; MDEconDev, 2000; MDHE, Statistical Summary, n.d.; Losing Ground, 2003; Podgursky, et. al., 2004). Researchers have suggested that the A+ Schools Program's goal of increasing access may be contributing to these changing post-secondary enrollment patterns (Lee, 2003; Mueser, Lee, & Podgursky, 2004), but this possibility has not been fully explored.

Purpose of the Study

Programs are the vehicles that deliver policy. Policy results from the process of transforming and accomplishing intentions (Hall & McGinty, 1997). While the primary focus of the A+ Schools Program is at the secondary level, it was also designed in part to improve post-secondary access through improved high school preparation and post-secondary tuition incentives. Therefore, the purpose of this study is to track the statewide public post-secondary enrollment patterns of Missouri A+ Schools Program graduates for three years beyond their initial term of enrollment and analyze those patterns using selected student characteristics as measures of post-secondary access for specific populations. Additionally, this research will explore a possible relationship between Pell

grant eligibility and enrollment in a Missouri public two-year institution. Finally, this research will explore potential unanticipated effects of the A+ Schools Program in terms of post-secondary access in Missouri's public post-secondary sector.

Research Questions

R.Q. 1 What is the relationship between selected characteristics of students in the Missouri A+ 2002 cohort (Pell grant-eligibility status, first-generation status, racial/ethnic status) and the likelihood of these students enrolling in a Missouri public two-year college?

R.Q. 2 What is the relationship between selected characteristics of students in the Missouri A+ 2002 cohort (Pell-grant eligibility, first-generation status, racial/ethnic status) and performance in Missouri public post-secondary education?

Research Hypotheses

This study investigated the relationship between A+ graduates' demographic characteristics and enrollment patterns in the Missouri public post-secondary sector. The research hypotheses were as follows:

1. Missouri 2002 A+-eligible graduates who are Pell grant-eligible will enroll in a Missouri public two-year institution at a higher rate than their counterparts who are not Pell grant-eligible.
2. Missouri 2002 A+-eligible graduates who are first-generation college attendees will enroll in a Missouri public two-year institution at a higher rate than their non-first-generation counterparts.

3. Missouri 2002 A+-eligible graduates who are minorities will enroll in a Missouri public two-year institution at a higher rate than their White counterparts.
4. Missouri 2002 A+-eligible graduates who are not Pell grant-eligible will be more likely to earn grades sufficient to maintain A+ eligibility at a Missouri public two-year institution than will their counterparts who are Pell grant-eligible.
5. Missouri 2002 A+-eligible graduates who are not first-generation college attendees will be more likely to earn grades sufficient to maintain A+ eligibility at a Missouri public two-year institution than will their first-generation counterparts.
6. Missouri 2002 A+-eligible graduates who are White will be more likely to earn grades sufficient to maintain A+ eligibility at a qualified Missouri public two-year institution at higher rates than will their minority counterparts.
7. Missouri 2002 A+-eligible graduates who are not Pell grant-eligible will be more likely to earn a certificate or degree from a Missouri public two-year institution than will their counterparts who are Pell grant-eligible.
8. Missouri 2002 A+-eligible graduates who are not first-generation college attendees will be more likely to earn a certificate or degree from a qualified Missouri public two-year institution than will their first-generation counterparts.

9. Missouri 2002 A+-eligible graduates who are White will be more likely to earn a certificate or degree from a qualified Missouri public two-year institution than will their minority counterparts.
10. Missouri 2002 A+-eligible graduates who are not Pell grant-eligible will be more likely to transfer to a Missouri public four-year institution after earning a certificate or degree from a Missouri public two-year institution or exhausting the A+ incentive than will their counterparts who are Pell grant-eligible.
11. Missouri 2002 A+-eligible graduates who are not first-generation college attendees will be more likely to transfer to a Missouri public four-year institution after attaining a certificate or degree from a Missouri public two-year institution or exhausting the A+ incentive than will their first-generation counterparts.
12. Missouri 2002 A+-eligible graduates who are White will be more likely to transfer to a Missouri public four-year institution after attaining a certificate or degree from a Missouri public two-year institution or exhausting the A+ incentive than will their minority counterparts.

Method

Research Population

The research population was the graduating cohort of spring 2002 A+-eligible students. The Missouri high school class of 2002 represents a mature A+ Schools Program, was one of the first graduating classes to face dramatic tuition increases in its initial years of post-secondary eligibility (Losing Ground, 2003), and is the first class for which there are reliable Pell grant-eligibility data and Free Application for Federal

Student Financial Aid (FAFSA) records available from the Missouri Department of Higher Education (MDHE).

Data sources were A+ Schools Program eligibility lists maintained by the Missouri Department of Elementary and Secondary Education's A+ Schools Program director and the Enhanced Missouri Student Achievement Study (EMSAS) database maintained by the MDHE. First-generation data and low income data were obtained from FAFSA records held by the MDHE.

Research Design.

The first part of the research investigated the relationship between students' Pell grant eligibility, minority status, and first-generation status and fall 2002 enrollment in a Missouri public two-year institution. The second part of the research tracked the 2002 A+ Schools Program graduates through the first three years of their post-secondary eligibility to obtain post-secondary snapshots in time. Selected demographic characteristics of A+ Schools Program graduates, including level of parental educational attainment, Pell grant eligibility status, and race/ethnicity status were noted. Graduates were tracked into the 4th year following their high school graduation in order to meet the three-year program completion standard for two-year programs and to identify those students who might have transferred to a Missouri four-year public institution following two-year program completion.

Statistical analyses

Research question one utilized descriptive and discriminant function analyses to understand the relationship between A+ Schools Program graduates' eligibility for the Pell grant, minority status, and first-generation status and initial enrollment in a Missouri

public two-year institution. Research question two was studied using descriptive, chi-square, and discriminant function analyses to describe and analyze participation and achievement patterns of the 2002 A+-eligible graduates over a period of three years.

Definition of Key Terms

1. *A+ Program Graduates/A+ Program Qualifiers/A+ Program-eligible/A+-eligible*: Students who graduated from an A+ School as defined by the Missouri Department of Elementary and Secondary Education, who met the program completion guidelines, and who are eligible to receive A+ Schools Program tuition incentives (DESE A+ Fact Sheet, 2006).
2. *A+ Schools Program*: “A school-improvement initiative established by *Missouri’s Outstanding Schools Act of 1993*, intended to raise academic standards, open new doors to higher education and introduce students to the teaching profession through tutoring and mentoring activities” (DESE A+ Fact Sheet, 2004).
3. *ACT exam*: The American College Testing exam, which “assesses high school students' general educational development and their ability to complete college-level work” (www.ACT.org).
4. *Associate degree*: An earned academic degree with the term "associate" in the title and normally requiring at least 60 semester credit hours or equivalent at the lower-division level (MDHE, n.d.).
5. *Bachelor’s/Baccalaureate degree*: Any earned academic degree with the term "bachelor" in the title and normally requiring at least 120 semester credit hours of study (MDHE, n.d.).

6. *CBHE*: The Missouri Coordinating Board for Higher Education, “the head of the Missouri Department of Higher Education and constitutes the policymaking body for the Department of Higher Education” (Section 173.005, RsMo; 6 CSR 10-1010, 2001, p. 3).
7. *Census Date*: “A snapshot on the enrollment status of those students enrolled at an institution as of the 20th day of classes” (EMSAS Manual, 2005, p. 68).
8. *Community college*: A public two-year college subsidized by local and state funds that typically offers certificate and associate degree programs, but not baccalaureate programs.
9. *DESE*: The Missouri Department of Elementary and Secondary Education, which is the administrative arm of the State Board of Education. It is primarily a service agency that works with educators, legislators, government agencies, and citizens to maintain a strong public education system. The scope of the Department’s duties ranges from early childhood to adult education services. The Department does not regulate or evaluate private, parochial, or home schools.” Retrieved January 16, 2006, from: <http://dese.mo.gov/overview.html>
10. *Expected Family Contribution (EFC)*: “Measures [a student’s] family’s financial strength and is used to determine eligibility for federal student aid during one school year.... [An EFC is] based on the processing results of [the] Free Application for Federal Student Aid (FAFSA)” (FAFSA, n.d.).
11. *Enhanced Missouri Student Achievement Study (EMSAS)*: “A comprehensive student tracking system administered by Missouri’s Coordinating Board for Higher Education” (MDHE, 2005).

12. *Four-year colleges*: Institutions accredited to award baccalaureate degrees.
13. *First-generation college student*: “A college or university student from a family where no parent or guardian has earned a baccalaureate degree” (Pike & Kuh, 2005).
14. *Free Application for Federal Student Financial Aid (FAFSA)*: A free application that must be completed annually by prospective and continuing students in order to be considered for federal or state financial aid funds (Retrieved December 19, 2005, from: www.StudentAid.ed.gov).
15. *FTFTDS*: A first-time, full-time degree-seeking student in higher education (IPEDS, 1999).
16. *Intended/Anticipated effects of Policy*: “Government intentions are conceived as the explicitly and publicly stated purposes of government activities. Government intentions can for example be formulated in laws, policies or official directives” (Organisation for Economic Co-operation and Development, Working Definitions, n.d.).
17. *The Integrated Post-secondary Education Data System (IPEDS)*. “Established as the core post-secondary education data collection program for National Center for Education Statistics (NCES), is a system of surveys designed to collect data from all primary providers of post-secondary education. IPEDS is a single, comprehensive system designed to encompass all institutions and educational organizations whose primary purpose is to provide post-secondary education. The IPEDS system is built around a series of interrelated surveys to collect institution-

level data in such areas as enrollments, program completions, faculty, staff, and finances” (National Center for Education Statistics, n.d.)

18. *Low-income students*: “An individual whose family’s taxable income for the preceding year did not exceed 150 percent of the [U.S. Census Bureau’s] poverty amount” (Federal TRIO Programs, U. S. Department of Education, n.d.).
19. *MDHE*: The Missouri Department of Higher Education, the agency that carries out the goals and administrative responsibilities for the state system of higher education (MDHE).
20. *Missouri’s public system of higher education*: Includes thirteen public four-year colleges and universities, nineteen public two-year colleges, and one public two-year technical college (MDHE).
21. *Outstanding Schools Act of 1993*: The Missouri state statute that established and outlined the framework for the A+ Schools Program (Section 160.545, RsMo).
22. *Post-secondary Enrollment Patterns*: Categories of student enrollment movement through Missouri’s public post-secondary system. This categorization includes students who do not transfer to other post-secondary institutions.
23. *Public institutions of higher education*: Post-secondary institutions that receive substantial direct state appropriations to subsidize the student cost (Heller, 2001).
24. *Race/Ethnicity*: Categories used to describe groups to which individuals belong, identify with, or belong with in the eyes of the community. The categories do not denote scientific definitions of anthropological origins. A person may be counted in only one group. The groups used to categorize U.S. citizens, resident aliens,

and other eligible noncitizens are as follows: American Indian or Alaskan Native, Asian or Pacific Islander, Hispanic, White, non-Hispanic, Unknown (IPEDS, n.d.)

25. *Transfer student*: A student who moves between and among institutions (Bingham-Newman & Hopkins, 2004; Laanan, Poisel, & Savoca, 2005) and transfers enrollment credits to the new institution accordingly. Students who are enrolled full time at one institution during the academic year who take a few courses at another institution during the summer are not considered transfer students at the second institution in this study.
26. *Traditional age college student*: Students who are 18-24 years of age (Missouri Coordinating Board for Higher Education, n.d.)
27. *Two-year colleges*: "...any institution accredited to award the associate's in arts or science as its highest degree" (Cohen & Brawer, 1982, pp. 5-6; Rouse, 1998).
28. *Unintended/Unanticipated effects of Policy*: "The law of unintended consequences is that actions of people—and especially of government—always have effects that are unanticipated or 'unintended'" (Norton, n.d.)

Limitations, Assumptions, and Design Controls

Limitations

There are several limitations to this study. One limitation is study participants were all eligible for the A+ Schools Program financial incentive at the beginning of the study period. Comparisons could not be made with a similar group of students who were not eligible for the A+ incentive at the beginning of the study period. A second limitation is that post-secondary enrollment patterns can only be examined in Missouri's public post-secondary system. Data about enrollment patterns for students who attended in-state

private institutions, proprietary institutions, or out-of-state institutions were not available. A third limitation is that first-generation and income indicators were only available from the federal financial aid application data. Because A+ graduates who expect to use their financial incentives are required to complete a federal aid application, it was assumed that first-generation and income data for A+ graduates were complete and accurate. Finally, data stored in the EMSAS database are reported by post-secondary institutions on a specified census date approximately three weeks into each term. Consequently, information on students who were enrolled on the term's first date but dropped out prior to the census date was not reported.

Assumptions

Data were gathered from existing statewide databases managed by various state departments. It was assumed that these data were accurate.

Delimiters

There are several delimiters in the study. Only those students who enrolled as first-time, full-time, degree seeking students at a two- or four-year Missouri public institution were identified. Those who enrolled in private, proprietary, or out-of-state institutions did not appear in the database and were considered in the "not enrolled" post-secondary enrollment category. The not enrolled category also included students who did not enroll at all or delayed their enrollment in Missouri public post-secondary education.

Significance of the Study

There had been no statewide longitudinal study of the post-secondary enrollment patterns of A+ Schools Program graduates beyond initial enrollment or with an emphasis on at-risk populations. Also, no research had explored potential unanticipated effects of

the A+ Schools Program in terms of post-secondary access. Barbis (2003) and Lee (2003) suggested that future research on the A+ Schools Program should examine post-secondary enrollment patterns of A+-eligible low-income and minority students. Further, Marin (2002) noted that additional research on statewide, merit-based scholarship programs should examine specific student populations and unintended program effects. Binder and Ganderton (2002) noted that “merit-based scholarship programs may be marred by unintended...outcomes” (p. 2). Finally, Perna and Titus (2004) observed that little research has explored the influence of state K-12 policies upon different types of post-secondary institutions.

This study adds to the body of knowledge on the A+ Schools Program by tracking a statewide cohort of A+ graduates in the first three years of their post-secondary eligibility. Additionally, this study utilized multivariate and discriminant analyses to understand the relationship between a student’s eligibility for a Pell grant and other demographic characteristics with post-secondary participation and persistence in a Missouri two-year public institution. This research provides longitudinal insights regarding the statewide post-secondary access and enrollment patterns of an A+ cohort with particular focus on low-income students, minority students, and first-generation students. Finally, this research explored potential unintended effects of the A+ Schools Program on Missouri public post-secondary enrollment patterns.

Summary

The proportion of Missouri high school graduates who enrolled initially in Missouri public four-year institutions had decreased in recent years (MDHE, Statistical Summary, n.d.; Marble & Stick, 2004; Lee, 2003). At the same time, increasing

proportions of recent high school graduates were enrolling initially in Missouri two-year institutions (Marble & Stick; 2004; MDHE, Statistical Summary, n.d.). It may be that there is a relationship between the A+ Schools Program's tuition assistance for attending two-year schools and increasing two-year enrollments, as well as decreasing initial four-year enrollments. Existing research about the A+ Schools Program had not fully explored the longitudinal effects of the A+ Schools Program (Barbis, 2003; Jochems, 2004; Lee, 2003; Marble & Stick, 2004) on post-secondary enrollment patterns.

This study tracked the statewide public post-secondary enrollment patterns of a Missouri A+ Schools Program cohort for three years beyond their high school graduation in order to describe longitudinal patterns of post-secondary participation and performance. Additionally, this study explored the relationship between Pell grant eligibility, minority status, and first-generation status and enrollment in a Missouri two-year public institution. Further, this study sought to explore potential unanticipated effects of the A+ Schools Program in Missouri's public post-secondary sector.

This study is organized into five chapters. Chapter one is an introduction to the study. Chapter two provides a review of relevant literature. Chapter three presents the research design and methodology in detail. Chapter four presents the findings of the study. Chapter five summarizes and analyzes the findings and discusses the study's implications for research and practice.

CHAPTER TWO

Literature Review

The purpose of this study was to track the statewide public post-secondary enrollment patterns of a Missouri A+ Schools Program cohort beyond their high school graduation and analyze those patterns using selected student characteristics as measures of post-secondary access for specific populations. In addition, this research explored potential unanticipated effects of the A+ Schools Program in terms of post-secondary access in Missouri's public post-secondary sector.

Policy results from the process of transforming and accomplishing intentions (Hall & McGinty, 1997). As increased post-secondary participation is one goal of the A+ Schools Program, the A+ financial incentive could be described as a post-secondary education access policy inducement. Because education policies and programs operate in a very complex and dynamic environment (Levin, 2001; Toutkoushian, 2003), there are inevitable unintended interactions and outcomes (Fowler, 2004). Assessments of policy and program effectiveness should include an evaluation of these unintended effects (Cooper, 2002; Fowler, 2004; Hall & McGinty, 1997; Sorrel, 2003). Accordingly, the concept of unintended effects of a post-secondary education access policy's effects on statewide post-secondary enrollment patterns frames this research project. The concept will be expanded upon in a later section in the context of post-secondary education policy and program evaluation.

The first part of this chapter will review human capital and public sector economic theory to frame a discussion of education policy that includes literature on

post-secondary access, the unintended effects of post-secondary education access policy, and statewide merit-based scholarship programs. Finally, a review of the existing literature on Missouri's A+ Schools Program will illustrate the absence of and need for research that tracks the post-secondary enrollment patterns of A+ graduates in a longitudinal fashion and that explores potential unintended effects noted by previous researchers.

Post-Secondary Education as a Vehicle for Development of Human Capital

Human capital theory holds that individuals will invest in enterprises, such as post-secondary education, that they believe will improve their human capital or productive capabilities (Jackson & Weathersby, 1975; Heller, 1997; Leslie & Brinkman, 1988; Paulsen, 2001a). However, in a free marketplace, investment is governed by means. Those with the means to participate are more likely to participate. Paulsen (2001b) suggested that "investment in higher education takes place in the context of imperfect capital markets" (p. 102). Private ability to invest in a very costly venture may be so limited and the benefits so important to society that government interventions are warranted (Paulsen, 2001b). Consequently, public sector economic theory, a parallel concept to human capital theory, holds that because society benefits exponentially from investments in post-secondary education through increased productive capabilities, society should help fund the public post-secondary enterprise (Callan & Finney, 2002; Heller, Leslie & Brinkman, 1988; Mumper, 1996; Paulsen, 2001a, 2001b).

Government values regarding public concerns are articulated through public policies. Fowler (2004) defined public policies as "the dynamic and value laden process through which a political system handles a public problem. It includes a government's

expressed intentions and official enactments as well as its consistent patterns of activity and inactivity” (p. 9). Government interventions that underpin and guide public response to public economic concerns can be articulated through capacity policies.

The basic tenets of capacity policy, a tool used by policymakers to drive long-term improvements to a population or institution’s capacity to access and benefit from a public investment, are rooted in public sector economic theory (Fowler, 2004; McDonnell & Elmore, 1987). Capacity building policy presumes that a public condition exists that can only be mitigated by the investment of substantial public funds. Further, the full effects of the public investment will be distant, ambiguous, and difficult to measure (Fowler, 2004; McDonnell & Elmore; Sorrell, 2003). “Capacity building assumes (a) that in the absence of immediate investment, future material, intellectual or human benefits will not be realized by society; and (b) that these longer term benefits are either worth having in their own rights, or are instrumental to other purposes that policymakers regard as important” (McDonnell & Elmore, p. 143). Mumper (1996) applied this reasoning to higher education subsidies: “Public money spent today to remove college price barriers cannot be expected to produce an immediate payoff. Policymakers, and the public more broadly, must recognize that such spending will bring benefits in future decades and to future generations” (p. 227). “The most fundamental educational responsibility of government is the development of the high levels of knowledge and skills that are needed for individual and societal success” (Callan & Finney, 2002, p. 31). Investments in education are investments in human capital.

Paulsen (2001a) defined human capital as “the productive capabilities—knowledge, understandings, talents, and skills—possessed by an individual or society” (p.

56). Investments in human capital include expenditures “on education...that augment productive capacities” (Paulsen, 2001b). In general, investments in education are responsible for fifteen to twenty percent of an economy’s growth (Leslie & Brinkman, 1988). Workforce productivity increases 1.2 percent “for each one-percentage point increase in the share of a state’s high school graduates who [have] college degrees” (Paulsen, 2001b, p. 100). There are clear relationships between public investments in education and workforce productivity. Much of this workforce productivity is external to the individual college graduate. Rather, an individual college graduate’s increased productivity engenders increased productivity of co-workers (Paulsen, 2001b).

Accordingly, the component benefits of human capital are twofold: (a) individual or private benefits that accrue only to the individual investor, and (b) external, public, or social benefits that accrue to society as a result of individual benefits (Paulsen, 1996). In theory, individuals rationally weigh the costs of investing in a college education against the benefits of the investment (Paulsen, 2001a). These costs include foregone earnings and direct costs such as tuition, room and board, travel, etc. Individual or private benefits include monetary benefits such as increased economic opportunity and personal wealth and non-monetary benefits such as quality of life (Paulsen, 2001a).

Increased economic opportunity and personal wealth are closely related. College graduates typically earn more because they have substantially greater opportunity and status (Mumper, 1996). While estimates differ based upon the variables, the monetary benefits of higher education are indisputably substantial. The earnings gap between those with a high school diploma and a two year degree is 18-25% (Grubb, 1999). The earnings gap between a high school diploma and a four-year degree is 55% (Bureau of Labor

Statistics, n.d.). The earnings gap between those with high school diplomas and advanced degrees averages 208% (Bureau of Labor Statistics, n.d.). The earnings gap is compounded throughout a working lifetime. “According to the Census Bureau, over an adult's working life, high school graduates earn an average of \$1.2 million; associate's degree holders earn about \$1.6 million; and bachelor's degree holders earn about \$2.1 million” (Day and Newburger, 2002, as cited in Porter, 2002).

Non-monetary benefits of higher education accrue to the individual, as well. Those with college degrees save more, enjoy better working lives, job security, fringe benefits, and professional mobility, exhibit better consumer decision making, experience better overall health, have stronger cognitive skills, enjoy more hobbies and leisure, and increase the quality of life for their children (Institute for Higher Education Policy, 1998; Mumper, 1996; Pascarella & Terenzini, 1991; Rowley & Hurtado, 2002). Further, these benefits have been shown to extend into succeeding generations (Cohn and Geske, 1992).

The public or social benefits of higher education result from those private benefits. Better jobs with higher wages translate to increased spending and tax revenues (Paulsen, 1996). Additionally, Mumper (1996) discussed the “neighborhood effects” (p. 14) of higher education, which include lower crime, increased civic engagement through charitable giving and volunteer work, and stronger political participation. Rowley & Hurtado (2002) suggested that those with college degrees are more open-minded, less prejudiced, and more concerned with world affairs. The benefits of post-secondary education extend far beyond the individual and exponentially impact the public good. External productivity is a substantial public benefit.

A college degree has taken on even more importance as a shift away from a traditional labor society towards a knowledge society occurs. This shift places a critical emphasis upon a society's ability to capitalize upon its intellectual capital to successfully compete in a global marketplace (Drucker, 2001; Preskill & Torres, 1999; Nanaka & Takeuchi, 1995; Senge, 1990). This global marketplace is increasingly focused on the production of knowledge, rather than the production of goods (McDonough, 2004). Leadership and collaborative, organizational learning are fundamental to a knowledge society (Bruffee, 1999; Drucker, 2001; Nanaka & Takeuchi, 1995; Preskill & Torres, 1999; Senge, 1990). The societal focus on knowledge and service demands a cognitive skill set that requires intellectual capacity and agility from all participants (McDonough, 2004; Senge, 1990). Post-secondary participation and attainment are critical to the development and enhancement of these skills (McDonough, 2004). Post-secondary participation and attainment are inextricably linked to post-secondary access.

Post-secondary Access and Its Costs

Deeply held democratic beliefs about providing equal opportunity to participate and benefit are reflected through the concept of post-secondary access. The Education Commission of the States (2001) has defined post-secondary access as “the availability of high-quality post-secondary education opportunities for all students, regardless of race, ethnicity, income, or gender” (¶1). Mumper (1997) defined post-secondary access as equal opportunity that extends to “all those who have the ability and the desire to attend college” (p. 21). Heller (2001a) broke the concept of access into component parts that include: (a) financial accessibility, (b) geographic accessibility, (c) programmatic accessibility, (d) academic accessibility, (e) cultural/social/physical accessibility. Taken

together, these components suggest that in order to be considered accessible, quality public post-secondary education must offer an appropriate range of academic programs that are well dispersed geographically, and students must have financial means and be academically, culturally, and socially prepared.

Governments develop policies and programs to ensure that the greatest number of citizens is able to participate in and complete post-secondary education. Post-secondary access policies include components that address academic preparation and affordability.

Post-secondary affordability simply has to do with whether a student can afford to attend higher education and, if so, what kind of institution s/he can afford. “This issue can be examined from a number of perspectives, including growth in prices relative to family income, the resources families need to manage college prices on their own, and the extent to which financial aid reduces the price of attending” (Choy, 1999, p. 14). Affordability, then, is of concern to most students at some level. Subsidizing higher education is one way that governments distribute the costs and benefits of economic activity in order to stabilize production and employment (Paulsen, 2001a). Government subsidies in education are investments in human capital and are a primary component of post-secondary access policy.

The cost of higher education is a relative relationship based upon perspective. A macro-economic perspective’s definition of cost “considers society as a whole and includes all costs spent for higher education to produce all the outcomes and outputs” (Lewis & Dundar, 1999, p. 135). In contrast, a micro-economic, individual student perspective focuses on costs related to opportunity, tuition, and related costs such as books and transportation (Lewis & Dundar, 1999). Individual students are far more

attuned to individual costs associated with higher education than with macro-economic benefits associated with their investment.

Because of the economic externalization effect, an individual student cannot fully comprehend the societal benefit of higher education and, because of high tuition and associated costs, will subsequently underinvest in individual costs of higher education (Mumper, 1996; Paulsen, 2001a). Individual underinvestment results in decreased public good. Therefore, governments intervene with subsidies to students and institutions to make higher education more affordable, which, in turn, increases the likelihood of individual enrollment (Mumper, 1996). The higher the subsidies that help offset college costs, the greater the probability that students will enroll in and complete post-secondary programs (Mumper, 1996; Paulsen, 2001b). Government subsidies in higher education provide more opportunity for individual internalized benefits that motivate individual students to in turn benefit externalized publics through increased organizational and societal productivity.

There are basic societal assumptions regarding who should pay for the costs of a college education. Various philosophies regarding the formula or mix of funds and subsidies are underpinned by the human capital theory of microeconomics and public sector economics (Paulsen, 2001a, 2001b). Deeply held democratic beliefs about providing equal opportunity to participate and benefit are reflected in government perspectives on the value of post-secondary education and are embodied through many government subsidies and programs (Center for Public Policy, 2003; Mumper, 2003). Essentially, public post-secondary education is both a private and public investment and, as such, it should be funded by both private and public sources.

In reality, very few could afford to attend college if made to pay actual costs. In order to increase college participation, the government provides funds and support through a myriad of programs and statutory responsibilities (Center for Public Policy, 2003). The individual states bear the primary responsibility for education funding and policy, but state policy intersects with federal and local education funding policy, as well (Baum & Payea, 2003; Center for Public Policy, 2003; Toutkoushian, 2003).

Historically, the broadest and most substantial support has been through government subsidies to public post-secondary institutions, which allow for considerably discounted participation rates for all who attend regardless of socio-economic circumstance. This approach is considered a “universal design” (Mumper, 2003, p. 38) approach to increasing post-secondary access. Heckman (2000) estimates that students “pay, on average, less than 20% of the direct cost of attending college” (p. 12).

Another subsidy philosophy advocates targeting aid toward the most needy (Mumper, 2003). Here, government subsidies are directed through grants to the most disadvantaged and government guaranteed loans to the more financially and socially advantaged (Baum & Payea, 2003; Mumper, 2003). This targeted student aid funding helps students pay actual user fees such as tuition, room, and board and is crucial to improving participation and opportunity for the disadvantaged (Baum & Payea, 2003; Mumper, 2003).

Mumper (1996) chronicled the development of large targeted student aid programs. The G.I. Bill, developed for soldiers returning from the World War II, was the first large-scale government student aid program that targeted a specific population. During the Cold War, targeted aid for skill sets that could advance technology was

common. Throughout the 1970's and as a result of the Higher Education Act of 1965, federal student aid programs expanded rapidly and provided vastly improved post-secondary opportunities for the disadvantaged. However, by 1980s, the post-secondary participation rate gap between the advantaged and disadvantaged began to grow again until it reached about the same levels where it had started in 1970. During the 1980s and 1990s, a significant shift away from need-based financial aid toward other forms of student aid occurred.

Regardless of its form, government financial assistance has not keep up with soaring college costs and the gap between the advantaged and the disadvantaged has continued to grow, making post-secondary affordability a continuing policy concern (Baum & Payea, 2003; Callan, 2001). Accordingly, policies and programs have been enacted to address post-secondary access and affordability concerns (Baum & Payea, 2003). Sometimes an evaluation of post-secondary education access policies and programs reveals unanticipated outcomes or unintended effects.

Unintended Effects of Education Policy

Policy results from the process of transforming and accomplishing intentions (Hall & McGinty, 1997). Because education policies and programs operate in a very complex and dynamic environment (Levin, 2001; Toutkoushian, 2003), there are inevitable unintended interactions and outcomes (Fowler, 2004). Assessments of policy and program effectiveness should include an evaluation of these unintended effects (Cooper, 2002; Fowler, 2004; Hall & McGinty, 1997; Sorrel, 2003). "History has shown us that unintended consequences can have far-reaching effects" (Jones, Jones, & Hargrove; 2003; p. 3). Because education policies and programs operate in a very

complex and dynamic environment with constantly-changing actors and influences (Hearn & Holdsworth, 2002; Levin, 2001; Toutkoushian, 2003), there are inevitable unintended interactions and outcomes (Fowler, 2004). These inevitable interactions can be exacerbated by conflicting agendas and disagreement regarding targeted populations and policy purpose (Hearn & Holdsworth, 2002). “Federal, state, and institutional policies and practices appear to be in a period in which substantial changes in policies and practices are taking place, but without the benefit of a thorough analytic approach and foundation for insightful policy formation, implementation, and evaluation” (Paulsen & Smart, 2001, p. 1). Researchers agree that the present educational policy environment is extraordinarily complex, which increases the risk for significant unintended effects.

The complexity of the current higher education policy environment is illustrated by policies concerning access to post-secondary education. These policies reflect the tension between the democratization of higher education through providing access to everyone while ensuring that those who display academic talent are rewarded for their merit.

The role of the community college is often at the center of tensions regarding post-secondary access policies. The Missouri A+ Schools Program financial incentive can only be used at Missouri public two-year institutions. Accordingly, this post-secondary access component of the A+ Schools Program is related to the literature on the role of the two-year community college.

There is some debate regarding the apparent role that first institutional attendance choice plays in students’ educational attainment and subsequent socio-economic status (Astin, 1993; Astin & Osequera, 2004; Monk-Turner, 1998; Pascarella & Terenzini,

1991, 2005). The following will articulate that debate and will be followed by a review of transfer student literature that is relevant to conversations about students who begin their post-secondary experiences at a community college and expect to transfer to a baccalaureate institution. As many policies impact the educational experiences of students, unintended effects of post-secondary policies related to community colleges and/or transfer student experiences will be discussed.

Community College Democratization and Diversion.

The concepts of democratization and diversion constitute two scholarly perspectives regarding community colleges. Democratization arises from functionalist beliefs based upon human capital theory and individuals' desire for upward social mobility. Democratization reflects the belief that community colleges increase access for low-income, minority, non-traditional, or under-prepared students by providing affordable and accessible post-secondary education (Dougherty, 1987; Laanan, 2000; Leigh & Gill, 2003).

The concept of diversion arises from the "class reproduction school of community college scholarship, which argues that community colleges reproduce the class structure of our capitalist society by producing graduates trained and socialized for work in capitalist enterprises and by insuring that children inherit their parents' social-class position" (Dougherty, 1987, p. 86). The concept of diversion presumes that community colleges provide lesser quality education and that, for those seeking to earn a baccalaureate, community college attendance can impede baccalaureate attainment. Diversion assumes that because those from lower socio-economic backgrounds, minorities, and first-generation students tend to enroll in community colleges at a higher

rate than those from higher socio-economic backgrounds, and because some researchers believe that community college attendance impedes overall educational attainment, policies and practices that divert students into the community college may serve to perpetuate socio-economic stratification (Astin & Oseguera, 2004; Brint & Karabel, 1989; Clark, 1960; Dougherty, 1987; Karabel, & Astin, 1975; Kurlaender & Flores, 2005; Leigh & Gill, 2003; Monk-Turner, 1998; Pascarella & Terenzini, 1991; Rosenbaum, 1976).

Supporters maintain that community colleges offer convenient, affordable, open access to post-secondary education. “Community colleges provide the opportunity for people from all walks of life to advance their education and careers, regardless of their educational background” (Laanan, 2000, p. 19). As such, the community college serves many masters. It enrolls substantial percentages of minorities, women, and non-traditional students (Laanan, 2000; Monk-Turner, 1998; Nevarez, 2001; Pascarella & Terenzini, 1991). It is often considered responsible for remedial education, vocational technical education, lower cost associate of arts or four-year preparatory education, and, increasingly, workforce training and re-training (Dougherty, 2001; Laanan, 2000, 2001, 2003; Townsend & Wilson, 2006b; Townsend & Twombly, 2001a). In a rapidly globalizing world where post-secondary education is increasingly important and costly, the multiplicity of community college roles fosters complex service and accountability responsibilities (Laanon, 2001; Levin, 2001; Townsend & Wilson, 2006b; Townsend & Twombly, 2001a).

Estimates of democratization/diversion. Community college supporters and critics do not agree on the effects of diversion or democratization. Supporters posit that

community colleges' democratization effect increases the overall educational attainment of a population and does not significantly add to time to degree completion for students aspiring to a bachelor's degree (Adelman, 1999; Dougherty, 1987; Leigh & Gill, 2003; Rouse, 1998). Critics maintain that community college entrance reduces overall educational attainment and that students aspiring to a baccalaureate who are qualified to attend a four-year school are better off starting at a four-year school in terms of bachelor's time-to-degree (Adelman, 1999; Smith, Young, Bae, Choy, & Aslsalam, 1997), degree completion (Monk-Turner, 1998; Pascarella & Terenzini, 1991; Whitaker & Pascarella, 1994), and overall economic attainment (Dougherty, 1987; Monk-Turner, 1998; Pascarella & Terenzini, 1991, 2005).

The democratization/diversion debate continues. A number of studies have investigated the effect of community college attendance on educational and occupational attainment. None of those studies has fully resolved the democratization/diversion debate.

Missouri's A+ Schools Program stipulates enrollment in a Missouri public two-year institution in order for qualified students to use their A+ financial incentive. Little is known about the educational attainment outcomes of A+ students who begin their post-secondary experience at two-year schools. Diversion effects could be an unintended effect of the stipulated financial incentive for A+ students.

Transfer Student Issues

The following section focuses primarily on the students involved in two-year to four-year transfer processes. Because the Missouri A+ Schools Program financial incentive can only be used at Missouri public two-year institutions, which necessitates transfer to a four-year institution for A+ students who desire both to utilize their A+

incentive and earn a baccalaureate degree, literature on the two-year to four-year transfer process and experiences will be reviewed.

Considerable research has studied the challenges faced by students in the two-year to four-year transfer process. “Students who begin their post-secondary education at community colleges need not only to succeed academically, but to negotiate the often difficult process of transferring to four-year schools” (Baker & Velez, 1996, p. 94). Estimates of transfer rates from two-year to four-year institutions range from 14.1 percent to 25 percent (Bingham-Newman & Hopkins, 2004).

While transfer rates seem to vary according to the research design (Townsend, 2002), researchers agree that considerably smaller proportions of students transfer from a two-year school than indicate the desire to transfer (Bingham-Newman & Hopkins, 2004; Laanan & Sanchez, 1996; McCormick & Carroll, 1997). Researchers posit several explanations for this unrealized transfer phenomenon including “insufficient advising; lack of information, support or encouragement, or financial resources; or institutional factors that place other barriers to the transfer process” (Bingham-Newman & Hopkins, 2004, p. 9). As community colleges enroll substantial percentages of minorities, low-income, and first-generation students (Astin, 1993; Cabrera, LaNasa & Burkum, 2001; Gordon & McDonald, 2004; Wellman, 2002) who are considered at-risk post-secondary populations, unrealized transfer rates are interwoven with barriers and challenges faced by those populations which will be discussed in detail later in this chapter.

In a recent update to their 1991 meta-analysis, Pascarella and Terenzini (2005) suggest that “students who transfer from a two-year to a four-year institution are academically distinctive, resembling more their counterparts who initially enroll in four-

year schools than their community college peers who do not transfer” (p. 377). Citing a number of studies from the 1990s, Pascarella and Terenzini elaborated on the socio-economic and enrollment qualities of students who were more likely to make the two-year to four-year transfer:

Transfer students (compared with non-transfers) are more likely to come from families in higher socio-economic brackets; to be younger, white, and male; to have been on an academic track in high school; to have higher degree expectations and be more academically oriented; to have attended school during the day and reached higher academic achievement levels (although somewhat below those of students who went directly to four-year institutions); to have been more academically and socially integrated in the institutions from which they were transferring; and to have been continuously enrolled (Pascarella & Terenzini, 2005, p. 377).

Because the A+ Schools Program high school grants stipulate that general diploma tracks will be replaced with post-secondary and workforce preparation tracks and because the A+ Program requires that students utilize their A+ financial incentive within three years of high school graduation and enroll full-time, A+ students may resemble the students described by Pascarella and Terenzini (2005). If so, A+ students may be more likely to transfer to a four-year school than community college students studied in other research.

Barriers to transfer. The explanations for unrealized transfers appear to fall into three broad categories: (1) personal/social challenges related to family circumstances and understanding both the higher education system and the transfer process, (2) financial challenges, (3) structural barriers imposed by incompatible academic program alignments

between two- and four-year institutions (Bingham-Newman & Hopkins, 2004; Cabrera, LaNasa & Burkum, 2001; Grites, 2004; Eggleston & Laanan, 2001; Ward-Roof, Kashner, & Hodge, 2003).

Some potential transfer students must overcome a number of challenges related to family circumstances such as minority, low-income, and/or first-generation status, and understanding both the higher education system and the transfer process. These challenges include understanding the post-secondary system, fear of the unknown, and getting good advice and advising from both the sending and receiving institutions (Bingham-Newman & Hopkins, 2004; Dunn, 2004; Townsend, 1995; Townsend & Wilson, 2006a; Ward-Roof, Kashner, & Hodge, 2003).

College financing concerns faced by two-year to four-year transfer students include the availability of institutional financial aid and scholarships as four-year institutions often designate most of their institutional aid packages for freshmen as a tuition discount recruitment strategy (Lapovsky, 1999), leaving fewer institutional funds for transfer students (Ward-Roof, Kashner, & Hodget, 2003). Dunn (2004) additionally noted that financial aid for traditional-aged transfer students who share more common qualities with independent students is still based upon parental income. This practice sometimes means that while students do not receive parental monetary support for their education, they may not be eligible for means tested aid because of their parents' incomes.

Challenges imposed by incompatible or unfriendly academic program alignments between two- and four-year institutions are often substantial (Ignash & Townsend, 2001; Wellman, 2002). One of these barriers seems to result from senior institutions' attitudinal

perspectives regarding the quality of two-year curricula (Dougherty, 1987) and an unwillingness to accept two-year coursework in substitution for four-year requirements (Ignash & Townsend, 2001). This issue concerns policymakers, especially state-level policymakers, as it impedes progress toward degree and costs students and taxpayers more. Policymakers increasingly address this concern with articulation agreements, which are inter-institutional contracts that delineate how academic credits will move between institutions (Ignash & Townsend, 2001). While articulation agreements are increasingly common and more effective, some students still encounter structural barriers between institutions (Dunn, 2004). In a related issue, some students find that, upon transfer, they have excess credit hours that may be accepted by the senior institution, but that will not apply toward a specific academic program (Dunn, 2004). These situations cause frustration and disenchantment that can be enough to derail transfer intentions.

Another increasingly common structural barrier is the rising number of students holding vocational credentials who expect to receive academic credit for vocational coursework at the senior institution (Dunn, 2004; Farmer & Frederickson, 1999; Townsend, 2001). Vocational coursework has not traditionally been considered transfer preparatory academic work by senior institutions (Dougherty, 2001; Dunn, 2004; Farmer & Frederickson, 1999). Consequently, most academic programs do not accept vocational credit in academic transfer programs (Dunn, 2004). This practice can also cause frustration and disenchantment that can derail transfer.

Challenges at the senior institution. Any movement between institutions necessitates a transition period and acculturation process for students as they adapt to a new environment with different expectations and cultures (Grites, 2004; Townsend &

Wilson, 2006a; Tinto, 1993). Students transferring from a two-year to a four-year institution are sometimes ill-prepared for a transition to what is often perceived as a more rigorous academic and impersonal climate (Townsend & Wilson, 2006a). Poor academic and social engagement during the transition period can lead to “transfer shock” (Hills, 1965) when transfer student achievement dips sharply during the first term at the receiving institution. Transfer or culture shock reflects the impact of “different academic policies, academic standards, faculty, expectations, peer group, terminology, and physical conditions” (Grites, 2004, p. 124) upon academic achievement. Some transfer students are unable to recover academically from a difficult transition (Townsend, 1995).

However, researchers have noted that, while they may take longer than native students, transfer students who can minimize and/or recover from transfer shock, graduate at similar rates as native four-year students (Adelman, 1999; Glass & Bunn, 1998, Pascarella & Terenzini, 2005). Researchers suggest that student characteristics might account for this phenomenon: Townsend (1995) contended that “students who succeed in transfer are self-reliant” (p. 188). Baker and Velez (1996) suggested that “transfer students, who are a selectively hardy and resilient lot ... may have greater academic motivation and social-emotional strengths than do students who began their academic careers at four-year colleges” (p. 94).

Additionally, many sending and receiving institutions are vigorously developing and refining transition services and programs to assist transfer students in their acculturation to the senior institution and minimize the effects of transfer shock (Bingham-Newman & Hopkins, 2004; Dunn, 2004; Grites, 2004; Laanan, Poisel, & Savoca, 2005). These programs, working in concert with committed students and

improved articulation practices, may help improve both transfer rates and the transfer experience so that more students can attain the level of post-secondary schooling that they desire.

A recent study by Melguizo and Dowd (2005), using data from the National Education Longitudinal Study (NELS:88/2000) and controlling for pre-college achievement and academic background as proxies for degree aspirations, compared the degree attainment of low SES four-year college juniors who had transferred from two-year community colleges with low SES rising juniors at four-year schools. The logistic regression analysis found when differences in SES are controlled, “the negative effect of being a transfer as opposed to a rising junior diminishes substantially” (p. 28). When SES, pre-college academic preparation, and degree aspirations were taken into account, four-year rising juniors and community college transfer juniors achieved similar degree outcomes.

A+ Schools Program students who desire to use their A+ financial incentive must begin their post-secondary experience at a qualified two-year institution. Those who desire a baccalaureate must then transfer to a four-year institution. As the preceding section has shown, the transfer process contains risks that can impede a student’s progress toward that goal. Requiring that all A+ students utilize their A+ Program incentive at a two-year school essentially requires a transfer experience for those A+ students who desire to both use their incentive and earn a baccalaureate degree. If those students experience the negative effects of the transfer process, it could be an unintended effect of the A+ Schools Program.

Low-income Access to Post-secondary Education

The A+ Schools Program was designed, in part, to encourage post-secondary participation for student populations that historically had low participation rates because of affordability concerns (House Committee on the A+ Schools Program). The A+ incentive was a financial enticement to encourage students to enroll in post-secondary education. While A+ Program graduates are expected to apply for federal financial aid and to use other federal grant monies before using A+ tuition subsidies, there are no financial eligibility restrictions for the A+ financial incentive based upon family income.

