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Baccalaureate Success of Vertical Transfer Students: The Impact of Geography, Gender, Age, and Risk

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Abstract

This exploratory study examined the impact of location (rural vs. non-rural) and individual characteristics such as age, gender, and risk factors on baccalaureate attainment of vertical transfer students. The data come from the Beginning Postsecondary Students Longitudinal Study 1996/2001 (BPS:96/01).

Descriptive findings indicate that overall few students (12%) who began in a two-year institution transferred to a four-year institution. Thirty-nine percent of students who transferred attended a rural high school while 61% of students who transferred did not. Further, rural students did not attain the baccalaureate degree at rates similar to their non-rural counterparts (36% and 64%, respectively). The logistic regression analyses showed that women and traditional-age students were more successful at baccalaureate attainment than men and nontraditional-aged students. In addition, men who were traditional-aged, had more risk factors, or attended a non-rural high school were more successful at baccalaureate attainment than were men who were nontraditional-aged, had fewer risk factors, or attended a rural high school.

Introduction

In today's knowledge-based economy some form of postsecondary education is critical for Americans to be able to attain or maintain a middle class lifestyle and educational level is directly related to annual median income. A number of scholars have written about the positive impact that higher levels of educational attainment have on a person's earnings potential (Mumper, 1996; Mumper & Freeman, 2005). For example, the College Board (2006a) found that a 2005 high school graduate could expect to earn a median income of $32,200, a community college graduate could expect to earn a median income of $41,200, and a graduate with a baccalaureate degree could expect to earn a median income of $54,800. These differences in earnings equate to 28% between a high school and community college graduate and 33% between a community college and four-year college graduate. Even more astounding, however, is the 70% difference in median income between a high school graduate and a bachelor's degree recipient.

Not only does a postsecondary education benefit an individual, it also benefits society. Those with a higher education tend to be more involved in their communities, have an increased role in civic participation, and have higher incomes. Higher incomes, in particular, are important to not only individuals but also to society due to the increased amount of tax dollars paid and donations given to charity (Mumper, 1996).

Given this, it seems that students would be anxious to enroll in some form of postsecondary education following high school graduation. However, this is not always the case. Rural students, in particular, attend postsecondary education at rates much lower than their non-rural counterparts. Even though nearly one-third of America's children attended rural schools (Beeson & Strange, 2003), only 21.7% of traditional-aged college

students were from rural areas (U.S. Census, 2000), suggesting rural students are not proportionately represented in postsecondary education. Why? One study conducted in the early 1990s found high school students from rural Appalachian Ohio said their plans did not include pursuing postsecondary education because college was not affordable (Lykins, Spohn, & Crowther, 1991). Since the early 1980s, college prices have risen in all sectors of higher education. This increase is especially pronounced at public four-year institutions. The overall increase from 1981-82 to 2006-07 was 190% (in constant dollars) (College Board, 2006b). Tuition and fees have increased rapidly in the past five years alone—35%. This increase is higher than in any other five-year interval since the mid-1970s (College Board, 2006b).

One choice many rural students make in order to offset some of these spiraling costs is to begin their postsecondary education at a two-year institution and transfer, also known as vertical transition or 2+2. These students enroll in a local community college with intentions to transfer to a four-year institution and complete a baccalaureate degree. This enables them to keep costs down through the lower tuition charges at community colleges and perhaps by living at home. The 2+2 model is beneficial to numerous rural students whose first institution of postsecondary attendance is the community college.

In fact, estimates indicate by 2013, enrollment at public two-year colleges will total around 6.8 million students. Today, 44 percent of students in public colleges attend two-year institutions (Long, 2005). Studies indicate that large numbers of these students (25-42%) anticipate attaining a bachelor's degree (Coley, 2000; Berkner, He, & Cataldi, 2002; Hoachlander, Sikora, & Horn, 2003). Researchers need a better understanding of why only 12% of students who begin their postsecondary education at two-year

institutions transfer, when anywhere from 25% to 43% of them indicate baccalaureate intentions. Scholars have been studying this phenomenon for more than 40 years, yet the increasing cost of higher education and dependence on a highly educated workforce points to the need for further research that focuses on bachelor's degree attainment of students who first attend two-year institutions.

As four-year college costs continue to rise and state and federal policy makers look for ways to maximize efficiencies, two-year institutions will increasingly be a choice for many students, especially rural students, to start their academic careers. Many studies have shown that academic performance, socioeconomic background, and financial conditions are important determinants of baccalaureate degree completion. Despite the voluminous research about rural students in K-12 education, there is scant research which focuses specifically on rural student postsecondary access and success. Thus, geographic access is an important area of research, particularly as it relates to baccalaureate attainment of rural students who begin in a two-year institution.

The purpose of this study is to explore how geography, defined by place or location of the high school or first postsecondary institution attended (rural vs. non-rural), and individual characteristics such as age, gender, and the risk factor index may influence transfer and baccalaureate completion. The risk factor index is comprised of seven risk factors as defined by Horn and Premo (1995). It was developed due to the highly correlated nature of the seven variables considered to be risk factors. The index assigns a score from 0-7 which represents the sum of seven possible risk factors each student had. The individual risk factors include a) delayed enrollment into postsecondary education, b) no high school diploma, c) attending part-time, d) being financially independent, e)

having a dependent other than a spouse, f) being a single parent, and/or g) working full-time.