Previous research has found that the “bigger the percentage of a high school’s graduates entering a Missouri public post-secondary institution, the higher the probability of that high school participating in A+ program” (Lee, 2003, p. 99). This suggests that financial incentives could be funding graduates from high schools that have historically overcome affordability concerns and had higher post-secondary participation rates. Additionally, Lee found that “the benefits of the A+ Program seem to go to academically, rather than economically marginal students” (p. 157). A+ graduates in families with incomes of less than \$18,000 and students of color are less likely than middle-income, White students to take advantage of the A+ incentives and enroll in public two-year post-secondary programs. Further, more than 30% of the 2001 A+ graduates reported family incomes of more than \$50,000, while 18% reported family incomes of less than \$24,000 (Lee). In fact, in percentage terms, there are fewer A+ graduates with family incomes of less than \$24,000 than in Missouri high schools in general (Lee). This finding suggests that the financially marginalized students for whom the A+ Schools Program financial incentive was primarily targeted are not participating in the A+ Program and,

subsequently, in post-secondary education at the same rate as students who traditionally accessed post-secondary education at higher levels and who are presumably more likely to have the ability to pay regardless of the A+ tuition incentives. In essence, the A+ Schools Program may be subsidizing the tuition of students who may already have the means to pay for post-secondary education. This outcome would appear to be an unintended effect of the A+ Schools Program financial incentive.

Another concern related to the A+ financial incentive arises from phenomena observed with Georgia's Helping Outstanding Pupils Educationally (HOPE) scholarship. HOPE funds tuition and fees at any of Georgia's state institutions. In its original configuration, "the amount of HOPE scholarship was reduced dollar-for-dollar for any federal financial aid, including the Pell grant" (Henry, Rubenstein, & Bugler, 2004, p. 687). Consequently, students who were eligible for Pell grants received virtually no HOPE funds. Policymakers and researchers noted that there was essentially no HOPE-related financial incentive for low income students to attend college.

Missouri's A+ students enrolled at qualified institutions must utilize other federal and state aid, including the Pell grant, before utilizing A+ funds. Accordingly, there could be little A+-related financial incentive for the lowest income students who should be eligible for a Pell grant to seek post-secondary education. This effect could also be an unintended effect of the A+ Schools Program financial incentive as one of the primary goals of the A+ Schools Program is to "open new doors to higher education" (DESE A+ Fact Sheet, 2004) for those students who "might otherwise be unable to attend college" (DESE FY2005 budget, p. 11).

Summary on Potential Unintended Effects of the A+ Schools Program Post-secondary Access Policy

The preceding section has noted potential unintended effects of a post-secondary education access policy that could be occurring because the A+ Schools Program stipulates enrollment at Missouri two-year public institutions. The concepts of community college diversion and democratization, concerns about transfer student experiences and educational attainment, and concerns about subsidizing students who already have the ability to pay for college were presented. Next, the review will present literature regarding the process and practice of evaluating and measuring the effects of post-secondary access policies and programs.

Evaluating Policies and Programs

Programs are the organizational implementation vehicles that deliver public policy to stakeholders or target groups (Fowler, 2004; Patton, 1997; Sorrell, 2003). Policies and programs do not exist in isolation. They are not immune to or buffered from political, social, economic, or cultural influences (Bolman & Deal, 1997; Fowler, 2004; McDonnell & Elmore, 1987; Morgan, 1997; Sorrell, 2003). Rather, public policies are “responses to a specific social setting that includes a wide range of phenomena ...economic forces, demographic trends...the culture of the broader society” (Fowler, 2004, p. 54). “Public expenditures are efficient if they change behavior in directions consistent with policy goals” (Baum, n.d., p. 8). Because of the dependent relationship of programs to policy, program effectiveness should be measured against program goals (Fowler, 2004), but in the context of the complex, dynamic, and permeable social, economic, political, and cultural systems in which it occurs (Bolman & Deal, 1997;

Morgan, 1997; Patton, 1997; Preskill & Torres, 1999; Sorrell, 2003). Further, assessments of policy and program effectiveness should include an evaluation of unintended effects (Cooper, 2002; Fowler, 2004; Hall & McGinty, 1997; Sorrel, 2003).

Post-secondary access policies and programs developed to address the absence of participation, achievement, and attainment for various populations at various kinds of institutions must be evaluated to ensure that they are meeting the needs of stakeholders (Patton, 1997; Preskill & Torres, 1999). Measurement is primary to evaluation. Access policies are measured in terms of enrollment patterns that track participation, achievement, and attainment for various populations in various kinds of post-secondary institutions (ACE, 2004; Adelman, 1999). Simply stated, the study of post-secondary enrollment patterns is interested in who goes where when and what do they do while they are there.

Post-secondary Enrollment Patterns

Post-secondary enrollment pattern research quantifies and maps the interaction between students and the post-secondary system. A great deal of traditional, post-secondary education access research has focused on the participation aspect of the experience. However, in a book devoted to current trends in post-secondary participation, Hoxley (2004) argued that the critical post-secondary access research arena now is concerned with how students attend college, rather than whether they attend college. “It is not college attendance that is interesting [to researchers], but college choices” (p. 2). Specifically, the interesting research is about “which colleges [they] attend (in-state or out-of-state, two-year or four-year, more or less selective) and how [they] attend (continuously or sporadically, full-time or part-time, immediately after high school

graduation or delayed)” (Hoxley, 2004, pp. 1-2). Enrollment pattern studies address this critical research need.

Post-secondary enrollment patterns are affected by many forces. Some of these forces, such as the economy, academic offerings, technology, and student aid policies, are external to individual students (Longanecker & Blanco, 2003; Pusser & Turner, 2004). “The way states distribute the responsibility for paying for higher education is reflected in their public policies—and these policies in turn can shape student attendance patterns” (Longanecker & Blanco, 2003, p. 54). Other factors are closely related to individual student circumstances and can be mitigated or exacerbated by external influences (Longanecker & Blanco, 2003; Hearn & Holdsworth, 2002; Pusser & Turner, 2004). Researchers note that these factors include socio-economic status, prior preparation, geography, habitus, and individual needs, goals, circumstances, and effort. There are numerous ways of approaching the study of enrollment patterns, but most utilize student, environmental, and institutional characteristics to understand and describe enrollment behaviors of various populations over a period of time (Adelman, 1999; McCormick, 2003).

One way of conceptualizing enrollment patterns is to study the attendance patterns of those who do participate in post-secondary education (Adelman, 1999; Pusser & Turner, 2004). These studies typically center on the characteristics and behaviors of students who attend various kinds of post-secondary institutions. Attendance pattern research is particularly interested in describing the populations of students who tend to enroll at certain kinds of institutions (Adelman, 1999; McDonough, 2004; Pusser & Turner, 2004). For instance, some populations of students seem more likely to enroll first

at community colleges or to enroll part time or to attend private, liberal arts institutions. Often, these attendance patterns are the result of market forces (Adelman, 1999; Pusser & Turner, 2004).

While estimates of effects differ, numerous studies have documented an inverse relationship between tuition and enrollment rates (Heller, 1996; Leslie & Brinkman, 1987; Rouse, 1994; St. John, 1990). Further, a tuition increase in one segment of higher education is directly related to an increase in other segments of higher education (Rouse, 1994). If four-year schools raise tuition, two-year schools are likely to experience an enrollment increase.

Enrollment pattern research that is concerned with post-secondary access focuses on the inverse of participation (Education Commission of the States (ECS), 2001). Studies then are typically centered on comparing the characteristics of those who do participate with those that do not to understand the role of external influences on participation (Tinto, 1993). Post-secondary access research is particularly concerned with those who are qualified to participate, but do not (Baker & Velez, 1996; ECS, 2001). Identifying the qualities of those who self-select out of the post-secondary experience can provide policymakers with insights that could improve the participation rates for those with similar characteristics (Baker & Velez, 1996).

Enrollment pattern research is also concerned with tracking the way that students move through their post-secondary experience (McCormick, 2003). Individual student demographic qualities are aggregated to describe how populations of students progress through the post-secondary system. Landmarks within the system signify points at which behaviors are measured.

Employing cohort analysis allows us to examine what types of institutions students enter, when students withdraw from post-secondary studies, what types of post-secondary schooling they obtain, and whether they ever obtain a degree. Researchers can thus move beyond simply reporting disparities and analyze the origins and points in the educational attainment process that contribute to...educational outcomes. (Kurlaender & Flores, 2005, pp. 19-20)

Measures of academic achievement, student retention and persistence, and educational attainment are used to track individual enrollment (McCormick, 2003; Robinson, 2004). Academic achievement is most often measured upon entrance to college by high school achievement, including standardized test scores (Adelman, 1999). In-process measures, such as grade point averages and credit hours earned, are indicators of student persistence and achievement (Adelman, 1999). Educational attainment measures include total credit hours earned and culminating achievements such as degree or program completion (Adelman, 1999). An important feature of attainment is identifying patterns that mark incompleteness behaviors based upon particular student traits and institutional characteristics (Kurlaender & Flores, 2005; Tinto, 1993).

Another body of research focuses primarily on post-secondary transfer patterns (Borden, 2004; McCormick, 2003). This research studies the pathways that students take between and among institutions and the points at which they make those transfers. Researchers (e.g., Adelman, 1999; Borden, 2004; McCormick, 2003; Tinto, 1993; Wetzel, O'Toole, & Petersen, 1999) have noted that traditional transfer patterns take two primary forms. Linear transfers are from two-year to four-year institutions upon completion of an associate's degree or other program of study. Horizontal transfers occur

between four-year institutions typically to accommodate an academic program or more appropriate fit for personal reasons. However, traditional transfer patterns are increasingly less common (Adelman, 1999; Borden, 2004; McCormick 2003).

Recent research has pointed to dramatically changing trends in enrollment patterns brought on by technology, a shift in consumer attitudes toward higher education, and spiraling costs associated with higher education (Adelman, 1999; Allen & Seaman, 2005; Borden, 2004; Laanan & Sanchez, 1996; McCormick, 2003; Pusser & Turner, 2004; Toutkoushian, 2003). This new trend, called “swirling” (Borden, 2004), is characterized by students who do not progress through their post-secondary experiences in a familiar pattern. Rather than traditional linear or horizontal progressions, swirling students move back and forth between different kinds of institutions or between multiple institutions, enroll simultaneously in more than one institution, enroll in a blend of on-line and on-ground coursework, re-enroll post-degree, or stop/start their progress frequently on their way toward a degree (Borden, 2004; Lopez, Sturz, & Bermudez, n.d.; Pusser & Turner, 2004).

Enrollment pattern research has also found certain populations of students are more likely to enroll in different kinds of institutions. For instance, community colleges have typically enrolled those with more financial need and/or with lesser academic preparation (American Council on Education [ACE], 2004; Clark, 1960; Brint & Karabel, 1989). Two-year schools are more likely to enroll part-time and/or non-traditional students and/or those seeking vocational preparation or job training (Kane & Rouse, 1999; Tinto, 1993). Two-year schools are more likely to have a majority of commuter students (Tinto, 1993). Four-year schools have traditionally enrolled those with more

financial means and/or academic merit and and/or are majority students who are more likely to be enrolled full-time in liberal arts education rather than vocational training (ACE, 2004; Tinto, 1993). Four-year schools are more likely to have extensive on-campus student housing opportunities with intentional co-curricular and student development programming that play an important role in the college experience (Pascarella & Terenzini, 1991; Tinto, 1993).

Student-level characteristics also interact with external influences to shift enrollment patterns. For example, research conducted by the American Council on Education (2004) found that the enrollment patterns of dependent and independent students were nearly bifurcated during the 1990s. Dependent students enrolled in two-year schools at much higher rates, while independent students enrolled in four-year institutions at higher rates (ACE, 2004). The patterns seemed to correlate with changes in student aid programs. Accordingly, it is important to drill down to student-level data and correlate with external influences in order to understand the populations comprised in enrollment shifts.

Advances in technology and improvements in state and national higher education infrastructures have provided the conditions that allowed development of more comprehensive student tracking systems and databases. These tools are integral to policymakers' ability to "collect, manipulate, and use such data to inform the policy process" (Welsh & Kjørlien, 2001, p. 313). The result is an improved ability to track individual student movement through the post-secondary system and into the workforce for a much richer understanding of student enrollment behaviors and patterns.

Findings about changing enrollment patterns that have resulted from the improved ability to track student movement, along with the educational accountability movement, have highlighted the need for the academy and policymakers to arrive at a deeper understanding of student transfer characteristics and activity (ACE, 2004; Adelman, 1999; Castaneda, 2002; Cheslock, 2001,2003; Laanan & Sanchez, 1996; Lopez, Sturtz, & Bermudez, n.d.; Monk-Turner, 1998; Romano & Wisniewski, 2003). In particular, “both researchers and policymakers need to pay more attention to the expanding set of educational pathways...and the extent to which these pathways are utilized by and provide opportunities for individuals from different racial/ethnic groups (Kurlaender & Flores, 2005, p. 25). Paradoxically, these rapidly changing enrollment “cross-currents and riptides” (Adelman, 1999, p. 21), or chaotic and overlapping enrollment patterns and trends, largely defy efforts to categorize student movement in a way that satisfies policymakers’ need to create and measure effective post-secondary access and retention policies (Adelman, 1999; Baker & Velez, 1996; LeBard, 1999; Longanecker & Blanco, 2003; McCormick, 2003; Phelan, 1999; Pusser & Turner, 2004; Romano & Wisniewski, 2003; Townsend, 2002).

Enrollment pattern research, as a component of post-secondary access research, is inextricably linked with two other major bodies of research. Student retention theory is focused on student and institutional qualities that contribute to retaining students in the post-secondary system (Pascarella & Terenzini, 1991). A parallel research track is student departure theory, which is concerned with student and institutional traits or situations that cause students to leave institutions or the post-secondary system altogether (Tinto, 1993). Taken together, enrollment pattern, persistence, retention, and departure

studies constitute an enormous volume of research that can be leveraged to understand post-secondary access for particular populations of students (Pascarella & Terenzini, 1991). Inconsistencies and concerns about barriers to post-secondary access for at-risk populations can be addressed through policy and practice.

At-risk Populations

The principles of democracy, human capital theory, and public sector economic policy underscore the need to ensure equal opportunity for all who desire a higher education (Mumper, 1997). However, some segments of society are particularly at-risk for opportunities to participate in and complete post-secondary programs of study. Among those considered most vulnerable for full inclusion in the post-secondary experience are minority, low-income, and first-generation students. Minority students, particularly African American and Hispanic students, are also likely to be low-income (Heller, 2005; Terenzini, Cabrera, & Bernal, 2001) and/or first-generation (Kurlaender & Flores, 2005; Terenzini, Cabrera, & Bernal, 2001). Low-income students are likely also first-generation or minority (Chen, 2005; Terenzini, Cabrera, & Bernal, 2001).

These characteristics frequently overlap in ways that impact post-secondary access. “The influences of family factors that are present from birth through adolescence accumulate over many years to produce ability and college readiness” (Heckman, 2000, p. 14). Recent research indicates that the college preparation begins before students start elementary school (McDonough, 2004). “Students aspire to, apply to, and then enroll in college through a complex, longitudinal, interactive process involving individual aspiration and achievement [and] learning opportunities” (McDonough, 2004, p. 5). By middle school, most students have begun to aspire to some sort of career path and those

who project themselves into careers that require post-secondary training need to choose a college-preparatory high school curriculum. Those students must also receive encouragement from their families and their schools that supports their aspirations. “A student’s habitus provides a powerful filter that implicitly determines what a student ‘sees’, how the student interprets and values what she sees, and what action she will take as a result” (Paulsen & St. John, 2002, p. 196). Ultimately, failure to intervene or disrupt the resulting patterns often results in continued social stratification.

These familial and contextual influences are seen at several stages of the post-secondary experience and can be measured in terms of student participation, persistence, and attainment. This section will discuss behavior patterns of these at-risk populations with regard to post-secondary participation barriers that can prevent students from enrolling in a post-secondary program. Following that section, persistence and attainment of at-risk populations who do participate in post-secondary education will be discussed. As students often belong to multiple at-risk populations, there are overlapping and repetitious characteristics and barriers that impact all phases of the post-secondary experience.

Minority Students at Risk

Many minority students, African-American and Hispanic students in particular, encounter barriers to participation, persistence, and attainment in post-secondary education. These post-secondary barriers seem to parallel societal barriers that arise from cultural norms and expectations and academic preparation inequities resulting from poverty and discrimination (Camara & Schmidt, 1999; Heller, 2005; Henriksen, 1996; Hoschild, 2003; Nevarez, 2001; Sacks, 1997; Tinto, 1993). Research has found that

“although access to and participation in post-secondary education have increased, African-Americans and Hispanics are less likely to attend and complete college than are Caucasian students” (Lotkowski, Robbins, & Noeth, 2004, p. 1). Additionally, there is evidence that suggests minority students, Hispanic students in particular, do not have adequate or equitable access to information about post-secondary participation and funding opportunities (Nevarez, 2001). Post-secondary access and attainment are particularly critical for minority students as “unemployment for African Americans and Hispanics is highest for those with a high school diploma or less, while racial differences in unemployment are statistically insignificant among all people holding bachelor’s degrees” (Lotkowski, Robbins, & Noeth, 2004, p. 2).

Low-income Students At-risk

Family income plays a crucial role in academic preparation for post-secondary experiences and also in the subsequent affordability component of access. Because of family income circumstances that affect residency, low-income students are more likely to attend under-resourced K-12 schools that provide insufficient academic preparation and college-preparatory engagement activities (McDonough, 2004; Nevarez, 2001; Scheurich & Imber, 1991; Terenzini, Cabrera, & Bernal, 2001).

Beyond preparation, participation in post-secondary education requires a substantial and immediate investment in long-term pay-offs. These immediate investments come in the form of tuition, fees, associated costs, and foregone earnings. While financial aid reduces the net price for low-income students and increases the affordability of higher education (Choy, 1999, 2000), the real and associated costs of attending college disproportionately affect low-income students who are less likely to

have the immediate financial resources or be able to forego or delay earnings (Callan, 2001; Camara & Schmidt, 1999; Corrigan, 2003; Heller, 2001, 2005; Mumper, 1996; Paulsen & St. John, 2002; Perna & Titus, 2004; Podgursky et al., 2004; Terenzini, Cabrera, & Bernal, 2001). Student financial aid eligibility includes a measure called Expected Family Contribution based on income and assets that approximates what families could afford to pay on their own (Choy, 1999). However, need-based aid has not kept pace with post-secondary costs, which have risen faster than family incomes (Choy 1999, 2000; Heller, 2001; Toutkoushian, 2003).

First-generation Students at Risk

Pascarella, et al., (2004) identified broad categories of literature pertaining to first-generation students' at-risk characteristics. One category has to do with the college planning process. Parental encouragement and involvement play a critical role in students' awareness of and preparation for post-secondary opportunity (Choy, 2001, 2005; Horn & Nunez, 2000; Laanan, 2000; Perna, 2005; Terenzini, Springer, Yaeger, Pascarella, Nora, 1995). Another category is focused on the transition period between high school and college, as first generation students must address a juxtaposition of the same anxieties as other students, an added layer of real or perceived familial anxiety and scrutiny, and the conflicts inherent in an upward departure from familial social status (Pascarella, et al, 2004).

Barriers to Participation for At-risk populations

Affordability as a barrier to participation. In a 2003 student aid report, Baum and Payea presented trends that affect the affordability of higher education. They suggested that affordability is the "relationship between how much colleges and universities charge

and the assistance available to students to pay these charges” (p. 2). In recent years, institutional costs have continued to climb while state appropriations declined, which increased the cost share that must be covered by tuition and fees. While Baum and Payea (2003) noted that “the net prices actually paid by students and families are more important than the higher published prices” (p. 2), the gap between these net prices and student aid is growing.

While affordability is concerned with direct costs, such as tuition and fees, it is also with associated costs that can be impacted by residency and/or the ability to commute from the family home, if and how much students need to work while in college, and students’ perceptions of the opportunity costs associated with a college education (Choy, 2000; Paulsen & St. John, 2002). “A student’s social class, cultural capital, and habitus influence how cost-conscious students are and even how students conceive of financial issues as part of the college-going decision (Paulsen & St. John, 2002, p. 196). Affordability, then, is about a student’s perspective and situation (Lewis & Dundar, 1999). Post-secondary education is not financially accessible for students who perceive that they are not appropriately situated.

There is ample evidence to suggest that low-income students and their parents are poorly informed about the actual cost of college (McDonough, 2004; Price & Wohlford, 2005). Unfortunately, in these cases they typically substantially over-estimate college costs and sometimes “are unable to hazard any guess about the price of college (Price & Wohlford, 2005, p. 64). Subsequently, many low-income students limit their post-secondary aspirations based upon incomplete and inaccurate information because they perceive that college will not be financially accessible (McDonough, 2004).

Financial accessibility affects most students at all stages in the post-secondary process. Low-income students, who are frequently also minority and first-generation, are particularly at risk (Horn & Nunez, 2000). “To understand how affordable college is for students, you need to examine the prices students pay in relation to the resources available from students and their families” (Heller, 2005, p. 93). College costs require a much higher proportion of low-income families’ resources. Subsequently, “low-income students, unlike those with more ample resources, make a decision about *whether* to go to college, not just about *where* to enroll” (Baum, n.d., p. 8).

The participation rates gap between low-income and upper-income students continues to widen. In 1996, students in the highest income quartile had an 80% chance of going to college. Students from the lowest income quartile had only a 35% chance (Callan, 2001). As college prices skyrocket and need-based aid dwindles, low-income and minority students cannot participate at the same levels as their White and middle- to upper-income counterparts. Heller (2005) posits that “in general, the price of college is less affordable for minority students than it is for White students” (p. 99).

Because of the proportional income effect of college costs, low-income and minority students are typically influenced much more by changes in college costs and are more responsive to changes in financial aid than White and middle- to upper-income students (Baum, n.d.; Heller, 1997, 2005; Jackson & Weathersby, 1975; Leslie & Brinkman, 1988; St. John, 1990). This cost/aid sensitivity is directly related to the proportion of family income that must be redirected toward higher education. “In 1971, tuition for one student at a public four-year institution required 12 percent of the income of a low-income family; in 1997, it required more than 25 percent” (Callan, 2001, p. 87).

For the lowest quintile of family income, the proportion of family income that is required for public four-year tuition is 62 percent (Heller, 2001b). According to Heller (2005), by 2004, the “cost of attendance by family income [had risen to] 30 percent for Black students” (p. 98).

Financial aid plays an important role in students’ ability to pay for college. Financial aid, particularly grant aid, has been shown to increase low-income student enrollment (Leslie & Brinkman, 1987; Nevarez, 2001). Financial need is based upon family and student income and assets, number of dependents, number of dependents seeking post-secondary education, and institution-specific costs (FAFSA, n.d.). Based upon this formula, the neediest students are typically awarded grants that do not need re-paid. As income and assets increase, need-based grant aid decreases and can be replaced by government-subsidized loans for needier students and unsubsidized loan eligibility for those in the higher income quintiles (Choy, 2000; King, 2006). Loans must be re-paid.

Low-income students benefit from government grants and subsidized loans, but they must submit a Free Application for Federal Student Financial Aid (FAFSA) in order to be eligible. King (2006) found that there are many low-income students who were enrolled in post-secondary institutions who did not submit a FAFSA and who subsequently did not receive grants and subsidized loans. The number of low- to moderate-income students who did not apply for aid increased from 1.7 million in 1999-2000 to 1.8 million in 2003-2004 (King, 2006). The lowest income students became even less likely to have applied for aid during the same time period. “Twenty-eight percent did not file a FAFSA in 2004’ (King, 2006, p. 1), which is up from 24% in 1999-2000. Further, King (2006) found that community college students, including those in the

lowest-income quintile, were the least likely to complete a FAFSA. Unfortunately, researchers and policymakers have little understanding about why students do not apply for aid (King, 2006).

While there is a general sense that some sort of financial aid is available for those who seek it, Heller (2005) found that even with generous aid packages, many students still have “unmet need” or costs that are not fully covered by financial aid. This is particularly burdensome for low-income and minority students (Choy, 1999). Heller (2005) illustrated that:

Across all college sectors, Black and Hispanic students faced an unmet need burden (measured as a proportion of parental income) that was greater than that for White students. This is an indication that the financial aid system is not meeting the needs of minority students. (p. 99)

Rapidly rising costs related to post-secondary participation have an increasingly burdensome effect upon low-income and minority students. Higher percentages of family income must be diverted to pay for college among low-income families, and need-based aid has not kept pace with increases in college-related costs. From an affordability perspective, the opportunity to participate for low-income students, many of whom are first-generation and minorities, in post-secondary education is increasingly inequitable.

Academic preparation and standardized assessment. One of the first post-secondary participation barriers that minority and low income students encounter relates to being qualified to participate. Qualification includes measures of academic preparedness that are strongly influenced by K-12 program quality and students’ course-taking behaviors, and that are frequently measured by standardized assessments.

Measures of K-12 program educational quality include student-teacher ratio, school expenditures, and achievement test scores (Paulsen 2001b). Chronically insufficient and inequitable resources in schools attended primarily by minority and low-income students can result in sub-standard and inadequate academic preparation (American Association of State Colleges & Universities [AASCU], 2005; Hoschild, 2003; Kurlaender & Flores, 2005; Perna, 2005; Nevarez, 2001, Scheurich & Imber, 1991; Tinto, 1993). “High school curriculum reflects 41 percent of the academic resources students bring to higher education. The impact [of high school curriculum] for African-American and [Hispanic] students is much greater than it is for White students” (Adelman, 1999, Selected findings section, para. 1). These “nested inequalities [or] disparities in schooling outcomes can be understood as two deeply embedded patterns of inequality” (Hoschild, 2003, ¶10) where the effects of insufficient resources are compounded with succeeding generations.

Beyond the high school’s ability to provide adequate curriculum, students must also choose to enroll in rigorous high school coursework in order to prepare adequately for post-secondary experiences (AASCU, 2005; Adelman, 1999; Camara & Schmidt, 1999; Choy, 2005; Horn & Nunez, 2000; McDonough, 2004; Perna, 2005; Terenzini, Cabrera, & Bernal, 2001; Warburton, Bugarin, Nunez, 2001). There is a strong correlation between taking rigorous mathematics courses in high school and subsequent post-secondary enrollment and achievement (Adelman, 1999; Horn & Nunez, 2000). High school preparation is key to post-secondary participation.

Beyond academic preparation, standardized measures, such as admissions exams, have repeatedly been shown to discriminate against members of particular races,

ethnicities, and lower socio-economic groups (Camara & Schmidt, 1999; Kurlaender & Flores, 2005; Monk-Turner, 1998; Sacks, 1997; Sedlacek, 2003, 2004). Students' habitus has enormous influence on their ability to score well on standardized, cognitive exams. "Families and environments, not just, or even, schools, play the crucial role in motivating and producing educational success as measured by test scores" (Heckman, 2000, p. 5). How and where a student grows up influences standardized test scores.

In a work that criticized standardized exams as sole measurements of ability, Sedlacek (2004) presented the concept of institutional racism:

Institutional racism is defined as the negative consequences that accrue to a member of a given group because of how a system or subsystem operates in the society regardless of any other attributes of the individual. Thus if we have an evaluation system that yields more useful results for people with traditional experiences than for those with less traditional experiences, we have an example of racism regardless of the motives involved. (p. 6)

In combination, poor academic preparation and standardized admissions exams can present formidable barriers for students already considered at-risk. Overcoming these barriers is key to minority and low-income student post-secondary participation, persistence, and attainment (Astin & Oseguera, 2004; Camara & Schmidt, 1999; Choy, 2001; Heller, 2001; Kurlaender & Flores, 2005; Nevarez, 2001; Monk-Turner, 1998; Mumper, 1996; Perna & Titus, 2004; Perna, Steele, & Hibbert, 2005; Sacks, 1997).

First-generation student participation. While first-generation students are likely to be academically under-prepared, that factor alone does not account for lower participation rates. In a longitudinal study using a large national dataset, Choy (2001)

found that first-generation students often get derailed on the path that leads to college. Pascarella, Pierson, Wolniak, and Terenzini (2004) had similar findings in a review of first-generation student literature. Specifically, first-generation students are considerably less likely than their peers with more educated parents to aspire to attend college, to prepare academically, to take the admissions exam, to complete a college application, and to actually enroll in college. Choy found that parents who did not go to college are less likely to be involved in their children's academic preparation, including encouraging and supporting a challenging high school curriculum, and in helping with the application process, which includes taking the admissions exam and completing financial aid paperwork (Choy, 2001). The final hurdle in the preparation path for first-generation students appears to be knowing about and understanding the price of attending college (Choy). Failure to understand the availability and intricacies of financial aid deters enrollment even for students who qualify for aid (Choy; King, 2006).

Many minority, low-income and first-generation students must overcome formidable academic and social preparation and affordability barriers in order to enroll initially in post-secondary education. The conditions that cause these populations to be at-risk for participation, frequently continue to impact subsequent post-secondary persistence and attainment.

Barriers to Persistence and Attainment of At-risk Populations.

Initial enrollment and participation is the first hurdle that students must overcome on the pathway towards a degree. Staying in and completing college is also a formidable task for at-risk populations. As discussed earlier, the benefits of a college education are much higher for those who earned a degree compared to those who have just some

college experience (Bureau of Labor Statistics, n.d.; Mumper, 1996; Paulsen 2001a, 2001b, Turner, 2004). Accordingly, Turner (2004) criticized policymakers who focus exclusively on participation data at the exclusion of persistence and attainment data:

Emphasis on vaguely defined notions of ‘collegiate access and affordability’ in public discourse has diverted attention from the monitoring of outcomes, such as courses completed and degrees awarded... These outcomes are measures of human capital acquired and, while necessarily somewhat inexact, they are indicators of the addition to the stock of skills available to the labor force (p. 14).

In short, “policymakers tend to focus exclusively on getting students to start college, neglecting questions of whether they *complete* college” (Hoxby, 2004, p. 4). While there have been significant gains in the numbers of students who participate in post-secondary education in the past forty years, parallel increases in attainment have not been observed (Turner, 2004). This failure to attain suggests that students are not persisting in their post-secondary endeavors. This section will review post-secondary retention and persistence literature in general and then will focus specifically on at-risk populations.

Factors Influencing Post-secondary Retention, Persistence, and Attainment

Volumes of research in the past 40 years have improved understanding of what helps or hinders college students in their quest for a college degree. Numerous theories and models that focus upon student, institutional, and environmental characteristics that improve or impede chances for completion have emanated from these improved understandings.

In their 1991 meta-analysis of post-secondary impact research, Pascarella and Terenzini categorized the models and theories into broad categories that include

developmental, impact, engagement, and change models. Results from these studies have made it clear that the post-secondary enterprise is much more than a strictly academic experience.

The college years are a time of student change on a broad front.... It is the breadth of change and development, however, that is perhaps the most striking characteristic of the evidence. Students not only make statistically significant gains in factual knowledge and in a range of general cognitive and intellectual skills; they also change on a broad array of value, attitudinal, psychosocial, and moral dimensions. (Pascarella & Terenzini, 1991, p. 557)

Student retention results when there is a good fit between student and institution and when students are acculturated and integrated into the academic and social fabric of the institution (Astin, 1977, 1993; Chickering, 1969; Chickering & Reisser, 1993; Levine, 1980; Lotkowski, Robbins, & Noeth, 2004; Nevarez, 2001; Noel & Levitz, 1982; Pascarella & Terenzini, 1991; Reason, Terenzini, & Domingo, 2005; Tinto, 1982, 1993; Upcraft & Gardner, 1989).

Intentional and targeted programming in a supportive environment enhances students' acculturation and integration. Because of background and/or cultural reasons, some student populations are particularly at risk for retention and ultimate degree attainment. The following sections address the retention challenges that minority, low-income, and first-generation students face and the over-arching concern for all three groups about post-secondary affordability.

Minority student persistence and attainment. As noted earlier, minority students are more likely to come from disadvantaged K-12 programs with deficient academic

skills (Camara & Schmidt, 1999; Henriksen, 1996; Heller, 2005; Hoschild, 2003; Kurlaender & Flores, 2005; Nevarez, 2001; Sacks, 1997; Tinto, 1993). Academic deficiency is often compounded by struggles to fully integrate into the social fabric of predominantly-White institutions where they may continue to feel some measure of discrimination and lack of institutional support for their efforts (Astin, 1993; Nevarez, 2001; Pascarella & Terenzini, 1991; Tinto, 1993).

In his research on student departure, Tinto (1993) posited that:

For students of color then, especially for those from disadvantaged backgrounds, departure appears, in large measure, not to differ so much in kind as in degree. They tend to face greater problems in meeting the academic demands of college work, in finding a suitable niche in the social and intellectual life of the college, and perhaps in obtaining sufficient financial resources. Academic difficulties, incongruence, isolation, and perhaps finances seem to be more severe for them than for students generally. (p. 75)

The barriers that minority students must overcome to gain initial access to post-secondary experiences continue to interfere with post-secondary persistence and attainment.

Hu and St. John (2001) examined African American and Hispanic and White persistence differences in connection with financial aid policy changes. They found that, while financial aid does affect persistence and attainment, “the overall persistence rates among racial/ethnic groups is largely explained by the differences in college grades and other experience variables” (p. 283). Lotkowski, Robbins, and Noeth (2004) found that academic skills are positively associated with retention and persistence, but social integration into the campus community is especially important for first-generation and

minority students. Further, enhanced social integration influences students' "levels of commitment, academic self confidence, and motivation [to persist]" (p. 16). Persistence and attainment result from a complex blend of preparation, integration, acculturation, engagement, and financial support (Lotkowski, Robbins, Noeth, 2004; Tinto, 1993).

More students from all racial and ethnic backgrounds are completing high school in recent years (Turner, 2004). However, these improvements do not seem to result in substantively higher baccalaureate-secondary completion rates for students from all racial and ethnic backgrounds (Gilroy, 2005; Nevarez, 2001; Turner, 2004). According to Kurlaender and Flores (2005), between the mid-1980s to 2000, baccalaureate completion rates for White students between the ages of 18-24 rose steadily to about 34 percent. Completion rates for 18-24-year-old Blacks also rose steadily, but peaked at about 18 percent. For 18-24-year-old Hispanic students, considerable fluctuation in completion rates occurred during this period until they reached about 10 percent having started at just 9 percent. Similarly, among 25-34-year-olds, about 24 percent of Whites, 30 percent of Asians, and only 9 percent of Latinos and 12 percent of Blacks hold baccalaureate degrees (Kurlaender & Flores, 2005). These figures are particularly dispiriting when considered in light of the steady increases in the Latino population and gains in post-secondary participation from all minority groups (Kurlaender & Flores, 2005; Nevarez, 2001). "The rate at which college participation is transformed into degree completion...has decreased over time.... This divergence is particularly large for Black Americans (Turner, 2004, p. 26).

Nevarez (2001) posited, however, that Hispanic students have not even experienced similar participation, retention, and attainment rates as Black Americans. He

stated that data from the 2001 Census indicated that 12.5 percent of the U.S. population is Latino, but Latino students are not proportionally represented in post-secondary education. “In 1998, the White, non-Latino college participation rate was 67.3 percent, the calculated rate for Latinos was 47.5 percent, the lowest rate since 1990” (Nevarez, 2001, ¶2). With further regard to participation and attainment, Nevarez (2001) indicated that over half of the Latino post-secondary population attends two-year schools (compared to about a third of White students) and that, proportionally, Latino students earn many more associate’s degrees than bachelor’s degrees. In fact, only 5.5 percent of the bachelor’s degrees awarded in 1998 were to Latino students (Nevarez, 2001).

Gilroy (2005) agreed that African-American and Hispanic students do not participate in post-secondary education at the same rate as their White peers. However, based upon data from the U.S. Department of Education, the U.S. Census Bureau, and the Integrated Post-secondary Education Data System (IPEDs) reported in the 2003-2004 “Minorities in Higher Education Annual Status Report”, Gilroy (2005) indicated that post-secondary enrollment of minorities rose by 52 percent between 1991 and 2001. Enrollment of Hispanics rose by 75 percent and African-Americans by 37 percent during the same period. Further, five-year persistence rates among all students who started at four-year institutions rose from 51 percent to 54 percent. White students persisted at a 58 percent rate, Hispanics at 52 percent, and African-Americans at a 36.4 percent rate (Gilroy, 2005). With regard to degree attainment, Gilroy (2005) found that Hispanic students earned more than twice the number of associate’s, bachelor’s, and master’s degrees in 2001-02 than they did in 1991-1992. While Hispanic Americans are not

participating in post-secondary education at the levels reflected by their proportion of the U.S. population, some gains are being made.

The research has reflected that minority students face barriers in the post-secondary experience. These barriers seem to result, in part, from inadequate academic preparation, cultures that may be perceived as in conflict with the cultures of predominantly White post-secondary institutions, and insufficient or inaccurate information about post-secondary opportunities. It seems that the post-secondary educational experience for many minority students continues to be inferior to the experience of many White majority students.

Low-income student persistence and attainment. Upon post-secondary enrollment, low-income college students face a multitude of barriers that impact persistence and attainment that are related to college costs. Some of these barriers are related to the amount of time low-income students must spend working to address unmet financial need and/or avoid assuming a larger student loan debt.

The more hours a student works, the fewer hours there are for school-related activities that affect both academic and social integration, which, in turn, have been shown to be associated not only with persistence and degree completion but with cognitive, psychosocial, and attitudinal and value change and development (Terenzini, Cabrera, & Bernal, 2001, p. 27).

Students who cannot be fully engaged in the collegiate experience are more distracted, have less time and energy to devote to academic and social activities, earn lower grades, and persist at lower rates (Terenzini, Cabrera, & Bernal, 2001).

While there is evidence to suggest that students who work on-campus and less than twenty hours per week are better integrated in the institution and have higher persistence and retention rates (e.g., Cuccaro-Alamin & Choy, 1998; Pascarella & Terenzini, 1991), students who work more than twenty hours a week off-campus are at-risk. Horn and Berktold (1998) found that the vast majority (more than 79 percent) of undergraduate students work while enrolled. Many are working to help pay for college. Those who work more than twenty hours per week report that work adversely affects their academic performance. In essence, there does appear to be a balance between increasing persistence through part-time employment and sabotaging persistence by working too much.

Low-income students are at-risk for college persistence because they must find ways to pay for a very expensive investment in their futures. While a great deal of need-based aid exists, it is not always sufficient to meet rapidly rising higher education costs. As has been previously noted, many low-income students are also first-generation students.

First-generation student persistence and attainment. In a review of first-generation student literature, Pascarella, et al. (2004) found that first-generation students as a group have a more difficult transition from secondary school to college than their peers. Not only do first-generation students confront all the anxieties, dislocations, and difficulties of any college student, their experiences often involve substantial cultural as well as social and academic transitions. (p. 250)

This difficult transition negatively impacts their persistence and ultimate baccalaureate attainment (Pascarella, et al., 2004).

First-generation college students are more likely to “delay post-secondary entry, begin at a two-year institution, and attend part time and discontinuously” (Chen, 2005). These enrollment behaviors have been shown to negatively impact post-secondary persistence and attainment (Astin, 1993; Choy, 2001; Corrigan, 2003; Dougherty, 1987; Nunez & Cuccaro-Alamin, 1998; Pascarella, et al., 2004; Pike & Kuh, 2005; Terenzini, et. al., 1996; Terenzini, Cabrera, Bernal, 2001; Warburten, Bugarin, & Nunez, 2001). Pascarella, et al. (2004) suggested that first-generation students often work more hours per week, are less likely to live on-campus, and have lower levels of extracurricular involvement, which align with Chen’s (2005) findings regarding delayed entry, two-year institutional attendance, part-time and discontinuous enrollment. Additionally, these factors negatively affect first-generation students’ levels of institutional engagement, which are known to impact retention and attainment (Chickering, 1969; Chickering & Reisser, 1993).

In sum, minority and low-income students have historically experienced low post-secondary participation and attainment rates. First-generation students, who are often also minority and/or low-income, are also at-risk for participation in higher education. Post-secondary participation barriers for these populations frequently arise from educational and societal inequities that result from poverty and a history of discrimination. Transfer students have also been shown to be an at-risk population as they transition to a new and unfamiliar post-secondary environment. Students transferring from two-year to four-year

institutions seem to be particularly at risk because of several factors. These factors include the likelihood that they are first-generation, low-income, and/or minority.

Traditionally, governments and institutions have targeted aid toward these at-risk populations in an effort to increase post-secondary participation and attainment through student subsidies. However, more recent educational policy has shown a shift from need-based to merit-based programmatic approaches to subsidizing post-secondary education and effecting post-secondary access.

Merit Aid Programs as an Emerging Approach to Subsidizing Higher Education

As government subsidies declined during the 1990's, the financial burden for students and their families increased dramatically (Baum & Payea, 2003; Callan, 2001; Toutkoushian, 2003). Accordingly, the shift away from need-based aid has taken three primary forms. The first of those forms has been government guaranteed education loans that must be repaid by students and/or parents (Baum & Payea, 2003; Hauptman, 2001; Heller, 2001a). The second form is toward tax incentives such as tax credits and state-sponsored college savings plans that primarily benefit middle- to upper-income families (Baum & Payea, 2003; Hauptman, 2001; Heller, 2001a). The third form is of significant importance to this research. Statewide merit-based scholarship programs have flourished as need-based aid has dwindled (Baum & Payea, 2003; Doyle, 2005; Dynarski, 2002, 2003; Hauptman, 2001; Heller, 2001a, 2001b). Georgia's Helping Outstanding Pupils Educationally (HOPE) scholarship, the first and best known of these merit aid programs, was launched in 1993. Since then, fourteen states have developed similar merit aid scholarship programs (Doyle, 2005).

Merit aid, the awarding of financial aid based upon academic characteristics (Doyle, 2005) without consideration for financial need, is certainly not a new educational concept. Academic merit scholarships are not uncommon. However, traditionally, merit scholarships have been on a small scale and have reached few students (Doyle). This recent trend is toward very large-scale, statewide programs based upon academic merit rather than need (Doyle, 2005; Dynarski, 2003; Heller, 2002). Additionally, the statewide merit aid scholarship trend is growing rapidly. According to Heller (2005), the year before Georgia's HOPE scholarship was launched, only nine percent of state aid nationwide was non-need-based. By 2002, that figure had grown to 27%. That increase represents a 629 percent increase in non-need-based aid compared to a need-based increase over the same time period of only 108 percent. Understanding the philosophical shift from need-based to merit-based state aid programs is important to educational policy analysis (Center for Public Policy, 2003).

Doyle's (2005) event history analysis studied educational, demographic, and political ideologies of the states that have developed large-scale merit aid programs to learn if there are particular state characteristics that make adopting a merit aid program more likely. His analysis found that, regardless of the state's dominant political ideology, legislators are concerned about particular characteristics of their states' educational demographics when developing merit aid programs. In particular, states with lower levels of post-secondary participation and educational attainment are more likely to adopt a merit aid program. The underlying philosophy for statewide merit aid appears to be providing incentives for post-secondary participation with the assumption that participation will lead to attainment and that attainment will lead to improved in-state

economies. While initial studies reported increased college participation rates among merit aid scholarship recipients, further studies have revealed important, unintended program effects (Dynarski, 2002, 2003).

Commenting on Dynarski's research on the effects of merit aid programs, Hoxby (2005) suggested that "the typical merit aid program raised the enrollment rate by only 1.4 percentage points, an amount that is not statistically different from zero. This lack of effect suggests that the vast majority of students who get merit scholarships would have attended college anyway" (p. 5). Accordingly, this lack of effect could represent an unintended program effect.

Unintended Effects of Merit Aid Programs

While most statewide, merit-based scholarship programs expressly concerned with increasing post-secondary access and participation, researchers have found that, in most instances, the benefits of these programs have largely gone to those who are middle- to upper-class White students and who would have attended college anyway (Binder & Ganderton, 2002; Cornwell, Mustard, & Sridhar, 2003; Dynarski, 2002, 2004; Heller, 2002, 2004, 2005; Stranahan & Borg, 2004). "The students least likely to be awarded a merit scholarship come from populations that have traditionally been underrepresented in higher education" (Marin, 2002, p. 114). Paradoxically, most merit aid programs are funded by lotteries in which low-income and minorities spend a larger share of their incomes than upper-class families (Cornwell & Mustard, 2004). Thus, low-income families are subsidizing the college educations of the middle- and upper-income students.

A series of studies on a dozen statewide merit scholarship programs in 2001 and 2002 examined program rationales, development, and outcomes, which are chronicled in

a report published by The Harvard Civil Rights project. In the report's forward, Orfield (2002) described the overall impact of these merit-based scholarship programs:

We are in the midst of a destructive set of federal, state, and local changes in higher education policy that limit the ability of minority and low-income families to go to college, damage their future and the future of their communities, and sacrifice too much of the human potential of society.... We have witnessed a significant reversal of access to higher education for minority and low-income students....Imagine someone reacting to higher education's current situation by saying that what we needed were large new programs to subsidize White and middle- to upper-income students to attend college, and that it was not necessary to raise need-based aid even enough to cover new tuition increases.... (p. xi)

Orfield's remarks summarized findings on overall educational policy effects related to low-income and minorities. The report's researchers focused on the underlying causes of the programs' effects.

The negative program effects on minority and low-income students noted by researchers are related to program participation criteria that make it more difficult for marginalized students to qualify initially and to maintain eligibility throughout their post-secondary experience. Initial and continuing eligibility is typically based upon academic achievement and standardized tests scores, which are criteria that do not favor low-income and minorities (Dynarski, 2002; Heller, 2005). Even though researchers agree that the academic eligibility standards for these merit aid programs are only moderately rigorous, they are frequently too rigorous for those populations that are already at an educational disadvantage (Dynarski, 2002, 2003; Heller, 2005). Ultimately, failure to

qualify for program benefits exacerbates existing participation and attainment gaps between low-income and minority students and middle- to upper-class White students (Binder & Ganderton, 2002; Cornwell, Mustard, & Sridhar, 2003; Dynarski, 2002, 2003; Heller, 2002, 2004, 2005; Marin, 2002; Stranahan & Borg, 2004).

The impact on low-income and minorities is further magnified by the substitution of funding for merit aid programs instead of funding for need-based aid programs. If students fail to qualify for the merit aid program, there is typically no parallel need-based program in place that is funded at the same levels (Dynarski, 2004). Hoenack (1982) considered this paradox a “second error” as “subsidizing students who would attend without the subsidy when there is no specific intent to transfer income to them results in foregone opportunities for increasing other enrollments or for using the resources to achieve other goals” (p. 411).

Effects of Statewide Merit Aid Programs on Enrollment Patterns

Research has also shown that these merit aid programs do impact post-secondary enrollment patterns (Binder & Ganderton, 2002; Cornwell, Mustard, & Sridhar, 2003; Dynarski, 2002, 2004; Heller, 2002, 2004; Stranahan & Borg, 2004). Most of the existing merit aid programs are designed to fund full tuition at in-state, public colleges. Some provide a portion of tuition to in-state private institutions. In most programs, only native students may participate. Research has found that in states that have adopted merit aid programs, initial post-secondary participation rates have increased, and student flow has been re-directed to the types of institutions that are targeted for participation (Heller, 2002). As most programs fund participation in four-year schools, four-year institutions

have seen the most increase in participation from merit-based program participants as students “upgrade from two-year colleges to four-year colleges” (Hoxley, 2004, p. 5).

Statewide Merit Aid Scholarship Programs

This section will review and synthesize literature related to statewide merit-based aid programs in detail. It will begin with an overview of merit aid programs and then will examine the methodology, data sources, and findings of existing merit aid studies. The synthesis will focus on the effects of merit aid programs on post-secondary enrollment patterns, on access for minority and low-income students, and on unintended effects noted by the researchers.

In the past fifteen years, a trend toward large-scale, statewide, merit-based scholarship programs has occurred (Cornwell & Mustard, 2004; Doyle, 2005; Heller, 2004, 2006; Marin, 2002). These scholarship programs have flourished as need-based aid has dwindled (Baum & Payea, 2003; Doyle, 2005; Dynarski, 2002, 2003; Hauptman, 2001; Heller, 2001a, 2001b, 2004, 2006; Marin, 2002). Georgia’s Helping Outstanding Pupils Educationally (HOPE) scholarship, the first and best known of these merit aid programs, was launched in 1993. Since then, fourteen states have developed merit aid scholarship programs that are similar to the HOPE scholarship (Cornwell & Mustard, 2004; Doyle, 2005).

Missouri’s Department of Elementary and Secondary Education considers the A+ Schools Program primarily a high school improvement program with a financial incentive for qualified students to attend college. However, in the context of this study, Missouri’s A+ Schools Program should be considered a merit aid scholarship program similar to Georgia’s HOPE scholarship because it is a statewide program that rewards

modest academic achievement with substantial post-secondary funding for in-state post-secondary attendance and is awarded without regard to family income.

Researchers have found that there are consistent similarities between these statewide merit aid programs. Most were promoted by state policymakers as access policies designed to increase post-secondary participation. Additionally, policymakers hoped to staunch “brain-drain” (Hamilton, 2002, as cited in Heller & Rogers, 2003) by encouraging bright students to attend college in the state, which would hopefully lead to keeping bright college graduates in the state as highly productive employees (Binder & Ganderton, 2002; Baum, n.d.; Doyle, 2005; Dynarski, 2002, 2004; Heller, 2005; Heller & Rogers, 2003).

The effects of these statewide merit-based programs appear similar, as well. Most of the programs are expressly concerned with increasing post-secondary access and participation by rewarding moderate academic merit with substantial student grants for in-state institutional attendance. There is some indication that more students are attending in-state institutions. However, researchers have found that, in most instances, the benefits of these statewide, merit-based aid programs have largely gone to middle- to upper-class White students who would have attended college anyway (Binder & Ganderton, 2002; Cornwell, Mustard, & Sridhar, 2003; Dynarski, 2002, 2004; Heller, 2002, 2004, 2005; Marin, 2002; Stranahan & Borg, 2004). Low-income and minority students appear at a disadvantage because the eligibility criteria are often based upon academic achievement measures that are known to discriminate against those populations (Dynarski, 2002; Heller, 2005; Marin, 2002).

Statewide Enrollment Patterns and At-risk Students

The first statewide, large-scale, merit-based scholarship was Georgia's HOPE scholarship (Cornwell & Mustard, 2002, 2004; Dynarski, 2004; Heller & Marin, 2002). "The HOPE Scholarship Program represents policy experimentation on a massive scale. At the time of its inception, no state had ever attempted to implement a merit aid program with such a high level of expenditures and large number of beneficiaries" (Henry, Rubenstein, & Bugler, 2004). Between its inaugural year in 1993 and 2002, Georgia dispersed over 1.2 million awards and over \$1.5 billion in aid through the HOPE scholarship. This aid was generated by a new state lottery. Because of HOPE's maturity and its influence on other statewide merit aid programs, this analysis of statewide, merit aid scholarship programs will begin with a review of HOPE scholarship studies following a short discussion regarding the HOPE eligibility guidelines.

Cornwell and Mustard (2004) outlined the HOPE Scholarship details. In order to meet HOPE's scholarship requirements, Georgia students must: (1) graduate from a Georgia high school with a "B" (3.0) average; (2) maintain a "B" (3.0) average in college. Students may use their scholarship at any of Georgia's public and private colleges and universities. "The scholarship pays all tuition and fees, and \$300 of book expenses to Georgia citizens who attend degree-granting public institutions" (Cornwell & Mustard, 2004, p. 80) and can be renewed annually. HOPE recipients who attend a Georgia private institution receive an annual \$3,000 award.

HOPE is considered the model for other states' merit scholarships and, as such, has changed the timbre of higher education financing and subsidy nationwide (Cornwell & Mustard, 2004; Doyle, 2005; Henry, Rubenstein, & Bugler, 2004). In particular, other

“HOPE-like [scholarships have] multi-year coverage, no limit on the number of qualifiers, and awards [are] distributed as entitlements for those who meet specified criteria (Cornwell & Mustard, 2004, p. 79).

Henry, Rubenstein, & Bugler (2004) observed that there have been three notable changes in HOPE eligibility requirements: (1) In 1993, its first year, HOPE capped family income for recipients at \$66,000. The second year, the income cap was raised to \$100,000, and by HOPE’s third year, 1995, the income cap was lifted entirely, and (2) “Originally, the amount of HOPE Scholarship was reduced dollar-for-dollar for any federal financial aid, including the Pell Grant” (Henry, Rubenstein, & Bugler, 2004, p. 687). This practice often meant that the lowest-income students sometimes only received very minimal HOPE funding, so HOPE was not affecting post-secondary access for low income students. Consequently, that component of the policy was eliminated in 2000-2001. The third notable change occurred with the high school graduating class of 2000. Prior to 2000, graduates had to have a 3.0 overall high school GPA. In 2000, the GPA requirement was adjusted to require a 3.0 GPA in high school core academic subject areas.

Georgia’s HOPE Scholarship program. Because of its innovative, influential policy and program goals and its maturity, the HOPE Scholarship has had the most interest from the research community. Several studies have focused on the HOPE program’s effects on enrollment patterns, post-secondary access, and unintended program effects. A review of these studies follows.

Cornwell and Mustard (2002) and Cornwell, Mustard, and Sridhar (2003) examined the early effects of HOPE on college enrollments with a focus on institutions.

Using IPEDS data, they contrasted Georgia's freshman enrollment rates before and after HOPE with those from neighboring southern states during the same time frames. HOPE was considered the treatment variable. They found that HOPE did increase the overall freshman enrollment rate in Georgia by 6.9 percentage points. However, because this increase was "less than 10 percent of all first-year program beneficiaries...findings suggest that the HOPE program has operated largely as a transfer to students who would have enrolled in college anyway" (Cornwell, Mustard, and Sridhar, 2003, p. 25). Because HOPE funds tuition and fees at all public institutions, Georgia four-year public institutions experienced the largest gains. The researchers felt that these gains represented a transfer of students who would have attended two-year schools to four-year schools and from out-of-state schools to in-state schools rather than increased overall post-secondary participation.

Both studies (Cornwell and Mustard, 2002; Cornwell, Mustard, and Sridhar; 2003) also noted that African-American student enrollments increased at similar rates. Public institutions and Georgia's Historically Black Colleges and Universities (HBCUs) experienced the largest gains in African-American students. However, some of this increase was attributed to the presence of several HBCUs in Georgia and that Georgia's largest two public institutions are ranked in the national top twenty colleges and universities. It was easier for Georgia to attract and retain in-state students when there were in-state, high profile, selective institutions and to retain African-American students when there were several HBCU options in the state. The researchers also noted that because HOPE recipients who qualified for Pell grants had "their Pell aid reduced dollar for dollar by their [HOPE] award...the scholarship provided no added incentive for low-

income students to attend college ” (Cornwell, Mustard, and Sridhar, 2003, p. 5).

Consequently, in terms of enrollment patterns, HOPE seemed to affect institutional choice more than college access, or the ability or decision to attend college at all (Cornwell and Mustard, 2002; Cornwell, Mustard, and Sridhar; 2003).

Cornwell and Mustard (2002) also expressed concern that HOPE may be “exacerbating the racial stratification of Georgia colleges and universities” (p. 67). Because the HOPE scholarship influenced greater proportions of high achieving Georgia graduates to attend in-state colleges, Georgia’s top universities were able to raise their admissions standards without affecting enrollment volume. This increase in admissions standards effectively pushed African-American student enrollments to the generally less selective Georgia HBCUs. Again, HOPE appeared to have impacted enrollment patterns or college choice more than post-secondary access.

In a follow-up study, Cornwell and Mustard (2004) focused more specifically on the effects of HOPE on minorities and low-income students. Part of this study analyzed high school demographics in relation to the number of students who receive the HOPE scholarship. In order to obtain a HOPE scholarship, students must earn a 3.0 high school GPA. Cornwell and Mustard found that there was a slight relationship between the number of students in the high school eligible for the Free and Reduced Lunch (F&RL) program and the number of students eligible for HOPE. As the number of F&RL recipients rose, the number of HOPE recipients fell. Additionally, as the proportion of African-American students in the school rose, the number of HOPE recipients fell. This suggested a slight negative effect on minority and low-income scholarship qualifying rates. However, neither of these effects was at a statistically significant level.

Dynarski (2002) studied how the early effects of HOPE varied by race and income. Using the U.S. Department of Commerce's Current Population Survey and IPEDS data, she compared changes in Georgia's 1993-1997 post-secondary attendance rates to those of neighboring southeastern states. Prior to HOPE, Georgia's college attendance rates were only 30 percent, relative to an average attendance rate of 41.5 percent in other southeast states. Controlling for economic effects, Dynarski found that after HOPE, Georgia experienced a college attendance increase of 7.9 percentage points, effectively bringing Georgia in line with the other states. However, because the HOPE scholarship was reduced dollar for dollar by receipt of Pell grant aid, low-income students did not increase their college attendance as a result of HOPE. "In contrast, HOPE increased enrollments for youth from families with incomes above \$50,000 by 11.4 percentage points.... As a result...higher-income youth increased their attendance relative to lower-income youth by 12.8 percentage points more than they did in other southeastern states" (p. 80). This observation aligns with Cornwell and Mustard's (2004) observation regarding low-income students' post-secondary participation. Dynarski concluded that HOPE has "widened the income gap in college attendance in Georgia" (p. 80).

With regard to HOPE's impact on race, Dynarski (2002) found that "college attendance for Blacks did not rise significantly in Georgia relative to the other southeastern states" (p. 81). In contrast, "college attendance among Whites rose 12.4 percentage points faster from 1993-1997 than in the rest of the southeastern [states]" (p. 81). Dynarski attributed these findings to higher income levels and higher average grades among Whites. Additionally, African-Americans were less likely to meet the high school

GPA requirement of 3.0. Further African-Americans who did meet the high school 3.0 GPA and earned HOPE were less likely to meet the college 3.0 GPA requirement and lose HOPE after initial enrollment. Therefore, Dynarski posited that “HOPE has widened the racial gap in college attendance in Georgia” (p. 82). Like Cornwell and Mustard (2002) and Cornwell, Mustard, and Sridhar (2003), Dynarski (2002) found that HOPE did impact enrollment patterns and college choice, but did not necessarily increase post-secondary access.

In 2004, Dynarski compared HOPE to other Southern states with no merit aid scholarship to see if HOPE “changed schooling decisions or simply subsidized inframarginal students” (p. 70). These were students from “families whose schooling decisions are unaffected by their receipt of aid” (p. 91). She also compared Georgia’s HOPE program results with similar merit aid programs implemented in other southern states using the Current Population and the Analysis of State Aid surveys. HOPE funds tuition and fees at any in-state public institution and awards \$3,000 annually to qualifying students enrolled at in-state private institutions.

In this updated study, Dynarski (2004) found that college participation rates did increase in Georgia and the other states as a result of the merit aid programs and that the effects increased over time. In particular, HOPE had raised the attendance rate by 8.6 percentage points relative to states without merit aid programs. Further, using regression analysis she found that HOPE did affect the type of college attended or statewide post-secondary enrollment patterns. HOPE increased the probability of attending a four-year school by 4.5 percentage points. A parallel decrease in attendance rates was noted at two-year public institutions. Similar enrollment shifts were observed in other Southern merit

aid states. These findings reflect the student transfer observations also noted by Cornwell and Mustard (2002) and Cornwell, Lee, and Mustard (2003).

With regard to merit aid programs' impact on race/ethnicity, Dynarski (2004) observed differences in the effects upon Whites and minorities. "HOPE had a substantially greater effect on White attendance (9.6 to 14.0 percentage points) than Black or Hispanic attendance (-0.7 to 6.6 percentage points) indicating that HOPE has increased racial and ethnic gaps in college attendance in Georgia" (p. 82). Conversely, Dynarski also found that merit aid programs in the other Southern states of Arkansas, Mississippi, and Florida narrowed the attendance rates between Whites and minorities. In fact, in those states the "estimated effects of merit aid on Blacks and Hispanics is consistently *more positive* than its effect on White non-Hispanics" (p. 88). Dynarski attributed this difference in effects to the lower initial and continuing GPA eligibility requirements in those states. This finding suggested that Georgia's comparatively high 3.0 college GPA requirement negatively affects Black students. Still, Dynarski concluded that an important unintended consequence of merit aid on schooling decisions suggested "that the great majority of aid goes to inframarginal families" (p. 91) or to students from families who are likely to have made the decision to attend college regardless of aid receipt.

Curious about the effects of becoming ineligible for HOPE once in college, Henry, Rubenstein, and Bugler (2004) attended to the impact of HOPE eligibility on college academic achievement, persistence, and graduation for a statewide cohort of "borderline" (p. 691) HOPE recipients. In 1995, the HOPE high school GPA criteria had not been adjusted to require the 3.0 in core classes yet. Additionally, students could

qualify with either a 3.0 GPA or a cumulative high school average of 80 or higher. Using the high school average figure, the researchers were able to identify a cohort of 1995 high school graduates who had barely qualified for the HOPE Scholarship and a matching cohort of 1995 graduates who had barely missed the qualifying criteria. Borderline students represented those who were “most likely to lose eligibility for the HOPE Scholarship and therefore, to experience its loss” (p. 693). They further matched students on type of post-secondary institution attended. Data were drawn from a statewide database maintained by the state department of higher education. The researchers used graduation, persistence, college credits earned, and college GPA as measures of college performance. Continued HOPE eligibility for students based upon college GPA was measured at 30, 60, and 90 post-secondary credit hour mileposts. Variables indicating student race were also included to examine the effects of race on HOPE eligibility and academic achievement.

With regard to academic in-process measures, Henry, Rubenstein, and Bugler (2004) found that the borderline HOPE recipients earned slightly more credit hours and a slightly higher GPA than non-HOPE recipients. This credit hour finding is in contrast to Cornwell, Lee, and Mustard’s 2003 University of Georgia case study findings where HOPE recipients took slightly fewer credit hours. As Henry, Rubenstein, and Bugler studied a post-secondary system-wide cohort, they attributed the difference to HOPE making it possible for some students to attend college full-time who would have attended part-time without the scholarship. “African American [HOPE recipients] accrued more credit hours than other students.... and other minority students earned fewer credits” (p.

697). Additionally, the researchers found that HOPE recipients earned a slightly higher college GPA (+0.17/4.0). This finding held for minority students, as well.

In their regression analysis of persistence and graduation rates, Henry, Rubenstein, and Bugler (2004) found that borderline HOPE recipients were twice as likely than non-recipients to graduate from a two-year institution and “72% higher at four-year institutions” (p. 699). The researchers suggested that the difference could be attributed to a lessened financial need for HOPE students to work while enrolled. Similarly, HOPE recipients persisted at high rates than non-recipients. There was no difference on persistence measures between Whites and African Americans.

Georgia policymakers had expressed concern that substantial numbers of HOPE recipients were losing HOPE eligibility at the 30 credit hour check point. Consequently, Henry, Rubenstein, and Bugler (2004) also studied the impact of losing HOPE funding once in college. Eighty-five percent of the borderline HOPE recipients lost eligibility at the 30 credit hour mark and only 3.5 percent maintained eligibility for four years. Analyses of the academic outcomes for initial qualifiers who lost eligibility compared to those who were never eligible for HOPE indicated that the benefits of HOPE only accrue to those who maintain eligibility throughout their post-secondary experience.

Recently, Cornwell and Mustard (2006) followed up their 2002 research on institutional stratification when they studied HOPE’s potential contributions to ability stratification in Georgia’s post-secondary system. Ability stratification reflects a intellectually homogeneous student body created by admissions screening processes and standards. Proponents of the concept feel that a homogenous institutional population composed of high achievers provides the opportunity to create a rigorous academic

culture without undue concerns about student retention. Critics maintain that the standards screen out marginalized students and reduce institutional diversity (Cornwell & Mustard, 2006). Because HOPE essentially pulled high ability native students back to in-state institutions, the two largest public universities in Georgia were able to increase their admission standards without negatively affecting enrollment volume.

Using 1989-2001 SAT data and graduation rankings that represent student ability from the Southern Regional Education Board, Cornwell and Mustard (2006) sought indications in institutional enrollment data that students were becoming more or less homogenous with regard to academic ability. Neighboring out-of-state institutions provided the control. They found that Georgia's most selective institutions did increase the quality and homogeneity of their student populations as measured by SAT and high school class rank. Georgia's lower-quality institutions did not experience similar increases in student quality. Additionally, they found that HOPE reduced the variance of math and verbal SAT scores in the Georgia "universities but had no impact on the variances at any other institution type" (p. 5). Based on these findings, Cornwell and Mustard concluded that HOPE had increased ability stratification in Georgia's post-secondary education system.

Other statewide merit aid programs. Shifting the focus from Georgia's HOPE Scholarship to other statewide merit aid programs, Binder and Ganderton (2002) evaluated the "enrollment, retention, and academic performance effects" (abstract) of the New Mexico Lottery Success Scholarship. Like HOPE, New Mexico Success is funded by a state lottery. It is intended to increase post-secondary access and encourage New Mexico students to enroll in-state. However, initial eligibility for New Mexico Success is

not based upon high school achievement. Rather, any New Mexico resident “who has graduated from New Mexico high school (or obtained the equivalent diploma) in the semester prior to enrolling for at least 12 credit hours in college and has a minimum 2.5 GPA in the first semester of college” is qualified. The Success scholarship pays tuition only at New Mexico public post-secondary institutions. Additionally, the Success scholarship does not cover the first semester of college. However, most New Mexico institutions have implemented “bridge” (p. 3) scholarships with similar qualifying criteria for use during the first term. Both scholarships’ renewal requirements include full-time, continuous enrollment and an earned GPA of 2.5. The New Mexico Success Scholarship can be awarded for a maximum of eight semesters and there is no income cap. Between its beginning in 1997 and mid-2000, New Mexico had awarded over 35,000 scholarships totaling about \$25.1 million in scholarship funds.

In this case study, Binder and Ganterton (2002) used data from the University of New Mexico (UNM) and IPEDS to investigate enrollment, retention, and academic performance effects pre-/post-Success. They found that, similar to HOPE, New Mexico Success “has not increased the overall college enrollment rate among high school graduates” (abstract). Rather, the main program effect appeared to be re-directing “already college-bound students to four-year in-state institutions, and in particular, to the University of New Mexico” (abstract). In particular, academically weaker students from higher SES backgrounds attended UNM at higher rates. These students, who probably would have attended less rigorous institutions in the past, were found to be more likely to drop out of UNM because of poor academic performance. Binder and Ganderton (2002) concluded that “New Mexico Success incentives have produced worse student-institution

matches” (p. 19). This effect is the contrast to Henry, Rubenstein, and Bugler’s (2004) research on the HOPE Scholarship where type of college attended did not appear to affect college GPA suggesting that the cohort of Georgia students was better matched institutionally than the New Mexico cohorts. With regard to low-income students, Binder and Ganderton found that New Mexico Success cohorts “have smaller proportions of low-income students by two to three percentage points” (p. 16).

Binder and Ganderton updated their UNM case study in 2004 with a particular focus on low-income and minority students. They noted that New Mexico is somewhat unique in its distribution of minorities in the state population. More than half of New Mexico’s residents are considered racial and Hispanic minorities. Consequently, racial minorities actually compose the majority of the state’s residents. Binder and Ganderton found that the New Mexico Success ratio of high- to low-income scholarships is 2.7:1 and of minority to non-minority was 1:1. More scholarships were awarded to high income students. In terms of New Mexico Success or bridge scholarship recipient retention at UNM, they found that 12% of Whites and 24% of minorities are not retained from the first to second semester. First to fourth semester failure rates increased to 35 percent for White students and 46 percent for minorities. The losses were the greatest for African-American students (63 percent) and Native American students (56 percent). Consequently, these students lost eligibility at UNM and, further, would no longer have been eligible for a Success scholarship at New Mexico’s other public institutions.

Binder and Ganderton (2004) reiterated in this study that while New Mexico Success increased the participation of minorities and low-income students at UNM, at least some of these students were mismatched institutionally. Those minority and low-

income students who were retained did not achieve academically at significantly higher rates than minority and low-income students prior to New Mexico Success. Binder and Ganderton concluded that New Mexico Success changed the enrollment patterns of New Mexico high school graduates, but, like HOPE, it seemed to impact statewide post-secondary enrollment patterns more than post-secondary access.

Focusing more on student qualities than on enrollment patterns, Heller and Rasmussen (2002) studied Florida and Michigan's statewide merit aid scholarships. They examined "how students' socio-economic characteristics are related to eligibility and receipt of merit-based awards in these two states, and how different criteria used for awarding these scholarships affect distributional equity" (p. 27). Florida's Bright Futures Scholarship (BFS) program is funded by a state lottery, awarded in three tiers based upon high school GPA and standardized test scores, and has no income cap. In this tier system, higher GPA and test scores are rewarded by higher dollar amounts to students. The BFS awards scholarships for up to four years at Florida's degree-granting institutions and vocational technical schools. Its stated goal is to reward achievement and does not claim to increase post-secondary access. In contrast, the Michigan Merit Award Scholarship program is funded by the state's tobacco settlement. It is awarded based upon high scores on Michigan's K-12 standardized academic achievement test, and its stated goal is to promote post-secondary access.

Using data from the states' departments of education and NCES files, Heller and Rasmussen (2002) found that "African-American and Hispanics qualify for the scholarships at rates well below those of White and Asian American students (p. 30). This was an expected effect because of known relationships between race/SES and

standardized instruments. Additionally, they found that “the greater proportion of the awards have been distributed to students in high schools with higher college-participation rates (before implementation of the merit scholarship programs)” (p. 33). Heller and Rasmussen concluded that “merit scholarships are likely to exacerbate, rather than help remedy, college enrollment gaps in the United States” (p. 35).

Farrell (2004) extended Heller and Rasmussen’s work to study recipient qualities by race and poverty levels in five states: Alaska, Florida, Kentucky, Michigan, and New Mexico. Using NCES data, the metropolitan status (central city, suburban area, rural area) of school districts or counties, and U.S. Census Bureau income and poverty estimates, she found “that there are inequities among merit scholarship recipients and high school graduates in [these states]” (p. 69). Specifically, Farrell found that the scholarships are enhancing post-secondary access for students who would have gone to college anyway. Additionally, she found “that White students, even if they are from urban and high poverty areas, have a greater opportunity to receive a non-need, merit scholarship than Black or Hispanic students” (p. 69). Finally, she found that the scholarships are biased toward students in middle-income to wealthy areas compared to “rural or inner-city and/or high poverty areas” (p. 70). Farrell concluded that these “inequities impact access to high education for minority and low-income students” (p. 69).

McClinton (2005) studied how Florida’s Bright Futures Scholarship program has affected “student success (access/enrollment, persistence, and graduation) among African-American students” (abstract) and whether “students who received the award remained in the state at a higher rate” (abstract). Florida’s scholarship is based upon GPA

and standardized test scores and is intended to reward achievement and encourage in-state attendance rather than promote post-secondary access. McClinton's study was limited to student performance in the first year following high school graduation. She found that African-American Scholarship recipients did attend in-state institutions at a higher rate than previous to the award. She posited that these enrollment gains were diversions from out-of-state institutions and Florida community colleges. Further, she concluded that "African-American student success increased after the initiation of the Merit Scholars Award at a higher rate than White students" (p. 95). However, a criticism of this study is that because of the Merit Scholars Award eligibility requirements, McClinton's study was limited to analyzing African-American students who had already demonstrated high achievement on pre-college indicators such as GPA and standardized test scores.

Heller and Rogers (2003) studied scholarship qualification trends for the Michigan Merit Award from the 2000, 2001, and 2002 Michigan high school graduating classes. They used data obtained from the Michigan State Department of Education on the demographic characteristics of high schools including racial/ethnic composition and F&RL program qualifier percentages merged with student-level ACT/SAT and Michigan Educational Assessment Program (MEAP) score data. Michigan's merit-based scholarship was enacted through 1999 legislation, is funded through the state's tobacco settlement, and awards a one-time \$2,500 scholarship to graduates based upon 11th grade MEAP scores.

Heller and Rogers (2003) found significant differences in the test score results for each of the three high school class cohorts. The researchers attributed some of these

differences to policy implementation circumstances. The Michigan class of 2000, the baseline cohort, had already taken its MEAP tests before the legislation was enacted, so had little opportunity to score higher on the MEAP. Consequently, the Michigan class of 2001, whose members would have been 11th graders taking the exam during the scholarship's highly-publicized launch year, were expected to show marked MEAP improvement over class of 2000. This expectation held true. Proportionally more students qualified for the Michigan Merit scholarship from the class of 2001. However, qualification rates for all non-White students and low-income students, already under-represented in Michigan's system of higher education, declined slightly with the class of 2002. Heller and Rogers concluded that it takes time for students to improve learning outcomes in order to score higher on the MEAP exam. They did not address possible explanations for the drop in qualification rates for non-White and low-income students. Additionally, Heller and Rogers hypothesized that the Michigan \$2,500 scholarship may not be sufficient financial incentive to change student behaviors.

Smothers (2004) used a mixed method design to analyze Louisiana's Tuition Opportunity Program for Students (TOPS) program's goals, impact, and influence on educational experiences of recipients. The TOPS program pays full tuition and fees at Louisiana public institutions and comparable amounts at Louisiana private institutions. Eligibility is based upon ACT scores, high school GPA, and completion of the high school core curriculum. Smothers found that African-American students and low-income students were less likely to be TOPS recipients and that high income students constituted the majority of scholarship recipients.

Academic Choices and Course-taking Behaviors

The preceding studies were focused primarily on how merit aid programs may be affecting post-secondary participation and institutional choice. Some researchers have studied how merit aid scholarship programs may be affecting decisions that recipients make once they are enrolled in a post-secondary institution.

Dee and Jackson (1999) studied the course-taking behaviors of HOPE students at Georgia Tech with a focus on whether decisions regarding college major impact scholarship retention. Using student level institutional data, they attended to whether HOPE scholarship recipients who chose to pursue majors with historically more rigorous grading standards such as architecture or engineering were more likely to lose their HOPE scholarship than students pursuing majors in programs with historically less rigorous grading standards such as the social sciences. Of particular concern was the 3.0 college GPA requirement for scholarship retention. Dee and Jackson's "models demonstrated that students whose major course of study is in engineering, computing, or the natural sciences are 21 to 51% more likely to lose their funding than similarly qualified students from other fields" (p. 5) after just one academic year. Consequently, Dee and Jackson posited that students of average ability may make decisions regarding their major course of study based upon scholarship renewal requirements, rather than interest and average ability. Further, Dee and Jackson found that African-American and Hispanic students with similar ability as measured by standardized test scores and high school GPA are as likely as White students to lose their HOPE scholarship for academic reasons.

Cornwell, Lee, and Mustard (2002) studied the effects of Georgia's HOPE scholarship on academic choices in college. Their focus was on potential unintended effects of the 3.0 eligibility GPA as it is related to enrolled credit hours, course withdrawal patterns, and diverting courses to summer when GPAs are typically higher. The 3.0 GPA requirement is intended to encourage students to study harder. Using institutional student-level data from the University of Georgia between 1989 and 1997, Cornwell, Lee, and Mustard compared enrollment and course-taking behaviors of HOPE recipients with similar students from out-of-state who did not have a HOPE scholarship. They found that HOPE recipients at the scholarship retention GPA margins did alter their course taking behaviors to increase their chances of earning higher GPAs. They took fewer courses, withdrew from courses to avoid earning a low grade at a higher rate, and diverted an average of 0.5 credit hours from the regular academic year to the summer. At-risk African-American and Hispanic students were more likely to enroll less than full-time or drop to less than full-time in efforts to remain academically eligible for HOPE. Consequently, these students may have been under-investing in their own human capital by slowing progress toward a degree.

Other Unintended Effects

The preceding studies have focused on students' post-secondary academic behaviors in relation to continuing academic eligibility requirements of the merit-based scholarships. The following section reviews other miscellaneous unintended effects of statewide merit aid scholarships.

Grade inflation. Because increasing proportions of Georgia students become eligible for the HOPE scholarship each year by meeting the 3.0 high school GPA

requirement, some researchers have accused HOPE of contributing to high school grade inflation (Bradbury & Campbell, 2003). Henry and Rubenstein (2002) explored this grade inflation argument. They studied SAT and student high school GPA trends from 1989-1999. Their hypothesis was that SAT scores would remain steady as high school GPA rose if grade inflation was occurring. National and regional SAT trends served as a control. Their analysis indicated that Georgia SAT scores and high school GPAs rose at comparable or faster rates than the regional comparison groups during the same time period. Henry and Rubenstein concluded that grade inflation was not occurring as a result of the HOPE Scholarship; the increases in proportions of students eligible for HOPE were the result of increased student effort. Further, their analysis indicated African-American students' SAT scores and GPA "have responded more strongly to the incentive" (p. 106) than other students suggesting that HOPE was not negatively impacting post-secondary access for minority students.

Financial aid and college prices. Other merit aid studies have investigated possible unintended effects of statewide merit-based scholarships related to financial aid and college prices. State spending on merit aid scholarship programs has been substantial. Heller (2004) analyzed state spending patterns in merit aid states. In 2000-01, the 12 existing merit aid states spent \$863 million on awards without consideration of students' financial need. In 2002-03, those states spent \$1.175 billion on merit aid, which represents a 36 percent increase in merit aid spending. During the same time period, those states increased spending on need-based aid only seven percent, "which represented less than a third of what the dozen states spent on merit aid" (Heller, 2004, p. 15).

It is important to note that during the early years of the millennial decade, an economic recession sent most state budgets into crisis, appropriations to higher education were substantially cut, and most higher education institutions raised costs dramatically (Losing Ground, 2003). This economic situation is important for two reasons. First, need-based allocations had not keep pace with these increased costs (Baum & Payea, 2003; Callan, 2001; Heller, 2004), so these spending patterns give rise to concern about post-secondary access for low-income students. “Unmet financial need—the gap between the costs of attending college and the resources available to students from their families and from all sources of financial aid—presents a major barrier for students from lower income families” (Heller, 2004, p. 15). Secondly, states have struggled to generate adequate merit aid funding as merit-scholarship programs have grown rapidly and outpaced the economy and original funding sources (Heller, 2004).

Returning to the impact of Georgia’s HOPE scholarship, Long (2002) studied the possibility that colleges might raise costs or decrease institutional aid in order to capture more state funds from a relatively captive enrollment audience. This practice would have a negative impact upon state coffers and upon students who do not qualify for the state merit-based scholarships because higher education costs would be higher. Using costs at nearby out-of-state institutions as a control for higher education price trends, Long found that Georgia colleges did change pricing structures in response to HOPE. Georgia public colleges increased room and board fees by about \$0.09 for each \$1 of HOPE aid over the comparison group. Georgia private four-year colleges increased tuition and decreased institutional aid “suggesting a possible aid substitution effect” (p. 104). “The estimates suggest that the average cost of private four-year colleges in Georgia increased by almost

\$0.25 for each \$1 of HOPE” (p. 104). Based upon Long’s analysis, it is possible that Georgia institutions raised costs or substituted HOPE funds for aid previously provided by the institution.

Lottery funding of scholarships. Other researchers have criticized the practice of funding statewide, merit-based scholarship with lottery proceeds. Stranahan and Borg (2004) explored the notion that the majority of Florida lottery players are from lower socio-economic households while the majority of the lottery funds distributed through the Florida Bright Futures (FBF) scholarship go to middle- to upper-income students. Stranahan and Borg surveyed the families of FBF awards at two large Florida universities to learn about their lottery playing habits. Regardless of SES, those households spent similar dollar amounts on lottery gaming each month. However, lower-income households spent proportionally far more than upper-income households. Calculating those responses against FBF benefits paid out to lower-income students, they found that, practically speaking, lower socio-economic households were subsidizing the higher education of higher socio-economic householders. Stranahan and Borg considered this the “Reverse Robin Hood effect” (p. 122).

Cornwell and Mustard (2001) conducted a similar study on Georgia’s lottery playing rates using federal and regional census, Georgia lottery, and Georgia Student Finance Commission data. They found results similar to Stranahan and Borg’s results. Lottery sales are higher in lower-income parts of the state than they are in higher-income areas. Minorities play the lottery at higher rates with one exception: Because of religious beliefs, Black Baptists are discouraged from playing the lottery. Still, the overall effects of the study indicated that lower-income residents and minorities spend a larger

proportion of their incomes on lottery sales and receive considerably fewer HOPE scholarships per capita. In effect, lower-income and minority residents are subsidizing merit scholarships that are awarded at higher rates to higher-income residents.

Intrigued by the notion that Georgia's HOPE scholarship appeared to be subsidizing higher-income families who could presumably afford to send students to college, Cornwell and Mustard (2005) explored how those families might have been spending funds that had previously been set aside for college. They posited that, as automobiles are the most common durable goods purchased, there would be a correlation between an increase in car licenses sold in higher-income counties and the advent of the HOPE scholarship. They found evidence to support their hypothesis. Thompson (2005) suggested that this phenomenon might represent a form of parent bribery to encourage HOPE-qualified students to attend in-state colleges in Georgia.

Merit grants compared to need grants. The preceding reported the results of studies that focused on various phenomena that seem related to the implementation of statewide merit aid scholarships. While not specific to post-secondary access and enrollment, the findings suggest that statewide merit aid programs can influence post-secondary enrollment behaviors in inadvertent ways and result in unintended effects.

Heller (2006) recently analyzed national trends in merit aid scholarship programs. His focus was on who receives merit grants compared to need-based grants and likely long-term effects of merit aid scholarship programs on college access. Using 1993-2003 data from the National Association of State Student Grant and Aid Programs, he found that state need-based grants had grown at a 7.5 percent annual rate, while spending on state merit-based grant aid had grown at a 20.7 percent annual rate. He noted that in

2003, “more than one in four state grant dollars [were] awarded without means testing” (p. 3). Analyzing the distribution of the merit-based grants, he noted that more than half of the funds were disseminated to students above the income median. Additionally, White students were awarded disproportionately more merit-based funds than minority students. Heller suggested that the interrelationship between state need-based and merit-based grants is key to understanding impact of merit-based grants on post-secondary access. In particular, while there has been little research done regarding the potential displacement of need-based funds by merit-based funds in state funding processes, “if even only a portion of their funding were reallocated to need grants, these states could more efficiently and effectively use scarce public resources to increase the college participation of underserved populations” (Heller, 2006, p. 8).

While the findings are mixed, there appears to be cause for concern about post-secondary access for at-risk populations as large, statewide merit aid programs proliferate. Commenting on the findings of the 2002 Civil Rights project study that focused on merit-based aid programs, Marin (2002) noted:

Overall, the studies in this report make it clear that the students least likely to be awarded a merit scholarship come from populations that have traditionally been underrepresented in higher education. This hinders the potential to increase college access among minority and low-income students, especially if these scholarship programs continue to overshadow need-based programs” (p. 114).

Promoted by many as post-secondary access programs designed to encourage and reward academic achievement and staunch brain drain, statewide merit aid programs appear to

sometimes result in unintended effects. Findings from the previous studies will inform and guide the following literature review about Missouri's A+ Schools Program.

The Missouri A+ Schools Program

Background and Context of Missouri's A+ Schools Program

During the late 1980s and early 1990s, the State of Missouri implemented a number of statewide recommendations and policies intended to improve the quality and coherence of the K-16 educational system and to improve post-secondary access (Blueprint for Higher Education, 1995; Missouri K-16 Coalition, 1999). The driving force behind these initiatives was a concern regarding Missouri's role in national and international commerce. Economic challenges in Missouri's agriculture production industry were driving a population shift from rural to urban centers (Missouri Department of Economic Development, 2000) and a downturn in farm-related revenues (U.S. Department of Labor, n.d.). Missouri's manufacturing revenues were also in a steep decline (U.S. Department of Labor, n.d.). Economists and researchers were predicting a momentous shift from a tangible, asset-based economy to an intangible, non-asset-based economy where knowledge was valued over material stock (Missouri Department of Economic Development, 2005, Nanaka & Takeuchi, 1995; Senge, 1990). State policymakers were challenged with finding ways to revitalize Missouri's economy by reinvigorating traditional industries and attracting new industries to the state. Advanced education would be key to Missouri's ability to capitalize on this trend.

Missouri's college educated. Research by the U.S. Department Labor in the mid-1990's found that college graduates earned 75% more than high school graduates (U.S. Department of Labor, 1998). Additionally, Paulsen (2001b) noted that workforce

productivity increases 1.2 percent “for each one-percentage point increase in the share of a state’s high school graduates who had college degrees” (p. 100). However, in 1990, only 18% of Missourians held a college degree (Missouri Social & Economic Data Analysis, n.d.) In 1992, only 48.7% of Missouri’s high school graduates enrolled in college directly after high school (Center for Higher Education, n.d.). The national average was 54.3% and even Missouri’s contiguous states produced much higher college-going rates (Center for Higher Education, n.d.). Missouri ranked 40th on national college participation rankings (Center for Higher Education, n.d.). Missouri’s 1992 9th graders had only a 35% chance of going to college as high school graduates (Center for Higher Education, n.d.). Those who did complete a bachelor’s degree had the 7th highest out-of-state migration in the nation (Center for Higher Education, n.d.). Missouri was not retaining or realizing the intellectual, economic, and social benefits from those that did earn degrees. State policymakers were concerned that the low education levels of the state’s workforce were limiting Missouri’s intellectual capacity and, subsequently, the state’s ability to capitalize on the new knowledge economy.

Missouri’s Education Policy Environment

Increasing the intellectual capacity of the population through a revitalization and an injection of funds into Missouri’s educational system grew out of concerns regarding the education levels of the state’s populace. Paulsen (2001a) stated that “by expanding the productive capacities of the workforce, investments in human capital are also positively related to increases in the general levels of local, state, regional, and national output and income” (p. 56). Missouri seemed intent on expanding its productive capacity. A resulting series of multifaceted state-level policies and programs dramatically altered

the complexion of Missouri public K-16 education. The A+ Schools Program was one of those state programs. Through its more clearly-articulated high school curricula and infusion of state funds into the public two-year institutions, the State intended to increase access to appropriate post-secondary education for Missouri citizens.

Missouri's system of public higher education includes thirteen public four-year colleges and universities, nineteen public two-year colleges, and one public two-year technical college (MDHE, n.d.). In addition, there are twenty-two private, not-for-profit, independent institutions and numerous private, for-profit, proprietary institutions. The Missouri Coordinating Board for Higher Education, the policy-making arm of the Missouri Department of Higher Education, establishes and coordinates public higher education policies and initiatives.

In addition to the A+ Schools Program, other state-level post-secondary education policies were implemented in the late 1980's and early 1990's. These policies centered on efforts to reduce unnecessary academic program duplication, strengthen curricula, develop programs to address identified workforce growth and preparation gaps, improve student transfer processes, develop the post-secondary technology infrastructure, and more precisely define institutional roles and missions relative to statewide agendas and needs. Accordingly, these new education policies included raised K-16 mathematics standards, institutional mission review and differential admissions standards for public post-secondary institutions, enhanced post-secondary technical education, statewide inter-institutional transfer and articulation expectations, and the A+ Schools Program (Blueprint for Higher Education, 1995; DESE A+ Fact Sheet, 2004; MDHE Admissions

Standards, 2004; MDHE Missions and Roles, 2004; Missouri Credit Transfer Guidelines, 2005; Missouri K-16 Coalition, 1999; Technical Ed Now, 1996).

Missouri A+ Schools Program Description and Eligibility Requirements

The Missouri A+ Schools Program was established by the passage of the *Outstanding Schools Act of 1993*, which was signed into law by Missouri Governor Mel Carnahan. The primary goal of the A+ Schools Program is to assure that all high school students are well prepared to pursue advanced education and employment. Three secondary goals form the cornerstones of the A+ Program: “raise academic standards in secondary schools, open new doors to higher education, and introduce high school students to the teaching profession” (DESE A+ Fact Sheet, 2004). The second of those goals provides the focus for this research project.

A+ Program incentives. There are two primary incentives for participation in the A+ program. Both target traditional barriers to participation in higher education. The first incentive is directed at educational preparation through substantial grant funding for high school curriculum adjustments and enhancements. Preparation is a component of the post-secondary access barrier (Callan, 2001; Harrington & Sum, 1999; Passaro, Lapovsky, Feroe, & Metzger, 2003). Eligibility requirements for A+ designation are outlined in Appendix A. New A+ grants to high schools were discontinued in 2001 as part of Missouri’s response to a budget crisis; however schools may still seek and be granted A+ designation (A+ Schools website, n.d.). Designated Missouri A+ public high schools from 1997-2002 are listed in Appendix B and designated Missouri A+ public high schools from 1997-2007 are listed in Appendix C.