Literature Review

Persistence

Persistence is viewed through a number of lenses—four-year, two-year, vertical transfer, student and institutional. The major theoretical models tend to view persistence through an institutional lens that focuses on traditional-age students who first attend a four-year institution. Astin, 1975; Tinto, 1975, 1987, 1993; Bean, 1980, 1981; Bean & Metzner, 1985, in particular, have published the seminal pieces of research related to persistence. A broad synthesis of their research suggests that persistence results from both academic and social integration—the immersion of students in the many dynamics of college life, as well as the result of a set of complex interactions over time (Hossler, 1984; Cabrera, Castaneda, Nora, and Hengstler, 1992). Thus, by integrating both the academic and social domains, there is a significant increase in student persistence and degree attainment. In using these models to test different theories about persistence, researchers have found other variables which explain persistence. For example, Nora (2001) found that the decision to remain in college was influenced by not only the components outlined by Tinto, but also the student's perceived support system.

However, as noted, these models focus on traditional-aged students who attend a four-year institution. They do not adequately address outcomes of students who begin in a community college and transfer to a four-year institution—vertical transitions. Vertical transitions have been a subject of interest among higher education officials for more than four decades. One of the earliest studies about vertical transfer was conducted by Knoell

and Medsker in 1965. Many of their findings mirror much of today's research about vertical transitions. For example, economics played a role in the decision to attend a junior (community) college and a delay in enrollment significantly diminished a student's chances of success. Their most significant finding, however, contradicts current research. They found that large numbers of students who began in a junior (community) college in the 1960s were successful at baccalaureate completion. Today, this is not always the case (Dougherty, 1987; Lee & Frank, 1990; Berkner, He, & Cataldi, 2002; Hoachlander, Sikora, & Horn, 2003; Freeman, 2007).

For example, Berkner, He, and Cataldi (2002) found that of those who began in a community college, with baccalaureate intentions (25%), only 13 percent had completed the baccalaureate degree within six years. This study also found that of those who actually transferred, approximately one-third had finished the baccalaureate degree within the same time frame. Given this, it does not stand to reason that even though nearly 25% of students who began in a community college aspired to a baccalaureate degree, less than one-fifth of them actually attained it.

A number of researchers have tried to explain why a large number of community college students with baccalaureate intentions fail to succeed (Pascarella, Smart, & Ethington, 1986; Nora & Rendon, 1990; Dougherty, 1987, 1992; Adelman, 2006). Some researchers would suggest it has to do with the change in mission as junior colleges became community colleges and community colleges became many things to many people (Cohen & Brawer, 2003). Other researchers would suggest that the community college student demographic is vastly different from that of the four-year student. One-half of community college enrollments are older than 24. Many of these nontraditional-

aged students have work and familial responsibilities, which in turn cause them to spend little time on campus. Therefore, they do not become as socially involved as their four-year counterparts.

Additionally, community colleges enroll disproportionately more women (Cohen & Brawer, 2003). While, current research tells us little about baccalaureate persistence for community college students, generally, we do know that those students who manage to transfer do persist (Freeman, 2007). But large numbers of them do not transfer, especially rural students. Thus, our knowledge about rural student access and success is even more scant. And, it is this population which is so germane to this study.

Rural Students

Heller (2001) identified geographic access as one important domain of studying student success in postsecondary education. Attending any postsecondary institution is difficult for many students for a myriad of reasons (financial, distance, work or familial responsibilities). Thus, students are more likely to choose an institution closer to home. Students from rural areas, in particular, have lower attendance rates than their non-rural counterparts. This is often due to geographic access barriers, as distance often is part and parcel of being rural. According to Treadway (1984), there are prominent demographic conditions that are associated with being rural. Specifically, individuals who live in rural areas tend to experience isolation that their non-rural counterparts do not. He goes on to note that “the rural family is often penalized with respect to higher education, as geographic proximity to a college campus has been found to be a major factor in determining who goes to college. Geography and access to educational opportunity are closely related.” Day-Perroots (1991) agrees. As she points out, for many rural students,

barriers to college education include geographic proximity and the time it takes to commute to and from campus. Thus, students from rural and remote areas, regardless of all other characteristics are far more likely to attend a college in closer proximity to their home (Anderson, Bowman, & Tinto, 1972; Rouse, 1995; Adelman, 2005). And this, more often than not, is a community college.

Even though nearly one-third of America's children attend rural schools (Beeson & Strange, 2003), only 21.7% of traditional-aged college students were from rural areas, compared to 36.4% from urban areas (U.S. Census, 2000). Not only do students from rural areas aspire to and attend postsecondary education at much lower rates than their non-rural counterparts, they also vertically transfer and attain baccalaureate degrees at much lower rates as well (Blackwell & McLaughlin, n.d.; Adelman, 2005; Monroe & Richtig, 2002). Of those students who do aspire to attend college, relatively few of them do immediately following high school. Students from rural areas attend postsecondary education in far smaller percentages compared to their non-rural counterparts (Hu, 2003). According to Yan (2002), 48% of rural students did not attend college compared to 28% of urban students and 36% of suburban students. Key reasons why rural students attend at lower rates are that rural students tend to be tied to place, do not wish to leave their roots, and parental encouragement and expectations are severely lacking. Often, it is the lack of parental encouragement and expectations that lead to the lower educational attainment of rural students (Brown & Swanson, 2003). Lykins, Spohn, & Crowther, (1991) found that rural students who want to stay in the area in which they grew up were more likely to seek employment or attend a community college, rather than attend a four-year institution immediately following high school graduation. The result is an educational attainment

gap which has been widening over the last three decades. Given this disparity, it is important to understand other characteristics which may impact postsecondary educational attainment—or lack thereof—of rural students.