The second participation incentive addresses the post-secondary affordability barrier (Callan, 2001; Heller, 2001; Mumper, 1996, 2001). Students who graduate from an A+ Program high school and meet the program's modest achievement expectations receive state-paid assistance to attend any public community college or career technical school in the state. There are no restrictions or limitations related to family income levels for A+ Program students. Any student who meets the program objectives, regardless of family income and ability to pay, receives the full financial incentive. However, Pell and other means-tested aid are applied to student tuition before A+ funds.

A+ eligibility requirements. In order to be considered eligible for an A+ incentive, a student must:

- (1) attend a designated A+ high school for three years immediately prior to graduation,
- (2) graduate with at least a cumulative 2.5 grade point average on a 4.0 scale,
- (3) graduate with a 95% attendance average over a four-year period,
- (4) perform 50 hours of unpaid tutoring or mentoring,
- (5) maintain a record of good citizenship, including the avoidance of the unlawful use of alcohol and drugs, as defined by the local school district's policy,
- (6) make a good faith effort to secure all available federal post-secondary student financial assistance funds

(PELL/SEOG) that do not require payment. (A+ website, n.d.)

Students who did not graduate from an A+ Schools Program high school or who attended but did not fulfill the A+ eligibility requirements of a designated A+ high school are not eligible for the A+ program financial incentive.

At the post-secondary level, the A+ financial incentive may only be used at public community colleges or public career technical schools in Missouri. Eligible public

community colleges are listed in Appendix D and eligible career technical schools are listed in Appendix E. Students are eligible for six terms/semesters of A+ funding and must utilize those funds within four years of high school graduation. The A+ incentive pays tuition, general fees, and up to 50% of book costs for up to 6 terms of or completion of an academic program. Students are expected to complete the FAFSA annually and to use federal and other state grants prior to A+ funding. However A+ incentive funds can cover the balance between federal grants and the cost of tuition. In order to remain eligible, A+ students must enroll in an eligible Missouri public two-year institution full time and maintain a 2.5 cumulative GPA (A+ website, n.d.).

The first A+ high school graduates were eligible to enter the post-secondary system in 1997 (House Committee on the A+ Schools Program, 1999). The number of program participants has grown each year and considerable state resources have been invested. The A+ Schools Program reports that more than 65,000 Missouri high school graduates had qualified for financial incentives by 2006 (A+ Schools Program website, n.d.). Additionally, the Missouri legislature had allocated more than \$185 million for the financial incentives between fiscal years (FY) 1995 and 2007 (M. Bartwell, personal correspondence, April 24, 2007; Growth in the A+ Schools Program, n.d.).

A+ as a merit aid program. While Missouri does not formally consider the A+ Schools Program scholarship a merit-based scholarship, the A+ incentive shares very similar eligibility requirements and benefits with the merit aid programs discussed previously. Common characteristics of statewide merit scholarship programs include moderate academic eligibility requirements and tuition subsidies for native students that can only be used at in-state institutions and which can be awarded without regard to

family income. The A+ incentive parallels these characteristics. Specifically, the A+ incentive has moderate academic eligibility requirements (2.5/4.0), pays tuition only at in-state institutions for qualified Missouri graduates, and is awarded without regard to family income.

However, Missouri's A+ Schools Program differs substantially from other states' programs in two regards: (1) not all Missouri high school graduates are eligible, regardless of high school GPA, and (2) the incentive can only be used at in-state two-year public institutions. Therefore, students who did not graduate from an A+ high school or those who graduated from an A+ high school but chose not to participate or did not meet the eligibility requirements are ineligible for A+ funding. Additionally, A+ incentive funds cannot be used at private post-secondary or four-year public institutions in Missouri.

Previous Research on the A+ Schools Program

There have been several A+ Schools Program studies (Barger, 2000; Jochems, 2004; Lee, 2003; MDHE, 2003; Missouri House Committee on the A+ Schools Program, 1999; Willis, 2003; Worts, 1999). This section will review A+ studies that are relevant to post-secondary access, enrollment patterns, and unintended effects noted by researchers.

Lee (2003) "evaluated the effects of the A+ Program on Missouri high schools and post-secondary institutions" (abstract) using statewide data from the Missouri departments of secondary education and higher education for the Missouri high school classes of 1997 to 2001. The unit of analysis was the high school because student eligibility for A+ incentive funds is first contingent on the high school's A+ status. Outcomes of interest included high school GPA, completion rates, standardized test

performance, and initial post-secondary participation rates of graduates before and after high schools secured A+ designation. Because not all Missouri high schools qualify for the A+ designation, natural comparison groups of high schools are readily available. Lee matched Missouri A+ high schools with Missouri non-A+ high schools based upon demographic and geographic characteristics.

Lee (2003) studied characteristics of high schools that secured A+ designation compared to those without A+ designation to see if particular qualities seemed to influence the school's decision to seek A+ designation. These school qualities included proportions of low-income and minority students, drop-out rates, college-going rates, average ACT scores, size, and habitus. Additionally, Lee compared A+ schools' pre- and post-designation student outcomes, such as type of post-secondary school attended and college GPA with matched non-A+ schools' student outcomes. Further, Lee traced changes in Missouri post-secondary enrollment patterns that might be attributed to the A+ Schools Program financial incentive's influence.

With regard to a school's decision to seek A+ designation, Lee (2003) found that rural and large metropolitan high schools were less likely to become A+ high schools compared to high schools in regional trade centers and small metropolitan areas. The high school's racial composition or drop-out rates did not appear to affect the decision to seek designation. However, as the proportion of students receiving F&RL or student/teacher ratios increased, the school was more likely to be an A+ school. Both of these qualities "tend to identify disadvantaged schools" (p. 155). Lee also noted that the "bigger the percentage of a high school's graduates entering a Missouri public post-secondary

institution, the higher the probability of that high school participating in A+ program” (p. 99).

Lee (2003) also expressed concern that high school grade inflation may be occurring as a result of a school’s A+ designation. High school GPAs increased at A+ schools, but ACT scores did not increase in a parallel fashion. She suggested that the increased GPAs might also reflect students’ decisions to enroll in easier high school courses in order to earn the required 2.5 GPA and noted concern that similar patterns might occur in post-secondary course-taking behavior. This observation parallels concerns about grade inflation and altered course-taking behaviors expressed by researchers in other merit aid studies (Bradbury & Campbell, 2003; Cornwell, Lee, & Mustard, 2002; Dee & Jackson, 1999).

Lee’s (2003) post-secondary participation findings indicated that the initial two-year post-secondary enrollment rates of A+ graduates increased, which corresponded with a decrease in four-year enrollments. Additionally, Lee found that “the benefits of the A+ Program seem to go to academically, rather than economically marginal students” (Lee, 2003, p. 157) as A+ graduates in families with incomes less than \$18,000 and students of color were less likely than middle-income, White students to enroll in public two-year post-secondary programs. While the scope of Lee’s research did not address if and where very low income and minority students did enroll in post-secondary institutions, she posited that because students are required to use means-tested aid before using A+ incentives, low-income students did not derive any particular benefit from the A+ incentive and may have chosen to enroll in four-year institutions instead. Cornwell and Mustard (2002), Cornwell, Mustard, and Sridhar (2003) and Dynarski (2002)

observed similar effects on low-income students in Georgia prior to HOPE's policy change regarding use of Pell grants.

Overall, Lee's (2003) study suggested that the financially marginalized students that seemed to be targeted by the A+ Schools Program were not participating in post-secondary education at the same rate as students who already accessed post-secondary education at higher levels and who were more likely to have the ability to pay regardless of the A+ financial incentive. Rather, as noted in previous merit aid studies (Cornwell & Mustard, 2002; Cornwell, Mustard, & Sridhar, 2003; Dynarski, 2004), the A+ financial incentives were acting as a transfer that influenced the flow of middle-income White students who were already likely to attend college to two-year institutions rather than four-year institutions. Lee expressed concern that re-directing students to two-year institutions could impact net post-secondary attainment. Lee's research indicated that A+ could be influencing post-secondary enrollment patterns, but not necessarily increasing post-secondary access for marginalized students.

In a second Missouri A+ Schools Program study using statewide secondary and higher education data, Barbis (2003) compared the high school graduation rates and initial post-secondary enrollment rates of A+ and non-A+ graduates from the Missouri high school class of 2002. Barbis adjusted for school size and percentages of low-income students and minority students and exploited the existence of a natural comparison group of non-A+ students.

Barbis (2003) found that "the A+ Schools Program has had a positive impact on the post-secondary enrollment rate in Missouri" (pp. 69-70). However, the research also found that "controlling for the effects of [high] school size, socio-economic status, and

percentage of minorities in a [high] school,” (p. 70) the A+ Schools Program no longer had a significant effect on post-secondary enrollment rates and suggested that some other factor/s might be responsible for the difference in post-secondary enrollment rates.

Additionally, noting literature on residency and travel costs associated with post-secondary enrollment, Barbis’s (2003) analysis further suggested that geography and distance from a public two-year school may be “significant factors in the post-secondary enrollment rates” (p. 70) of A+ Schools Program graduates. A+ funds may only be used to pay for tuition costs at Missouri public two-year institutions. Missouri has two major metropolitan centers with a strong community college presence. However, other parts of Missouri are very rural and eligible two-year schools are sparse (Missouri House Committee on the A+ Schools Program, 1999). Consequently, Barbis suggested that “the distance of an A+ [high] school from the nearest community college may be one of the most significant factors in the post-secondary enrollment rates of high school graduates of the A+ Schools Program” (Barbis, 2003, p. 70). Considering the student transfer effects noted in other merit aid studies, this finding would not be unexpected. It could be that A+-eligible students who live too far from an eligible post-secondary institution who have other means to pay for college simply decide to forego their A+ incentive and utilize other forms of aid. Some may decide to forego post-secondary participation altogether.

In a case study focused on a single public post-secondary technical school, Jochems (2004) utilized three years’ of institutional data to compare A+ incentive recipients with recipients of other merit scholarships and students who did not receive any merit scholarship or A+ incentive. All students had a minimum high school GPA of

2.5 (the minimum required by the A+ program) and were further matched on high school size.

Jochems (2004) found that A+ students and non-A+ students were comparable in terms of post-secondary institutional GPA, enrollment in remedial courses, and institutional graduation rates. A+ graduates did not perform better at a statistically significant rate than non-A+ graduates. Post-secondary GPAs were of particular concern in this research as the mean college GPA of A+ graduates was lower than the 2.5 minimum required to maintain A+ incentive eligibility. Still, Jochems noted anecdotal evidence to suggest a positive relationship between the A+ Schools Program and initial post-secondary enrollment rates.

A 2003 study by the Missouri Department of Higher Education (MDHE) reported on “the achievement, enrollment, academic performance and completion patterns of 1997 to 2002 A+ high school graduates in Missouri’s public colleges and universities” (MDHE, 2003, p. 1). Using statewide Missouri public post-secondary student data, the report compared measures of A+ student achievement to non-A+ student achievement during the same time period. Information about students enrolled in proprietary or private schools was not reported.

Measures of academic achievement in the 2003 MDHE report included the percent of ACT takers and resultant scores of both the A+-eligible and non-A+-eligible groups. Of the A+-eligible students who enrolled full-time at Missouri public two-year institutions, 80 percent took the ACT test and earned average score of 20. Of the A+-eligible students who enrolled full-time at Missouri four-year institutions, 98.7 percent took the ACT test and earned an average score of 23.6. Of the A+-eligible students who

did not appear as enrolled in any Missouri public two- or four-year institution, 68.7 percent took the ACT test and earned an average score of 21.3.

Of the non-A+-eligible students who enrolled full-time at Missouri public two-year institutions, 57 percent took the ACT test and earned an average score of 19.2. Of the non-A+-eligible students who enrolled full-time at Missouri public four-year institutions, 96 percent took the ACT test and earned an average score of 23.6.

With regard to overall Missouri public post-secondary freshmen enrollment from 1997 to 2002, the MDHE (2003) reported that 59 percent of freshmen enrolled in public four-year institutions and 41 percent enrolled in public two-year institutions. Researchers found that the percentage of A+-eligible students enrolling in public four-year institutions increased from 10 percent in 1997 to 22 percent of the 2002 graduates. Overall, 72 percent of the A+-eligible students enrolled in a Missouri public post-secondary institution. Of these overall figures, 53 percent of the A+-eligible students enrolled in a Missouri public two-year school and 19 percent in a Missouri public four-year school. A higher percentage of A+-eligible students than Missouri students overall enrolled in Missouri public two-year institutions.

Turning from initial enrollment to post-secondary academic performance, the 2003 MDHE study reported course-taking behaviors, earned credit hours, first year GPA, and first year completion rates. At two-year public schools, “lower proportions of A+ graduates are enrolled in remedial mathematics, English, and reading than their classmates who are not A+ high school graduates” (MDHE, 2003, p. 3). Further, “A+ high school graduates also accumulate more credit hours and achieve a higher GPA after their first year than their non-A+ classmates” (MDHE, 2003, p. 3). Accordingly, A+

graduates successfully complete their first year at higher rates than non-A+ graduates. Similar results were found for A+ students enrolled in Missouri four-year public institutions. The researchers also noted that A+/non-A+ students and two-year/four-year students were very different in their academic makeup:

A+ and Non-A+ high school graduates enrolling in the state's public four-year colleges and universities are distinctly different from those A+ and Non-A+ students enrolling in the state's two-year public institutions suggesting that students are enrolling in those institutions where they have the highest probability of academic success their first year out of high school. (MDHE, 2003, p. 3)

This finding is in contrast to the poor student-institution matches noted by Binder and Ganderton's (2002) New Mexico study.

Finally, with regard to three-year completion rates, which is the standard measure for two-year institutions, MDHE (2003) researchers found that 41 percent of A+ students compared to 20 percent of the non-A+ students who enroll full-time in a Missouri public post-secondary institution earn a certificate or associate degree after three years. These researchers concluded that "the A+ program is preparing students to enroll in the type of institution where they are most likely to succeed academically and as well prepare them for academic success in college in ways that are not available to non A+ students" (MDHE, 2003, p. 4).

A+ summary. The A+ Schools Program shares many of the qualities of large-scale, statewide, merit-based scholarship programs. Only Missouri graduates are eligible based upon high school GPA and the financial incentive must be used at in-state institutions. Additionally, there is no family income cap on financial eligibility. However,

the A+ Program differs from other merit aid programs in that not all Missouri high school graduates are eligible regardless of GPA and funds can only be used at in-state, two-year public institutions.

Existing research on the effects of the Missouri A+ Schools Program's influence on post-secondary access and enrollment patterns is limited. Further, findings from existing studies appear mixed. Lee (2003) studied the first four A+ high school classes and found that the benefits of the A+ program tend to go to middle-income students who already planned to attend college. Lee also noted that the A+ program seemed to be impacting post-secondary enrollment patterns as enrollment shifted away from four-year schools toward two-year institutions. Barbis (2003) found that the A+ program appeared initially to increase post-secondary participation, but the effects dissipated when matching controls on race/ethnicity, family income, and high school size were applied. Barbis further expressed concern about adequate post-secondary opportunities to utilize A+ funds in rural areas of Missouri. In a single vocational technical institution case study, Jochems (2004) found no significant difference in measures of post-secondary academic achievement between A+ and non-A+ students. Further, he expressed concern that the post-secondary GPA of A+ students was below the 2.5 GPA required to maintain eligibility, thus indicating that students would be likely to lose the scholarship. Finally, a report by the Missouri Department of Higher Education (MDHE, 2003) using longitudinal data indicated that A+ students achieve higher ACT scores, GPAs, credit hours, and completion rates than non-A+ students enrolled in Missouri post-secondary institutions.

Merit Aid Summary

Most large statewide merit scholarship programs are designed and promoted as post-secondary access programs. The programs are funded at very high levels, often by lottery proceeds. However, research has found that post-secondary at-risk populations are less likely than the more socio-economically advantaged to be able to participate in the merit aid programs because of eligibility requirements that are often based upon factors that are known to negatively impact marginalized populations. Ultimately, statewide merit scholarship programs “are likely to have little effect on college participation” (Heller, 2005, p. 91).

Summary and Conclusions

Post-secondary education access and affordability policies guide individual and societal opportunities to expand intellectual capital. Government subsidies to post-secondary institutions and students are investments in human capital as they decrease the cost of higher education born by students through general and targeted funding. Targeted funding has historically been directed toward students with demonstrated academic merit and/or populations with lower post-secondary participation rates.

Statewide merit aid programs are a relatively recent national trend that target state aid toward students with moderate academic merit in an effort to improve post-secondary participation rates and encourage bright students to enroll at in-state institutions. A review of the literature on statewide merit aid programs suggested that the primary beneficiaries of these programs are those who already participated in post-secondary education at higher rates. The Missouri A+ Schools Program shares similar characteristics with statewide merit aid programs. However, the A+ program is unique in

that only students who have graduated from qualified high schools may qualify and those students must utilize their A+ incentive at a qualified, in-state, two-year public institution.

It seems evident from previous studies that analyzing merit aid program effects from a statewide longitudinal perspective yields differing results than case studies involving single institutions or single cohorts. Confounding factors, such as policy modifications and changing admissions standards or eligibility requirements, appear to influence program effects upon single institutions or single cohorts. The overall findings from previous studies of the Missouri A+ Schools Program indicate that the program does appear to be a catalyst for changes in Missouri post-secondary enrollment patterns. However, no research has fully addressed the post-secondary enrollment patterns of A+ Schools Program graduates in a statewide longitudinal fashion and none has explored potential unanticipated effects of the A+ Schools Program in terms of post-secondary access for at-risk populations.

The following chapter will address the methodology of this study that will address the absence of research on the longitudinal post-secondary enrollment patterns of Missouri's A+ Schools Program graduates with a primary focus on selected student characteristics and unintended program effects.

CHAPTER THREE

Methodology

The Missouri A+ Schools Program was developed in 1993 to improve high school graduates' opportunities through enhanced high school preparation and increased post-secondary access (A+ Schools Program Primer, n.d.). One of the primary goals of the A+ Schools Program is to "open new doors to higher education" (DESE A+ Fact Sheet, 2004) for those students who "might otherwise be unable to attend college" (DESE FY2005 budget, p. 11). The State of Missouri has allocated \$185 million to the A+ Schools Program since 1993. However, there has been no statewide longitudinal study of the post-secondary enrollment patterns of A+ Schools Program graduates with a focus on demographic characteristics of participants. Also, no research has explored potential unanticipated effects of the A+ Schools Program in terms of post-secondary access.

The purpose of this study was to track the statewide public post-secondary enrollment patterns of the 2002 Missouri A+ Schools Program cohort for three years beyond their high school graduation and analyze those patterns using selected student characteristics as measures of post-secondary access for specific populations. These characteristics included low-income, first-generation, and minority status. Finally, this research explored potential unanticipated effects of the A+ Schools Program in terms of post-secondary access in Missouri's public post-secondary sector.

The methods chapter will be presented in four major sections. First, a general overview of the research study will be presented. Second, participant characteristics will be described. Third, the data collection and preparation procedures will be outlined.

Finally, descriptive and correlational analysis variables along with analysis methods will be presented and discussed.

Research Design

Program evaluation research allows researchers to evaluate overall program or policy effects, intended or unintended, in political and organizational context (Babbie, 1999; Fowler, 2004; Patton, 1997; Tronchim, 2002). Further, utilizing a cohort analysis model to evaluate a post-secondary access program allows researchers

to examine what types of institutions students enter, when students withdraw from post-secondary studies, what types of post-secondary schooling they obtain, and whether they ever obtain a degree. Researchers can thus move beyond simply reporting disparities and analyze the origins and points in the educational attainment process that contribute to... educational outcomes. (Kurlaender & Flores, 2005, pp. 19-20)

This study evaluated the post-secondary access component of the Missouri A+ Schools Program through enrollment pattern analysis. There are numerous ways of approaching the study of enrollment patterns, but most utilize student, environmental, and institutional characteristics to understand and describe enrollment behaviors of various populations over a period of time (Adelman, 1999; McCormick, 2003). Individual student demographic qualities are aggregated to describe how populations of students progress through the post-secondary system (McCormick, 2003). Landmarks within the system signify points at which behaviors are measured.

This cohort study used a non-experimental research design composed of descriptive, non-parametric, and discriminant function analyses. Analyses were

conducted at junctures in the post-secondary experience during Academic Years (AY) 2002-03 through 2005-06, the three years following high school graduation for the 2002 Missouri A+ Schools Program cohort. These junctures included students' initial participation in the Missouri public post-secondary system during their first fall term of post-secondary eligibility, students' persistence from the first to second terms, and students' persistence from the first to second year, second to third year, and third to fourth year.

Descriptive analyses were conducted to describe the population's academic and demographic characteristics at each juncture. Additionally, the study used chi-square analyses to determine the significance of relationships between demographic characteristics and academic achievement. Finally, discriminant function analyses were utilized to describe academic and demographic membership characteristics of students in the various post-secondary enrollment categories. These analysis methods were appropriate for program evaluation research that was framed in the context of a public program intended to increase post-secondary access.

Procedures

Participants

The research population was all valid cases of Missouri A+ Schools Program students who graduated from a Missouri public high school in the spring of 2002. Two hundred of the 453 Missouri public high schools had met the A+ Schools Program criteria defined by the Missouri Department of Elementary and Secondary Education in 2002 (A+ Schools Program, n.d.). The Missouri high school class of 2002 represented a mature A+ Schools Program, was one of the first graduating classes to face dramatic

tuition increases in their initial years of post-secondary eligibility (Losing Ground, 2003), and was the first class for which there were reliable Pell grant-eligibility data and Free Application for Federal Student Financial Aid (FAFSA) records available from the Missouri Department of Higher Education.

Missouri A+ class of 2002. There were 8,017 students who graduated from an A+ School as defined by the Missouri Department of Elementary and Secondary Education in the spring of 2002, met the A+ program completion guidelines, and were eligible to receive the A+ Schools Program post-secondary financial incentive. These students represented approximately 15% of the total Missouri high school graduating class of 2002.

Data Sources

Archival data representing the 2002 cohort were drawn from two data sources:

Enhanced Missouri Student Achievement Study database. The EMSAS relational database, a “comprehensive student tracking system” (EMSAS manual, 2005, p. 1) administered by the CBHE, includes a number of data elements that fall broadly into post-secondary student demographic, participation, achievement, and attainment categories. The database is populated by DESE reports, ACT reports, and post-secondary census data reported by Missouri public post-secondary institutional representatives on specified dates and timelines. Data are reported at the student level, thus allowing the ability to track and describe an individual student’s movements through Missouri’s public post-secondary education system.

Free Application for Federal Student Financial Aid (FAFSA) data. Students’ family income data and information on parental levels of educational attainment were

available through the CBHE for students who had completed a FAFSA. A+ Schools Program graduates are required to complete a FAFSA in order to be eligible for the A+ financial incentive, so financial data was available on most A+-eligible students.

Data Collection

The Missouri Class of 2002 A+ graduates were identified to the Missouri Department of Higher Education by the Missouri Department of Elementary and Secondary Education's A+ director. Those graduates were then matched in the EMSAS and FAFSA databases maintained by the Missouri Department of Higher Education (MDHE). Three sets of files from within the EMSAS database were utilized: (a) term registration files that house data collected at the end of each academic term, (b) fall enrollment files that house data collected on October 15 each calendar year, and (c) completions files that house data related to annual degree completions. These data are submitted to the MDHE by Missouri public post-secondary institutions each year. Demographic and academic data from Academic Years (AY) 2002-03, 2003-04, 2004-05, and 2005-06 were then compiled into a single data source with a unique identifying code for each student.

Data Preparation

The dataset from the MDHE contained 7,952 of 8,017 students who appeared on the original A+-eligible lists. Student files with inaccurate student identification numbers were removed from the dataset. The remaining data were imported into SPSS version 11.5.1 (2002). First-generation and minority variables in the data source were re-coded to appropriately categorize students. First-generation data were drawn from the FAFSA files. Students who indicated "Middle school/Jr. High" or "High school" in their response

to the FAFSA questions regarding “highest school your father” and “highest school your mother completed” were re-coded as a first-generation student. Students who selected “college or beyond” or “other/unknown” for either parent were coded as not-first-generation students. Students who reported data on a single parent were coded according to the educational level of the reported parent. Data on race were drawn from the EMSAS files submitted by the Missouri public post-secondary institutions. Students who appeared in the EMSAS database as (1) African American, (2) American Indian/Alaskan Native, (3) Hispanic, (4) Asian/Pacific Islander, (5) Nonresident Alien, and (6) other were re-coded to “minority”.

Data screening. Data were screened for outliers. The EMSAS database utilizes configurations of “9s” as an “unknown” code, which, if included in the data, could result in skewed analyses. Consequently, the following 9s were re-coded to “null” or “unknown”: (a) “9.99” term and cumulative GPAs, (b) “99.99” term, cumulative, enrolled, earned, graded, and transfer credit hours, and (c) “99” degree level types. The FAFSA files utilized “99999” as a code for no financial need, so that code was retained. Students’ academic major codes included a “99” for “other”, which was also retained.

Files where a “0.00” appeared for a GPA when there were no corresponding credit hours attempted or earned and no quality points appeared were re-coded to “null”. Term GPAs above a 4.0 were re-calculated by dividing the number of quality points earned by credit hours attempted when those data were available. When quality points and credit hour data were missing, the GPA was re-coded to “null”. A “0” in credit hours earned was changed to “null” if there was a “0” in credit hours attempted.

Finally, the FAFSA data included a “-1” code for “unknown” in the Expected Family Contribution (EFC) field. The “-1” codes were changed to “null” to avoid skewing analyses on family income.

Data Analysis

Describing and analyzing existing post-secondary enrollment patterns of A+ graduates is primary to exploring relationships between the A+ program and post-secondary access. A cohort analysis utilizes a population whose members do not change over the course of the study period (Frankel & Wallen, 2003; Kurlaender & Flores, 2005). A descriptive study summarizes data and multivariate analyses analyze relationships between variables (Fraenkel & Wallen, 2003; Mertler & Vannatta, 2005; Trochim; 2002). Longitudinal repeated measures research design “takes place over time” with several “waves of measurement” (Trochim, 2002, time). Thus, this cohort study utilized repeated descriptive and multivariate analyses to track, describe and analyze the post-secondary enrollment patterns of the Missouri A+ Schools Program 2002 cohort over the course of three academic years.

Variables in the Study

Measures of academic achievement, student retention and persistence, and educational attainment are used to track individual enrollment (McCormick, 2003; Robinson, 2004). Academic achievement is most often measured upon entrance to college by high school achievement, including standardized test scores (Adelman, 1999). In-process measures, such as grade point averages and credit hours earned, are indicators of student persistence and achievement (Adelman, 1999). Educational attainment measures include total credit hours earned and culminating achievements such as degree

or program completion (Adelman, 1999). Another important feature of attainment is identifying patterns that mark incompleteness behaviors based upon particular student traits and institutional characteristics (Kurlaender & Flores, 2005; Tinto, 1993).

Entering academic ability. ACT scores are often used by post-secondary institutions as a level measure of entering academic ability (Sedlacek, 2004; St. John, Hu, Simmons, & Musoba, 2001). Additionally, selective Missouri public post-secondary institutions require various levels of ACT composite scores for admission (MDHE, n.d.) ACT composite scores were included in this study as measures of entering academic ability and treated as continuous variables.

Grade point average (GPA). GPA is an important measure of academic achievement in enrollment pattern analyses. Cumulative GPA is particularly important in this study as students must maintain a 2.50 cumulative GPA in order to remain eligible for the A+ financial incentive (A+ fact sheet, n.d.). Cumulative and term GPAs were included in this study as continuous variables.

Credit hours. The number and types of credit hours students enroll in and complete are important persistence and attainment measures (Adelman, 1999). This study used term, transfer, and cumulative credit hours as continuous variables. Additionally, numbers and types of remedial hours were included as continuous variables as remediation can both support persistence and slow progress toward a degree.

Transfer credit hours and transfer GPA Transfer credit hours and transfer GPA are indicators of transfer behaviors (McCormick, 2003) and were included in this study as continuous variables.

Withdrawal. An important feature of educational attainment is identifying patterns that mark incompleteness behaviors based upon particular student traits and institutional characteristics (Kurleander & Flores, 2005; Tinto, 1993). Withdrawing from an academic term is one measure of incompleteness and was included in this study as a categorical variable.

Institution type. Enrollment pattern research includes analysis of the kinds of institutions that populations of students enroll in (Adelman, 1999). Institution type (not enrolled or enrolled in a Missouri public two-year or four-year) was included in this study as a categorical variable.

Certificate and degree attainment. Earning a certificate or degree is the primary measure of student attainment (Adelman, 1999). Earning a certificate or degree was included in this study as a categorical variable.

As discussed previously, research suggests that post-secondary persistence and attainment result from a complex blend of preparation, integration, acculturation, engagement, and financial support (Lotkowski, Robbins, Noeth, 2004; Tinto, 1993). Some populations are particularly at-risk for opportunities to participate in and complete post-secondary programs of study. Among those considered most vulnerable for full inclusion in the post-secondary experience are minority, low-income and first-generation students (Astin, 1993; Pascarella & Terenzini, 1991, 2005; Tinto, 1993). The following section discusses the variables used in this study.

Minority. Minority students are more likely to come from disadvantaged K-12 programs with deficient academic skills (Camara & Schmidt, 1999; Heller, 2005; Tinto, 1993). Academic deficiency is often further compounded by struggles to fully integrate

into predominantly White institutions (Astin, 1993; Pascarella & Terenzini, 1991; Tinto, 1993). Accordingly, this study included minority status as a categorical variable.

Low-income. The real and associated costs of attending college disproportionately affect low-income students who are less likely to have the immediate financial resources or be able to forego or delay earnings (Callan, 2001; Camara & Schmidt, 1999; Heller, 2001, 2005; Mumper, 1996; Paulsen & St. John, 2002). Thus, low-income, defined as eligible for a Pell grant, was included in this study as a categorical variable.

Expected Family Contribution (EFC). Student financial aid eligibility includes a measure called “expected family contribution”, based on income and assets that approximates what families could afford to pay on their own (Choy, 1999). EFC is a measure of family income and was included as a continuous variable.

First-generation. First-generation students are at-risk in the college planning and preparation process and the transition into and persistence within the post-secondary experience (Choy, 2001, 2005; Horn & Nunez, 2000; Pascarella, et al., 2004). Accordingly, first-generation status was included in this study as a categorical variable.

Overlapping demographic variables. The preceding variables often overlap. Minority students, particularly African American and Hispanic students, are also likely to be low-income and/or first-generation (Heller, 2005; Terenzini, Cabrera, & Bernal, 2001). Low-income students are also likely to be first-generation or minority (Chen, 2005; Terenzini, Cabrera, & Bernal, 2001). Accordingly, combinations of the demographic categorical variables described previously were treated categorically.

Dependent, college level variables were assigned to the following post-secondary categories: (1) participation, (2) achievement, and (3) persistence and attainment.

Independent, student-level variables included in the participation category were (1) institution type (two-year public or four-year public or not enrolled), (2) ACT composite score, (3) Expected Family Contribution. Variables assigned to the achievement category were (1) term enrolled/earned credit hours, (2) term completed/graded credit hours, (3) remedial hours (by subject area and overall) (4) term grade point average, (5) cumulative grade point average, (6) transfer hours earned, (7) cumulative hours earned, and (8) term withdrawal. Variables that were included in the persistence and attainment category were: (1) institution type, (2) degree level conferred (one-year or two-year certificate, associate's degree, bachelor's degree, etc.).

This study was concerned with understanding the influence of the A+ Schools Program's student financial incentive for two-year public institution attendance upon post-secondary enrollment patterns. Thus participant characteristics were measured at the junctures described previously for the three academic years immediately following high school graduation in order to gauge enrollment rates and institutional choices, academic eligibility for the A+ incentive, post-secondary persistence, and certificate or degree attainment. Three academic years was an appropriate time frame since completing a certificate or associate degree within three years is a nationally accepted benchmark for calculating graduation rates for two-year institutions and programs (IPEDS, 1999) and because the A+ Schools Program tuition subsidies are limited to six terms within four years of high school graduation (DESE A+, n.d.). The fourth fall term was included to capture enrollment data for students after their A+ financial incentive eligibility had been exhausted.

Analytic Techniques

This study was guided by two research questions and twelve hypotheses designed to define group membership based upon demographic qualities and to track populations of students through the first three years of their post-secondary enrollment experience based upon eligibility for the A+ Schools Program financial incentive and other demographic characteristics. Descriptive statistics were used to describe and compare populations. Chi-square and discriminant function analyses were used to investigate the relationship between Pell grant eligibility, minority status, and first-generation status. The unit of analysis in this study was at the student level. Dummy variables were assigned for each of the independent and dependent variables.

Threats to internal validity. Concerns about program implementation threats were addressed by DESE's A+ Schools Program implementation standards and approval of A+ standing for schools. Using all students in the designated A+ classes controlled for subject characteristics as students must have met the A+ program guidelines established by DESE in order to be qualified for the financial incentive. Finally, using archival data collected by state education agencies addressed validity concerns about data collection characteristics and data collector bias.

Descriptive statistics. The researcher used descriptive statistics including means, standard deviations, frequencies, and percentages to report quantitative variables, such as ACT scores and grade point averages, used to describe members of each group noted in the research questions. Observation frequencies and proportions were reported for categorical data such as race/ethnicity, first-generation status, low-income status, continuing students, transferring students, graduating students, etc.

Chi-square analysis. Research question two additionally utilized chi-square to study the relationship and interaction between the categorical independent variables and the means of the dependent variable cumulative grade point average that is measured on an interval scale (Cronk, 2004, Fraenkel & Wallen, 2003; Mertler & Vannatta, 2005). The level of significance was established at the .05 level.

Discriminant Function Analysis. The research questions were also addressed through discriminant function analysis to understand the relationship between student demographics and student participation and persistence within the Missouri public post-secondary system. Discriminant analyses are utilized to identify which combinations of independent variables best predict membership defined by a single dependent variable (Mertler & Vannatta, 2005). Discriminant analyses were conducted to define initial participation and institution type of enrollment, persistence into subsequent terms, and certificate or degree attainment based upon a student's demographic characteristics and ACT score. The level of significance was established at the .05 level. While this study utilized correlational research methods, cause and effect were not established.

Measuring and describing characteristics of students who fall into the various enrollment categories between groups and within groups could provide a clearer understanding of how A+ students progress through the Missouri public post-secondary system. For example, describing the characteristics of A+ students who transfer from a two-year to a four-year public institution during the third fall term could provide information about factors that contribute to transfer and persistence. Tracking the 2002 A+ cohort through their post-secondary experience could add longitudinal perspective

both between (two-year/four-year) and within (e.g. two-year minority/two-year first-generation) the groups.

Summary

This cohort study used a non-experimental research design composed of descriptive, non-parametric, and predictive analyses. Analyses were conducted at post-secondary enrollment junctures during the three years following high school graduation for the 2002 A+ cohort to capture snapshots of longitudinal enrollment experiences. These junctures included students' initial participation in the Missouri public post-secondary system and subsequent term enrollment. Analyses described, compared, and analyzed cohort enrollment patterns with a particular focus on the students who initially enrolled in a two-year institution and the participation, persistence, academic achievement, and certificate or degree attainment of students who were first-generation, low-income, and/or minority.

CHAPTER FOUR

Results

The purpose of this study was to track the statewide public post-secondary enrollment patterns of Missouri Class of 2002 A+ Schools Program graduates for three years beyond their high school graduation and analyze those patterns using selected student characteristics as measures of post-secondary access for specific populations. Thus, this research explored possible relationships among Pell grant eligibility, minority status, first-generation status, and enrollment in a Missouri public two-year or four-year institution.

Presentation and Analysis

The results will be presented in three categories that mirror students' longitudinal progression through the post-secondary experience: (1) Post-secondary Participation, (2) Academic Achievement, (3) Persistence and Attainment. Post-secondary enrollment pattern research quantifies and maps the interaction between students and the post-secondary system. Accordingly, enrollment patterns of the A+ students will be described through snapshots of student behaviors and experiences captured at junctures provided by the data. These junctures include initial participation, persistence from the first to second term, persistence from the first to second year, persistence from the second to third year, and persistence from the third to fourth year. Discriminant function analyses were used to determine which variables discriminated between students who persist, transfer, and/or attain certificates or degrees based upon student demographic characteristics and measures of student potential. Accordingly, the snapshots are presented through

descriptive statistics, analyzed for significance through chi-square, and differences in patterns defined using discriminant function analyses.

As the A+ incentive criteria require students to enroll at a qualified two-year institution, comparisons were made between those who enrolled at a Missouri public two-year institution and those who waived the A+ incentive for the Fall 2002 term by enrolling at a Missouri public four-year institution. Comparisons were also made between student demographic characteristics previous research has shown to influence enrollment behaviors and outcomes. Because many students met multiple measures of at-risk demographic characteristics, analyses focused upon the interaction of these demographic characteristics upon enrollment behaviors and outcomes.

The “Post-secondary Participation” section describes and analyzes student demographic, financial, and academic characteristics of Missouri A+ class of 2002 in terms of those who did or did not enroll in the Fall 2002 term. Additionally, discriminant function analyses were utilized to define Missouri public post-secondary participation based upon population demographics and measures of student preparation. The “Academic Achievement” section described and analyzed academic achievement by population demographics and initial institution enrollment type. The “Persistence and Attainment” section described, analyzed, and defined differences in student enrollment behaviors and certificate or degree attainment in academic terms subsequent to Fall 2002 through AY 2005-06 in terms of demographics and institution type. There is naturally some overlap in enrollment categories, especially when describing two-year degree attainment and transfer to four-year institutions.

The 2002 A+ Cohort

There were 7,952 students from the Missouri high school class of 2002 identified as A+-eligible in the data set. Demographic data collected and housed in the EMSAS database or with the Missouri Department of Higher Education may be limited or missing for students who did not enroll in a Missouri public post-secondary institution. Two student records were removed from the data set because all corresponding data was invalid. Table 1 details the single category demographic characteristics of first-generation, Pell-eligible, and race of the 2002 A+ cohort. The majority of the 2002 A+ cohort were not first-generation or Pell grant-eligible or minority.

Table 1
Single Category Demographic Frequencies and Percentages of the Overall 2002 A+ Cohort

2002 A+ Cohort Single Category Demographic Descriptors

	Yes		No		Missing data	
Pell grant-eligible	2455/7950	31%	4940/7950	62%	556/7950	7%
First-generation	2832/7950	36%	4545/7950	57%	573/7950	7%
Minority	429/7950	5%	5252/7950	66%	2269/7950	29%

Many students belonged to more than one at-risk demographic category. Table 2 details the frequencies and percentages of the 2002 A+ cohort in terms of both first-generation status and Pell grant-eligibility status of those with demographic characteristic data on file. Students who were not first-generation or Pell-eligible composed the largest percentage ($N = 2494, 72\%$) of the 2002 A+ cohort.

Table 2
*Frequencies and Percentages of the Overall 2002 A+ Cohort
 First-generation and Pell-eligible students*

First Generation		Pell eligible	
		No	Yes
No	<i>N</i>	2494	975
	% within First Generation	72%	28%
	% within Pell eligible	66%	59%
	% of Total	46%	18%
Yes	<i>N</i>	1309	675
	% within First Generation	66%	34%
	% within Pell eligible	34%	41%
	% of Total	24%	12%
Total	<i>N</i>	3803	1650
	% within First Generation	70%	30%
	% within Pell eligible	100%	100%
	% of Total	70%	30%

ACT composite score is a measure of academic preparation (ACT, n.d.). Figure 1 illustrates a normal curve on the ACT composite score frequencies of the 2002 A+ cohort with the apex at an ACT composite score of 21. The average ACT composite score of all 2002 Missouri high school graduates was a 21.5 (DESE, 2005). In comparison, the 2002 A+ cohort ACT scores align with the state average.

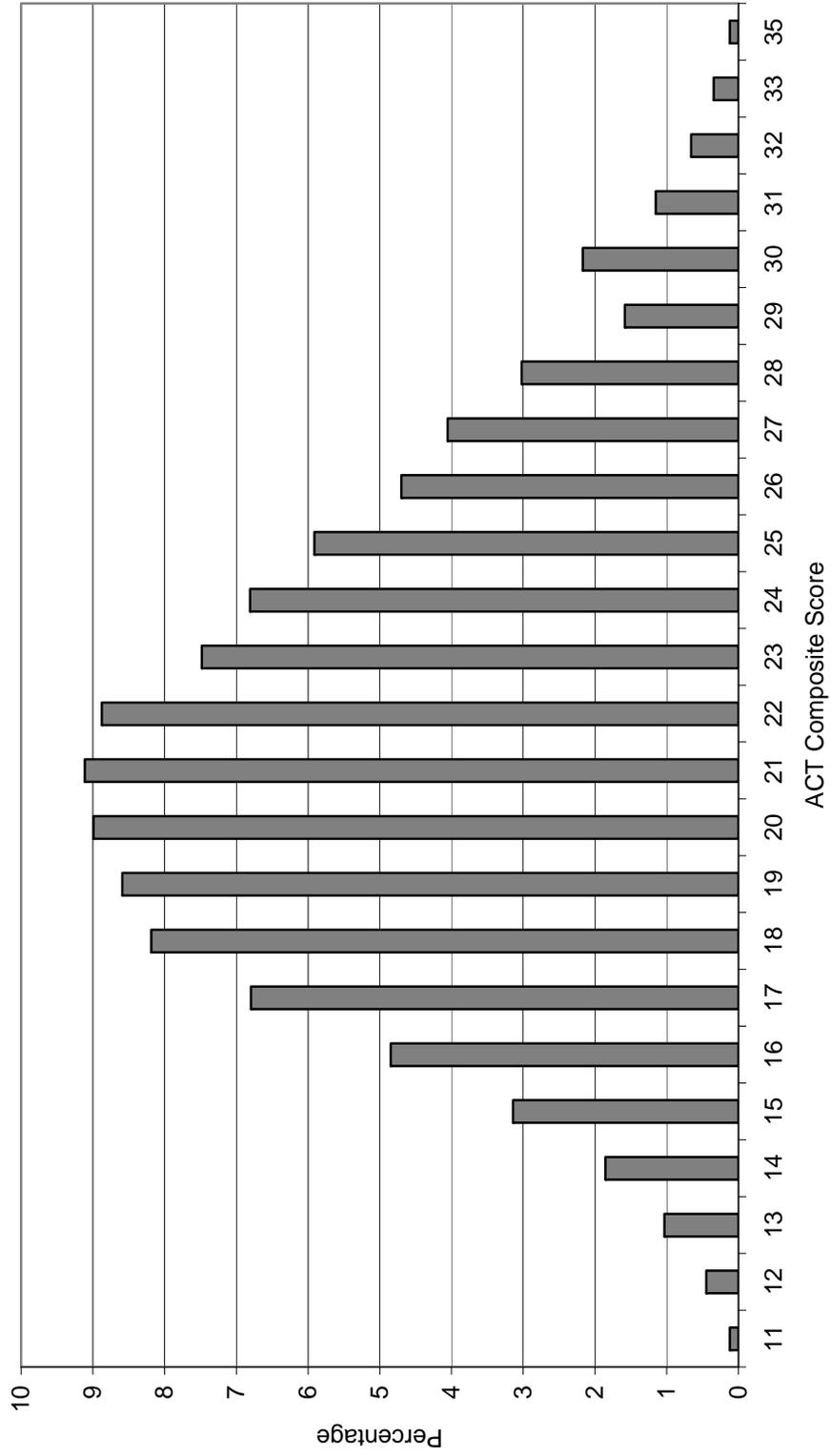


Figure 1. ACT Composite score frequency percentage distribution for the Missouri A+ 2002 cohort.

Table 3 illustrates the 2002 A+ cohort's ACT composite scores by single demographic characteristics (race, first-generation, and Pell-eligible). Minority students had the lowest ACT composite score ($M = 20.22$, $SD=4.11$) and students who were not eligible for a Pell grant had the highest ACT composite score ($M = 21.54$, $SD=4.16$).