Individual Characteristics

Any number of individual characteristics can play a role in whether or not a student is successful in postsecondary education. Researchers have identified characteristics that are important to consider, recognizing their tendency to be intertwined. These include age, gender and risk. We posit these same characteristics are important to rural student outcomes as well. Each is addressed below.

Women have been making great strides in higher education over the last three decades, (Peter, Horn & Carroll, 2005; Freeman, 2004; King, 2000; Trent 1984). However, many researchers are quick to point out that the playing field is still far from level (Lee & Frank, 1990; Freeman, Conley, & Brooks, 2006; Peter, Horn, & Carroll, 2005). This is especially true for rural women. For example, Yan (2002) found that rural females were more likely to attend postsecondary education than males, but they were also more likely to delay enrollment or drop out compared to urban students. This finding is similar to Freeman, Conley, & Brooks (2006) where they found that although larger percentages of women were successful at attaining the baccalaureate degree, when other intervening variables—including rurality—were entered into the equation, women were actually significantly *less likely* to attain the baccalaureate degree. Blackwell and McLaughlin (n.d.) found that family background was more important to baccalaureate attainment for rural females than rural males. Females were more likely to be successful if their parents had postsecondary degrees, especially their mothers. Similarly, Day-

Perroots (1991) found that parental encouragement was particularly important to rural female success.

Historically, students who attended postsecondary education did so immediately after high school. At the age of 18, with parental financial support, living on campus, and attending school full-time, these students are those we refer to today as "traditional" students. Yet, nearly one-half of today's undergraduate enrollments are made up of students who are 25 years or older (Adelman, 1994; Choy & Ottinger, 1998; Berkner, et al., 2002). This is likely due in part to the loss of employment in the manufacturing and mining industries, leading to the need for individuals to update their skills to be marketable in today's knowledge-based economy. As rural residents experience either the loss of jobs or underemployment, they have two choices—either move elsewhere in search of a job which provides a livable salary or seek some form of postsecondary education to update their skills. Many rural people choose the former, which helps to explain the declining rural population (Treadway, 1984; Johnson & Strange, 2005). For those who choose to seek to update their skills, they are also more likely to be employed full-time and/or have familial responsibilities while attending postsecondary education. These factors combined tend to tie them to place, often making baccalaureate attainment difficult if a four-year institution is not in close proximity to their home, should they want to pursue one.

Work and familial responsibilities often tend to serve as obstacles to completing a baccalaureate degree. Still other research has shown a number of different risk factors have strong and significant effects on transfer and baccalaureate degree attainment. These include a) delayed enrollment into postsecondary education, b) no high school diploma,

c) attending part-time, d) being financially independent, e) having a dependent other than a spouse, f) being a single parent, and/or g) working full-time (Horn & Premo, 1995). As the number of risk factors increase, the less likely it is that students will transfer from a two-year to a four-year institution, or attain a baccalaureate degree. Horn and Premo (1995) noted that students who began in a community college were far more likely to have one or more of these risk factors. Additionally, students with two or more risk factors were far less likely to persist. And, many of these students have multiple risk factors. In particular, risk factors such as being a single parent, working full-time and attending part-time tend to have detrimental effects on student persistence. Degree attainment often takes a backseat to familial and work responsibilities (Adelman, 1999, 2006; Freeman & Conley, 2006; Ryland, Riordan, & Brack, 1994). This is particularly true for rural, nontraditional-aged students, who are more likely to begin their postsecondary careers in a community college (Freeman, 2007).

Given this extensive literature, our assumption is that certain individual characteristics will distinguish those vertical transfer students who completed the baccalaureate degree from those who did not. Here, we add to the literature by exploring factors such as the impact of level of geography (rural vs. non-rural) and individual characteristics such as gender, age, and risk on baccalaureate attainment of those who began in a two-year institution.

Research Questions

1. What are the geographic and individual characteristics (age, gender, and risk factor index) of first-time beginning students who (a) attended a rural high school, (b) first attended a rural two-year institution, (c) aspired to a baccalaureate degree, (d)

transfered from a two-year to a four-year institution, and (e) completed a baccalaureate degree within six years (by 2001)?

2. Are geographic and individual characteristics (age, gender, and risk factor index) related to baccalaureate attainment among a) all students who first began in a two-year institution, b) women who first began in a two-year institution, and c) men who first began in a two year institution?

Methodology

A combination of descriptive statistics and multivariate techniques were used to explore the research questions. The primary focus of this study was the relationship between (a) rural and non-rural settings, (b) age, (c) gender, and (d) the risk factor index and baccalaureate attainment of students who began their postsecondary education in a two-year institution and transferred to a four-year institution.

Data Source

The data for this study were drawn from the National Center for Education Statistics 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS: 96/01). The BPS: 96/01 consists of a sample of all undergraduates, regardless of when they graduated from high school, who enrolled in postsecondary education for the first time in 1995-96 and were last interviewed in 2001, approximately six years later. Overall, nearly 12,100 individuals were eligible for BPS:96/01 (both 1996/98 respondents and non-respondents) out of approximately 12,400 who were originally identified as BPS:96 eligible. This survey provides the latest data on degree attainment and persistence six years after the students first enrolled as well as their four-year college transfer rates and the outcomes of these transfers. For those individuals where information on level of

geography was missing in the BPS: 96/01, additional data were drawn from the Common Core of Data (CCD) and the Integrated Postsecondary Education Data System (IPEDS).

Study Sample

The sample was restricted to BPS students whose first enrollment was in a two-year institution. In other words, the unit of analysis was students who began in a two-year institution. [1]

Variables

The dependent variable was a dichotomous indicator of whether or not the student attained a baccalaureate degree by 2001. The independent variables included a set of variables related to geography including geographic location of the high school, first institution attended, and whether or not a student stayed in a rural area for college; and the individual characteristics: age, gender, and the risk factor index. Each is operationalized below.

To determine level of geography, we used a coding scheme based on locale codes recently revised by the National Center for Education Statistics (NCES). The coding scheme is referred to as "urban-centric." Geverdt (2006) explains an urban-centric coding scheme uses the most current geographic concepts. Here, locale codes are based on proximity to an urbanized area, using four major types of areas: city, suburban, town, and rural. Each of these has three subcategories. For city and suburb, the subcategories include large, midsize, and small. Town and rural areas are determined in a similar manner, but also include linear distance from an urbanized area. These subcategories include fringe, distant, or remote. For purposes of this project, all levels of town and rural

[1] Due to NCES standards and the licensing agreement, actual sample sizes are not reported. Rather, sample sizes are rounded or weighted sample sizes are reported. See NCES Statistical Standard 5-3-5 at http://nces.ed.gov/statprog/2002/std5_3.asp for additional information.

were considered “rural” while all levels of city and suburb were considered “non-rural.” Town: fringe, even though it is considered within close proximity to an urban cluster, was considered rural for purposes of this study. Other researchers have employed a similar operationalization of rural (Freeman, 2007; Freeman, Conley, & Brooks, 2006; Freeman & Conley, 2006). Each of the three geographic location variables was dichotomized into rural and non-rural using this strategy. We looked at rural vs. non-rural on three levels—the first institution (two-year) of higher education attended, the high school attended, and a new variable “stay rural” which was constructed to measure whether or not a student stayed rural (attended both a rural high school and a rural two-year institution).

A subset of the data including only those variables for the population of interest was created. There were missing data on the locale code variables because these variables were derived from ACT/SAT tests, which are not typically required by community colleges. We took a two-part approach to fill in the missing geographic data. For those cases where we had the first postsecondary institution codes and/or high school codes available in the data set, we used IPEDS and the CCD, respectively, to identify the geographic codes for each. Approximately 10 cases total were identified through IPEDS and CCD.

However, for those cases where the first postsecondary institution codes and/or high school codes were also missing from the data set (approximately 90 cases) we constructed the geographic variables as follows.

1. If a student’s first postsecondary institution was 50 miles or less from their high school and the first postsecondary institution locale code was missing, then the first postsecondary institution and the high school were coded the same—rural or non-rural.

2. If a student's first postsecondary institution was 50 miles or less from their high school and the high school locale code was missing, then the first postsecondary institution and the high school were coded the same—rural or non-rural.

3. If a student's first postsecondary institution was greater than 50 miles from their high school and the high school locale code was missing, the cases were deleted. It was not possible to determine without the likelihood of error the high school locale.

4. If there was a lack of information from which the level of geography could otherwise reasonably be determined, then those cases were deleted from the dataset.

After construction of the variables, approximately 60 cases were deleted prior to the analysis.

The rationale for the 50 mile cut off for imputation was best described by Adelman (1999), where he noted that 50 miles was the point at which a student is unlikely to commute from home. And, it is unlikely that students will travel from one rural community to a different rural community college more than 50 miles away. Part of the mission of community colleges is to provide geographic access, especially to students from rural areas, as these students typically do not wish to go far from home. Additionally, in reviewing the raw data, we found there to be a distribution in the match between high school and postsecondary institution location. These two issues combined provide for the 50 mile cut point as a reasonable assumption.

The age variable was dichotomized in order to discern among traditional-aged students and nontraditional-aged students. Traditional-aged students included those 18 or younger. Nontraditional-aged students were considered to be older than 18 years. This is a more restrictive operationalization of traditional-aged than in previous studies, but it

parallels the risk factor of “delayed enrollment”. Additionally, Clifford Adelman, Senior Associate with the Institute for Higher Education Policy (IHEP) suggests that there are problems with using the default measure of age 24. Students who begin postsecondary education, essentially having delayed enrollment, are very different from those who begin immediately following high school (Clifford Adelman, personal communication, February 2006). Here, we looked at age as a predictor of baccalaureate attainment based on whether the student was traditional or non-traditional (i.e., attended immediately following high school or delayed enrollment). Gender included male and female.