	<i>N</i>	Mean ACT	<i>SD</i>
Minority	429	20.22	4.11
White	5,252	21.51	4.17
First-generation	2,832	20.96	4.03
Not First-generation	4,545	21.81	4.30
Pell-eligible	1,673	20.86	4.10
Not Pell-eligible	3,826	21.54	4.16

Note: N=number of students with data reported.

Many students belonged to more than one at-risk demographic category. Table 4 details ACT score means by available multiple demographic characteristics. Minority students overall had the lowest ACT means ($M=19.57$, $SD=3.81$; $M=19.42$, $SD=4.03$) regardless of Pell-eligibility or first-generation status. The highest ACT means were recorded for students who were not Pell-eligible, first-generation, or minority ($M=21.89$, $SD=4.20$).

Table 4
Overall 2002 A+ Cohort ACT Means by Multiple Demographic Descriptors

Pell eligible	First Generation	Race	<i>N</i>	Mean ACT	<i>SD</i>	
No	No	White	2105	21.89	4.20	
		Minority	141	20.77	4.15	
Yes	Yes	White	1069	21.14	4.02	
		Minority	68	19.57	3.81	
	No	White	734	21.22	4.15	
		Minority	93	19.42	4.03	
Yes	Yes	White	509	20.68	3.98	
		Minority	53	20.57	4.08	
Total	No	White	2839	21.71	4.20	
		Minority	234	20.23	4.15	
	Yes	White	1578	20.99	4.01	
		Minority	121	20.01	3.94	
	Total			4772	21.36	4.15

Note: N=number of students with data reported.

A three-way analysis of variance (ANOVA) was conducted to determine if students' ACT scores were significantly related to the demographic characteristics Pell eligible, first-generation, and minority status. One of the one main effects, one of the two-way, and the three-way interaction were significant. Main effects for "minority status" ($F = 22.177$, $Sig. = 0.00$) and interaction effects for "Pell-grant eligible" X "first-generation" ($F = 6.783$, $Sig. = 0.01$) and "minority status" X "Pell-grant eligible" X "first-generation" ($F = 4.792$, $Sig. = 0.03$) were significant. However, the significant results of the ANOVA indicated that demographic characteristics accounted for only a very small proportion (1.7%) of ACT score variance.

Post-secondary Participation

There were 7,952 students from the Missouri high school class of 2002 identified as A+-eligible in the data set. Those students' Missouri public post-secondary participation is described in order to address hypotheses 1-3, which are combined as follows: Missouri 2002 A+-eligible graduates who are first-generation, Pell grant-eligible, and/or minority will enroll in a two-year institution rather than a four-year institution at higher rates than their non-first-generation, not Pell grant-eligible, and/or White counterparts.

Semester 1: Fall 2002 Descriptive Analyses

Students who did not enroll Fall 2002. Three demographic characteristics of the 2,316 A+ students who graduated from an A+ high school in the spring 2002, but did not enroll in a Missouri public post-secondary institution in the Fall 2002 term were analyzed. Because these students did not enroll, data collected and housed in the EMSAS database or with the Missouri Department of Higher Education were limited or missing. There were 91 students with the three demographic characteristics on file. Of those, 41% were first-generation, 26% were Pell-eligible, and 10% were minority. Twenty percent were both first-generation and Pell-eligible. Of those without minority status on file, 28% ($N=689$) were not first-generation or Pell-eligible and 16% ($N = 386$) were first-generation and Pell-eligible.

ACT composite scores, Expected Family Contributions (EFCs), and Pell grant eligibility of students who graduated A+ eligible from an A+ high school in 2002, but did not enroll in a public post-secondary institution in the Fall 2002 term are presented in Table 5. Because these students did not enroll in the Fall 2002 term, financial data on

some students were limited or missing. The 1,711 students (74%) with ACT scores on file with the Missouri Department of Higher Education had a mean ACT composite score of 21.66 ($SD = 4.4$). The 1,887 with FAFSA data on file had a mean EFC of \$10,095 ($SD = \$14,037$).

Table 5
ACT Score and Expected Family Financial Contributions of the Overall 2002 A+ Students Not Enrolled Fall 2002 in a Missouri Public Post-secondary Institution

	<i>N</i>	<i>M</i>	Mdn	Mode	<i>SD</i>
ACT composite score	1711	21.66			4.40
Estimated Family Financial Contribution	1808	\$10,095	\$5,901	\$0	\$14,037
Eligible for Pell Grant	782	(42%)			

Note: *N* = number of students with data reported.

Students who enrolled Fall 2002. Out of the 7,952 A+ eligible graduates of the Missouri high school class of 2002, 5,634 enrolled in a Missouri public post-secondary institution in the Fall 2002 term and had valid data in the EMSAS and FAFSA databases. Single category demographic frequencies and percentages of the overall cohort demographic characteristics are detailed in Table 6. Lower percentages of Pell grant-eligible and first-generation students enrolled in the Fall 2002 term compared to non-Pell grant-eligible and non-first-generation students from the overall 2002 cohort. Equal percentages of minority and White students from the overall 2002 cohort enrolled for the Fall 2002 term.

Table 6
Single Demographic Category Frequencies and Percentages of the Overall 2002 Cohort Demographic Characteristics that Enrolled Fall 2002

	Yes		No		Missing data	
Pell grant-eligible	1673/2455	68%	3826/4940	77%	135/556	24%
First-generation	2049/2832	72%	3517/4545	77%	68/573	12%
Minority	419/429	98%	5164/5252	98%	51/2269	2%

Table 7 details the demographic frequencies and percentages among those students who enrolled for the Fall 2002. Within the Fall 2002 enrolled cohort ($N = 5,634$), there were fewer Pell grant-eligible students, first-generation students, and minority students than there were non Pell grant-eligible students, non-first-generation students, and White students.

Table 7
Single Category Demographic Characteristics Within Only the Fall 2002 Enrolled Cohort

	Yes		No		Missing data	
Pell grant-eligible	1673/5634	30%	3826/5634	68%	135/5634	2%
First-generation	2049/5634	36%	3517/5634	62%	68/5634	1%
Minority	419/5634	7%	5164/5634	92%	51/5634	1%

The majority of the students from the 2002 A+ cohort who enrolled in the Fall 2002 in a Missouri public post-secondary institution enrolled in a two-year institution ($N = 3,979/5634$, 71%) compared to a four-year institution ($N = 1544/5634$, 29%). Within the population that enrolled in a Missouri public two-year institution there were lower percentages of Pell grant-eligible, first-generation, and minority students than non-Pell

grant-eligible, non-first-generation, and White students. Frequencies and percentages of the overall 2002 cohort are detailed in Table 8.

Table 8
Single Category Frequencies and Percentages of the Fall 2002 Enrolled Cohort that Enrolled in a Two-Year Institution Fall 2002

	<u>2 year</u>			
	Yes		No	
	<i>N</i>	%	<i>N</i>	%
Pell grant-eligible	1241/2455	51%	2706/4940	55%
First-generation	1545/2832	55%	2391/4545	68%
Minority	277/429	65%	3664/5252	70%

Note. % = % of category in 2002 A+ cohort

Table 9 details the Fall 2002 term enrollment by multiple category student demographic characteristics by type of institution (two-year or four-year). Many students belonged to more than one at-risk demographic category, but 38% ($N = 2148/5632$) of the overall Fall 2002 enrollees with known demographic characteristics were not Pell grant-eligible, first-generation, or minority. Of the A+ students who enrolled in a Missouri public two-year institution, 25% ($N = 1414/3797$) had no at-risk demographic characteristics, 40% ($N = 1597/3979$) were not minority or Pell grant-eligible, and 92% ($N = 3664/3979$) were not minority. Of the A+ students who enrolled in a Missouri public post-secondary four-year institution with demographic characteristics on file, 13% ($N = 734/1653$) were not minority, first-generation, or Pell grant-eligible. Sixty-two percent ($N = 1031/1653$) were not minority or Pell grant-eligible and 91% ($N = 1500/1653$) were not minority.

Table 9
Multiple Demographic Category Frequencies of Fall 2002 A+ Students Enrolled in Missouri Public Institutions

Institution Type		First Generation	Pell Eligible	<i>N</i>	% within enrolled cohort	% within institution type
Fall 2002	Race					
2-year	White	Yes	Yes	469	8.32%	11.79%
			No	933	16.56%	23.45%
		No	Yes	464	8.24%	11.66%
			No	1414	25.10%	35.54%
		Unknown	Yes	172	3.05%	4.32%
			No	183	3.25%	4.60%
	Unknown		29	0.51%	0.73%	
	Minority	Yes	Yes	33	0.59%	0.83%
			No	51	0.91%	1.28%
		No	Yes	61	1.08%	1.53%
			No	91	1.62%	2.29%
		Unknown	Yes	26	0.46%	0.65%
			No	12	0.21%	0.30%
	Unknown	Yes	Yes	5	0.09%	0.13%
			No	11	0.20%	0.28%
			Unknown	3	0.05%	0.08%
		No	Yes	8	0.14%	0.20%
			No	10	0.18%	0.25%
			Unknown	3	0.05%	0.08%
	No	No	1	0.02%	0.03%	
					3979	
4-year	White	Yes	Yes	133	2.36%	8.04%
			No	264	4.69%	15.95%
		No	Yes	207	3.67%	12.51%
			No	734	13.03%	44.35%
		Unknown	Yes	37	0.66%	2.24%
			No	33	0.59%	1.99%
	Unknown		92	1.63%	5.56%	
	Minority	Yes	Yes	17	0.30%	1.03%
			No	20	0.35%	1.21%
		No	Yes	28	0.50%	1.69%
			No	60	1.06%	3.63%
		Unknown	Yes	6	0.11%	0.36%
			No	2	0.04%	0.12%
	Unknown	Yes	Yes	1	0.02%	0.06%
			No	1	0.02%	0.06%
			Unknown	9	0.16%	0.54%
		No	Yes	1	0.02%	0.06%
			No	5	0.09%	0.30%
			Unknown	2	0.04%	0.12%
	No	No	1	0.02%	0.06%	
					1653	

Note: *N* = number of students with demographic data reported.

Mean ACT scores of the single category demographic characteristics for students who enrolled in two-year and four-year Missouri public post-secondary institutions are detailed in Table 10. Overall, two-year enrollees had lower mean ACT scores than four-year enrollees. Additionally, students who were first-generation, Pell grant-eligible, and minority had lower ACT scores than students who were not first-generation, not Pell grant-eligible, or White.

Table 10
Single Demographic Category ACT Composite Means of Overall 2002 A+ Cohort Students Enrolled Fall 2002 by Institution Type

	<u>2-year Fall 2002</u> Avg. ACT	<u>4-year Fall 2002</u> Avg. ACT
First generation	19.95	23.60
Pell grant-eligible	19.78	23.42
Minority	19.20	21.77
Not First Generation	20.23	24.17
Not Pell grant-eligible	20.27	24.23
White	20.19	24.21

The known ACT scores of 4,972 (88%) of the 5,634 students enrolled in a Missouri public post-secondary school in the Fall 2002 term by multiple demographic category are detailed in Table 11. The mean ACT score of the two-year students was a 20.1 ($SD = 3.5$). Those students who were not minority, first-generation, or Pell grant-eligible had a mean ACT score of 20.4 ($SD = 3.5$), which was the highest mean ACT of those with all three demographic variables available who enrolled in a two-year institution. Students who were minority, first-generation, and Pell grant-eligible had a

mean ACT score of 18.8 ($SD = 2.9$), which was the lowest mean ACT of those with all three demographic variables available who enrolled in a two-year institution.

The mean ACT score of the four-year students was a 24.0 ($SD = 4.2$). Those students who were not minority, first-generation, or Pell grant-eligible had a mean ACT score of 24.6 ($SD = 4.0$), which was the highest mean ACT of those with all three demographic variables available who enrolled in a four-year institution. Students who were minority, first-generation, and Pell grant -eligible had a mean ACT score of 23.4 ($SD = 4.2$). Of those with all three demographic variables known, minority students who were Pell-eligible, but not first-generation, had the lowest mean ACT score at a 20.5 ($SD = 4.6$). ACT scores of minority students were generally lower than White students among both two-year and four-year students, but there was more variance among those enrolled in four-year institutions.

Table 11
Mean ACT Composite Scores of 2002 A+ Class Subpopulations Enrolled Fall 2002 by Public Institution Type

Institution type Fall 2002	Race	First Generation	Pell eligible	<i>N</i>	<i>M</i>	<i>SD</i>		
2-year	White	No	Yes	495	20.0	3.5		
			No	1367	20.4	3.5		
			Unknown	5	19.0	3.3		
		Yes	Yes	380	19.8	3.3		
			No	788	20.1	3.6		
			Unknown	12	20.8	3.3		
		Unknown	Yes	14	18.6	4.0		
			No	12	20.3	3.4		
			Unknown	1	22.0	.		
	Minority	No	Yes	62	18.9	3.6		
			No	80	19.8	3.8		
			Unknown	2	17.5	0.7		
		Yes	Yes	33	18.8	2.9		
			No	48	19.0	3.4		
			Unknown	1	22.0	.		
		Unknown	Yes	1	27.0	.		
			No	1	16.0	.		
			Unknown	1	16.0	.		
	Unknown	No	Yes	3	20.7	3.1		
			No	9	19.2	3.9		
			Unknown	9	18.1	2.5		
		Yes	Yes	7	20.0	4.3		
			No	9	18.1	2.5		
			Unknown	1	21.0	.		
		<u>All enrolled 2-year Fall 2002</u>				3331	20.1	3.5
		4-year	White	No	Yes	239	23.8	4.1
					No	738	24.6	4.0
Unknown	36				25.1	4.6		
Yes	Yes			129	23.3	4.5		
	No			281	23.9	3.9		
	Unknown			41	23.9	4.5		
Unknown	Yes			3	21.0	4.6		
	No			7	23.7	3.5		
	Unknown			13	24.4	4.8		
Minority	No		Yes	31	20.5	4.6		
			No	61	22.1	4.3		
			Unknown	3	21.7	4.6		
	Yes		Yes	20	23.4	4.2		
			No	20	21.1	4.4		
			Unknown	4	27.8	3.6		
	Unknown		Unknown	2	18.0	1.4		
			No	Yes	2	27.0	4.2	
				No	4	20.3	3.7	
Unknown	1			19.0	.			
Yes	Yes		2	20.0	1.4			
	No		3	22.3	2.5			
	Unknown		1	23.0	.			
<u>All enrolled 4-year Fall 2002</u>				1641	24.0	4.2		
<u>All 2002 A+ class enrolled Fall 2002</u>				4972	21.4	4.2		

Comparing the ACT Composite scores of A+ students who enrolled in the Fall 2002 term (Table 11) with those who did not enroll (Table 5) indicated that the mean ACT of those who did not enroll ($M = 21.7$, $SD = 4.4$) was quite similar to those who did enroll ($M = 21.4$, $SD = 4.2$).

An ACT composite score frequency analysis was undertaken in an attempt to understand more about the academic preparation of students who waived their A+ tuition incentive by enrolling in a Missouri public four-year school. Figure 2 details ACT composite score percentage frequencies at two- and four-year institutions. The frequency distribution illustrates a normal distribution for A+ students who enrolled at a two-year institution with the apex at an ACT composite score of 20. In contrast, the frequency distributions for A+ students enrolled at a four-year school shows a sharp distinction between numbers of students with scores above and below an ACT composite score of 21. An ACT composite score of 21 guarantees admission to Missouri's public moderately-selective four-year institutions (MDHE, n.d.). Increases are also noted at or in close proximity to scores that guarantee admission for other levels of institutional selectivity at Missouri public selective four-year institutions (MDHE, n.d.).

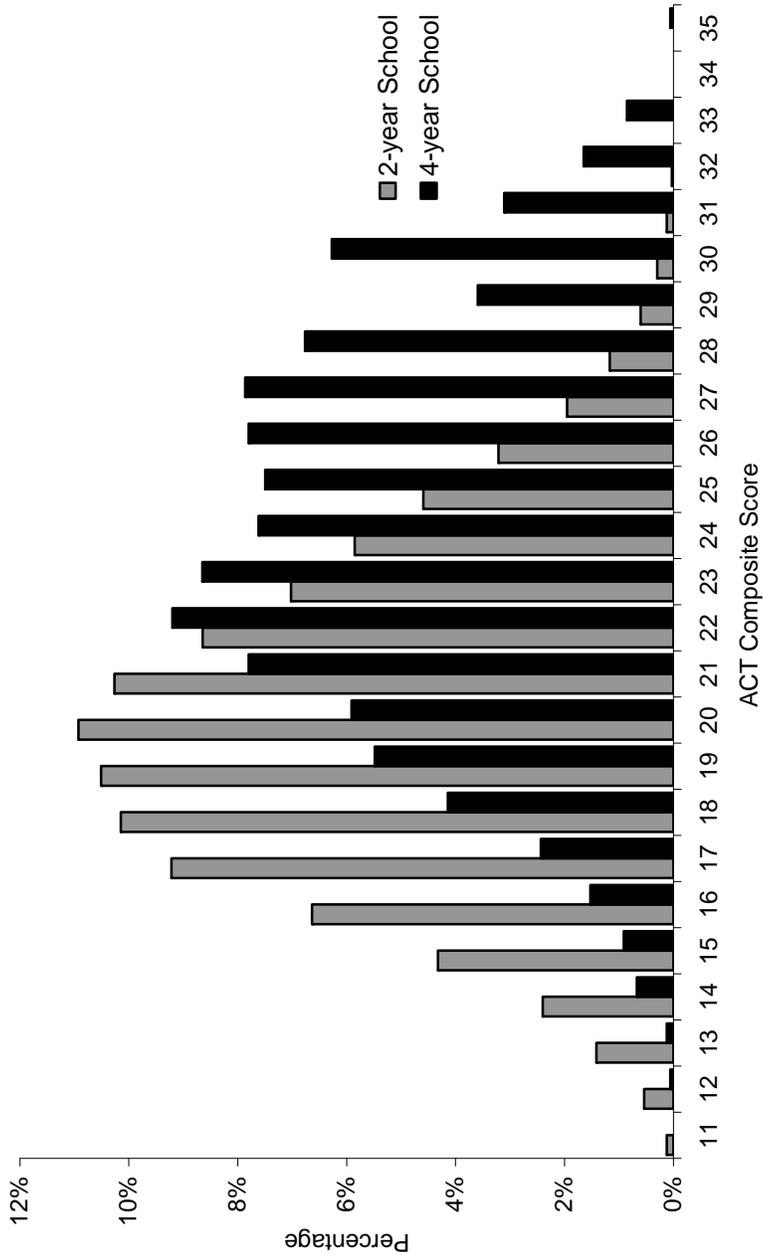


Figure 2. A frequency chart that represents ACT composite score frequency and percentage distributions of Fall 2002 A+ participants between two- and four-year institutions.

ACT requirements for admission to Missouri public four-year post-secondary institutions: Highly-selective = 27; Selective = 25; Moderately-selective = 21; Open (& 2-year) = Any ACT score.

Financial data for A+ students enrolled in the Fall 2002 term are described in Table 12. These data include the students' EFC calculation based upon family income and financial assets. The EFC is considered an indicator of a student's ability to pay for college (FAFSA, n.d.). Lower amounts indicate less ability to pay. An EFC of \$0 suggests that a student's family would likely not be able to contribute financially to the student's post-secondary education and the student should be financially eligible for a full Pell grant of \$4,050 per academic year (FAFSA, n.d.).

The financial data in Table 12 shows that four-year students had a higher EFC ($M = \$13,212$, $Mdn = \$8,547$) than two-year students ($M = \$10,373$, $Mdn = \$6,974$). However, four-year students had a higher standard deviation ($SD = \$15,5792$) than the two-year students ($SD = \$12,287$). This could indicate that while, on average, four-year students came from wealthier families, there was more variance in their family incomes.

Comparing the mean and median EFC of A+ students enrolled in the Fall 2002 term ($N = 5634$, $M = \$11,173$, $Mdn = \$7,314$, $SD = \$13,361$) with those not enrolled (Table 5, $N = 2,316$, $M = \$10,095$, $Mdn = \$5,901$, $SD = \$14,037$) indicated that, in general, those not enrolled had higher financial need. Among all three groups (not-enrolled, two-year, four-year) the mode is \$0. About 8% of the total 2002 A+ student cohort had a very high financial need. Of those who enrolled, 7% had an EFC of \$0. Of those who did not enroll, 11% had an EFC of \$0.

The amount paid by the A+ program for tuition to institutions where these students were enrolled is indicated by the "Fall 2002 A+ payment" descriptor. A+ policies require students to enroll at an eligible two-year institution in order to qualify for

Table 12

Descriptive Financial Statistics of 2002 A+ Cohort Enrolled Fall 2002 in a Missouri Public Institution

	All A+ Enrolled			Enrolled 2-year			Enrolled 4-year		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Fall 2002 A+ payment	1,296	\$1,115	\$611	1,231	\$1,086	\$580	65	\$1,677	\$869
Estimated Family Financial Contribution	5,470	\$11,173	\$13,361	3,929	\$10,373	\$12,287	1,541	\$13,212	\$15,592
Eligible for Pell Grant	1,673	(30%)		1,241	(31.2%)		432	(26.1%)	

Note. *N* = number of students with data reported from datasource.

A+ financial incentives. However, at least two Missouri four-year institutions have arranged to enroll and receive A+ payments for A+ students who are enrolled in vocational technical programs housed within or closely affiliated with the four-year institution. Consequently, A+ payments for 65 students appeared in the four-year enrollment category. The A+ payment amount per student is the balance of tuition, associated fees, and 50% of book costs minus Pell grants and other state grants and scholarships. The higher a student's Pell-grant eligibility, the lower the amount of A+ funds paid. The mean A+ payment for two-year students was \$1,086 (*SD* = \$580) and for four-year students \$1,677 (*SD* = \$869). The difference probably reflects generally higher tuition rates at four-year institutions.

Semester 1: Fall 2002 Post-secondary Participation Analysis

Fall 2002 post-secondary participation. An analysis of three dependent variables (ACT, first-generation status, and Pell-eligibility) was conducted. Discriminant analysis

was used to identify significant variables that defined differences between the Fall 2002 enrollment status (not enrolled, enrolled in a two-year institution, or enrolled in a four-year institution) of the Spring 2002 A+ cohort. There were too few students with minority status data in the non-participant group to include minority status variables. The large group size exceeds the minimum participant-to-variable ratio of 20:1 recommended by Stevens (1996).

Table 13
Test of Significance from Discriminant Statistics for Fall 2002 Enrollment Type

Factor	Eigenvalue	% Variance	Wilks' lambda	Chi-square	<i>p</i>
1	0.169	95.9%	0.849	1029.446	0.00
2	0.007	4.1%	0.993	45.565	0.00

The analysis revealed that two significant discriminant functions could be constructed to discriminate between the Fall 2002 enrollment status of the 2002 A+ cohort (see Table 13). Standardized function coefficients and correlation coefficients (see Table 14) revealed that the ACT variable was most associated with the first function, which accounted for 14% of the variance in the Fall 2002 enrollment status. Based upon these results, the first function was labeled *Preparation*. First-generation status was negatively associated and Pell grant eligibility was slightly negatively associated with the Preparation function. The second function, which accounted for only 1% of the variance, was positively contributed to by Pell grant eligibility and first-generation. Based upon these results, the second function was labeled *Risk Factors*.

Table 14
Identification of Discriminate Functions Extracted from Data that Contribute to Fall 2002 Enrollment Type

Variable Name (Source)	New Factor Name	Function 1	Function 2
ACT Composite	Preparation	0.992 ^a	
Pell eligible 2002-03 First Generation	Risk Factors		0.878 ^b 0.546

Note.

^a Wilks' Lambda = 0.849, *sig.* = 0.00

^b Wilks' Lambda = 0.993, *sig.* = 0.00

Group centroids were then computed to determine the degree of discrimination. Using the function structure matrix, all three variables were assembled into one rubric named "Enrollment Type Fall 2002" (see Table 15). The enrollment type means are plotted in *Figure 3*.

Table 15
Enrollment Type Fall 2002

Enrollment type	Centroids	
	Preparation	Risk Factors
Not-enrolled	.100	.152
2-year enrolled	-.349	-.038
4-year enrolled	.652	-.066

These results suggest that students with higher ACT scores (high preparation), but with no Pell grant eligibility and not first-generation (lower risk factors) were more likely to be enrolled in four-year schools. Those with the lowest ACT scores (low preparation), but no Pell grant eligibility and not first-generation (lower risk factors) were more likely to be enrolled in two-year schools. Those with moderate ACT scores (moderate

preparation) who were eligible for a Pell grant and were first-generation (higher risk factors) were more likely not to be enrolled in a Missouri public post-secondary institution.

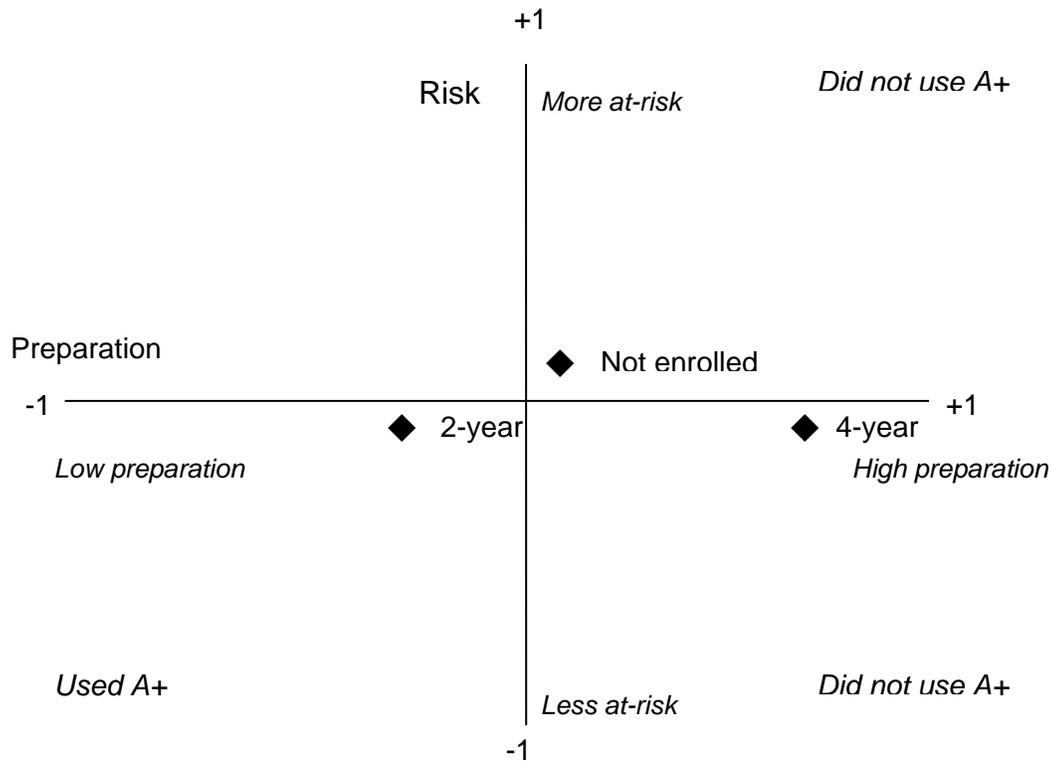


Figure 3. A graph with enrollment type means plotted for each Fall 2002 enrollment type group. “Preparation function” = ACT composite score; “Risk Factors” function = first-generation status and eligibility for a Pell grant.

Fall 2002 institution type. An analysis of four dependent variables (ACT, first-generation status, minority status and Pell-eligibility) was conducted. Discriminant analysis was used to identify significant variables that defined differences between the Fall 2002 institution type (enrolled in a two-year institution, or enrolled in a four-year

institution) of the overall 2002 A+ cohort. The large group size exceeds the minimum participant-to-variable ratio of 20:1 recommended by Stevens (1996).

The analysis revealed that one significant discriminant function could be constructed to discriminate between the Fall 2002 institution type of the 2002 A+ cohort (see Table 16). Standardized function coefficients and correlation coefficients revealed that the ACT variable was most associated with the first function, which accounted for 20% of the variance in the type of institution attended Fall 2002. Based upon these results, the function was labeled *Preparation*. First-generation status was slightly negatively associated and minority status was slightly positively associated with the Preparation function.

Table 16
Identification of Discriminate Functions Extracted from Data that Contribute to Fall 2002 Enrollment in Institution Type

Variable Name (Source)	New Factor Name	Function 1
ACT Composite	Preparation	0.977 ^a

Note.

^a Wilks' Lambda = 0.804, *sig.* = 0.00

Group centroids were then computed to determine the degree of discrimination. Using the function structure matrix, all four variables were assembled into one rubric named "Institution Type Fall 2002" (see Table 17).

Table 17
Institution type Fall 2002

	<i>Centroids</i>
Institution type	Preparation
Enrolled 2-year	-.338
Enrolled 4-year	.723

The four-year students ($M = .723$) had the highest mean on the Preparation dimension, while the two-year attendees ($M = -.338$) had a negative Preparation mean. These results suggest that students with higher ACT scores (higher preparation) were more likely to be enrolled in four-year schools than students with lower ACT scores (moderate preparation) regardless of Pell grant eligibility, first-generation status, or minority status. The preparation means are plotted in Figure 4.

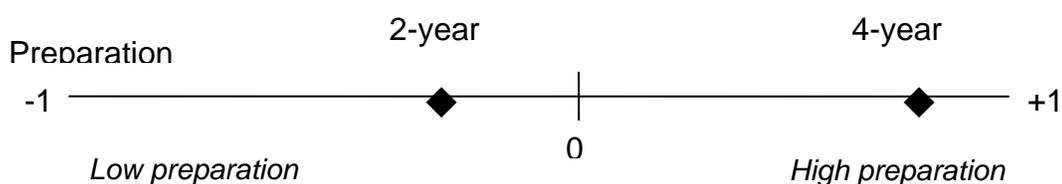


Figure 4. A graph with Preparation means plotted for each institution type for the Fall 2002 term.

Post-secondary Participation Summary

The average ACT composite score ($M = 21$) of the 2002 A+ cohort aligned with the Missouri statewide 2002 cohort. The majority of the cohort was not first-generation, Pell-eligible, or minority. Those who did not enroll in the Fall 2002 term appeared, on average, to be quite similar to, but seemed to have more variance than, those who enrolled in terms of academic preparation and demographics.

The average ACT score of those who enrolled in a two-year school in the Fall 2002 term was a 20.4 and for those who enrolled in a four-year a 24.0. ACT scores of those who enrolled in four-year schools seemed to align with four-year admissions standards. Minority students had lower overall ACT scores than White students. First-generation minority students eligible for a Pell grant had the lowest ACT score average.

Students who were not first-generation, Pell-eligible, or minority had the highest ACT score average. However, demographic characteristics accounted for less than 2% of the ACT score variance.

The majority of the overall cohort (71%) enrolled in a two-year institution. The majority of the first-generation students and Pell-eligible students enrolled in a two-year institution, but minority students were slightly more evenly distributed between two- and four-year institutions. Classification models based upon academic preparation and demographic characteristics accounted for 14%-20% of the variance in enrollment status.

The post-secondary participation section described and analyzed the Missouri A+ Schools Program 2002 cohort overall and with regard to which students enrolled in a Missouri public post-secondary institution in the Fall 2002 term and the type of institution they enrolled in. The next section will present the academic achievement of those who enrolled.

Academic Achievement

Academic achievement is a measure of earned academic qualifications and accomplishments, which is measured here by grades and credit hours earned. In order to remain eligible for the A+ incentive, students must enroll full-time at a qualified institution and maintain a 2.50 cumulative GPA. A+ funds may not be used for tuition and costs for courses that are repeated (A+ fact sheet, n.d.). Additionally, institutions and other financial aid programs require some level of academic achievement for continued enrollment and funding. This section is guided by Research Question 2 and hypotheses 4, 5, and 6 which are summarized as follows: Missouri 2002 A+-eligible graduates who are not Pell grant-eligible, first-generation, or minority will be more likely to earn sufficient

grades to maintain A+ eligibility at a Missouri public two-year institution than will their counterparts who are Pell grant-eligible, first-generation, or minority.

Academic achievement will be presented by year and term through descriptive analyses. Additionally, outcomes on the A+ 2.50 cumulative GPA eligibility measures for students who enrolled in a two-year institution during the Fall 2002 term will be analyzed for significance through chi-square tests. As the A+ incentive is only available to students enrolled at two-year institutions, cumulative GPAs will only be analyzed for significance for students who began at a two-year institution and who were enrolled at a two-year institution during the term analyzed. Appendix F illustrates frequency distributions and percentages of cumulative GPAs above and below 2.50 by term by overall population, Pell grant status, first-generation status, and minority students of students who were enrolled in a two-year institution in the Fall 2002 term.

Year 1: Fall 2002-Winter 2003

Fall 2002 term achievement descriptive analysis. Fall 2002 term enrollment experiences and academic outcomes of students enrolled in a Missouri public post-secondary institution as a group and by institution type are described in Table 18. These data were drawn from the EMSAS Fall 2002 registration files which are reported by institutions based upon end-of-term data. These experiences include the number and type of credit hours attempted and completed; term, transfer, and cumulative grade point average (GPA); and if a student withdrew before the end of the term. These data are common indicators of student achievement and persistence (Adelman, 1999).

Two-year students enrolled in an average of 13 credit hours and were graded on an average of 12 credit hours. The lower graded figure could be accounted for by students

auditing a course, placing a course on pass/fail, or institutional recording of remedial coursework. Some students enrolled in more than one remedial course. Fifty-one percent of the two-year students enrolled in at least one remedial course. Specifically, 38% enrolled in remedial math hours, 21% in remedial English hours, and 10% in remedial reading hours. Two-year students earned an average term GPA of 2.44 and 3% withdrew before the end of the term.

Four-year students enrolled in and were graded on an average of 14 credit hours. Nine percent of the four-year students enrolled in at least one remedial course, 6% enrolled in remedial math hours, and 4% in remedial English hours. Fewer of the four-year students enrolled in more than one remedial course. Four-year students earned an average term GPA of 3.00 and 1% withdrew before the end of the term.

With regard to cumulative data, four-year students had accumulated higher numbers of credit hours and earned a higher cumulative GPA. The cumulative GPA of two-year students ($M = 2.76$, $SD = 0.98$) could be of concern. Students must maintain a 2.50 cumulative GPA in order to retain their A+ incentive. While the mean GPA meets the eligibility criteria, the standard deviation indicates that some students would likely have lost their academic eligibility. Transfer data show that both groups had participated in dual credit programs and/or took Summer 2002 classes. On average, four-year students took more credit hours prior to the Fall 2002 term. However, the higher standard deviation (14.37) of the two-year students showed more variance in prior college participation.

Table 18
Descriptive Fall 2002 Academic Statistics of 2002 A+ Cohort Enrolled Fall 2002 in a Missouri Public Institution

Fall 2002 term:	All A+ Enrolled			Enrolled 2-year			Enrolled 4-year		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
term enrolled/earned cr hrs	4789	13	2.80	3156	13	3.05	1633	14	2.10
term completed/graded cr hrs	4753	13	2.98	3120	12	3.29	1633	14	1.91
remedial math hrs	1312	3	0.44	1207	3	0.38	105	3	0.82
remedial reading hrs	314	3	0.51	304	3	0.50	10	2	0.52
remedial English hrs	737	3	0.72	668	3	0.75	69	3	0.24
other non-college hrs	19	2	2.56	19	2	2.56	0		
enrolled in at least one remedial course	1763	4	2.05	1611	4	2.08	152	3	1.58
term gpa	5165	2.61	1.14	3529	2.44	1.22	1636	3.00	0.79
withdrew from term	122			100			22		
cumulative credit hours	5136	19	10.49	3492	17	9.45	1644	24	10.84
cumulative gpa	5136	2.86	0.92	3492	2.76	0.98	1644	3.07	0.73
transfer credit hrs total	1580	12	11.47	688	12	14.37	892	13	8.58

Note: *N* = number of students with data reported in data source.

Fall 2002 term A+ eligibility analysis. In order to remain eligible for the A+ incentive, students must enroll full-time at a qualified two-year institution and maintain a 2.50 cumulative GPA. There were 3,492 students who completed the Fall 2002 term who

had valid cumulative GPA data on file. Of those, 2,493 (71%) earned a cumulative GPA at or above a 2.50.

Analyses were then conducted for students with valid cumulative GPA data and valid demographic characteristics. A chi-square test of significance was calculated to compare the frequency of earning a Fall 2002 cumulative GPA above or below 2.50 for students who were enrolled in a two-year school in the Fall 2002 term. The demographic characteristics of Pell eligibility, first-generation status, and minority status were included in the analysis as independent variables.

Of those with valid cumulative GPA data and demographic characteristics of file, 70% ($N = 771/1094$) of the Pell grant-eligible students earned above a 2.50 Fall 2002 cumulative GPA compared to 72% ($N = 1706/2374$) of the students who were not Pell grant-eligible. Chi-square analyses on valid single demographic characteristics indicated no significant Fall 2002 cumulative GPA differences for students with Pell grant eligibility. First-generation students achieved at or above a 2.50 cumulative GPA in equal proportions (71%) to students who were not first-generation. There were no significant differences noted for first-generation students in the single demographic characteristics analysis. However, significant differences were noted for minority students (chi-square (1) = 8.42, $p = .004$). Sixty-three percent ($N = 143/227$) of the minority students earned above a 2.50 cumulative GPA for the Fall 2002 term compared to 72% ($N = 2337/3246$) of the White students. Based upon single category demographic characteristics, Pell-eligible students were slightly more likely and minority students were significantly more likely to earn a Fall 2002 cumulative GPA below 2.50.

As many students belong to more than one at-risk demographic category, chi-square analyses on multiple demographic characteristics were also examined through crosstabs. As shown in Table 19, a significant difference was found for students who were not eligible for a Pell grant, regardless of first-generation status. Minority students who were not eligible for a Pell grant were more likely to earn a cumulative GPA lower than 2.50 than White students who were not eligible for a Pell grant regardless of first-generation status. Minority students who were not eligible for a Pell grant were more likely to lose eligibility for the A+ financial incentive after the Fall 2002 term.

Table 19
Summary of Chi-square Crosstab Analysis Results for Fall 2002 Cumulative GPA by Demographic Characteristics

Pell eligible	First Generation	Fall 02 cumulative gpa	Race		χ^2	df	p
			White	Minority			
No	Yes	+ 2.50	73% (602)	57% (25)	5.42	1	0.02*
		- 2.50	27% (223)	43% (19)			
	No	+ 2.50	72% (1009)	62% (51)	3.75	1	0.05*
		- 2.50	28% (390)	38% (31)			
Yes	Yes	+ 2.50	70% (289)	65% (24)	0.48	1	0.49
		- 2.50	30% (122)	35% (13)			
	No	+ 2.50	72% (402)	67% (41)	0.50	1	0.48
		- 2.50	28% (160)	33% (20)			

* $p < .05$.

Those who persisted to the Winter 2003 term. The academic experiences of 5,038 (89%) students who enrolled for the Winter 2003 term out of the 5,634 who were enrolled at two- or four-year institutions in the Fall 2002 term are described in Table 20.

The data showed similar academic achievement as the students enrolled during the Fall 2002 as described in Table 18. During the Winter 2003 term, four-year students enrolled in more credit hours overall, fewer remedial hours, and earned a higher term GPA than the two-year students. The cumulative GPA for two-year students rose slightly from Fall 2002 to Winter 2003, but the total transfer credit hours fell by 2 credit hours.

Those who did not persist to the Winter 2003 term. The number of students who did not persist from the first term (Fall 2002) to the second term (Winter 2003) was 596 (11%): 535 (10%) of the Fall 2002 two-year students and 61 (4%) of the Fall 2002 four-year students. Fall 2002 term achievement comparisons between those who persisted to the Winter 2003 term with those who did not persist indicated that non-persisters enrolled in fewer credit hours (-2), completed fewer credit hours (-3), and had earned fewer cumulative credit hours (-7). Their ACT score was 19.41 ($SD = 3.67$) compared to the mean ACT score of 21.4 ($SD = 4.2$) of the Fall 2002 class. Their term GPA was a 1.32 ($SD = 1.26$) and cumulative GPA was a 2.02 ($SD = 1.17$). The cumulative GPA for most of these students was lower than the 2.50 required for continued A+ incentive eligibility.

With regard to demographic characteristics of the 535 students enrolled in a two-year institution in the Fall 2002 who did not enroll for the Winter 2003 term, many students demonstrated at-risk demographic characteristics, but 37% ($N = 196$) had no at-risk characteristics. Fifty-four percent ($N = 290$) were not minority or first-generation, 6% ($N = 35$) were minority, and 2% ($N = 9$) met all three at-risk characteristics. These students' EFC was \$9,400 ($SD = \$12,977$), which is lower than students who did not enroll in the Fall 2002 term ($M = \$9,673$, $SD = \$13,888$) which are described in Table 5

and lower than the mean EFC ($M = \$11,128$, $SD = \$13,353$) of the enrolled Fall 2002 cohort.

Table 20
Descriptive Winter 2003 Academic Statistics of 2002 A+ Cohort Enrolled Fall 2002 in a Missouri Public Institution

Winter 2003:	All A+ Enrolled			Enrolled 2-year			Enrolled 4-year		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
term enrolled/earned cr hrs	4885	13	3.12	3306	13	3.38	1579	14	2.30
term completed/graded cr hrs	5033	13	3.97	3428	12	4.28	1605	14	2.75
remedial math hrs	605	3	0.40	546	3	0.82	59	3	0.37
remedial reading hrs	41	3	0.61	41	3	0.61	0		
remedial English hrs	121	3	0.68	116	3	0.69	5	3	0.00
other non-college hrs	10	2	2.49	10	2	2.49	0		
enrolled in at least one remedial course	697	3	1.36	633	3	1.42	64	3	0.35
term gpa	4907	2.77	0.92	3318	2.69	0.96	1589	2.94	0.82
withdrew from term	88			68			20		
cumulative credit hours	5003	31	11.33	3404	28	10.19	1599	37	11.43
cumulative gpa	5001	2.90	0.71	3402	2.83	0.72	1599	3.06	0.67
transfer credit hrs total	1590	11	8.31	704	10	7.84	886	13	8.47

Note: N = number of students with data reported in data source.

Winter 2003 term A+ eligibility analysis. In order to retain the A+ incentive, students must maintain a 2.50 cumulative GPA and be enrolled full-time at an eligible two-year institution. Of the 3,979 who were enrolled in a two-year institution in the Fall

2002 term, 3,402 students completed the Winter 2003 term at a two-year institution and had valid cumulative GPA data on file. Of those, 2,444 (72%) earned a cumulative GPA at or above a 2.50.

Analyses were conducted for students with valid cumulative GPA data and valid demographic characteristics. A chi-square test of significance was calculated to compare the frequency of earning a Winter 2003 cumulative GPA above or below 2.50 for students who enrolled in a two-year school in the Fall 2002 term and were still enrolled in a two-year school for the Winter 2003 term. The demographic characteristics of Pell eligibility, first-generation status, and minority status were included in the analysis as independent variables.

Chi-square analyses on valid single demographic characteristics indicated significant Winter 2003 cumulative GPA differences for students with Pell grant eligibility (chi-square (1) = 3.888, $p = .049$). Of those with valid cumulative GPA data and demographic characteristics of file, 70% ($N = 724/1035$) of the Pell grant-eligible students earned above a 2.50 Winter 2003 cumulative GPA compared to 73% ($N = 1706/2329$) of the students who were not Pell grant-eligible.

There were no significant differences noted for first-generation students in the single demographic characteristics analysis. Seventy-two percent ($N = 937/1308$) of the first-generation students earned above a 2.50 cumulative GPA for the Winter 2003 term compared to 72% ($N = 937/1308$) of the students who were not first-generation. Significant differences were also noted for minority students (chi-square (1) = 17.502, $p = .000$). Sixty-one percent ($N = 144/238$) of the minority students earned above a 2.50 cumulative GPA for the Winter 2003 term compared to 73% ($N = 2286/3127$) of the

White students. Based upon single category demographic characteristics, Pell-eligible students and minority students were more likely to earn a Winter 2003 cumulative GPA below 2.50.

As many students belong to more than one at-risk demographic category, chi-square analyses on multiple demographic characteristics were also examined through crosstabs. As shown in Table 21, a significant difference was found for three populations of students: those who were not eligible for a Pell grant, regardless of first-generation status, those who were eligible for a Pell grant who were not first-generation, and minority students. Students who were not eligible for a Pell grant were more likely to earn a cumulative GPA below 2.50 than students who were eligible for a Pell grant regardless of first-generation status. Minority students were more likely to earn a cumulative GPA below a 2.50 regardless of Pell-eligibility status or first-generation status than White students regardless of first-generation or Pell-eligibility status. Minority students who were not eligible for a Pell grant and students who were not eligible for a Pell grant were more likely to lose eligibility for the A+ financial incentive after the Winter 2003 term.

Table 21
Summary of Chi-square Crosstab Analysis Results for Winter 2003 Cumulative GPA by Demographic Characteristics

Pell eligible	First Generation	Winter 2003 cumulative gpa	Race		χ^2	df	p	
			White	Minority				
No	No	+ 2.50	74% (1004)	59% (49)	8.38	1	0.004*	
		- 2.50	26% (360)	41% (34)				
	Yes	+ 2.50	75% (604)	56% (27)	9.43	1		0.006*
		- 2.50	25% (205)	44% (21)				
Yes	No	+ 2.50	73% (382)	62% (41)	3.75	1	0.039*	
		- 2.50	27% (138)	38% (25)				
	Yes	+ 2.50	68% (266)	65% (24)	.138	1		0.419
		- 2.50	32% (126)	35% (13)				

* $p < .05$.

Year 2: Fall 2003-Winter 2004

Fall 2003 term achievement descriptive analysis. Fall 2003 term enrollment experiences and academic outcomes of students enrolled in a Missouri public post-secondary institution as a group ($N = 4,378$) and by institution type are described in Table 22. These data were drawn from the EMSAS Fall 2003 registration files which are reported by institutions based upon end-of-term data.

Two-year students ($N = 2,848$) enrolled in an average of 13 credit hours and were graded on an average of 13 credit hours. Some students enrolled in more than one remedial course. Ten percent of the two-year students enrolled in at least one remedial course. Specifically, 9% enrolled in remedial math hours and 1% in remedial English hours. Two-year students earned an average term GPA of 2.73 and 3% withdrew before the end of the term.

Four-year students ($N = 1,530$) enrolled in and were graded on an average of 14 credit hours. Two percent of the four-year students enrolled in at least one remedial course and 2% enrolled in remedial math hours. Fewer of the four-year students enrolled in more than one remedial course. Four-year students earned an average term GPA of 2.92 and less than 1% withdrew before the end of the term.

With regard to cumulative data, four-year students had accumulated higher numbers of credit hours and earned a higher cumulative GPA. Transfer data show that both groups had accumulated transfer credit hours. Thirty-two percent of the two-year students and 65% of the four-year students had accumulated transfer credit hours.

Table 22
Descriptive Fall 2003 Academic Statistics of 2002 A+ Cohort Enrolled Fall 2002 in a Missouri Public Institution

Fall 2003:	All A+ Enrolled			Enrolled 2-year			Enrolled 4-year		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
enrolled/earned cr hrs term	4378	13	3.06	2848	13	3.32	1530	14	2.43
completed/graded cr hrs	4345	13	3.15	2814	13	3.42	1531	14	2.45
remedial math hrs	275	3	0.83	246	3	0.84	29	3	0.68
remedial reading hrs	12	3	0.00	12	3	0	0		
remedial English hrs	44	3	0.36	37	3	0.39	7	3	0
other non-college hrs	8	1	0.74	7	1	0.79	1	1	
enrolled in at least one remedial course during term	313	3	1.20	278	3	1.23	35	3	1.00
term gpa	4389	2.80	0.91	2855	2.73	0.95	1534	2.92	0.84
withdrew from term	98			91			7		
cumulative credit hrs	4446	46	14.79	2910	44	14.43	1536	51	14.17
cumulative gpa	4445	2.95	0.63	2894	2.90	0.63	1528	3.06	0.60
transfer credit hrs total	1784	14	11.20	795	13	12.30	989	15	10.21

Note. *N* = number of students with data reported in data source.

Fall 2003 term A+ eligibility analysis. There were 2,798 students who completed the Fall 2003 term who had valid cumulative GPA data on file. Of those, 2,107 (78%) earned a cumulative GPA at or above a 2.50.

Analyses were conducted for students with valid cumulative GPA data and valid demographic characteristics. A chi-square test of significance was calculated to compare the frequency of earning a Fall 2003 cumulative GPA above or below 2.50 for students who enrolled in a two-year school in the Fall 2002 term and were still enrolled in a two-year school for the Fall 2003 term. The demographic characteristics of Pell eligibility, first-generation status, and minority status were included in the analysis as independent variables.

Chi-square analyses on valid single demographic characteristics indicated no significant Fall 2003 cumulative GPA differences for students with Pell grant eligibility. Of those with valid cumulative GPA data and demographic characteristics of file, 76% ($N = 620/818$) of the Pell grant-eligible students earned above a 2.50 Fall 2002 cumulative GPA compared to 78% ($N = 1535/1963$) of the students who were not Pell grant-eligible. There were no significant differences noted for first-generation students in the single demographic characteristics analysis. Seventy-seven percent ($N = 838/1092$) of the first-generation students earned above a 2.50 cumulative GPA for the Fall 2003 term compared to 78% ($N = 1314/1681$) of the students who were not first-generation. No significant differences were noted for minority students at the $p = .05$ level. Seventy-two percent ($N = 142/197$) of the minority students earned above a 2.50 cumulative GPA for the Fall 2003 term compared to 78% ($N = 2015/2587$) of the White students. Based upon single category demographic characteristics, Pell-eligible students and first-generation students were slightly more likely and minority students were more likely to earn a Fall 2003 cumulative GPA below 2.50.

As many students belong to more than one at-risk demographic category, chi-square analyses on multiple demographic characteristics were also examined through crosstabs. As shown in Table 23, a significant difference was found for first-generation students who were not eligible for a Pell grant. First-generation minority students who were not Pell-eligible were more likely to earn a cumulative GPA lower than 2.50 than first-generation White students who were not eligible for a Pell grant. First-generation minority students who were not eligible for a Pell grant were more likely to lose eligibility for the A+ financial incentive after the Fall 2003 term.

Table 23
Summary of Chi-square Crosstab Analysis Results for Fall 2003 Cumulative GPA by Demographic Characteristics

Pell eligible	First Generation	Fall 2003 cumulative gpa	Race		χ^2	df	p	
			White	Minority				
No	No	+ 2.50	78% (893)	76% (55)	2.06	1	0.373	
		- 2.50	22% (245)	24% (17)				
	Yes	+ 2.50	21% (146)	41% (17)	9.43	1		0.003*
		- 2.50	79% (550)	59% (24)				
Yes	No	+ 2.50	78% (315)	75% (45)	.301	1	0.344	
		- 2.50	22% (90)	25% (16)				
	Yes	+ 2.50	73% (230)	77% (20)	.167	1		0.442
		- 2.50	27% (84)	23% (6)				

* $p < .05$.

Winter 2004 term achievement descriptive analysis. Winter term enrollment experiences and academic outcomes of students enrolled in a Missouri public post-secondary institution as a group ($N = 4,075$) and by institution type were analyzed. These data were drawn from the EMSAS Winter 2004 registration files which are reported by institutions based upon end-of-term data.

Two-year students ($N = 2,604$) enrolled in an average of 13 credit hours and were graded on an average of 12 credit hours. The lower graded figure could be accounted for by students auditing a course, placing a course on pass/fail, or institutional recording of remedial coursework. Some students enrolled in more than one remedial course. Seven percent of the two-year students enrolled in at least one remedial course. Six percent enrolled in remedial math hours. Two-year students earned an average term GPA of 2.79 and 2% withdrew before the end of the term.

Four-year students ($N = 1,471$) enrolled in and were graded on an average of 14 credit hours. Less than 1% of the four-year students enrolled in a remedial course. Four-year students earned an average term GPA of 2.98 and less than 1% withdrew before the end of the term.

With regard to cumulative data, four-year students had accumulated higher numbers of credit hours and earned a higher cumulative GPA. Transfer data show that both groups had accumulated transfer credit hours. Thirty-one percent of the two-year students and 63% of the four-year students had accumulated transfer credit hours.

Winter 2004 term A+ eligibility analysis. Of the 3,979 who were enrolled in a two-year institution in the Fall 2002 term, 2,650 students completed the Winter 2004 term at a two-year institution and had valid cumulative GPA data on file. Of those, 1,195 (80%) earned a cumulative GPA at or above a 2.50.

Analyses were conducted for students with valid cumulative GPA data and valid demographic characteristics. A chi-square test of significance was calculated to compare the frequency of earning a Winter 2004 cumulative GPA above or below 2.50 for students who enrolled in a two-year school in the Fall 2002 term and were still enrolled in

a two-year school for the Winter 2004 term. The demographic characteristics of Pell eligibility, first-generation status, and minority status were included in the analysis as independent variables.

Chi-square analyses on valid single demographic characteristics indicated significant Winter 2004 cumulative GPA differences for students with Pell grant eligibility (chi-square (1) = 4.25, $p = .04$). Of those with valid cumulative GPA data and demographic characteristics of file, 78% ($N = 569/732$) of the Pell grant-eligible students earned above a 2.50 Winter 2004 cumulative GPA compared to 81% ($N = 1413/1537$) of the students who were not Pell grant-eligible.

There were no significant differences noted for first-generation students in the single demographic characteristics analysis. Eighty percent ($N = 774/971$) of the first-generation students earned above a 2.50 cumulative GPA for the Winter 2004 term compared to 81% ($N = 1202/1491$) of the students who were not first-generation. No significant differences were noted for minority students. Seventy-five percent ($N = 129/172$) of the minority students earned a Winter 2004 cumulative GPA above 2.50 compared to 81% ($N = 1853/2300$) of the White students. Based upon single category demographic characteristics, Pell-eligible students and first-generation students were slightly more likely and minority students were more likely to earn a Winter 2004 cumulative GPA below 2.50.

As many students have more than one at-risk demographic characteristic, chi-square analyses on multiple demographic characteristics were also examined through crosstabs. As shown in Table 24, a significant difference was found for students who were not eligible for a Pell grant, but were first-generation. First-generation minority

students who were not eligible for a Pell grant (35%) were more likely to earn a cumulative GPA lower than 2.50 than first-generation White students who were not eligible for a Pell grant (18%). First-generation minority students who were not eligible for a Pell grant were more likely lose eligibility for the A+ financial incentive after the Winter 2004 term.

Table 24
Summary of Chi-square Crosstab Analysis Results for Winter 2004 Cumulative GPA by Demographic Characteristics

Pell eligible	First Generation	Winter 2004 cumulative gpa	Race		χ^2	df	p
			White	Minority			
No	No	+ 2.50	82% (821)	74% (52)	.243	1	0.086
		- 2.50	18% (179)	26% (16)			
	Yes	+ 2.50	82% (505)	65% (24)	6.51	1	
		- 2.50	18% (112)	35% (13)			
Yes	No	+ 2.50	78% (288)	80% (41)	.161	1	0.426
		- 2.50	22% (82)	20% (9)			
	Yes	+ 2.50	77% (214)	79% (19)	.076	1	
		- 2.50	23% (65)	21% (5)			

* $p < .05$.

Year 3: Fall 2004-Winter 2005

Fall 2004 term achievement descriptive analysis. Fall 2004 term enrollment experiences and academic outcomes of students enrolled in a Missouri public post-secondary institution as a group ($N = 3,456$) and by institution type were analyzed. These data were drawn from the EMSAS Fall 2004 term registration files which are reported by institutions based upon end-of-term data.

Two-year students ($N = 2,031$) enrolled in an average of 11 credit hours and were graded on an average of 11 credit hours. Some students enrolled in more than one

remedial course. Five percent of the two-year students enrolled in at least one remedial course. Specifically, 4% enrolled in remedial math hours. Two-year students earned an average term GPA of 2.71 and 4% withdrew before the end of the term.

Four-year students ($N = 1,425$) enrolled in and were graded on an average of 14 credit hours. Less than 1% of the four-year students enrolled in any remedial hours. Four-year students earned an average term GPA of 3.01 and less than 1% withdrew before the end of the term.

With regard to cumulative data, four-year students had accumulated higher numbers of credit hours and earned a higher cumulative GPA. Transfer data show that both groups had accumulated transfer credit hours. Eighty-nine percent of the two-year students and 99.7% of the four-year students had accumulated transfer credit hours.

Fall 2004 term A+ eligibility analysis. Of the 3,979 who were enrolled in a two-year institution in the Fall 2002 term, 1,284 students completed the Fall 2004 term at a two-year institution and had valid cumulative GPA data on file. Of those, 940 (73%) earned a cumulative GPA at or above a 2.50.

Analyses were conducted for students with valid cumulative GPA data and valid demographic characteristics. A chi-square test of significance was calculated to compare the frequency of earning a Fall 2004 cumulative GPA above or below 2.50 for students who enrolled in a two-year school in the Fall 2002 term and who were still enrolled in a two-year school for the Fall 2004 term. The demographic characteristics of Pell eligibility, first-generation status, and minority status were included in the analysis as independent variables.

There were no significant differences noted for Pell grant-eligible students in the single demographic characteristics analysis. Of those with valid cumulative GPA data and demographic characteristics of file, 74% ($N = 295/397$) of the Pell grant-eligible students earned above a 2.50 Fall 2004 cumulative GPA compared to 73% ($N = 636/877$) of the students who were not Pell grant-eligible. There were no significant differences noted for first-generation students in the single demographic characteristics analysis. Seventy-four percent ($N = 295/397$) of the first-generation students earned above a 2.50 cumulative GPA for the Fall 2004 term compared to 73% ($N = 636/877$) of the students who were not first-generation. There were no significant differences were noted for minority. Seventy-two percent ($N = 73/101$) of the minority students earned above a 2.50 cumulative GPA for the Fall 2004 term compared to 73% ($N = 856/1171$) of the White students. Based upon single category demographic characteristics, Pell-eligible students and minority students were slightly more likely to earn a Fall 2004 cumulative GPA below 2.50, but first-generation students were slightly more likely to earn a Fall 2004 cumulative GPA above 2.50.

As many students belong to more than one at-risk demographic category, chi-square analyses on multiple demographic characteristics were also examined through crosstabs. There were no significant findings based upon the demographic characteristic interactions.

Winter 2005 term achievement descriptive analysis. Two-year students ($N = 1,763$) enrolled in an average of 11 credit hours and were graded on an average of 11 credit hours. Some students enrolled in more than one remedial course. Four percent of the two-year students enrolled in at least one remedial course. Specifically, 4% enrolled

in remedial math hours. Two-year students earned an average term GPA of 2.71 and 3% withdrew before the end of the term.

Four-year students ($N = 1,378$) enrolled in and were graded on an average of 14 credit hours. Less than 1% of the four-year students enrolled in any remedial hours. Four-year students earned an average term GPA of 3.09 and less than 1% withdrew before the end of the term.

With regard to cumulative data, four-year students had accumulated higher numbers of credit hours and earned a higher cumulative GPA. Transfer data show that both groups had accumulated transfer credit hours. Ninety-one percent of the two-year students and 99.5% of the four-year students had accumulated transfer credit hours.

Winter 2005 term A+ eligibility analysis. Of the 3,979 who were enrolled in a two-year institution in the Fall 2002 term, 956 students completed the Winter 2005 term at a two-year institution and had valid cumulative GPA data on file. Of those, 2,444 (72%) earned a cumulative GPA at or above a 2.50.

Analyses were conducted for students with valid cumulative GPA data and valid demographic characteristics. A chi-square test of significance was calculated to compare the frequency of earning a Winter 2005 cumulative GPA above or below 2.50 for students who enrolled in a two-year school in the Fall 2002 term and were still enrolled in a two-year school for the Winter 2005 term. The demographic characteristics of Pell eligibility, first-generation status, and minority status were included in the analysis as independent variables.

Chi-square analyses on valid single demographic characteristics indicated no significant Winter 2005 cumulative GPA differences for students with Pell grant

eligibility. Of those with valid cumulative GPA data and demographic characteristics of file, 72% ($N = 213/295$) of the Pell grant-eligible students earned above a 2.50 Winter 2005 cumulative GPA compared to 70% ($N = 457/653$) of the students who were not Pell grant-eligible. There were no significant differences noted for first-generation students in the single demographic characteristics analysis. Seventy-two percent ($N = 286/399$) of the first-generation students earned above a 2.50 cumulative GPA for the Winter 2005 term compared to 70% ($N = 382/545$) of the students who were not first-generation. There were no significant differences noted for minority students. Sixty-five percent ($N = 52/80$) of the minority students earned above a 2.50 cumulative GPA for the Winter 2005 term compared to 71% ($N = 618/868$) of the White students. Based upon single category demographic characteristics, Pell-eligible students were slightly more likely and minority students more likely to earn a Winter 2005 cumulative GPA below 2.50, but first-generation students were slightly more likely to earn a GPA above 2.50.

As many students belong to more than one at-risk demographic category, chi-square analyses on multiple demographic characteristics were also examined through crosstabs. There were no significant findings based upon the demographic characteristic interactions.

Academic Achievement Summary

Comparisons between two-year and four-year students indicated that, overall, two-year students enrolled in fewer credit hours, more remedial credit hours, and earned lower GPAs. The average number of term enrolled credit hours gets lower as two-year students near academic program completion, which aligns with A+ policies that pay only for required coursework. A+ eligibility analyses based upon single and multiple

demographic characteristics were inconsistent. Minority students and Pell-eligible students were significantly more at-risk for losing A+ funding in single demographic analyses, but minority students who were not first-generation were significantly more at-risk in multiple demographic analyses. In single-category demographic analyses, first-generation students often out-performed those who were not first-generation. Overall, demographic characteristics become increasingly less significant throughout the study period.

The academic achievement section analyzed and presented measures of earned academic qualifications and accomplishments measured each fall and winter term for three years from the Fall 2002 term through the Winter 2005 term. The next section will present analyses on student persistence and attainment.

Persistence and Attainment

The “Persistence and Attainment” section will describe, analyze, and define differences in student enrollment behaviors and certificate or degree attainment in academic terms subsequent to Fall 2002 through AY 2005-06 in terms of demographics and institution type. There is naturally some overlap in enrollment categories, especially when describing two-year degree attainment and transfer to four-year institutions.

Student persistence is described here by re-enrolling or transfer behaviors. Educational attainment measures include culminating achievements such as degree or program completion (Adelman, 1999). Additionally, because this study was interested in the influence of the two-year institution requirement on enrollment patterns, post-secondary enrollment beyond certificate or degree attainment will be presented.

This section is guided by Research Question 2 and hypotheses 7, 8, and 9 which are summarized here as follows: Missouri 2002 A+-eligible graduates who are not Pell grant-eligible, first-generation, or minority will be more likely to earn a certificate or degree from a Missouri public post-secondary institution than will their counterparts who are Pell grant-eligible, first-generation, or minority. Students are limited to six terms of A+ eligibility and no longer eligible for A+ incentive funds after they have earned a certificate or degree or after four academic years beyond high school graduation. For the A+ class of 2002, the A+ incentive was no longer available during AY 2005-06 for students who had been continuously enrolled in a two-year institution beginning Fall 2002.

Describing Enrollment Behaviors Subsequent to Fall 2002

Enrollment behaviors. Enrollment behaviors of the Fall 2002 students during subsequent academic years were analyzed. The data were drawn from the EMSAS term registration files for academic years (AY) 2002-03, 2003-04, and 2004-05. Only students who completed the terms as identified are included in the data. Table 25 demonstrates academic persistence behaviors through re-enrollment and transfer between Missouri public post-secondary institutions. The results do not distinguish re-enrollment at a particular institution, but rather at an institutional type (two-year or four-year.) Subsequent year enrollment is based upon those students who completed the Fall 2002 term at a Missouri public two- or four-year post-secondary institution.

From academic year AY 2002-03 to AY 2003-04, 68% of those who had completed the Fall 2002 term at a two-year institution enrolled at a two-year institution, 3% in a four-year institution, and 30% no longer appeared in the database as enrolled at a

Missouri public post-secondary institution. During the same period, 88% of the four-year students enrolled in a four-year institution, 5% in a two-year, and 7% no longer appeared in the database.

From AY 2003-04 to AY 2004-05, 32% of those who had completed the Fall 2002 term at a two-year institution enrolled at a two-year institution, 18% in a four-year, and 50% no longer appeared as enrolled. During the same period, 81% of the four-year students enrolled in a four-year institution, 5% in a two-year, and 14% no longer appeared in the database.

From AY 2004-05 to AY 2005-06, 14% of those who had completed the Fall 2002 term at a two-year institution enrolled at a two-year institution, 23% in a four-year, and 63% no longer appeared in the database. During the same period, 76% of the four-year students enrolled in a four-year institution, 3% enrolled in a two-year, and 20% no longer appeared in the database.

Table 25

Subsequent Enrollment by Institution Type Based upon 2002-03 Institution Type

2002-03 beginning term institution type	2002-03		Subsequent year institution type					
	N	%	2003-04		2004-05		2005-06	
2-year	3940	100	2659	67.49	1263	32.06	540	13.71
4-year			112	2.84	725	18.40	905	22.97
Earned credential/not enrolled*			17	0.43	340	8.62	376	9.54
Earned credential cumulative**					17	.43	357	9.06
Not enrolled			1152	29.23	1595	40.48	1762	44.72
Total			3940	100.00	3940	100.00	3940	100.00
4-year	1643	100	79	4.81	82	4.99	54	3.29
Earned credential/not enrolled*			1447	88.07	1326	80.71	1255	76.38
Earned credential cumulative**					2	0.12	33	2.00
Not enrolled			117	7.12	233	14.18	299	18.20
Total			1643	100.00	1643	100.00	1643	100.00

Note. *not enrolled in academic year immediately following credential attainment.

** earned credential and removed from subsequent years' analyses.

Degree seeking behaviors. The type and level of degree sought by students who were enrolled in the Fall 2002 term during AYs 2002-03, 2003-04, 2004-05 are described in Table 26. These data were drawn from the Fall 2002, 2003, 2004, and 2005 term registration files.

The majority of students who were enrolled in a two-year institution in the Fall 2002 term were seeking a certificate or degree of less than a bachelor's level. Seventy-seven percent were seeking an unspecified associate or an associate of arts degree and 16% were seeking degrees or certificates commonly considered vocational such as certificates and AS/AAS degrees (Townsend, 2001). Sixty-seven of the two-year students appeared to be seeking bachelor's degrees. The latter could be a data input interpretation error where a "highest degree sought" variable was confused with a "current degree sought" variable.

During academic years subsequent to AY 2002-03, the number of students enrolled in a two-year institution in the Fall 2002 who were seeking bachelors degrees and beyond began to increase. Additionally, the number of students who no longer appeared in the database ("not enrolled") increased with subsequent years. These increases corresponded with a decrease in the number of students seeking two-year credentials.

The majority of students who were enrolled in a four-year institution in the Fall 2002 term were seeking bachelor's degrees. A very small percentage was seeking associate degree credentials. During subsequent years, the percentage of students seeking bachelor's degrees decreased slightly and percentages of students seeking associate degree or certificate credentials began to increase slightly.

Table 26
Degree Sought by Institution Type Enrolled 2002-03

Enrolled in a 2-year institution Fall 2002: (*N* = 3940)

Degree sought:	2002-03		2003-04		2004-05		2005-06	
	<i>N</i>	% ^c	<i>N</i>	% ^c	<i>N</i>	% ^c	<i>N</i>	%
Certificate	94	2.38	40	1.01	24	0.60	30	0.76
Unspecified Assoc	1648	41.83	1032	26.19	468	11.88	176	4.47
AA	1389	35.25	1062	26.95	481	12.21	151	3.83
AS	55	1.40	41	1.04	23	0.58	9	0.23
AAS	472	11.98	378	9.59	198	5.03	123	3.12
BA	67	1.70	137	3.48	667	16.93	868	22.03
MA	0		0		0		2	0.05
Professional	0		1	0.03	1	0.03	4	0.10
Total	3737	94.85	2691	68.30	1862	47.26	1353	34.34

Enrolled in a 4-year institution Fall 2002: (*N* = 1643)

Certificate	0		0		3	0.18	3	0.18
Unspecified Assoc	12	0.73	52	3.16	50	3.04	25	1.52
AA	2	0.12	19	1.16	11	0.67	13	0.79
AS			37	2.25	20	1.22	5	0.30
AAS	4	0.24	12	0.73	19	1.16	17	1.03
BA	1263	76.87	1206	73.40	1217	74.07	1194	72.67
MA	0		0		0		11	0.67
Professional	10	0.61	13	0.79	16	0.97	22	1.33
Total	1291	78.58	1339	81.50	1336	81.31	1290	78.51

Note.

- a. *N* = number of students with data reported.
- b. "degree sought" = declared degree-seeking status, not degree aspiration.
- c. % = % of beginning Fall 2002 cohort by institution type.

Certificates and Degrees Earned

The frequencies and percentages of students who earned certificates or degrees during the study period are shown in Table 27 by single category demographic characteristic. The results are reported proportionally from within three separate groups: (1) the percentage of students who earned certificates or degrees, (2) the percentage of

students who earned certificates or degrees from the overall 2002 A+ cohort, and (3) the percentage of students who earned certificates or degrees from the 2002 A+-eligible Fall 2002 two-year enrollees. Comparisons between demographic groups from the Fall 2002 two-year cohort who earned certificates or degrees indicated that a higher percentage of students who were not Pell grant-eligible earned certificates or degrees than students who were Pell grant-eligible. Also, a higher percentage of White students earned certificates or degrees than minority students. However, a higher percentage of first-generation students earned certificates or degrees than those who were not first generation students.

Table 27
Demographic Percentages of Fall 2002 Enrolled Cohort that Earned a Certificate or Degree, 2002-2005

Pell-grant Eligibility Status

	Pell grant-eligible		Not Pell grant-eligible	
% within attainment group	436/1526	29%	1079/1526	71%
% within overall 2002 A+ cohort	436/2455	18%	1079/4940	22%
% within Fall 2002 enrolled cohort	436/1673	26%	1079/3826	28%

First-generation Status

	First-Generation		Not-First-Generation	
% within attainment group	575/1526	38%	936/1526	61%
% within overall 2002 A+ cohort	575/2832	20%	936/4545	21%
% within Fall 2002 enrolled cohort	575/2049	28%	936/3517	27%

Minority Status

	Minority		White	
% within attainment group	87/1526	6%	1433/1526	94%
% within overall 2002 A+ cohort	87/429	20%	1433/5252	27%
% within Fall 2002 enrolled cohort	87/419	21%	1433/5164	28%

Note. Missing demographic data removed.

Academic and financial characteristics. Attainment and persistence described by subsequent year enrollments by institutional type of the 733 students who first enrolled

Fall 2002 in a two-year institution and earned a degree or certificate in AY 2003-04 are illustrated in Table 28. Mean ACT scores and mean EFC financial data are shown for each group.

Of the 733, 54% ($N = 393$) enrolled in AY 2004-05. Of those, 9% enrolled at a two-year institution, had a mean ACT score of 21.85 ($SD = 2.80$), and a mean EFC of \$8,278 ($SD = \$9,598$). Of the 733, 45% ($N = 329$) subsequently enrolled in a four-year institution. This group had a mean ACT score of 22.26 ($SD = 3.19$) and a mean EFC of \$11,914 ($SD = \$12,611$).

Of the 733, 50% ($N = 364$) enrolled in AY 2005-06. Of those, 6% enrolled at a two-year institution, had a mean ACT score of 21.46 ($SD = 2.94$), and a mean EFC of \$10,069 ($SD = \$8,384$). Of the 733, 4% ($N = 319$) enrolled in a four-year institution, had a mean ACT score of 22.36 ($SD = 3.15$), and a mean EFC of \$11,782 ($SD = \$12,539$). Of the 733, 50% ($N = 369$) did not enroll for AY 2005-06, had a mean ACT score of 21.27 ($SD = 3.35$), and a mean EFC of \$10,010 ($SD = \$11,247$).

This analysis revealed that almost half of the students who enrolled in the Fall 2002 term and earned a degree or certificate in AY 2003-04 did not enroll again for AY 2004-05 or 2005-06. Students who did not enroll had similar ACT scores ($M = 21.26$, 21.27) than students who enrolled again in two-year institutions ($M = 21.85$, 21.46), but lower ACT scores than those who transferred to four-year institutions ($M = 22.26$, 22.36). Additionally, not-enrolled students' mean EFC (\$10,165, $SD = \$11,035$) more closely resembled those who transferred to a four-year institution ($M = \$11,914$, $SD = \$12,611$)

Table 28
Subsequent Enrollment of Students Enrolled in a 2-year Institution Fall 2002 Who Earned a Certificate or Degree in AY 2003-04

Institution type enrolled 2002-03	Number earned degree 2003-04	Institution Type		2004-05		2005-06	
				N	%	N	%
2-year	733	Total re-enrolled		393	54%	364	50%
		2-year		64	9%	45	6%
		4-year					
		Est. Family Financial Contribution		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
		ACT score		\$8,278	\$9,598	\$10,069	\$8,384
				21.85	2.80	21.46	2.94
				<i>N</i>	%	<i>N</i>	%
				329	45%	319	44%
		Est. Family Financial Contribution		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
		ACT score		\$11,914	\$12,611	\$11,782	\$12,539
				22.26	3.19	22.36	3.15
				<i>N</i>	%	<i>N</i>	%
		Not re-enrolled		340	46%	369	50%
		Est. Family Financial Contribution		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
		ACT score		\$10,165	\$11,035	\$10,010	\$11,247
				21.26	3.38	21.27	3.35

Note. N = Number of students with data reported.

than those who enrolled at a two-year ($M = \$8,278$, $SD = \$9,598$). Those who moved from a two-year to a four-year had higher EFCs. There is little difference between ACT scores of the three groups for AY 2004-05 or AY 2005-06.

Closer analysis of the 733 students who first enrolled Fall 2002 in a two-year institution and earned a degree or certificate in AY 2003-04 revealed some evidence of “swirling” (Bordon, 2004) and stop-out enrollment behaviors between AY 2004-05 and AY 2005-06. Table 29 details these behaviors. As shown previously, 393 (54%) of the 733 students enrolled AY 2004-05. However, the 364 enrolled in AY 2005-06 are not all enrolled in the same type of institution as in AY 2004-05. Of the 64 who enrolled in a two-year institution in AY 2004-05, 12 moved to a four-year, 19 enrolled in a two-year, and 33 were no longer enrolled in AY 2005-06. Of the 329 who enrolled in a four-year institution in AY 2004-05, 10 students enrolled in a two-year, 102 in a four-year, and 36 were no longer enrolled in 2005-06. Of the 340 who were not enrolled in AY 2004-05, 16 enrolled in a two-year, 24 in a four-year, and 300 were not enrolled in AY 2005-06.

Table 29

Enrollment in 2004-05 and 2005-06 of Students Who Earned a Certificate or Degree in 2003-04 by 2002-03 Institution Type

Institution type enrolled 2002-03	Number earned degree 2003-04	2004-05		2005-06			
		<i>N</i>	% of degree holders	<i>N</i>	% of degree holders		
		Total re-enrolled	393	54%	Total re-enrolled	364	50%
		2-year	64	9%	2-year	19	3%
					4-year	12	2%
					Not re-enrolled	33	5%
2-year	733	4-year	329	45%	2-year	10	1%
					4-year	273	37%
					Not re-enrolled	36	5%
		Not re-enrolled	340	46%	2-year	16	2%
					4-year	24	3%
					Not re-enrolled	300	41%
							88%

Frequencies and types of degrees attained. The frequencies and types of certificates or degrees earned by academic year by students who enrolled in and completed the Fall 2002 term are detailed in Table 30. A few students did complete a certificate or degree within AY 2002-03. However, considerably more completed certificates and degrees in AY 2003-04 and AY 2004-05. This observation was expected. Nineteen percent of the two-year students completed at least one certificate or degree in AY 2003-04 and 18% completed at least one certificate or degree in AY 2004-05. Overall, 38% of the two-year students who completed the Fall 2002 term at a two-year institution completed at least one certificate or degree within three academic years.

Table 30
Degrees Earned 2002-2005 by Institution Type 2002-03

Degree Type	Degree Earned 2002-03		Degrees Earned 2003-04		Degrees Earned 2004-05		Total degrees
	1st degree ^a	2nd degree ^a	1st degree ^a	2nd degree ^a	1st degree ^a	2nd degree ^a	
2-year	22	73% ^b	26	4% ^b	37	5% ^b	104
Certificates			8	50% ^b	11	34% ^b	7%
(N = 3940)	8	27% ^b	250	34% ^b	212	31% ^b	470
Unspecified Assoc			360	49% ^b	317	47% ^b	677
AA			4	1% ^b	18	3% ^b	22
AS			92	13% ^b	94	14% ^b	215
AAS					21	66% ^b	14%
BA					1	0% ^b	1
Subtotal 2-year	30	1% ^c	732	19% ^c	679	17% ^c	1489
No degree reported	3910	99% ^c	3208	81% ^c	3261	83% ^c	2451
4-year			1	8% ^b	1	1% ^b	2
Certificates			11		36		48
(N = 1643)					30	45% ^b	30
Associate degrees					67	4% ^c	1
BA			12	1% ^c		0% ^c	80
Subtotal 4-year			1631	99% ^c	1576	96% ^c	1563
No degree reported					1642	100% ^c	95% ^c

Note.

^a "1st degree" and "2nd degree" are annual, not cumulative, calculations that signify only that a degree was earned during that academic year, not cumulative degrees earned. ^b % = of the degrees earned that period. ^c % = of students enrolled 2002-03.

Defining Attainment and Transfer Behaviors

The following analyses address Research Question 2 and hypotheses 10, 11, and 12, which are summarized as follows: Missouri 2002 A+-eligible graduates who are not Pell grant-eligible, first-generation, or minority will be more likely to transfer to a Missouri public four-year institution after earning a certificate or degree from a Missouri public two-year institution or depleting the A+ incentive than will their counterparts who are Pell grant-eligible, first-generation, or minority.

Table 31 details the Missouri public two-to-four-year institution transfer behaviors of the Fall 2002 two-year enrollees by single category demographic characteristic. Those who earned certificates or degrees between 2002 and 2005 and those who transferred without earning a certificate or degree are included. A slightly higher percentage of students who were not eligible for a Pell grant transferred than those who were eligible for a Pell grant. Additionally, a slightly higher percentage of White students transferred than minority students. However, a slightly higher percentage of first-generation students transferred than those who were not first-generation.

Table 31
Fall 2002 Two-year Institution Cohort Transfers to Four-year Institutions After Attaining a Certificate or Degree or Exhausting A+ Incentive Eligibility

Pell grant Eligibility Status	Total N	Pell grant-eligible	Total N	Not Pell grant-eligible
earned credential 2002-2003, transferred 4-year 2003-2004	4	1 25% *	4	3 75% *
earned credential 2003-2004, transferred 4-year 2004-2005	13	5 38% *	13	8 62% *
earned credential 2004-2005, transferred 4-year 2005-2006	278	78 28% *	278	197 71% *
total earned credential 2002-2005		84 5% *		208 5% *
no credential, transferred to a 4-year by 2005-2006	605	169 28% *	605	432 71% *
% of Fall 2002 2-year demographic transferred from 2-year to 4-year	1673	337 15% **	3826	848 17% **
First-generation status		First Generation		Not First-generation
earned credential 2002-2003, transferred 4-year 2003-2004	4	1 25% *	4	3 75% *
earned credential 2003-2004, transferred 4-year 2004-2005	13	5 38% *	13	8 62% *
earned credential 2004-2005, transferred 4-year 2005-2006	278	116 42% *	278	160 58% *
total earned credential 2002-2005		122 6% *		171 5% *
no credential, transferred to a 4-year by 2005-2006	605	225 37% *	605	375 62% *
% of Fall 2002 2-year demographic transferred from 2-year to 4-year	2049	469 17% **	3517	717 16% **
Minority Status		Minority		White
earned credential 2002-2003, transferred 4-year 2003-2004	4	0 0% *	4	4 100% *
earned credential 2003-2004, transferred 4-year 2004-2005	13	0 0% *	13	13 100% *
earned credential 2004-2005, transferred 4-year 2005-2006	278	19 7% *	278	257 92% *
total earned credential 2002-2005		19 5% *		274 5% *
no credential, transferred to a 4-year by 2005-2006	605	44 7% *	605	559 92% *
% of Fall 2002 2-year demographic transferred from 2-year to 4-year	419	82 15% **	5164	1107 16% **

Note. Missing demographic data removed
 * = of those who earned credential
 ** = of Fall 2002 2-year cohort demographic

Persistence to AY 2005-2006. The number of students enrolled during AY 2005-06 was analyzed and the results are reported in Table 32. There were 3,940 students enrolled in a two-year school who completed AY 2002-03. Of those, 36% ($N = 1,427$) earned a certificate or degree from 2002-2005. Of those who completed a certificate or degree, 17% were enrolled again in AY 2005-06: 14% in a four-year and 3% in a two-year. Nineteen percent were not enrolled in AY 2005-06. Of the 3,940, 64% did not earn a certificate or degree. Of those, 20% were enrolled in AY 2005-06: 9% in a four-year and 11% in a two-year. Forty-four percent were not enrolled in AY 2005-06. Overall, 14% were enrolled in a two-year, 23% in a four-year, and 63% were not enrolled. With regard to demographic characteristics, minority and first-generation status had little effect on AY 2005-06 enrollment. However, 76% of those enrolled in AY 2005-06 were not eligible for a Pell grant.

Table 32
Enrollment During AY 2005-06 by Institution Type AY 2002-03

Institution type enrolled 2002-03	Institution type enrolled 2005-06		Earned Degree 2002-2005		No Degree Earned 2002-2005		
	% of Institution Type		% of Institution Type		% of Institution Type		
	<i>N</i>	2002-03	<i>N</i>	2002-03	<i>N</i>	2002-03	
2-year	2-year	540	14%	109	3%	431	11%
	4-year	905	23%	568	14%	337	9%
	Not enrolled	2495	63%	750	19%	1745	44%
		3940	100%	1427	36%	2513	64%
4-year	2-year	54	3%	1	0%	53	3%
	4-year	1255	76%	39	2%	1216	74%
	Not enrolled	334	20%	36	2%	298	18%
		1643	100%	76	5%	1567	95%

Defining Persistence and Attainment Behaviors

Persistence from the first to second term. An analysis of four dependent variables (ACT, first-generation status, minority status and Pell-eligibility) was conducted.

Discriminant analysis was used to identify significant variables that defined differences between the Winter 2003 enrollment status (enrolled or not enrolled) of the Fall 2002 A+ cohort. The large group size exceeds the minimum participant-to-variable ratio of 20:1 recommended by Stevens (1996).

The analysis revealed that one significant discriminant function could be constructed to discriminate between the persistence from the first to second term for the 2002 A+ cohort. Standardized function coefficients and correlation coefficients revealed that the ACT variable was most associated with the first function, which accounted for 20% of the variance between categories of persistence and attainment ($\Lambda = .799$, $\chi^2(6, N = 4,772) = 1,071$, $p < .01$, eigenvalue = .252). Based upon these results, the function was labeled *Preparation*. Minority status (0.063) was slightly associated and eligibility for a Pell grant (-0.062) and first generation status (-0.173) were negatively associated with the Preparation function.

Group centroids were then computed to determine the degree of discrimination. Using the function structure matrix, all four variables were assembled into one rubric named “Persistence 1st to 2nd Term” (see Table 33).

Table 33
Persistence 1st to 2nd term

Institution type	<i>Centroids</i>
	Preparation
Non-persisters	-.554
2-year persisters	-.300
4-year persisters	.744

These results suggest that students with higher ACT scores (high preparation) were more likely to persist than those with lower ACT scores (moderate and low preparation) regardless of Pell grant eligibility, first-generation status, or minority status. The preparation means are plotted in Figure 5.

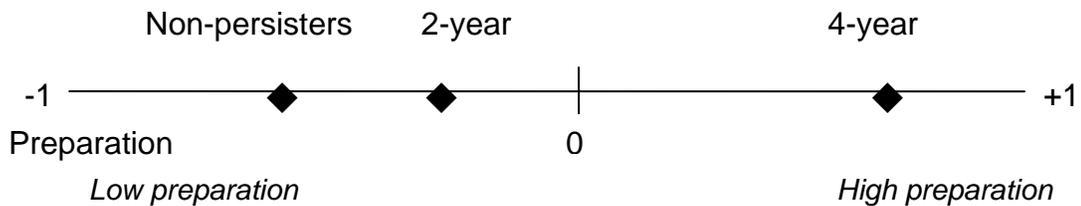


Figure 5. A graph with Preparation means plotted for each persistence group from the Fall 2002 term to the Winter 2003 term.

First year attainment and persistence to the second year. An analysis of four dependent variables (ACT, first-generation status, minority status and Pell-eligibility) was conducted. Discriminant analysis was used to identify significant variables that defined differences between the Fall 2003 enrollment status of the Fall 2002 A+ cohort.

The enrollment categories were: (A) “Did not persist or earn credential,” (B) “Attained 2-year credential/did not re-enroll,” (C) “Persisted 2-year to 2-year, no credential,” (D) “Attained 2-year credential, re-enrolled 2-year,” (E) “Persisted 4-year to 4-year, no credential,” and (F) “Attained 2-year credential, transferred 4-year.” The large group size exceeds the minimum participant-to-variable ratio of 20:1 recommended by Stevens (1996).

The analysis revealed that one significant discriminant function could be constructed to discriminate between the persistence and attainment status from the first to second year for the 2002 A+ cohort ($\Lambda = .799$, $\chi^2(6, N = 4,772) = 1,071$, $p < .01$, eigenvalue = .448). Standardized function coefficients and correlation coefficients revealed that the ACT variable was most associated with the first function, which accounted for 20% of the variance between categories of persistence and attainment. Based upon these results, the function was labeled *Preparation*. Minority status showed a slight positive and first-generation and eligibility showed small negative relationships to the Preparation function.

Group centroids were then computed to determine the degree of discrimination. Using the function structure matrix, all four variables were assembled into one rubric named “Persistence 1st to 2nd Year” (see Table 34).

Table 34
Persistence 1st to 2nd Year

	Centroid
	Preparation
Group A. Did not persist or earn credential	-.461
Group B. Attained 2-year credential, did not re-enroll	-.945
Group C. Persisted 2-year to 2-year, no credential	-.278
Group D. Attained 2-year credential, re-enrolled 2-year	-.472
Group E. Persisted 4-year to 4-year, no credential	.750
Group F. Attained 2-year credential, transfer 4-year	.219

These results suggest that, regardless of Pell eligibility, first-generation or minority status, students with higher ACT scores (high preparation) were more likely to start at and persist in a 4-year school (Group E). Those with moderately strong ACT scores who earned a 2-year certificate or degree were more likely to attain a certificate or degree and transfer to a 4-year school (Group F). Those with moderate ACT scores who earned a certificate or degree were more likely to re-enroll in a 2-year school (Group D) or maintain enrollment in a 2-year school without having earned a certificate or degree (Group C). Those with moderately low ACT scores were more likely to not earn 2-year certificate or degree and or persist in a Missouri public institution (Group A). Those with the lowest ACT scores were most likely to earn a certificate or degree and not re-enroll in the Missouri public post-secondary system (Group B). The Preparation means for each enrollment group are plotted in Figure 6.

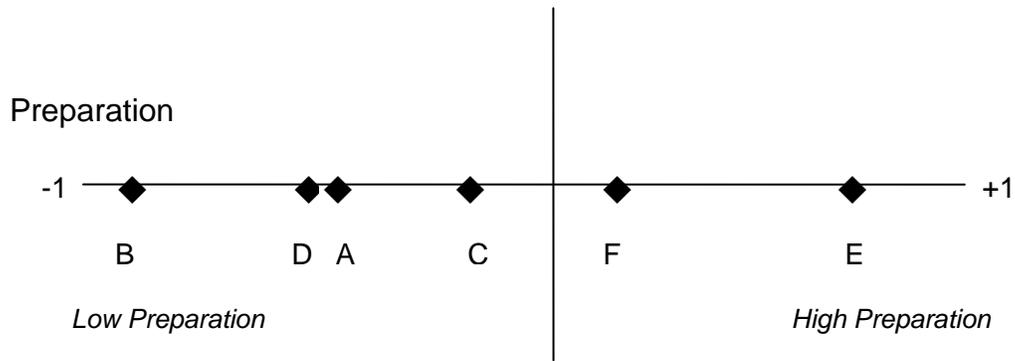


Figure 6. A graph with Preparation means plotted for each enrollment group from the first year (2002-2003) to the second year (2003-2004).