Horn and Premo (1995) were the first to identify the seven risk factors and develop the risk factor index. The index was developed as a part of a report using data from the 1993 National Postsecondary Student Aid Study (NPSAS:93). The report focused on those students who were nontraditional and “at-risk” of not completing a postsecondary program. These students had at least one if not more of the following characteristics, now identified as risk factors. They are (a) delaying enrollment into higher education, (b) not having a high school diploma, (c) attending part-time, (d) being financially independent, (e) having a dependent other than a spouse, (f) being a single parent, and (g) working full-time. Here, we looked at the number of risk factors and how it influenced baccalaureate attainment of those students who began in a two-year institution, specifically.

Statistical Methods

A combination of descriptive statistics and multivariate techniques were used to answer the research questions. Relevant statistics for students who began their postsecondary education at a two-year institution and transferred to a four-year institution

were produced using the BPS 96/01 Data Analysis System (DAS), restricted data file, SAS and SUDAAN. The DAS produces weighted estimates, standard errors that take into account the complex sample design, and weighted sample sizes for the estimates. For the first research question, we computed descriptive statistics including estimates and the corresponding standard errors using DAS. We computed Student's t-tests to test for differences in the estimates.

To answer the second research question, we conducted logistic regression analyses using SAS and SUDAAN. Logistic regression is an appropriate multivariate technique when the dependent variable is dichotomous (DesJardins, 2001). Mathematically:

$$\log\frac{P_i}{1 - P_i} = a + BX_i \quad (1)$$

In this case, there are two outcomes or events of interest for the model—attained versus did not attain. P_i is the probability that a student who began their postsecondary education in a two-year institution attained. While $1 - P_i$ is the probability that the student did not attain a baccalaureate degree. The factors related to attainment of transfer students form a set of independent variables, X, and a and B are the intercept and the estimated coefficients of each of the independent variables included in the model, respectively.

Limitations

There were several limitations to this study. First, the BPS dataset is marginal with regard to geographic measurement. There is no variable which measures the level of geography of the final (baccalaureate degree-granting) institution attended. Without such a variable, it is difficult to fully understand how geographic location impacts the entire

educational pipeline of rural students who transferred or if the geographic location of the final institution had any impact on baccalaureate success.

Second, the BPS sample size of students at two-year institutions (approximate n=2,400)[2], while larger than in past studies, may not contain enough cases to sufficiently analyze transfer and baccalaureate attainment after disaggregating by location. Some analyses may be affected by missing data or a small number of cases. This is particularly true with regard to the level of geography variable. According to Tracy Hunt-White, Project Officer, Beginning Postsecondary Students Longitudinal Study, National Center for Education Statistics, U.S. Department of Education, the variable which measures the level of geography of the student's high school was derived from ACT/SAT data. Unfortunately, students who begin in two-year institutions often do not take these standardized tests. As such there are a number of missing cases (Tracy Hunt-White, personal communication, August 2005). While this sample size is a limitation in that it is possible that students who begin in two-year institutions may not be fully represented, there were a sufficient number of cases to complete the analysis, particularly after imputation of data using other data sources such as the CCD and IPEDS.

Finally, the BPS was a longitudinal study that lasted for only six years. This may have not been enough time for transfer students to complete the baccalaureate degree, especially for those students who attended on a part-time basis, had work and/or familial responsibilities, or had to commute long distances from rural areas to attend.

[2] Actual sample sizes are not reported due to NCES standards and the licensing agreement. Sample sizes are rounded or weighted sample sizes are reported. See NCES Statistical Standard 5-3-5 at http://nces.ed.gov/statprog/2002/std5_3.asp for additional information.

Results

Descriptive statistics, including estimates, corresponding standard errors, and Student's t statistics, were computed to answer the first research question: What are the geographic and individual characteristics (age, gender, and risk factor index) of first-time beginning students who (a) attended a rural high school, (b) first attended a rural two-year institution, (c) aspired to a baccalaureate degree, (d) transferred from a two-year to a four-year institution, and (e) completed a baccalaureate degree within six years (by 2001). This research question explores the educational pipeline for beginning postsecondary students from high school through two-year institutions to baccalaureate institutions and student outcomes. Results indicated that 31% of beginning postsecondary students attended a rural high school. A majority of beginning postsecondary students attended a two-year institution (59%). Approximately 20% of these students intended to pursue a baccalaureate degree, a finding similar to previous research (Coley, 2000; Berkner, He, & Cataldi, 2002; Hoachlander, Sikora, & Horn, 2003). However, at the end of six years only 12% had transferred to a four-year institution. Of those, more than one-third (37%) had attained a baccalaureate degree (see Table 1). While this statistic may appear to be a successful outcome for vertical transfer students, in reality, it accounts for only 4.4% of two-year beginners who actually completed baccalaureate degrees.