Second year attainment and persistence to the third year. An analysis of four dependent variables (ACT, first-generation status, minority status and Pell-eligibility) was conducted. Discriminant analysis was used to identify significant variables that defined differences between the Fall 2004 enrollment status of the Fall 2002 A+ cohort. The enrollment categories were: (A) “Did not persist or earn credential,” (B) “Attained 2-year credential/did not re-enroll,” (C) “Persisted 2-year to 2-year, no credential,” (D) “Attained 2-year credential, re-enrolled 2-year,” (E) “Persisted 4-year to 4-year, no credential,” and (F) “Attained 2-year credential, transferred 4-year.”

The analysis revealed that two significant discriminant functions could be constructed to discriminate between the persistence and attainment status from the second to third year. Standardized function coefficients and correlation coefficients that the ACT variable was most associated with the first function, which accounted for 19% of the variance between categories of persistence and attainment ($\Lambda=.804, \chi^2(20, N = 4,772) = 1,040, p < .01, \text{eigenvalue} = .234$). Based upon these results, the first function was labeled *Preparation*. Pell grant eligibility and first-generation status showed slight negative and

minority status showed slight positive relationships to the Preparation function. The second function was strongly negatively contributed to by Pell grant eligibility and positively contributed to by first-generation and minority status, but only accounted for less than 1% of the variance between categories of persistence and attainment ($\Lambda=.992$, $\chi^2(12, N = 5,634) = 38, p < .01$, eigenvalue = .006). Based upon these results, the second function was labeled *Risk Factors*. Preparation was slightly negatively associated with the Risk Factors function.

Group centroids were then computed to determine the degree of discrimination. Using the function structure matrix, all four variables were assembled into one rubric named “Persistence 2nd to 3rd Year” (see Table 35).

Table 35
Persistence 2nd to 3rd year

	Centroids	
	Preparation	Risk Factors
A. Did not persist or earn credential.	-.427	-.069
B. Attained 2-year credential, did not re-enroll	-.036	.057
C. Persisted 2-year to 2-year, no credential earned	-.448	.091
D. Attained 2-year credential, re-enrolled 2-year	.074	-.408
E. Persisted 4-year to 4-year, no credential earned	.621	.002
F. Attained 2-year credential, transfer 4-year	.259	.019

These results suggest that students with higher ACT scores (high preparation), but with moderate risk factors were more likely to earn a 2-year certificate or degree and transfer to a 4-year school (Group F) or start at and persist in a 4-year school (Group E). Those with moderate ACT scores, but slight risk factors were more likely to earn a 2-year certificate or degree and not re-enroll in a Missouri public institution (Group B). Those

with low ACT scores, but with slight risk factors were more likely to not earn a certificate or degree or persist (Group A). Those with low ACT scores, but with slight risk factors were more likely to still be enrolled in a 2-year school (Group C). Those with moderate ACT scores with the lowest risk factors of any group were more likely to earn a 2-year certificate or degree and re-enroll in a 2-year school (Group D). Persistence and attainment means are plotted in Figure 7.

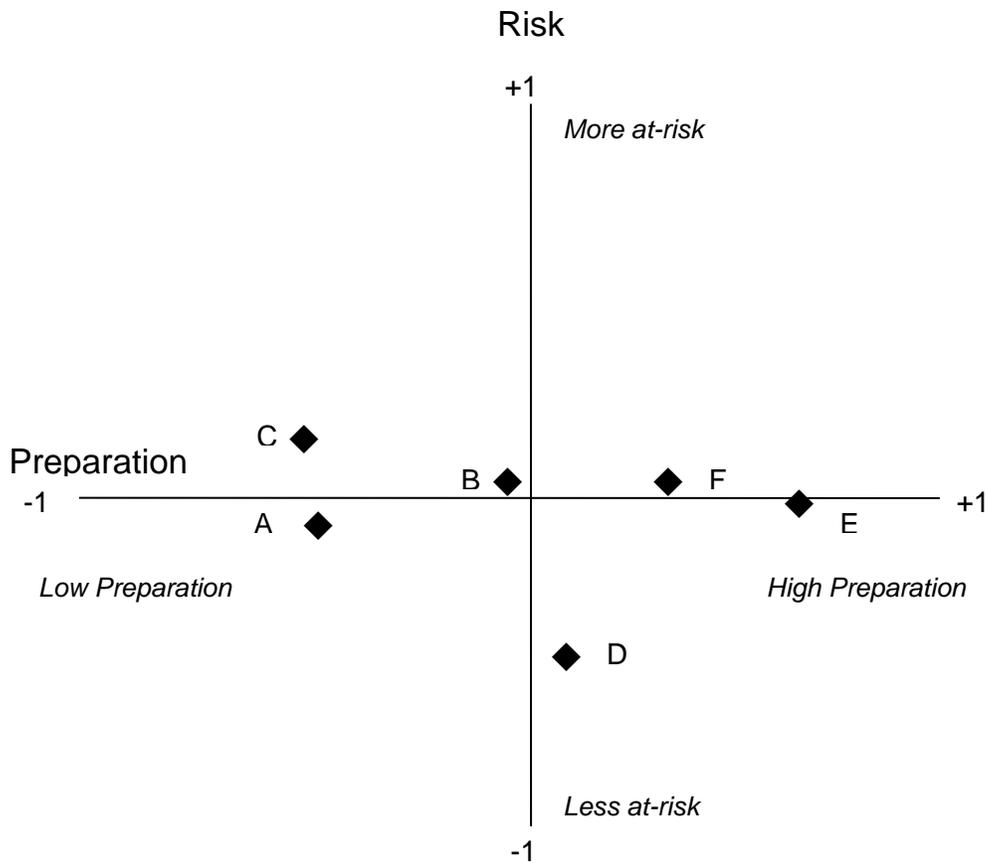


Figure 7. A graph with Preparation and Risk Factors means plotted for each enrollment group from the second year (2003-2004) to the third year (2004-2005).

Persistence from the third to the fourth year. An analysis of four dependent variables (ACT, first-generation status, minority status and Pell-eligibility) was conducted. Discriminant analysis was used to identify significant dependent variables that defined differences between the Fall 2005 enrollment status of the Fall 2002 A+ cohort. The enrollment categories were: (A) “Did not persist or earn credential,” (B) “Attained 2-year credential/did not re-enroll,” (C) “Persisted 2-year to 2-year, no

credential,” (D) “Attained 2-year credential, re-enrolled 2-year,” (E) “Persisted 4-year to 4-year, no credential,” and (F) “Attained 2-year credential, transferred 4-year.” The large group size exceeds the minimum participant-to-variable ratio of 20:1 recommended by Stevens (1996).

The analysis revealed that two significant discriminant functions could be constructed to discriminate between the persistence and attainment status from the third to fourth year. Standardized function coefficients and correlation coefficients that the ACT variable was most associated with the first function, which accounted for 19% of the variance between categories of persistence and attainment ($\Lambda=.826$, $\chi^2(20, N = 4,772) = 910$, $p < .01$, eigenvalue = .204). Based upon these results, the first function was labeled *Preparation*. Minority status showed a slight positive and first-generation status and Pell eligibility showed negative relationships to the Preparation function. The second function was strongly contributed to by first-generation status with slight positive contributions by minority status and a small negative Pell eligibility relationship, but only accounted for less than 1% of the variance between categories of persistence and attainment ($\Lambda=.994$, $\chi^2(12, N = 5,634) = 28$, $p < .01$, eigenvalue = .003).

Group centroids were then computed to determine the degree of discrimination. Using the function structure matrix, all four variables were assembled into one rubric named “Persistence 3rd to 4th Year” (see Table 36).

Table 36
Persistence 3rd to 4th year

	Centroids	
	Preparation	Risk Factors
A. Did not persist or earn credential.	-.352	-.029
B. Attained 2-year credential, did not re-enroll	-.237	.106
C. Persisted 2-year to 2-year, no credential earned	-.448	.054
D. Attained 2-year credential, re-enrolled 2-year	-.531	-.323
E. Persisted 4-year to 4-year, no credential earned	.585	-.006
F. Attained 2-year credential, transfer 4-year	-.178	.107

These results suggest that students with higher ACT scores (high preparation), but with no Pell grant eligibility and not first-generation or minority (low risk factors) were more likely to start at and persist in a 4-year school (Group E). Those with moderate ACT scores, but higher risk factors (Group B) were more likely to earn a 2-year certificate or degree and not re-enroll in a Missouri public institution or to earn a 2-year certificate or degree and transfer to a 4-year school (Group F). Those with lower ACT scores, but with lower risk factors were more likely to not earn a certificate or degree or persist (Group A). Those with lower ACT scores and higher risk factors were likely to still be enrolled in a 2-year school (Group C). Those with the lowest ACT scores and with the lowest risk factors of any group were more likely to earn a 2-year certificate or degree and re-enroll in a 2-year school (Group D). Persistence and attainment means are plotted in Figure 8.

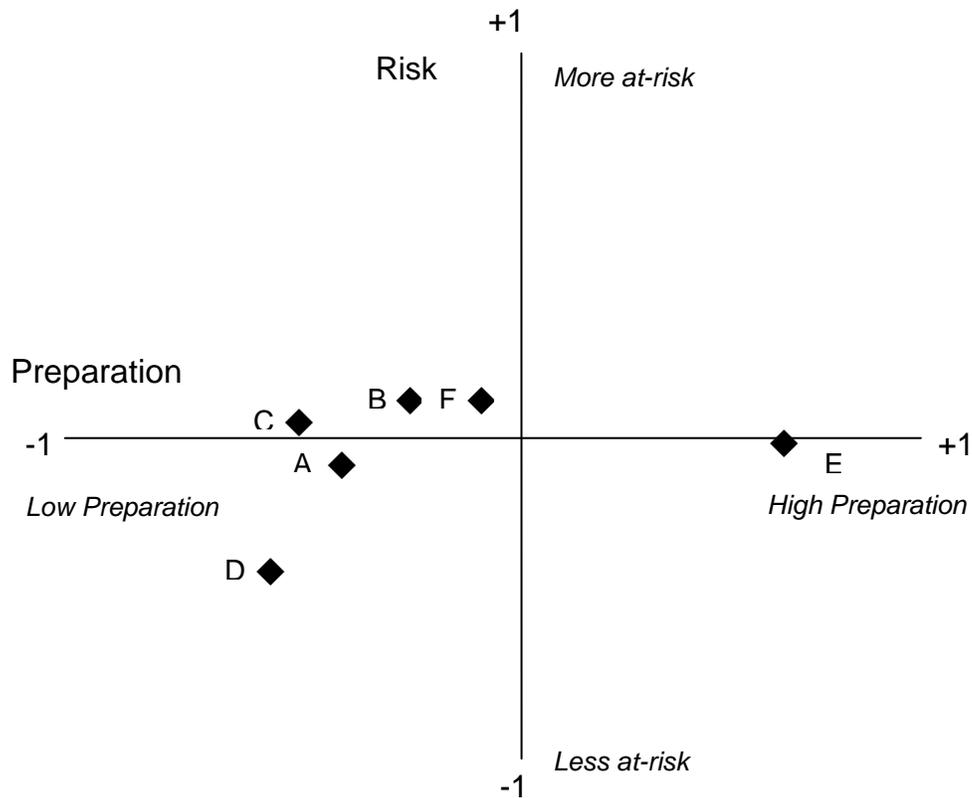


Figure 8. A graph with Preparation and Risk Factors means plotted for each enrollment group from the third year (2004-2005) to the fourth year (2005-06).

Post-secondary Persistence and Attainment Summary

The majority (81%) of the enrolled 2002 A+ cohort were seeking non-vocational credentials. About 38% of the students earned a certificate or degree in three years. Those with higher ACT scores and/or no at-risk characteristics seemed to earn credentials sooner. The percentage of those who were not Pell grant-eligible or minority earned more credentials overall. However, a slightly higher percentage of the Fall 2002 two-year first-generation students earned a certificate or degree than those who were not first-generation. First-generation students transferred to four-year institutions upon earning a certificate or degree or exhausting their A+ eligibility at slightly higher rates

than students who were not first-generation. Students who were not eligible for a Pell grant and White students transferred to four-year institutions upon earning a certificate or degree or exhausting their A+ eligibility at slightly higher rates than those who were eligible for a Pell grant and minority students. Students with higher ACT scores seemed more likely to transfer to four-year institutions after earning a certificate or degree. While academic preparation seemed to consistently drive student retention, ACT seemed to account for only about 20% of the variance in enrollment categories.

Results Summary

This chapter presented the results of descriptive statistics and quantitative analyses conducted to track the post-secondary enrollment patterns of the Missouri 2002 A+ Schools Program cohort from AY 2002-03 to AY 2005-06. The analyses were guided by the research questions and hypotheses. Distinctions and comparisons were made based upon the student demographic characteristics of Pell grant-eligibility status, first-generation status, and/or minority status between those who enrolled and those who did not enroll in a Missouri public post-secondary institution and also between those who began at a Missouri public two-year institution and those who began at a Missouri public four-year institution. The analyses results were presented in three broad categories: (1) post-secondary participation, (2) academic achievement, (3) persistence and attainment. A student's ACT score was found to be significantly related to initial enrollment institution type, persistence, and certificate or degree attainment. Additionally, minority students seemed most at risk for losing eligibility for the A+ post-secondary financial incentive. First-generation students achieved slightly higher GPAs, attained slightly higher percentages of certificates and degrees, and transferred to four-year institutions in

slightly higher percentages than students who were not first-generation. However, no other clear and consistent enrollment patterns based upon student demographic characteristics emerged from the analyses.

A discussion of the results, conclusions, and recommendations will follow in Chapter 5.

CHAPTER FIVE

Discussion of Results

This chapter will discuss the implications of the cohort analysis results found in chapter four. These will be presented in order of the hypotheses and in the context of previous literature. Next, implications for theory and practice will be discussed. Finally, limitations of the study and suggestions for future research will be presented.

This cohort study tracked the 2002 Missouri A+ Schools Program cohort's post-secondary experience from AY 2002-03 through 2005-06. The study was grounded in post-secondary access and enrollment pattern literature and previous studies pertaining to the outcomes of large, statewide merit-based scholarship programs. Particular emphasis was placed on the influence of student demographic characteristics upon post-secondary enrollment patterns.

One of the Missouri A+ Schools Program's goals is to "open new doors to higher education" (A+ Fact Sheet, 2006) which is supported with a post-secondary financial incentive from the State of Missouri that pays tuition and related costs for qualified students at eligible Missouri public post-secondary two-year institutions. Using data collected by the Missouri Department of Higher Education and guided by the research questions and hypotheses, descriptive analyses, analyses of covariance, chi-square analyses, and discriminant function analyses resulted in snapshots of A+ students' post-secondary participation, achievement, persistence and attainment within the Missouri public post-secondary system. Comparisons were made between and among student demographic populations, including low-income, first-generation, and minority students,

who attended two- and four-year Missouri public post-secondary institutions. The results are presented in three broad categories: (1) post-secondary participation, (2) academic achievement, (3) persistence and attainment.

Post-secondary Participation

There were almost 8,000 students in the Missouri A+ class of 2002 and over 70% enrolled in a Missouri public post-secondary institution in the Fall 2002 term. This section will interpret and discuss the results of demographic and academic analyses focused on describing and comparing students who did not enroll, students who enrolled in two-year institutions, and students who enrolled in four-year institutions.

Models that predicted participation in the Missouri public post-secondary system based upon ACT and demographic were mixed. Those students who did not enroll for the Fall 2002 term were plotted toward the median on the ACT dimension, but demonstrated more at-risk factors than students who enrolled. These students appeared qualified to participate in post-secondary education, so it is possible that they enrolled in private, proprietary, or out-of-state institutions.

No clear demographic enrollment patterns emerged from the analysis among those who enrolled in the first fall term after high school graduation. The majority of the A+ students who pursued post-secondary education in the Missouri public system did so at a two-year institution. Of those, most were not Pell grant-eligible. This finding aligns with research by the American Council for Education (2004), which found that middle-income students “were more heavily concentrated in community colleges at the end of the 1990s than they were at the beginning” (p. 4). The ACE report posited that middle income families likely do not qualify for financial aid, but struggle to afford higher

education and are increasingly enrolling in two-year institutions where tuition and costs are generally lower. Accordingly, the A+ incentive may be influencing middle-income students' enrollment at two-year schools because it is a funding source and because costs are generally lower.

Other results of the demographic analyses in this study were mixed. If students were categorized by only a single demographic descriptor and measured in percentage terms, first-generation students and Pell-eligible students were more likely than non-first-generation and non-Pell-eligible students to enroll in a two-year institution. In contrast, minority students and White students enrolled in a two-year institution in equal proportions. Observations based upon single demographic descriptors were insufficient as many students belonged to multiple at-risk demographic categories. When analyzed between and among multiple demographic categorical groups, the results varied. For example, students who were both minority and first-generation were more likely to enroll in a two-year school if they were not eligible for a Pell grant. Students who were both White and non-first-generation were more likely to enroll in a four-year school regardless of Pell grant-eligibility. Those who were first-generation and low-income were more likely to enroll in a two-year school than those who were first-generation but not Pell grant-eligible.

Mixed demographic results suggest that intervening factors beyond the scope of this research were at play. For instance, the results of analyses and comparisons between those in the 2002 A+ cohort who enrolled in the Fall 2002 term with those who did not were perplexing. Participating in the A+ program, taking the ACT test, and completing a FAFSA usually signal a student's intent to enroll in college. Most of the students who did

not enroll had completed a FAFSA, which is required for A+-eligibility, and many had ACT scores on file. In terms of academic qualifications, these students were quite similar to the students who enrolled in two-year institutions. However, the high percentage of students eligible for a Pell grant and comparatively low EFC figures for this population were striking. As indicated by EFC, 11% had a very high financial need, compared to only 7% of those who enrolled. The absence of information regarding the race of most of these students indicates that many did not enroll in a Missouri public institution during the three years following high school graduation as data on race are submitted to the MDHE by post-secondary institutions and housed in EMSAS, so would have appeared in the query if known. The A+ incentive is reduced dollar-for-dollar by Pell grant funds, so low-income students who qualify for a Pell grant may not be particularly advantaged by the A+ incentive. These findings suggest that low family income continues to impede post-secondary participation for some A+-eligible students.

Another possible set of factors is related to where students live. Because students could only use their A+ incentive for tuition and related costs at a qualified two-year institution, geography and distance from a qualified degree-granting institution could negate the promise of free tuition, especially if commuting was not a viable option or financial limitations prohibited a student from living on or near campus. In some rural areas of the state, A+ students live more than two hours from a qualified two-year institution that offers a degree or credentials beyond a program certificate. Frequency distributions indicated that about half the students who did enroll in a two-year institution lived within the school's taxing district. This finding held true regardless of the type of certificate or degree sought. Another 20% of those who enrolled in a two-year institution

were out-of-district students. However, the EMSAS “in-district” designation may be misleading. Some rural community college taxing districts are defined quite narrowly, but their service region is much broader. Therefore, students who are categorized as out-of-district may still live quite near their institution of enrollment. Student identifiers in the data set were blinded, so it is not known how many of those who enrolled in a four-year school or those who did not enroll found distance to a qualified two-year degree-granting institution problematic.

Far clearer than the demographic analysis was the finding that a student’s ACT score seems related to institution of initial enrollment. Overall, students with lower ACT scores tended to enroll in two-year institutions and students with higher ACT scores tended to enroll at four-year institutions. These observations extend to minority students, as well. While minority students’ ACT scores were generally lower than White students’ ACT scores, minority students with higher ACT scores also tended to enroll in four-year institutions.

Frequency distribution analysis on ACT scores showed a sharp increase in ACT scores of 21 and above for students enrolling at four-year schools. An ACT composite score of 21 grants automatic admission to Missouri’s moderately-selective four-year public institutions (MDHE, n.d.). Increases are also noted at or in close proximity to scores that guarantee admission for other levels of institutional selectivity at Missouri public four-year institutions (MDHE). This finding suggests that most A+ students enroll at the type of institution where they may have the best chance for success.

The ACT analysis results in this study contrasted with findings of New Mexico’s statewide merit scholarship which seemed to result in poorer student-institution matches

(Binder & Ganderton, 2002). In New Mexico, students can use their merit scholarship at any public New Mexico institution if they meet institutional admissions requirements. It seemed that many New Mexico students without sufficient pre-college preparation were utilizing the state scholarship to upgrade to four-year institutions. In contrast, Missouri A+ students seem to make more appropriate student-institution matches. Students with higher ACT scores appeared qualified to enroll in and drawn to four-year institutions, which could be the influence of other merit scholarships that reward their ACT achievement. Additionally, at least 14 Missouri four-year institutions have developed locally-funded “A+ scholarships” (Glendale High School, n.d.) that are awarded to A+-qualified students in order to draw high achieving A+ students away from two-year schools.

The mixed results of the demographic analyses and the influence of ACT score on institution type are consistent with Lee’s (2003), Barbis’s (2003), and the Missouri Department of Higher Education’s (MDHE, 2006) research on the A+ Schools Program post-secondary participation patterns and rates. Lee’s research found that the A+ benefits were primarily extended to those who were not low-income or minority, but also not particularly academically high-achieving. These could be students who were planning to attend college, but did not meet the four-year admissions criteria and/or were not eligible for other substantial academic scholarships or Pell grants. The MDHE also found that A+ students with higher ACT scores tended to enroll in four-year institutions. Finally, Barbis expressed concern about student residency and costs associated with travel negatively influencing students’ ability to attend a qualified two-year institution.

The low number of A+-eligible minority students who enrolled for the Fall 2002 term suggests that minority students are being screened out of the A+ program at some point prior to the post-secondary experience. However, missing racial descriptors of students who did not enroll and the absence of comparative demographic data on non-A+ students prevents further analysis on post-secondary participation gaps related to race. Minority student achievement, persistence, and attainment will be discussed in later sections.

With regard to overall post-secondary participation, the majority of the 2002 A+ students enrolled in a Missouri public post-secondary institution. The majority of those students attended a two-year institution. Those who did not enroll demonstrated more at-risk characteristics. However, results of demographic analyses regarding institutional choice for those who enrolled were mixed. For those who enrolled, ACT score was a stronger indicator of institutional choice than students' demographic characteristics.

Academic Achievement

Academic achievement was analyzed by describing end-of-term data such as hours and grades earned. Particular attention was paid to earning sufficient grades to maintain A+ incentive eligibility.

Minority students and Pell grant-eligible students were most at-risk of earning insufficient grades. Students must maintain a 2.50 cumulative GPA to remain eligible for the A+ incentive. More minority students and Pell grant-eligible students earned cumulative GPAs below 2.50 throughout the study period. This finding suggests that many minority students lost their A+ incentive, some after only one term. This result is consistent with findings from previous studies on the Georgia HOPE scholarship where

the GPA requirement is a 3.0 (Dynarski, 2002). Dynarski found that minority students were more likely than non-minority students to lose the HOPE scholarship because of GPA. However, research on other statewide merit scholarships has found positive achievement and scholarship retention results for minority students when the GPA requirement is lower (Dynarski, 2004). The A+ incentive requires a lower GPA (2.50) than the HOPE scholarship (3.0), yet minority students seem most at risk. Accordingly, the minority student GPA findings from this study seem out of alignment with previous research. Additionally, it was noted that students who were Pell grant-eligible were significantly more likely to earn a cumulative GPA below 2.50 early in the study period than students who were not eligible for a Pell grant. This finding parallels research on other statewide merit aid programs where higher income students typically achieve higher GPAs (Binder & Ganderton, 2004; Dynarski, 2004).

A positive finding was that first-generation students achieved academically at very similar and sometimes higher rates than their non-first-generation counterparts. This finding suggests that first-generation A+ students may be better aware of and prepared for post-secondary education than first-generation students in other studies (Chen, 2005; Choy, 2001; Pascarella, et al., 2004).

Comparing two-year students' with four-year students' enrollment behaviors and experiences yielded interesting observations. Overall, during the Fall 2002 term, two-year students enrolled in fewer term credit hours and more remedial hours, earned lower term and cumulative GPAs, and earned fewer cumulative and transfer credit hours than students enrolled at four-year institutions. The lower number of credit hours that two-year students enrolled in parallels findings from Cornwell, Lee, and Mustard's 2002 study on

HOPE scholarship recipients' academic choices. That study found that HOPE students who were concerned about losing scholarship eligibility enrolled in fewer courses, withdrew from more courses to avoid earning a low grade, and diverted credit hours to summer sessions where grades are often higher.

Findings about the number of students enrolled in remedial hours and the number of remedial hours taken at both two- and four-year schools were unexpected. As the A+ Program's primary purpose was high school curriculum improvement, large numbers of students needing remediation were somewhat surprising. However, a study by the MDHE (2006) that compared remedial course-taking behaviors of A+ students with non-A+ students concluded that A+ students still take fewer remedial courses than non-A+ students.

Persistence and Attainment

Persistence and attainment analyses studied A+ students' re-enrollment in academic terms subsequent to Fall 2002 and the certificate or degree or degree attainment of the Fall 2002 A+ cohort. There is some natural overlap in the analyses.

The primary persistence finding was that term and cumulative GPAs and credit hours earned seem to influence re-enrollment behaviors and demographic characteristics accounted for little of the variance in enrollment patterns. As discussed in the previous section, cumulative GPA is important to continued A+ eligibility and was found to negatively affect minority students throughout the study period. While the persistence analyses indicated that in succeeding academic years cumulative GPA becomes increasingly less significant, minority students remained at-risk in terms of meeting the A+ incentive GPA requirements. However, this finding also suggests that students who

were at-risk of losing their A+ incentive rebound academically or were no longer enrolled during subsequent academic terms.

Examination of those who did not re-enroll for the second term (Winter 2003) supported the suggestion that students considered at-risk on GPA indicators do not re-enroll. Students who did not persist into their second term had enrolled in and earned fewer credit hours during the Fall 2002 term and earned poorer grades. In particular, their cumulative GPA was considerably lower than the required 2.50 required for continued eligibility. When these students were compared to the remaining Fall 2002 cohort, there were marked differences in ACT score and EFC. Both indicators were lower than the Fall 2002 cohort and of the students who did not enroll for the Fall 2002 term. Additionally, findings from analyses that predicted second term enrollment suggested that a student's ACT composite score was a stronger predictor for second term persistence than a student's demographic characteristics.

Analyses that investigated persistence over a multi-year period found that nearly 45% of the Fall 2002 two-year students were no longer enrolled in a Missouri public post-secondary institution in AY 2005-06. When aligned with earned two-year credentials and upward transfer behaviors, many students remain unaccounted for. However, a 2006 MDHE study noted that labor market conditions improved during this time period and it was posited that A+ students might have entered the workforce having earned stronger educational credentials. Additionally, tuition rates were rising throughout this period. Some students may have felt priced out of the higher education market regardless of A+ or other financial support.

The results of predictive persistence analyses that included students' ACT score and demographic characteristics consistently found that ACT score was a strong factor in student persistence and attainment. Overall, those with higher ACT scores persisted in the Missouri public post-secondary system at higher rates. Those with the highest ACT scores were most likely to enroll initially in a four-year institution or to transfer to a four-year institution from a two-year institution regardless of demographic characteristics or certificate or degree attainment. Those with the lowest ACT scores either did not persist or earned a certificate or degree and did not re-enroll in the Missouri public post-secondary system. Those with lower ACT scores and higher risk scores who had not earned a certificate or degree were more likely to remain enrolled in two-year institutions after exhaustion of the A+ incentive. In contrast, those with lower risk scores, especially those who were not first generation, who had lower or moderate ACT scores, were more likely to earn a certificate or degree and re-enroll in a two-year institution.

Demographic analyses showed that a large majority of students who were still enrolled after three years were not eligible for a Pell grant. This finding suggests that low-income students' ability to pay continued to affect their post-secondary persistence and attainment, which corresponds to Henry, Rubenstein, and Bugler's (2004) findings that the benefits of the HOPE scholarship only accrue to those students who remain eligible. Because students are no longer eligible for the A+ incentive after three years, they must identify and utilize other financial resources to persist in the post-secondary system.

Persistence analyses included observations regarding degree-seeking behaviors. A large majority of Fall 2002 two-year students were seeking A.A. or unspecified

associate's degrees, which are usually considered to be transfer preparation credentials (Townsend & Dever, 1999; Townsend & Wilson, 2006b) and the rest were seeking A.S., A.A.S., or other vocational credentials. Most four-year students were seeking bachelor's degrees.

As expected, students who enrolled in a two-year institution in the Fall 2002 began to transition from two-year certificate- or degree-seeking status to bachelor's degree seeking status as they persisted in the post-secondary system. However, the percentage of students originally enrolled in four-year institutions and seeking bachelor's degrees began to decrease slightly and percentages of students seeking associate degree or certificate credentials began to increase slightly. These changes could signal "reverse-transfer" (Borden, 2004, Townsend & Dever, 1999) behaviors, which are described as four-year students transferring to two-year schools, or "swirling" (Borden, 2004) enrollment behaviors where students move back and forth between different kinds of institutions. Additionally, these dates correspond with dramatic tuition increases statewide (Losing Ground, 2003). These reverse-transfer or swirling enrollment behaviors could be observations of students who waived their A+ incentive during the Fall 2002 term by enrolling in a four-year institution and then, in response to tuition increases, enrolled at a qualified two-year in subsequent terms in order to utilize their A+ incentive.

As noted previously, there is some overlap between the persistence analyses and the attainment analyses. The attainment analyses revealed that 38% of the Fall 2002 two-year students earned a certificate or degree within three years. For context, the MDHE (2006) found that less than 20% of the 2002 non-A+ students earned a certificate or

degree during the same period. In comparison to the MDHE study, considerably more A+ students earned a certificate or degree than non-A+ students.

While there was no significant relationship between membership in an at-risk population and completing a certificate or degree, lower percentages of minority students and Pell grant-eligible students than White students and non-Pell grant-eligible students earned a certificate or degree. Again, higher percentages of first-generation students earned certificates or degrees than non-first-generation students. It was also noted that students with higher ACT scores and cumulative GPAs earned certificates or degrees sooner. About half the students who earned a certificate or degree enrolled again during a subsequent term. However, the results suggest that the longer it takes students to complete a two-year certificate or degree, the less likely they are to enroll again the following year. With regard to types of degrees earned, most two-year students were enrolled in transfer-oriented academic programs. Less than 20% of the total certificates and degrees awarded during AY 2003-04 and 2004-05 were in technical areas.

Overall, most of those who earned certificates or degrees through AY 2004-05 were not minority, Pell-eligible, or first-generation students. An even bigger percentage were not minority or Pell-eligible. While these populations represented greater proportions of those who enrolled in the Fall 2002 term, they earned certificates and degrees in even greater proportions. This observation suggests that minority status and low family income negatively affect persistence toward degree.

Transfer behavior. Because the A+ incentive stipulates enrollment at a qualified two-year institution, those students who desire to use both the incentive and earn a

baccalaureate degree will incur a transfer experience from a two-year to a four-year institution. Additionally, transfer behaviors are indicators of enrollment patterns.

About 17% of the students who earned degrees at two-year schools and 2% who earned degrees from four-year schools were still enrolled in the Missouri public post-secondary system in AY 2005-06, most of them at a four-year school. Another 9% had transferred from a two-year to a four-year by AY 2005-06 without completing a formal academic award. The A+ transfer rates are consistent with research that places national transfer rates between 14-25% depending upon the research design (Bingham-Newman & Hopkins, 2004, Townsend, 2002).

Slightly lower percentages of Pell grant-eligible students and minority students transferred to a four-year institution than students who were not eligible for a Pell grant and White students. However, a slightly higher percentage of first-generation students transferred to a four-year institution.

Students who transferred from a two-year to a four-year institution after attaining a certificate or degree had higher EFCs than those who re-enrolled in two-year institution. This could indicate that students from higher incomes are more likely to continue their post-secondary education through the pursuit of a four-year degree. These findings align with Pascarella and Terenzini's 2005 observation that those who transfer from a two- to four-year institution are more likely to be of higher income and academic ability, of more traditional college age, and non-minority.

There is little difference between ACT scores of those who earned a certificate or degree in AY 2003-04 and then enrolled in a two-year, a four-year, or did not enroll in AY 2004-05 and AY 2005-06. However, those who transferred to a four-year institution

after earning a certificate or degree in AY 2003-04 had slightly higher ACT scores and higher EFCs. Those enrolled in a two-year school after earning a certificate or degree had lower ACT scores and lower EFCs. As was exhibited during their first term, this observation could represent students self-selecting into institutions perceived as having the level of appropriate rigor for them with an additional influence of rising tuition rates. Because students' A+ incentive was no longer available and because two-year tuition is generally lower, lower-income students may have felt priced out of the four-year market.

Those with moderate ACT scores and lower risk scores were more likely to enroll again at two-year institutions following certificate or degree attainment. These results were unexpected. These could be students who earned an A.A. or other non-vocational degree. With lower preparation scores and no vocational credentials, they may have been concerned about meeting the rigor of a four-year institution, so returned to a two-year to work toward vocational credentials. They might also be students who completed one tier of a vocational program and returned to complete an additional tier of similar training (ex. LPN to an associate's in nursing.)

Additionally, there is evidence that some of the students who earned a vocational certificate were proceeding with additional coursework at two- and four-year institutions, which was also noted in the 2006 MDHE study. About 17% of those who earned an A.S. or A.A.S. and a few students with vocational certificates transferred to a four-year institution. These observations align with research that suggests students are increasingly expecting to utilize applied or vocational credentials as transfer credentials (Dunn, 2004; Farmer & Frederickson, 1999; Townsend, 2001; Townsend & Wilson, 2006b).

Major Findings

Based upon the previous discussion of the results, this study has twelve key findings related to the research questions and hypotheses. Additionally, four related findings will be discussed following the hypothesis results.

Research Question 1 and hypotheses 1 through 3 addressed A+ students' participation in the Missouri public post-secondary system. The hypotheses stated that more Pell grant-eligible, first-generation, and minority students would enroll in a Missouri public two-year institution than their non-Pell grant-eligible, non-first-generation, and White student counterparts.

Finding 1: A higher proportion of A+-eligible students from the 2002 A+ cohort who were not eligible for a Pell grant enrolled than students who were eligible for a Pell grant in a Missouri public two-year institution. Hypothesis 1 was not supported. Additionally, A+-eligible students who did not enroll in the first fall term after high school graduation had more financial need than those who did enroll suggesting that family income continues to impede post-secondary participation

Finding 2: A higher proportion of A+-eligible students from the 2002 A+ cohort who were not first-generation than first-generation students enrolled in a Missouri public two-year institution. Hypothesis 2 was not supported.

Finding 3: A higher proportion of White students than minority students from the 2002 A+ cohort enrolled in a Missouri public two-year institution. Hypothesis 3 was not supported.

Research Question 2 and hypotheses 4, 5, and 6 addressed post-secondary performance. The hypotheses stated that Missouri 2002 A+-eligible graduates who were

not Pell grant-eligible, first-generation, or minority would be more likely than their Pell grant-eligible, first-generation, or minority counterparts to earn sufficient grades to maintain eligibility at a Missouri public two-year institution.

Finding 4: Significantly higher proportions of the fall 2002 students enrolled in a Missouri public two-year institution who were not Pell grant-eligible earned sufficient grades to maintain A+ eligibility at a Missouri public two-year institution than students who were Pell grant-eligible. However, comparisons between students based upon Pell grant eligibility became increasingly less significant throughout the study period.

Hypothesis 4 was generally supported.

Finding 5: First-generation status seemed to have little or no effect upon earning sufficient grades to maintain A+ eligibility at a Missouri public two-year institution. This was a very encouraging finding. Hypothesis 5 was not supported.

Finding 6: Significantly higher proportions of the White students who were enrolled in a Missouri public two-year institution in the fall 2002 earned sufficient grades to maintain A+ eligibility at a Missouri public two-year institution than minority students. Hypothesis 6 was supported. Additionally, when compared to White students who earned credentials in proportionately higher percentages to beginning cohort numbers, minority students earned proportionately fewer credentials and took longer to earn them. However, while minority students seemed consistently at-risk for losing A+-eligibility, they largely seemed to exhibit similar enrollment behaviors as White students.

Research Question 2 and hypotheses 7, 8, and 9 addressed post-secondary credential attainment. The hypotheses stated that Missouri 2002 A+-eligible graduates who were not Pell grant-eligible, not first-generation, or White would be more likely than

their Pell grant-eligible, first-generation, or minority counterparts to earn a certificate or degree from a Missouri public two-year institution.

Finding 7: Slightly higher proportions of the fall 2002 students enrolled in a Missouri public two-year institution who were not Pell grant-eligible earned certificates or degrees at a Missouri public two-year institution than students who were Pell grant-eligible. Hypothesis 7 was generally supported.

Finding 8: Slightly higher proportions of the fall 2002 first-generation students enrolled in a Missouri public two-year institution earned certificates or degrees at a Missouri public two-year institution than students who were not first-generation. Hypothesis 8 was not supported.

Finding 9: Significantly higher proportions of the fall 2002 White students enrolled in a Missouri public two-year institution earned certificates or degrees at a Missouri public two-year institution than minority students. Hypothesis 9 was supported.

Research Question 2 and hypotheses 10, 11, and 12 addressed student transfer from two-year to four-year Missouri public institutions. The hypotheses stated that Missouri 2002 A+-eligible graduates who were not Pell grant-eligible, first-generation, or minority would be more likely than their Pell grant-eligible, first-generation, or minority counterparts to transfer to a Missouri public four-year institution after earning a certificate or degree from a Missouri public two-year institution or exhausting their A+ incentive.

Finding 10: Slightly higher proportions of the fall 2002 students enrolled in a Missouri public two-year institution who were not Pell grant-eligible transferred to a Missouri public four-year institution after earning a certificate or degree from a Missouri

public two-year institution or exhausting their A+ incentive than students who were Pell grant-eligible. Hypothesis 10 was generally supported.

Finding 11: Slightly higher proportions of the fall 2002 first-generation students enrolled in a Missouri public two-year transferred to a Missouri public four-year institution after earning a certificate or degree from a Missouri public two-year institution or exhausting their A+ incentive than students who were not first-generation. Hypothesis 11 was not supported

Finding 12: Slightly higher proportions of the fall 2002 White students enrolled in a Missouri public two-year institution transferred to a Missouri public four-year institution after earning a certificate or degree from a Missouri public two-year institution or exhausting their A+ incentive than minority students. Hypothesis 12 was generally supported.

Additional findings related to transfer behavior were also noted. First, students who earned a two-year certificate or degree within two years of starting their post-secondary experience were more likely to transfer to a four-year institution upon attainment. Second, at the conclusion of the A+ incentive eligibility period (six academic terms after high school graduation), students who had persisted in the two-year post-secondary system for three years exhibited distinct fourth-year enrollment behaviors: (a) those with the lowest ACT scores and slightly higher risk factors who had not earned a certificate or degree were likely to continue enrollment in a two-year school, (b) students with the highest two-year ACT scores and slightly higher risk factors who had earned a certificate or degree were likely to transfer to a four-year institution, and (c) students with lower ACT scores and the lowest risk factors who had earned a certificate or degree were

likely to re-enroll in a two-year institution. Third, some students who earned vocational and applied credentials did transfer to four-year schools. Those holding applied associate degrees were more likely to transfer than those holding vocational certificates. Fourth, the percentage of A+ students who transferred to four-year institutions with or without two-year credentials aligned with national transfer rates.

Conclusions

Conclusion 1. The primary analytical observation of this cohort analysis supports the notion articulated in Chapter One that Missouri's A+ Schools Program's post-secondary incentive has the unintended effect of primarily subsidizing the post-secondary education of students who may already have had the financial means to enroll and persist in college. This observation is based upon the comparatively low numbers of low-income and minority students in the 2002 A+ cohort and the low percentage of low-income and minority students still enrolled in AY 2005-06. While low-income and minority students accounted for comparatively few of the 2002 A+ cohort, they persisted in even lower proportions. The beginning enrolled cohort was quite homogenous with regard to race and family income. Minority students and low-income students seemed most at-risk for losing eligibility for the A+ financial incentive and possibly other forms of financial aid and/or continued post-secondary enrollment. As these students dropped out of the enrollment analyses, the continuing cohort became increasingly homogenous and analyses based upon demographic characteristics became increasingly less significant.

Conclusion 2. The A+ incentive did seem to influence A+ student flow toward two-year institutions. However, that flow was also strongly affected by ACT scores. A+ students who enrolled in two-year schools had lower ACT scores and family incomes

overall. The two-year attendees demographically appeared overall to be those who intended to enroll in college, but would not necessarily have been eligible to enroll in selective four-year institutions or be eligible for substantial academic scholarships. Those who enrolled in four-year schools had higher ACT scores that seemed to correspond with admissions requirements at four-year schools. Four-year students generally had higher mean family incomes, but there was more variance in those incomes, suggesting that those with lower family incomes might have earned other academic scholarships and/or utilized Pell grant funds that made a four-year institution more affordable. However, student flow toward two-year institutions may also be a reflection of higher nationwide two-year enrollment rates throughout the 1990s noted in the 2004 American Council on Education report.

Conclusion 3. The A+ Schools Program may have improved the post-secondary participation and persistence experiences of first-generation students. This is likely because of A+ programs in high schools that communicate the importance of post-secondary education, ensure enrollment in appropriate high school courses, and share information about the post-secondary process with students and families in addition to the availability of the A+ financial incentive.

Conclusion 4. The ACT analysis results may mitigate concerns regarding the diversion of qualified students from four-year to two-year institutions as this cohort appeared to be making enrollment decisions largely based upon academic preparation. This finding also suggests that efforts by policymakers to more evenly distribute students throughout the Missouri public post-secondary system may be becoming realized as the

results also suggested that students with higher ACT scores were more likely to transfer to four-year institutions.

5. Without a comparative cohort of non-A+ students that includes demographic and ACT information, it is not known if the A+ incentive is improving post-secondary access for low-income, first-generation, and minority student populations.

Theoretical Implications

Statewide merit aid scholarship programs are intended to improve post-secondary access for students who have demonstrated some level of academic achievement in high school. These merit aid programs provide substantial financial support, regardless of family income, for post-secondary experiences provided that recipients enroll in an in-state institution and meet the academic achievement standards established by the program. The Missouri A+ Schools Program financial incentive parallels other statewide merit aid programs in that it rewards participating students for academic achievement if they attend in-state post-secondary institutions and is not restricted to financially needy students. However, the A+ Program has three distinct characteristics that are not observed in other states' programs: (1) the program's locus of improvement was at the secondary level, (2) students must meet program eligibility requirement while in high school and must graduate from an eligible high school, and (3) students may only utilize their A+ incentive at a qualified, in-state, two-year public institution. Most other states' programs award merit aid scholarships to any in-state high school graduate who meets high school GPA requirements and allow students to use the award at most in-state institutions. Accordingly, this study extends the research base on the post-secondary access component of statewide merit aid programs. This study analyzes the post-secondary

enrollment patterns of students participating in Missouri's program, which has unique participation requirements that are related more to institutional qualities, such as qualified high schools and eligible two-year post-secondary schools, than student qualities, such as academic or demographic characteristics.

Previous research on the A+ Program found that the majority of students who qualify for the A+ incentive are White middle-to upper-income students who probably would have attended college regardless of the A+ incentive (Lee, 2003). That finding held for this study, as well. There were comparatively few A+-eligible minorities in the enrolled 2002 cohort and only about 30% of the enrolled cohort was eligible for a Pell grant. These findings parallel previous research that has suggested that statewide merit aid programs act largely as a tuition subsidy for students who would have attended college anyway rather than as incentives to encourage students to attend college (Binder & Ganderton, 2002; Cornwell, Mustard, & Sridhar, 2003; Dynarski, 2002, 2004; Heller, 2002, 2004, 2005; Marin, 2002; Stranahan & Borg, 2004).