Geography

When looking at this same educational pipeline according to the independent variables—level of geography (high school and first postsecondary institution attended), age, gender, and risk a few interesting findings are noteworthy. On the surface where a

Table 1

Percent Two-year Beginners in the Educational Pipeline

Characteristics	Percent
Total Attended a Rural High School	30.7 (2.76) *
Total Began in a Two-year institution	58.8 (2.46) *
Total Two-year Beginners with BA Intentions	20.1 (2.13) *
Total Two-year Beginners who Transferred	12.0 (1.02) *
Total Two-year Beginners who Attained BA	37.2 (5.0) *

Note. Standard errors are in parentheses. May not add to 100.0 percent due to rounding. Weighted n=approximately 268,000. *Source* : Beginning Postsecondary Students Longitudinal Study, 1996-2001, Data Analysis System, February 16, 2007. *$p < .05$.

student attended high school did not appear to have an impact on the type of postsecondary institution they first attended. As mentioned above, the majority of students first attended two-year postsecondary institutions, regardless of geographic location of the high school they attended (59%) and most of them enrolled in non-rural colleges and universities (84%) (See Table 1). Overall, 60% of beginning postsecondary students who had attended rural high schools began their postsecondary education in a 4-year institution and 40% began in a two-year institution. Similarly, 67% of students who attended non-rural high schools began their postsecondary education in a 4-year institution and 33% began in a two-year institution. While the percentage of beginning postsecondary students who attended rural high schools and first attended a 4-year institution appears lower than the percentage of students who attended non-rural high

schools (60% vs. 67%), this was not a statistically significant difference likely due to the magnitude of the standard error of the estimate of students who attended rural high schools (7.78). Nearly three-quarters of students who first attended four-year institutions attended non-rural institutions (73%). (See Table 2).

Only a small number of beginning postsecondary students attended either rural high schools or rural postsecondary institutions. This may be a product of (a) the small number of rural high school students, generally, (b) a lack of representation of rural high school students in the beginning postsecondary student sample, (c) students who attended rural high schools are not attending postsecondary education at rates similar to students who attended non-rural high schools, or (d) some combination thereof.

As Table 3 shows, about one-third of beginning postsecondary students who attended a rural high school and first attended a two-year institution had baccalaureate intentions (34%). Of these students, 18% transferred to a four-year institution within six years (Table 4). While 48% of students who first began their postsecondary education in a rural two-year institution had attained a baccalaureate degree, there were insufficient cases to report an estimate of baccalaureate attainment of students who also attended a rural high school (Table 5). Once again this suggests a myriad of possibilities similar to those previously stated above.

Table 2

Percent Attended a Two-year and Four-year Postsecondary Institution by Geographic and Individual Characteristics

Characteristics	Two-year	Four-year
All Postsecondary Students	58.8 (2.46)	41.1 (2.46) *
First Institution Type Nonrural		
Of All Two-year Beginners--Nonrural Institution Attendees	83.7 (9.47) *	
Of All Four-year Beginners--Nonrural Institution Attendees		73.0 (5.21) *
All Rural High School Attendees	39.8 (7.78)	60.1 (7.78) *
All Non-rural High School Attendees	33.1 (2.05)	66.8 (2.05) *
All Traditional-age Students	57.2 (3.06)	42.8 (3.06) *
Of All Two-year Beginners--Traditional-age Students	39.7 (4.51) *	
Of All Four-year Beginners--Traditional-age Students		78.9 (2.54) *
Of All Traditional-age Rural High School Attendees	36.5 (7.54)	
Of All Traditional-age Nonrural High School Attendees	29.5 (2.25)	
All Nontraditional-age Students	80.4 (2.04)	19.6 (2.04) *
Of All Nontraditional-age Rural High School Attendees	61.8 (10.3)	
Of All Nontraditional-age Nonrural High School Attendees	51.9 (11.1)	
Gender Male		
All Males	58.9 (2.58)	41.0 (2.58) *
Of All Four-year Beginners--Males		45.3 (2.28)
Of All Four-year Beginners--Male Rural High School Attendees		44.1 (1.98)
Gender Female		
All Females	58.6 (2.73)	41.3 (2.73) *
Of All Four-year Beginners--Females		54.6 (2.28) *
Of All Four-year Beginners--Female Rural High School Attendees		55.9 (1.98) *
All Risk Factors		
No Risk Factors	30.1 (3.65)	69.8 (3.65) *
One Risk Factor	66.1 (2.78)	33.8 (2.78) *
Six Risk Factors	91.6 (2.55)	8.3 (2.55) *
Seven Risk Factors	---	---
Rural High School Attendees Risk Factors		
No Risk Factors	33.1 (8.42)	67.0 (8.42) *
One Risk Factor	59.5 (8.01)	40.5 (8.01)
Two Risk Factors	56.6 (12.9)	43.5 (12.9)
Three Risk Factors	---	---
Four Risk Factors	---	---
Five Risk Factors	---	---
Six Risk Factors	---	---
Seven Risk Factors	---	---

Note. Standard errors are in parentheses. May not add to 100.0 percent due to rounding. Weighted n=approximately 268,000. *Source*: Beginning Postsecondary Students Longitudinal Study, 1996-2001, Data Analysis System, February 16, 2007. *$p < .05$.

Table 3

Percent with Baccalaureate Intentions by Geographic and Individual Characteristics

Characteristics	BA Intentions		No Intentions	
All Postsecondary Students	20.1 (2.13)		79.9 (2.13)	*
All Rural High School Attendees	33.9 (6.83)	*	66.1 (6.83)	
All Traditional-age Students	29.6 (3.36)		70.4 (3.36)	*
Of All Traditional-age Reporting BA Intentions	94.2 (3.53)	*		
Of All with BA Intentions--Rural High School Attendees	96.7 (5.58)	*		
All Nontraditional-age Students	7.9 (1.03)		92.1 (1.03)	*
Of All with BA Intentions--Nontraditional-age	5.8 (3.53)			
Gender Male				
Of All with BA Intentions--Males	54.5 (4.7)			
Of All Male Rural High School Attendees--No BA Intentions			61.9 (6.42)	
Gender Female				
Of All with No BA Intentions--Female			56.8 (1.69)	*
Of All Female Rural High School Attendees--No BA Intentions			71.3 (8.32)	*
All Risk Factors				
No Risk Factors	29.0 (4.98)		71.0 (4.98)	*
One Risk Factor	31.2 (3.92)		68.8 (3.92)	

Note. Standard errors are in parentheses. May not add to 100.0 percent due to rounding. Weighted n=approximately 268,000. *Source* : Beginning Postsecondary Students Longitudinal Study, 1996-2001, Data Analysis System, April 3, 2008. *$p < .05$.

Table 4

Percent Vertically Transferred by Geographic and Individual Characteristics

Characteristics	Transferred	Did Not Transfer	
All Postsecondary Students	12.0 (1.02)	87.9 (1.02)	*
All Rural High School Attendees	17.7 (5.48)	82.3 (5.48)	*
All Traditional-age Students	14.2 (1.54)	85.9 (1.54)	*
Of All Who Transferred--Traditional-age	67.2 (3.15)	*	
Of All Traditional-age, Rural High School Attendees	17.2 (5.35)	*	
All Nontraditional-age Students	9.4 (0.64)	90.7 (0.64)	*
Of All Nontraditional-age, Rural High School Attendees	27.7 (13.3)		
Gender Male			
All Males	15.2 (1.49)	84.7 (1.49)	*
Of All Who Transferred, Male Rural High School Attendees	65.0 (7.78)	*	
Gender Female			
All Females	9.4 (1.07)	90.5 (1.07)	*
Of All Who Transferred, Female Rural High School Attendees	35.0 (7.78)		
All Rural High School Attendees Risk Factors			
No Risk Factors	60.9 (8.73)		
One Risk Factor	29.0 (8.18)		
Two Risk Factors	6.4 (4.98)		
Three Risk Factors	---		
Four Risk Factors	---		
Five Risk Factors	---		
Six Risk Factors	3.8 (5.01)		
Seven Risk Factors	---		
Rural High School Attendees Risk Factors			
Of all Rural High School Attendees with No Risk	17.1 (5.88)		
Of all Rural High School Attendees with One Risk Factor	18.5 (8.0)		
Of all Rural High School Attendees with Two Risk Factors	24.7 (11.2)		

Note. Standard errors are in parentheses. May not add to 100.0 percent due to rounding. Weighted n=approximately 268,000. *Source* : Beginning Postsecondary Students Longitudinal Study, 1996-2001, Data Analysis System, February 16, 2007. *$p < .05$.

Table 5

Percent Attained the Baccalaureate by Geographic and Individual Characteristics

Characteristics	Attained BA	No BA
All Postsecondary Students	37.2 (5.0)	62.8 (5.0) *
First Institution Type Rural	47.5 (12.2)	52.5 (12.2)
All Rural High School Attendees		
Of All Traditional-age, Rural High School Attendees	21.8 (3.4) *	
All Traditional-age Students		
Of All Who Attained BA, Rural High School Attendees	97.9 (2.81) *	
All Nontraditional-age Students		
Of All Nontraditional-age, Rural High School Attendees	---	---
Gender Male		
Of All Who Attained the BA--Males	45.4 (4.13)	
Of All Who Attained the BA--Male Rural High School Attendees	58.9 (13.7)	
Gender Female		
Of All Who Attained the BA--Females	54.6 (4.13)	
Of All Who Attained the BA-Female Rural High School Attendees	41.1 (13.7)	
All Risk Factors		
No Risk Factors	60.4 (3.33) *	
One Risk Factor	25.2 (3.23) *	
Rural High School Attendees Risk Factors		
No Risk Factors	70.0 (8.7)	
One Risk Factor	27.2 (8.89)	
Two Risk Factors	2.8 (3.29)	
Three Risk Factors	0	
Four Risk Factors	0	
Five Risk Factors	0	
Six Risk Factors	0	
Seven Risk Factors	0	
Non-rural High School Attendees Risk Factors		
No Risk Factors	57.2 (5.56)	
One Risk Factor	31.1 (5.49)	
Two Risk Factors	7.8 (3.83)	
Three Risk Factors	2.6 (1.55)	
Four Risk Factors	0	
Five Risk Factors	1.3 (1.44)	
Six Risk Factors	0	
Seven Risk Factors	0	

Note. Standard errors are in parentheses. May not add to 100.0 percent due to rounding. Weighted n=approximately 268,000. *Source* : Beginning Postsecondary Students Longitudinal Study, 1996-2001, Data Analysis System, February 16, 2007. *$p < .05$.

Individual Characteristics

Next we calculated descriptive statistics on selected individual characteristics which have been shown to be related to student outcomes, by geographic location. Beginning postsecondary students were considered rural if they had attended a rural high school. Individual characteristics included age, gender, and the risk factor index. Outcomes included type of first postsecondary institution attended (two-year vs. four-year), baccalaureate intentions, transfer, and baccalaureate degree completion.

Age.