Research on other state programs has also found that low-income and minority students appear at a disadvantage because the eligibility criteria are often based upon academic achievement measures that are known to discriminate against those populations (Dynarski, 2002; Heller, 2005; Marin, 2002). The results of this study are less clear. It is not known whether there were fewer minority and low-income students in the cohort because they did not attend A+-eligible high schools or because they attended an A+ high school, but did not meet the eligibility requirements.

Comparisons between eligible students who enrolled and those who did not enroll suggested that the A+ financial incentive is not enough to overcome low family income

for some students. Because racial identifiers were missing on so many of the students who did not enroll, it is not known how many of them would have been considered both minority and low-income, which, based upon HOPE scholarship studies (Dynarski, 2002, 2004) and previous research on minorities in college (Nevarez, 2001; Pascarella & Terenzini, 1991; Tinto, 1993; Turner, 2004), would have a substantive impact on post-secondary participation.

As research on other statewide merit aid programs has found, the A+ incentive did seem to affect Missouri post-secondary enrollment patterns as A+ student flow was directed to two-year public institutions (Binder & Ganderton, 2002; Cornwell & Mustard, 2002; Cornwell, Mustard, & Sridhar, 2003; Dynarski, 2002, 2004; Heller, 2002). However, the absence of a comparative cohort of students with similar academic and demographic characteristics who were not eligible for an A+ incentive limits the findings about overall impact on post-secondary enrollment patterns.

Overall, the results suggest that the academic achievement of those who enrolled was affected most by ACT score, family income, and minority status. The ACT findings are supported by research from the American Council on Education (ACE, 2004) where it was noted that community colleges typically enroll those with lesser academic preparation. Based upon cumulative GPA, minority students were at-risk of becoming ineligible for continuance of the A+ funding. This finding parallels HOPE scholarship studies where the GPA requirement is 3.0 (Dynarski, 2002), but contradicts studies on merit scholarships with lower GPA requirements (Dynarski, 2004). Students who did not persist into the second term had lower family incomes and lower ACT scores. ACT score frequency distributions indicated that low income students overall generally had lower

ACT scores. This finding aligns with previous research on low-income students (McDonough, 2004; Nevarez, 2001; Scheurich & Imber, 1991; Terenzini, Cabrera, & Bernal, 2001).

Researchers have found that African American and Hispanic students are much more at-risk than other minority populations with regard to post-secondary participation and attainment (Hu & St. John, 2001; Kurlaender & Flores, 2005; Nevarez, 2001; Turner, 2004). In large part, barriers to post-secondary participation and attainment for minority students seem to result from inadequate academic preparation (Camera & Schmidt, 1999; Heller, 2005; Sacks, 1997, Tinto, 1993). As this research found that minority students are consistently at-risk for losing eligibility, yet largely seem to exhibit similar enrollment behaviors as non-minority students, it could be that the strengthened A+ high school curricula is making a positive difference in the experiences of minorities who are able to retain their A+ incentive-eligibility. Previous research has noted that students who attend high schools with adequate curricula and who enroll in rigorous high school coursework can better overcome other barriers to post-secondary participation and achievement (Adelman, 1999). This research could be especially instructive if A+ minorities could be matched with similar non-A+ minorities.

First-generation status seemed to have very little impact in any of the analyses unless it was paired with low-income and/or minority status with one exception. In most analyses, first-generation students' experiences paralleled those who were of the same income status, but not first-generation. However, first-generation students' persistence from the third to fourth year was different than students who were not first-generation. First-generation students with lower ACT scores enrolled in two-year schools seemed

more likely to earn a two-year certificate or degree and then not re-enroll. Students who were not first-generation with lower ACT scores seemed more likely to re-enroll in a two-year school during their fourth year with or without having earned a certificate or degree.

Previous research has found that post-secondary participation barriers for first-generation students are primarily related to college aspirations, taking appropriate and rigorous high school courses, completing financial aid applications, and knowing about and understanding the price of going to college (Choy, 2001; King, 2006). The A+ Schools Program's focus on improving high school curricula, providing encouragement for students to meet the A+ incentive criteria, and providing information about post-secondary opportunities and funding seems to be helping first-generation students overcome the traditional barriers that first-generation students encounter. These findings could be more instructive if first-generation A+ students could be compared with similar first-generation students who were not A+-eligible.

The Missouri A+ Schools Program is unique in that it directs student flow to two-year institutions. This unique quality added another dimension to analyses involving student participation, persistence, and attainment, especially when considered in light of dramatic tuition increases and improving labor market conditions during the study period.

Certificate or degree attainment did not appear to be impacted by any demographic characteristic for those students who persisted in the public post-secondary system. Because other research on merit aid programs has studied four-year degree attainment, there are no comparison analyses on two-year certificate or degree attainment available. The findings also showed that those students who transfer to a four-year

institution, both with and without certificates or degrees, were largely not eligible for Pell grants. This result was not unexpected as these students constituted the majority of the entering cohort. These findings align with Pascarella and Terenzini's 2005 observation that those who transfer from a two- to four-year institution are more likely to be of higher income. Further, it suggests that low-income students' ability to pay continues to affect post-secondary persistence and attainment, which corresponds to previous findings that students' chances of persisting and graduating decline as unmet financial need increases (Paulsen & St. John, 2002; St. John, 1990). Specific to statewide merit scholarship programs, Henry, Rubenstein, and Bugler (2004) found that the benefits of the HOPE scholarship only accrue to those students who remain eligible. Because students are no longer eligible for the A+ incentive after six terms, they must identify and utilize other financial resources to persist in the post-secondary system.

Implications for Research and Practice

There are notable voids in the existing A+ Schools Program research. The following are recommendations for future research in order of importance:

1. The absence of a comparative student cohort limited the effectiveness and conclusions that could be drawn in this study. Only high school-level demographic data on all Missouri public high school graduates was available from the State of Missouri for this research project. Student-level demographic data were not available from a central data source in Missouri on most students who did not enroll in the Missouri public post-secondary system. Accordingly, the Missouri Department of Elementary and Secondary Education should develop a central database that houses student-level

demographic and academic data. Variables should parallel and interact with those housed in the Missouri Department of Higher Education's EMSAS database. A central database with K-12 student-level data would allow researchers and policymakers to study the movements and transitions of students from the K-12 system into the public higher education system more cohesively and provide a more comprehensive Missouri K-16 perspective. Absent the ability to match and/or analyze at the student level, A+ policies and programs cannot be rigorously evaluated. Further, the influence of the A+ schools program on enrollment shifts within Missouri's public post-secondary system cannot be understood without a comparative cohort.

2. Future research should demographically match A+ students with non-A+ peers to compare post-secondary experiences. The absence of student-level demographic data at the high school level impeded this researcher's ability to make comparisons between three populations: (a) those who did not graduate from an A+ high school, (b) those who graduated from an A+ high school and were eligible for the A+ incentive, (c) those who graduated from an A+ high school, but were not eligible for the incentive. As the A+ Schools Program was primarily a 9-12 curriculum enhancement initiative, it would be expected that students who graduated from an A+ high school, regardless of an individual student's A+-eligibility, would out-perform non-A+ high school graduates at the post-secondary level. Additionally, the influence of the A+ schools program on enrollment shifts within Missouri's public post-secondary system could be better understood with comparative studies.

3. Future research should use the IPEDs and national clearinghouse databases to track A+ students who may have enrolled in private or out-of-state post-secondary institutions for a more comprehensive understanding of the post-secondary behaviors of A+ students and to compare their experiences with those who enrolled in Missouri public post-secondary institutions.
4. Future research should extend this study with its focus on student demographic characteristics through students' sixth year following high school graduation to follow A+ students through their baccalaureate experience to capture further educational attainment (see, for example, Melguizo and Dowd, 2005). Six years is the standard measure of graduation rates for four-year institutions (IPEDs, 1999),
5. Future research should study the interactions between A+ students' permanent residency and enrollment in a qualified two-year institution. The relatively sparse opportunities for enrollment in a qualified two-year degree-granting institution in rural areas of the state may be impacting student participation, especially as the A+ incentive does not apply to room and board costs. This researcher noted that the EMSAS "in-district" designation of those attending two-year schools may be misleading. Some rural community college taxing districts are defined quite narrowly, but the service region is much broader, so some other method that identifies distance to a qualified institution should be utilized.
6. Further research should more closely study student enrollment beyond attaining a two-year certificate or degree or exhaustion of the A+ incentive to

understand any relationship between attending a qualified two-year institution and subsequent enrollment in a four-year institution that is closely affiliated through geography or administrative oversight to the two-year. The findings from this research could help four-year institutions develop stronger articulation agreements and transition programs for A+ students.

7. Future research should focus on the large number of A+ graduates who are enrolled in remedial post-secondary coursework to understand how this might be alleviated with curricular changes at the high school level (See, for example, Bueschel, 2004). Additionally, as other studies have found that A+ students enroll in fewer post-secondary remedial hours than non-A+ students (MDHE, 2006), the A+ high school may be a model for strengthening the high school experiences at non-A+ high schools.

Recommendations for Practice

The findings of this study in the context of previous research suggest that there are several improvements that could be made in the post-secondary component of the A+ Schools Program. These suggestions are outlined below.

First, this research found that many of the students who did not enroll in the Fall 2002 term were low-income, but the large majority of students who were still enrolled after three years were not low-income. Therefore, it seems that low family income continues to negatively affect post-secondary participation, persistence, and attainment. The A+ incentive is reduced dollar-for-dollar by Pell grant funds, so low-income students who are eligible for large Pell grants are not particularly advantaged by the A+ incentive. The early format of Georgia's HOPE scholarship had similar funding restrictions. Studies

on the HOPE scholarship (Dynarski, 2002; Henry, Rubenstein, & Bugler, 2004) found that when Georgia changed the funding policy to allow students to receive HOPE funds that were not reduced by Pell grant funds, more low-income students attended college. Additionally, Henry, Rubenstein, and Bugler (2004) posited that this policy change allowed low-income students to reduce the number of hours they worked to pay for college costs. Allowing students to receive their A+ incentive on top of Pell and other scholarships and grants would help low-income students pay for non-tuition-related expenses associated with attending college. This change would be particularly helpful for rural students who may not have an eligible two-year degree-granting institution in close proximity.

Secondly, Missouri's A+ Schools Program is unique in that students can only utilize their A+ incentive at two-year institutions. This restriction may be linked to early A+ conversations about encouraging more non-college bound students to seek post-secondary-level training in vocational studies and to conversations about more evenly distributing student enrollment throughout the Missouri public post-secondary system. As this research has found, most A+ students are not enrolled in vocational studies at two-year institutions. Rather, they are enrolled in transfer-oriented, liberal arts programs. Additionally, students who do not live near a qualified two-year degree-granting institution could be discouraged from using their A+ incentive if commuting or room and board near the institution are cost-prohibitive. Accordingly, the A+ incentive benefits should be extended to qualified students attending Missouri public four-year institutions. As this recommendation would raise concerns regarding higher state-born costs related to generally higher four-year tuition rates, it is suggested that policymakers investigate ways

that other statewide, merit-based scholarship programs have addressed this concern. Other states' programs have effectively utilized a set dollar amount for students attending in-state private institutions, which could provide a model for establishing a set dollar amount for A+ awards at four-year institutions where tuition costs are typically higher.

Limitations

As with all research, there are limitations to this study. First, all students in the beginning study cohort were eligible for the A+ incentive at the beginning of the study period, so comparisons could not be made with a similar group of students who were not A+-eligible. Second, post-secondary enrollment patterns could only be examined in Missouri's public post-secondary system. Data about enrollment patterns for students who attended in-state private institutions, proprietary institutions, or out-of-state institutions were not available. A third limitation was that first-generation and income indicators were only available from the federal financial aid application data. Because A+ graduates who expect to use their tuition incentives are required to complete a federal aid application, it was assumed that first-generation and income data for A+ graduates were complete and accurate. Fourth, information about race is reported in EMSAS files so racial characteristics of students who did not enroll in the Missouri public post-secondary system were unknown. Fifth, data stored in the EMSAS database are reported by post-secondary institutions on a specified census date approximately three weeks into each term. Consequently, information on students who were enrolled on the term's first date but withdrew prior to the census date was not reported. Finally, the analysis was limited to the 2002 Missouri A+ Schools Program cohort. Because of programmatic, population,

and economic changes, findings should not be generalized to other A+ cohorts or Missouri post-secondary students.

Significance of Study

This study extended the existing research base on Missouri's A+ Schools Program by tracking a cohort of A+ schools program graduates through the first three years of their post-secondary eligibility with a particular focus on student demographic characteristics that are often barriers to post-secondary access. The study further added to the national research base on statewide merit aid programs by investigating the post-secondary experiences of students who have participated in a merit aid program with unique qualifying characteristics that are related more to institutional qualities (attending qualified high schools and post-secondary schools) than student qualities.

Findings indicated that Missouri's A+ Schools Program's post-secondary incentive has the unintended effect of primarily subsidizing the post-secondary education of students who may already have had the financial means to enroll and persist in college. It was noted that A+-eligible students who did not enroll in the first fall term after high school graduation had more financial need than those who did enroll. Also, low-income students who did enroll were less likely to transfer to four-year institutions after exhausting their A+ eligibility. Additionally, minority students were particularly at risk of losing their A+ incentive based upon cumulative GPA. However, an encouraging demographic finding was that the A+ Schools Program seems to have improved the post-secondary participation and persistence experiences of first-generation students who are not low-income or minority. Overall, while student demographic characteristics seemed to somewhat affect post-secondary participation and persistence for the 2002 A+ cohort,

at-risk demographic populations compared quite favorably to students who were not considered at-risk with regard to demographic characteristics.

Additionally, the A+ incentive did seem to influence student flow toward two-year institutions, but that flow was also strongly affected by ACT scores. A+ students who enrolled in two-year schools had lower ACT scores overall. In terms of demographics, the two-year attendees appeared overall to be those who intended to enroll in college, but would not necessarily have been eligible to enroll in selective four-year institutions or be eligible for substantial academic scholarships.

Finally, without a comparative cohort of students who were not A+ eligible because they either did not attend an A+ high school or did not meet eligibility requirements at an A+ high school, it is not known if the A+ incentive is improving post-secondary access for Missouri's low-income and minority student populations.

Summary of Study

This descriptive study tracked the post-secondary enrollment experiences of the 2002 Missouri A+ Schools Program cohort. Particular emphasis was placed upon comparing first-generation, low-income, and minority student experiences with those who were not first-generation, low-income, or minority. This study found that while the overall cohort was quite demographically homogenous, post-secondary enrollment behaviors and patterns appeared to be driven more by measures of academic preparation, than by demographic characteristics. Finally, absent a similar comparative cohort composed of students who were not A+-eligible, the vigorously expanding A+ Schools Program's effect on Missouri post-secondary enrollment patterns and access cannot be fully understood.

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Appendix A

A+ Schools Program High School Selection Criteria

1. Participation is restricted to Missouri public high schools.
2. Participation is voluntary.
3. High schools seeking designation must be approved by the Missouri Department of Elementary and Secondary Education.
4. High schools seeking designation must meet the A+ Schools Program requirements which include:
 - A. Establish measurable district-wide performance standards for each of the three A+ Schools Program goals:
 - i. All students be graduated from school;
 - ii. All students complete a selection of high school studies that is challenging and for which there are identified learning expectations; and
 - iii. All students proceed from high school graduation to a college or post-secondary vocational or technical school or high-wage job with work place skill development opportunities.
 - B. Specify the measurable learner objectives (competencies) that students must demonstrate in order to successfully complete any individual course offered by the school, and any course of study while qualifies a student for graduation from the school.
 - C. Offer a career preparation system including:
 - i. Implementation of a comprehensive K-12 guidance program;

- ii. Establishment of a four-year high school planning process for all students that delineates a course of study or courses contributing to a career pathway that leads to post-secondary studies or a high-wage job;
- iii. Providing opportunities for parent/guardian involvement in the four-year planning process;
- iv. Dissemination of promotional and explanatory information about the four-year planning process and career pathways to parents/guardians and students.

D. Require rigorous coursework with standards of competency in all academic subjects for students pursuing post-secondary education or employment:

- i. Provide appropriate academic preparation courses for students pursuing post-secondary education or employment;
- ii. Increase the number of high school [core] curriculum upper-level course offerings in biology/chemistry, communications, mathematics and physics including advanced placement and dual credit course. Fifty percent of the district's juniors and seniors must be enrolled in either advanced courses or vocational courses;
- iii. Eliminate high school general track courses that do not prepare students upon graduation to successfully enter and/or progress in employment and/or post-secondary education.

E. Have a partnership plan developed in cooperation and with the advice of local business persons, labor leaders, parents, and representatives of college and post-secondary vocational and technical school representatives, with the plan then

approved by the local board of education. The plan shall specify a mechanism to receive information on an annual basis from those who developed the plan in addition to senior citizens, community leaders, and teachers to update the plan in order to best meet the goals of the program. Further, the plan shall detail the procedures used in the school to identify students that may drop out of school and the intervention services to be used to meet the needs of such students. The plan shall outline counseling and mentoring services provided to students who will enter the work force upon graduation from high school, address apprenticeship and intern programs, and shall contain procedures for the recruitment of volunteers from the community of the school to serve in schools receiving [A+ designation].

- F. Meet performance standards under the Missouri School Improvement Program to include Academic Achievement, Career Preparation, and Educational Persistence Standards.

(Missouri Department of Elementary and Secondary Education, A+ Schools Seeking Designation, n.d.)

Appendix B

Designated A+ Schools Program Public High Schools, 1997-2002

Year A+ Designated	School District	School Building Name
1997	Aurora R-VIII	Aurora HS
1997	Boonville R-I	Boonville HS
1997	Brookfield R-III	Brookfield HS
1997	Cape Girardeau 63	Central HS
1997	Center 58	Center HS
1997	Chillicothe R-II	Chillicothe HS
1997	Clinton	Clinton HS
1997	Eldon R-I	Eldon HS
1997	Farmington R-VII	Farmington HS
1997	Fulton 58	Fulton HS
1997	Gideon 37	Gideon HS
1997	Jefferson City	Jefferson City HS
1997	Kirksville R-III	Kirksville HS
1997	Knob Noster R-VIII	Knob Noster HS
1997	Lexington R-V	Lexington HS
1997	Lindbergh R-VIII	Lindbergh HS
1997	Logan-Rogersville R-VIII	Logan-Rogersville HS
1997	Mehlville R-IX	Oakville HS
1997	Montgomery Co. R-II	Montgomery Co. HS
1997	New Franklin R-I	New Franklin Middle-HS
1997	North Kansas City 74	North Kansas City HS
1997	North Kansas City 74	Oak Park HS
1997	North Kansas City 74	Winnetonka HS
1997	North St. Francois Co. R-I	North Co. HS
1997	Reeds Spring R-IV	Reeds Spring HS
1997	Richmond R-XVI	Richmond HS
1997	Rolla 31	Rolla HS
1997	Sedalia 200	Smith-Cotton HS
1997	South Iron Co. R-I	South Iron HS
1997	Springfield R-XII	Central HS
1997	St. Charles R-VI	St. Charles HS
1997	St. Charles R-VI	St. Charles West HS
1997	St. James R-I	St. James HS
1997	St. Joseph	Lafayette HS
1997	Warren Co. R-III	Warren Co. HS
1997	Waynesville R-VI	Waynesville HS
1997	Wentzville R-IV	Emil E. Holt HS
1997	West Plains R-VII	West Plains HS

1998	Bernie R-XIII	Bernie HS
1998	Camdenton R-III	Camdenton HS
1998	Carl Junction R-I	Carl Junction HS
1998	Dallas Co. R-I	Buffalo HS
1998	Hallsville R-IV	Hallsville HS
1998	Hannibal 60	Hannibal HS
1998	Independence 30	Truman HS
1998	Independence 30	William Chrisman HS
1998	Joplin R-VIII	Joplin HS
1998	Marshall	Marshall HS
1998	Meramec Valley R-III	Pacific HS
1998	Mexico 59	Mexico HS
1998	Monett R-I	Monett HS
1998	Northeast Randolph Co. R-IV	Northeast HS
1998	Osage Co. R-II	Linn HS
1998	Republic R-III	Republic HS
1998	Smithville R-II	Smithville HS
1998	Trenton R-IX	Trenton HS
1998	Willow Springs R-IV	Willow Springs HS
1999	Carthage R-IX	Carthage HS
1999	Cassville R-IV	Cassville HS
1999	Crystal City 47	Crystal City HS
1999	Festus R-VI	Festus HS
1999	Hazelwood	Hazelwood West HS
1999	Houston R-I	Houston HS
1999	Kennett 39	Kennett HS
1999	Macon Co. R-I	Macon HS
1999	Marshfield R-I	Marshfield HS
1999	Meadville R-IV	Meadville HS
1999	Mehlville R-IX	Mehlville HS
1999	Moberly	Moberly HS
1999	Nevada R-V	Nevada HS
1999	North Callaway Co. R-I	North Callaway HS
1999	Northwest R-I	Northwest HS
1999	Park Hill	Park Hill HS
1999	Park Hill	Park Hill South HS
1999	Perry Co. 32	Perryville HS
1999	Platte Co. R-III	Platte County HS
1999	Poplar Bluff R-I	Poplar Bluff HS
1999	Potosi R-III	Potosi HS
1999	Putnam Co. R-I	Putnam Co. HS
1999	Salem R-80	Salem HS
1999	Sikeston R-6	Sikeston HS
1999	South Harrison Co. R-II	South Harrison HS
1999	St. Clair R-XIII	St. Clair HS
1999	Summersville R-II	Summersville HS

1999	Valley Park	Valley Park HS
1999	Webb City R-VII	Webb City HS
2000	Ava R-I	Ava HS
2000	Bowling Green R-I	Bowling Green HS
2000	Central R-III	Central HS
2000	Clark Co. R-I	Clark Co. HS
2000	Clearwater R-I	Clearwater HS
2000	Excelsior Springs 40	Excelsior Springs HS
2000	Ferguson-Florissant R-II	McCluer North HS
2000	Francis Howell R-III	Francis Howell HS
2000	Gallatin R-V	Gallatin HS
2000	Gilman City R-IV	Gilman City HS
2000	Hancock Place	Hancock HS
2000	Hickory Co. R-I	Skyline HS
2000	Knox Co. R-I	Knox Co. HS
2000	Lamar R-I	Lamar HS
2000	Lawson R-XIV	Lawson HS
2000	Lebanon R-III	Lebanon HS
2000	Macon Co. R-IV	Macon Co. HS
2000	Malden R-I	Malden HS
2000	Milan C-2	Milan HS
2000	Mountain Grove R-III	Mountain Grove HS
2000	Mountain View-Birch Tree R-III	Liberty HS
2000	Mt. Vernon R-V	Mt. Vernon HS
2000	Neosho R-V	Neosho HS
2000	Nixa R-II	Nixa HS
2000	Osceola	Osceola HS
2000	Palmyra R-I	Palmyra HS
2000	Puxico R-VIII	Puxico HS
2000	Raymore-Peculiar R-II	Raymore-Peculiar HS
2000	Shelby Co. R-IV	South Shelby HS
2000	Southern Boone Co. R-I	Southern Boone HS
2000	Springfield R-XII	Glendale HS
2000	Springfield R-XII	Parkview HS
2000	Sullivan	Sullivan HS
2000	Twin Rivers R-X	Twin Rivers HS
2000	Willard R-II	Willard HS
2000	Winona R-III	Winona HS
2001	Carrollton R-VII	Carrollton HS
2001	Caruthersville 18	Caruthersville HS
2001	Charleston R-I	Charleston HS
2001	Fort Osage R-I	Fort Osage HS
2001	Hamilton R-II	Penney HS
2001	Hillsboro R-III	Hillsboro HS
2001	Mansfield R-IV	Mansfield HS
2001	Marceline R-V	Marceline HS

2001	Odessa R-VII	Odessa HS
2001	Orchard Farm R-V	Orchard Farm HS
2001	Ozark R-VI	Ozark HS
2001	Riverview Gardens	Riverview Gardens HS
2001	Schuyler Co. R-I	Schuyler Co. HS
2001	Warsaw R-IX	Warsaw HS
2001	Webster Groves	Webster Groves HS
2001	Wright City R-II	Wright City HS
2002	Arcadia Valley R-II	Arcadia Valley HS
2002	Bolivar R-I	Bolivar HS
2002	Branson R-IV	Branson HS
2002	Columbia 93	Columbia-Hickman HS
2002	Columbia 93	Rock Bridge HS
2002	Concordia R-II	Concordia HS
2002	Desoto 73	Desoto HS
2002	East Newton Co. R-VI	East Newton HS
2002	Ferguson-Florissant R-II	McCluer HS
2002	Ferguson-Florissant R-II	McCluer South-Berkeley HS
2002	Gainesville R-V	Gainesville HS
2002	Gasconade Co. R-II	Owensville HS
2002	Grundy Co. R-V	Grundy Co. HS
2002	Harrisonville R-IX	Harrisonville HS
2002	Hartville R-II	Hartville HS
2002	Hickman Mills C-1	Hickman Mills HS
2002	Liberty 53	Liberty HS
2002	Linn Co. R-I	Linn Co. HS
2002	Macks Creek R-V	Macks Creek HS
2002	Maryville R-II	Maryville HS
2002	New Bloomfield R-III	New Bloomfield HS
2002	North Shelby	North Shelby HS
2002	Norwood R-I	Norwood HS
2002	Oak Ridge R-VI	Oak Ridge HS
2002	Oregon-Howell R-III	Koshkonong HS
2002	Pattonville R-III	Pattonville HS
2002	Pierce City R-VI	Pierce City HS
2002	Princeton R-V	Princeton R-V HS
2002	Seneca R-VII	Seneca HS
2002	Spokane R-VII	Spokane HS
2002	St. Elizabeth R-IV	St. Elizabeth HS
2002	Ste. Genevieve Co. R-II	Ste. Genevieve HS
2002	Thayer R-II	Thayer HS
2002	Warrensburg R-VI	Warrensburg HS
2002	Washington	Washington HS
2002	Wentzville R-IV	Timberland HS

Appendix C

Designated A+ Schools Program Public High Schools 1997-2007

<u>School District</u>	<u>School Building Name</u>
Adair Co. R-I School District	Adair Co. HS
Affton 101 School District	Affton HS
Alton R-IV School District	Alton HS
Arcadia Valley R-II School District	Arcadia Valley HS
Aurora R-VIII School District	Aurora HS
Ava R-I School District	Ava HS
Bakersfield R-IV School District	Bakersfield HS
Bernie R-XIII School District	Bernie HS
Bevier C-4 School District	Bevier HS
Bloomfield R-XIV School District	Bloomfield HS
Bolivar R-I School District	Bolivar HS
Boone County R-IV School District	Hallsville HS
Boonville R-I School District	Boonville HS
Bowling Green R-I School District	Bowling Green HS
Branson R-IV School District	Branson HS
Brookfield R-III School District	Brookfield HS
Cabool R-IV School District	Cabool HS
Camdenton R-III School District	Camdenton HS
Cape Girardeau 63 School District	Central Sr. HS
Carl Junction R-I School District	Carl Junction HS
Carrollton R-VII School District	Carrollton Sr. HS
Carthage R-IX School District	Carthage Sr. HS
Caruthersville 18 School District	Caruthersville HS
Cassville R-IV School District	Cassville HS
Center 58 School District	Center Sr. HS
Central R-III School District	Central HS
Charleston R-I School District	Charleston HS
Chillicothe R-II School District	Chillicothe HS
Clark County R-I School District	Clark County HS
Clearwater R-I School District	Clearwater HS
Climax Springs R-IV School District	Climax Springs HS
Clinton School District	Clinton Sr. HS
Cole Co. R-V School District	Eugene HS
Columbia 93 School District	Columbia-Hickman HS
Columbia 93 School District	Rock Bridge HS
Concordia R-II School District	Concordia HS
Couch R-I School District	Couch HS
Crystal City 47 School District	Crystal City HS
Dallas County R-I School District	Buffalo HS
DeSoto 73 School District	DeSoto Sr. HS
Dora R-III School District	Dora HS

Dunklin R-V School District
East Buchanan County C-1 School District
East Carter County R-II School District
East Newton County R-VI School District
Eldon R-I School District
Excelsior Springs 40 School District
Farmington R-VII School District
Fayette R-III School District
Ferguson-Florissant R-II School District

Festus R-VI School District
Fordland R-III School District
Fort Osage R-I School District
Fox C-6 School District

Francis Howell R-III School District
Fredericktown R-I School District
Ft. Zumwalt R-II School District

Fulton 58 School District
Gainesville R-V School District
Gallatin R-V School District
Gasconade Co. R-II School District
Gideon 37 School District
Gilman City R-IV School District
Green City R-I School District
Greene County R-VIII School District
Greenville R-II School District
Grundy County School District
Hamilton R-II School District
Hancock Place School District
Hannibal 60 School District
Harrisonville R-IX School District
Hartville R-II School District
Hazelwood School District
Hickman Mills C-1 School District

Hickory County R-I School District
Hillsboro R-III School District
Holden R-III School District
Houston R-I School District
Hurley R-I School District
Independence 30 School District

Herculaneum HS
East Buchanan HS
East Carter Co. HS
East Newton HS
Eldon HS
Excelsior Springs HS
Farmington Sr. HS
Fayette HS
Berkeley HS
McCluer HS
McCluer North High
Festus Sr. High School
Fordland HS
Fort Osage High School
Fox Sr. HS
Seckman Sr. HS
Francis Howell HS
Fredericktown HS
Ft. Zumwalt North HS
Ft. Zumwalt South HS
Ft. Zumwalt West HS
Fulton Sr. HS
Gainesville HS
Gallatin HS
Owensville HS
Gideon HS
Gilman City HS
Green City HS
Logan-Rogersville HS
Greenville HS
Grundy County HS
Penney HS
Hancock Sr. HS
Hannibal Sr. HS
Harrisonville HS
Hartville HS
Hazelwood West HS
Hickman Mills Sr. HS
Ruskin HS
Skyline HS
Hillsboro HS
Holden HS
Houston HS
Hurley HS
William Chrisman HS
Truman HS

Jefferson City School District
Joplin R-VIII School District
Kansas City 33 School District

Kennett 39 School District
Kirksville R-III School District
Knob Noster R-VIII School District
Knox County R-I School District
Lamar R-I School District
Lawson R-XIV School District
Lebanon R-III School District
Lee's Summit R-VII School District

Lexington R-V School District
Liberty 53 School District
Licking R-VIII School District
Lindbergh R-VIII School District
Linn County R-I School District
Macon County R-I School District
Macon County R-IV School District
Macks Creek R-V School District
Malden R-I School District
Mansfield R-IV School District
Marceline R-V School District
Marshall School District
Marshfield R-I School District
Maryville R-II School District
Meadville R-IV School District
Mehlville R-IX School District

Meramec Valley R-III School District
Mexico 59 School District
Mid-Buchanan County R-V School District
Milan C-2 School District
Moberly School District
Monett R-I School District
Montgomery Co. R-II School District
Morgan County R-II School District
Mountain Grove R-III School District
Mtn. View-Birch Tree R-III School District
Mt. Vernon R-V School District
NE Randolph Co. R-IV School District
Neosho R-V School District
Nevada R-V School District

Jefferson City HS
Joplin Sr. HS
Lincoln College Preparatory
Paseo Academy of Performing Arts
Van Horn HS
Kennett HS
Kirksville Sr. HS
Knob Noster HS
Knox County HS
Lamar HS
Lawson HS
Lebanon Sr. HS
Lee's Summit North HS
Lee's Summit Sr. HS
Lee's Summit West HS
Lexington HS
Liberty HS
Licking HS
Lindbergh Sr. HS
Linn County HS
Macon Sr. HS
Macon County HS
Macks Creek HS
Malden HS
Mansfield HS
Marceline HS
Marshall Sr. HS
Marshfield HS
Maryville HS
Meadville HS
Mehlville Sr. HS
Oakville Sr. HS
Pacific HS
Mexico HS
Mid-Buchanan HS
Milan HS
Moberly Sr. HS
Monett HS
Montgomery Co. HS
Morgan County HS
Mountain Grove HS
Liberty Sr. HS
Mt. Vernon HS
Northeast HS
Neosho HS
Nevada HS

New Bloomfield R-III School District	New Bloomfield HS
New Franklin R-I School District	New Franklin HS
Nixa R-II School District	Nixa HS
North Callaway Co. R-I School District	North Callaway HS
North Kansas City 74 School District	Winnetonka HS
	Oak Park HS
	North Kansas City HS
North St. Francois County R-I School District	North County Sr. HS
Northwest R-I School District	Northwest HS
Northwestern R-I School District	Northwestern HS
Norwood R-I School District	Norwood HS
Oak Ridge R-VI School District	Oak Ridge HS
Odessa R-VII School District	Odessa HS
Oregon-Howell R-III School District	Koshkonong HS
Osage County R-II School District	Linn HS
Osceola School District	Osceola Sr. HS
Ozark R-VI School District	Ozark HS
Palmyra R-I School District	Palmyra HS
Park Hill School District	Park Hill HS
	Park Hill South HS
Pattonville R-III School District	Pattonville Sr. HS
Perry Co. 32 School District	Perryville Sr. HS
Pierce City R-VI School District	Pierce City HS
Platte Co. R-III School District	Platte City HS
Pleasant Hill R-III School District	Pleasant Hill HS
Poplar Bluff R-I School District	Poplar Bluff HS
Potosi R-III School District	Potosi HS
Prairie Home R-V School District	Prairie Home HS
Princeton R-V School District	Princeton Sr. HS
Putnam County R-I School District	Putnam County HS
Puxico R-VIII School District	Puxico HS
Raymore-Peculiar R-II School District	Raymore-Peculiar Sr. HS
Raytown C-2 School District	Raytown Sr. HS
	Raytown South HS
Reeds Springs R-IV School District	Reeds Spring HS
Republic R-III School District	Republic HS
Richmond R-XVI School District	Richmond HS
Riverview Gardens School District	Riverview Gardens Sr. HS
Rolla 31 School District	Rolla Sr. HS
Salem R-80 School District	Salem Sr. HS
Salisbury R-IV School District	Salisbury HS
Santa Fe R-X School District	Santa Fe HS
School of the Osage R-II School District	Osage HS
Schuyler County R-I School District	Schuyler County HS
Sedalia 200 School District	Smith Cotton HS
Seneca R-VII School District	Seneca HS

Seymour R-II School District	Seymour HS
Shelby County R-IV School District	South Shelby HS
Shelby County C-1 School District	North Shelby HS
Sikeston R-VI School District	Sikeston Sr. HS
Slater School District	Slater HS
Smithton R-VI School District	Smithton HS
Smithville R-II School District	Smithville HS
South Harrison County R-II School District	South Harrison HS
South Iron County R-I School District	South Iron HS
Southern Boone County R-I School District	Southern Boone HS
Sparta R-III School District	Sparta HS
Springfield R-XII School District	Parkview HS
	Glendale HS
	Central HS
Spokane R-VII School District	Spokane HS
St. Charles County R-V School District	Orchard Farm Sr. HS
St. Charles R-VI School District	St. Charles HS
	St. Charles West HS
St. Clair R-XIII	St. Clair HS
St. Elizabeth R-IV School District	St. Elizabeth HS
St. James R-I School District	John F. Hodge HS
St. Joseph School District	Benton HS
	Lafayette HS
Ste. Genevieve County R-II School District	Ste. Genevieve Sr. HS
Sullivan C-2 School District	Sullivan Sr. HS
Summersville R-II School District	Summersville HS
Thayer R-II School District	Thayer Sr. HS
Trenton R-IX School District	Trenton Sr. HS
Twin Rivers R-X School District	Twin Rivers HS
Union R-XI School District	Union HS
Valley Park School District	Valley Park Sr. HS
Warren County R-III School District	Warren County Sr. HS
Warrensburg R-VI School District	Warrensburg HS
Warsaw R-IX School District	Warsaw HS
Washington School District	Washington HS
Waynesville R-VI School District	Waynesville Sr. HS
Webb City R-VII School District	Webb City HS
Webster Groves School District	Webster Groves HS
Wentzville R-IV School District	Emil E. Holt Sr. HS
	Timberland HS
West Plains R-VII School District	West Plains Sr. HS
Willard R-II School District	Willard HS
Willow Springs R-IV School District	Willow Springs HS
Winona R-III School District	Winona HS
Wright City R-II School District	Wright City HS

Appendix D

A+ Schools Program Eligible Public Community Colleges, 2006-2007

Crowder College, Neosho, MO

East Central College, Union, MO

Jefferson College, Hillsboro, MO

Linn State Technical College, Linn MO

Metropolitan Community College -Blue River, Independence MO

Metropolitan Community College- Business & Technology Campus, Kansas City MO

Metropolitan Community College-Longview, Lee's Summit MO

Metropolitan Community College-Maple Woods, Kansas City, MO

Metropolitan Community College-Penn Valley, Kansas City MO

Mineral Area College, Park Hills, MO

Missouri State University-West Plains, West Plains MO

Moberly Area Community College, Moberly MO

North Central Missouri College, Trenton MO

Ozarks Technical Community College, Springfield MO

St Louis Community College at Florissant Valley, St. Louis MO

St Louis Community College at Forest Park, St. Louis MO

St Louis Community College at Meramec, St. Louis MO

St. Charles County Community College, St. Peters MO

State Fair Community College, Sedalia MO

Three Rivers Community College, Poplar Bluff MO

Appendix E

A+ Schools Program Eligible Career Technical Schools, 2006-2007

School District	School Name
Arcadia Valley R-II	Arcadia Valley Career Technical Center
Boonville R-I	Boonslick Technical Education Center
Brookfield R-III	Brookfield Area Career Center
Camdenton R-III	Lake Career & Technical Center
Cape Girardeau 63	Cape Girardeau Career & Technical Center
Carrollton R-VII	Carrollton Area Career Center
Carthage R-IX	Carthage Technical Center
Chillicothe R-II	Grand River Technical School
Clinton	Clinton Technical School
Columbia 93	Columbia Area Career Center
Dallas Co. R-I	Dallas County Career Center
Doniphan R-I	Current River Area Vocational Technical School
Eldon R-I	Tri-County Technical School
Excelsior Springs 40	Excelsior Springs Career Center
Fort Osage R-I	Career & Technical Center At Ft. Osage
Hannibal 60	Hannibal Career & Technical Center
Harrisonville R-IX	Cass Career Center
Jefferson City	Nichols Career Center
Joplin R-VIII	Franklin Technology Center
Kennett 39	Kennett Area Vocation School
Kirksville R-III	Kirksville Area Tech. Center
Lamar R-I	Lamar Area Vocation-Technical School
Lebanon R-III	Lebanon Technical & Career Center
Lexington R-V	Lex La-Ray Technical Center
Macon Co. R-I	Macon Area Vocational School
Marshall	Saline County Career Center
Maryville R-II	Northwest Technical School
Mexico 59	Davis H. Hart Area Vocational Technical School
Moberly	Moberly Area Technical Center
Monett R-I	Southwest Area Career Center
Mountain Grove R-III	Ozark Mountain Technical Center
Nevada R-V	Nevada Regional Technical Center
New Madrid Co. R-I	New Madrid R-I Technical Skills Center
North St. Francois Co. R-I	Unitec Career Center
Pemiscot Co. Special Sch. Dist.	Pemiscot County Vocational School

Perry Co. 32	Perryville Area Career & Technical Center
Pike Co. R-III	Pike/Lincoln Technical Center
Platte Co. R-III	Northland Career Center
Poplar Bluff R-I	Poplar Bluff Technical Career Center
Raytown C-2	Herndon Career Center
Reeds Spring R-IV	Gibson Technical Center
Rolla 31	Rolla Technical Institute
Sikeston R-VI	Sikeston Career & Technical Center
South Harrison Co. R-II	North Central Career Center
Specl. Sch. Dst. St. Louis Co.	North County Technical
Specl. Sch. Dst. St. Louis Co.	South County Technical
St. Charles R-VI	Lewis & Clark Career Center
St. Joseph	Hillyard Technical Center
Warrensburg R-VI	Warrensburg Area Vocational Technical School
Washington	Four Rivers Career Center
Waynesville R-VI	Waynesville Technical Academy
West Plains R-VII	South Central Career Center

Appendix F

Cumulative GPA	Overall	Pell-eligible		First-generation		Minority	
		Yes	No	Yes	No	Yes	No
Fall 2002							
Below 2.50	999	323	668	385	605	84	909
Above 2.50	<u>2493</u>	<u>771</u>	<u>1706</u>	<u>954</u>	<u>1514</u>	<u>143</u>	<u>2337</u>
N	3492	1094	2374	1339	2119	227	3246
Winter 2003							
Below 2.50	940	311	623	371	371	94	841
Above 2.50	<u>2444</u>	<u>724</u>	<u>1706</u>	<u>937</u>	<u>937</u>	<u>144</u>	<u>2286</u>
N	3384	1035	2329	1308	1308	238	3127
Fall 2003							
Below 2.50	628	198	428	254	367	55	572
Above 2.50	<u>2170</u>	<u>620</u>	<u>1535</u>	<u>838</u>	<u>1314</u>	<u>142</u>	<u>2015</u>
N	2798	818	1963	1092	1681	197	2587
Winter 2004							
Below 2.50	491	163	324	197	289	43	447
Above 2.50	<u>1995</u>	<u>569</u>	<u>1413</u>	<u>774</u>	<u>1202</u>	<u>129</u>	<u>1853</u>
N	2486	732	1737	971	1491	172	2300
Fall 2004							
Below 2.50	344	102	241	145	196	28	315
Above 2.50	<u>940</u>	<u>295</u>	<u>636</u>	<u>385</u>	<u>544</u>	<u>73</u>	<u>856</u>
N	1284	397	877	530	740	101	1171
Winter 2005							
Below 2.50	279	82	196	113	163	28	250
Above 2.50	<u>677</u>	<u>213</u>	<u>457</u>	<u>286</u>	<u>382</u>	<u>52</u>	<u>618</u>
N	956	295	653	399	545	80	868

VITA

Leslie M. Galbreath was born in Albuquerque, New Mexico. She is the daughter of Jim and Judy Galbreath of rural Missouri, and mother to teenage daughters, Ashley and Kelsey. She graduated from North Andrew R-VI High School in Rosendale, Missouri, and holds a Bachelor of Arts (English/criminal justice) and a Masters of Science in Education (educational leadership) from Northwest Missouri State University in Maryville, Missouri, and a Doctorate of Educational Leadership/Policy Analysis from the University of Missouri--Columbia.

Leslie's professional career has been spent at Northwest Missouri State University dedicated to helping students be successful in college and in life. She began her career in 1986 helping establish Northwest's new comprehensive academic support program, the Talent Development Center, which is modeled after Alexander Astin's talent development concept. Two years later, she became the director of two new programs that targeted academic support for at-risk freshmen and varsity student athletes through the Assist and Student Athlete Success Programs. In 1997, she assumed the directorship of the Talent Development Center, where she blended the targeted and broad outreach support of all the programs into a comprehensive support unit that is recognized internationally as a benchmark student support program. Under her leadership, the Talent Development Center has garnered significant recognition as a model student retention program from numerous professional and educational organizations including the Missouri Quality Award, the Malcolm Baldrige National Quality Award, the American Association for State Colleges and Universities, the National Collegiate Athletics

Association, the Continuous Quality Improvement Network, the University of Ulsan, South Korea, and the Higher Education Council of England's Leadership, Governance, & Management Programme. Additionally, she serves as Northwest's ADA/504 Compliance Officer. She contributes to a very wide range of campus-wide efforts and initiatives to acculturate and support students. Leslie has a special fondness for rural, first-generation students and considers herself an advocate for all students who possess strong work ethics and the determination to be successful.

Leslie is a passionate supporter of her daughters' numerous academic, musical, and other miscellaneous activities. Her off-work time is spent in quite diverse settings. She is a very active international, regional, and local leader in the Sweet Adelines International women's barbershop singing organization where she utilizes her education and experience to help develop musical and administrative leaders. She spends a couple of weekends each summer "cruising" the back roads of Missouri on a 1962 International Farmall 560 diesel tractor (the tractor she spent much of her teenage years on) with her dad and siblings as a participant in antique tractor cruises that raise donations for a local camp for children with cancer. She is dedicated to honoring and preserving the rural way of life and prefers to be with family and on the farm, playing with tractors, horses, and other farm critters and toys.