The majority of students in the sample were traditional-age. Traditional-age students were significantly more likely to begin in a four-year institution than a two-year institution (57% and 43%, respectively). Conversely, nontraditional-age students were significantly more likely to begin in a two-year institution than a four-year institution (80% and 20%, respectively). This affects the age distribution by type of institution. While the majority of all beginning postsecondary students were traditional age, 79% of students who first began in a four-year institution were traditional age compared to 40% who first began in two-year institutions (see Table 2).

A statistically significant difference was not observed between traditional aged beginning postsecondary students who first attended a two-year institution, by whether or not they attended a rural or non-rural high school (37% and 30%, respectively). Again, this may be due to the magnitude of the standard error of the estimate of students who attended rural high schools (7.54). Given the distribution of age overall, it may also be that age is more of a factor than geographic location of the high school and first institution attended. However, geographic access may still be an issue for some students.

Sixty-two percent of non-traditional aged students who attended a rural high school first attended a two-year institution, while 52% of non-traditional aged students who attended a non-rural high school first attended a two-year institution (see Table 2). In other words, non-traditional age students who attended rural high schools were more likely than those who attended non-rural high schools to begin their postsecondary education in a two-year institution. Reasons they attend two-year institutions may include institutional proximity, educational goals and/or work and familial responsibilities. These factors may be more pronounced for students who attended rural high schools and are attending rural postsecondary institutions. Geographic access to a four-year institution, then, may be a factor in baccalaureate degree completion for rural students (defined here as students who attended rural high schools).

Most two-year beginners who expressed baccalaureate degree intentions were traditional age (94%). Only 6% of two-year beginners who expressed baccalaureate degree intentions were nontraditional-age. Overwhelmingly, nontraditional-age students who began their postsecondary education in a two-year institution did not have baccalaureate intentions (92%). However, 70% of traditional age students who began their postsecondary education in a two-year institution did not aspire to the baccalaureate degree either. Findings did not differ based on the geographic location of the high school attended. Most two-year beginners who attended rural high schools and expected to attain a baccalaureate degree were traditional age (97%) (see Table 3). This finding is supported by previous research that rural students—at least traditional-age, rural students—do have baccalaureate intentions (Lykins, Spohn, & Crowther, 1991).

The majority of students who began their postsecondary education in a two-year institution did not transfer. However, the majority of students who did transfer were traditional age. This holds true, generally, regardless of geographic location of the high school or first postsecondary institution attended, but the transfer rates were actually a little higher than the national average when age and geographic location of the high school attended were taken into consideration. Approximately two-thirds of beginning postsecondary students who transferred were traditional age (67%). Again, this is somewhat deceiving because only 14% of traditional age students beginning their postsecondary education in a two-year institution transferred (a similar estimate to the percentage that transferred overall, 12%). Yet, nine percent of nontraditional-age students beginning in two-year institutions had transferred six years later, suggesting that two-year colleges provide geographic access to the baccalaureate degree for some rural students. Seventeen percent of traditional age two-year beginners who attended a rural high school transferred and 28% of nontraditional-age two-year beginners who attended a rural high school transferred (see Table 4).

Twenty-two percent of traditional-age students who attended a rural high school had attained the baccalaureate degree within six years. There were not enough data to report for nontraditional-age students who attended a rural high school. However, given the distribution of students who transferred by age, it is not surprising that the majority of two-year beginners who completed the baccalaureate degree were also traditional age (98%) (see Table 5).

This finding coupled with the previous two findings about nontraditional-age, rural student baccalaureate intentions and transfer outcome suggest that, while

traditional-age, rural students may have baccalaureate intentions to begin, very few of them transfer, and even fewer attain the baccalaureate degree. This pattern is consistent with the population overall and with previous research. Most likely this is because they are persisting six years out, rather than attaining within six years (Freeman, 2007). Interestingly, students may be persisting six years out even though they have not completed the baccalaureate degree during the period. Further research is needed to fully understand issues related to timing of baccalaureate degree completion, which is most certainly intertwined with age.

Gender.

The second individual characteristic we explored was gender. As Table 2 indicates, both men and women were significantly more likely to first attend a two-year institution than a four-year institution (59% and 59%, respectively). This is consistent with the fact that more students, generally, begin in a two-year institution. Interestingly, though, women were significantly more likely to begin in a four-year institution than were men (55% and 45%, respectively). However, the majority of women who began in a two-year institution did not expect to attain a baccalaureate degree (57%). The majority of men on the other hand did expect to attain a baccalaureate degree (55%) (see Table 3). This in turn may have led to fewer women transferring than men. Table 4 shows that 9 percent of women transferred compared to 15% of men. However, it appears as though once they transferred about as many women as men attained the baccalaureate degree (55% vs. 45%, respectively) (see Table 5).

Findings are similar when looking at the geographic location of the high school attended by gender. First, women who attended rural high schools were significantly

more likely to begin their postsecondary education in a four-year institution than were men (56% and 44%, respectively) (see Table 2). However, the majority of women who attended rural high schools and first attended two-year postsecondary institutions reported that they did not expect to attain a baccalaureate (71%). While still a majority, 62% of men who attended rural high schools and first attended two-year postsecondary institutions reported that they did not expect to attain a baccalaureate degree (see Table 3).

With such low aspirations, women who attended rural high schools and first attended a two-year postsecondary institution also transferred at rates much lower than men. Almost twice as many of these men (65%) than these women (35%) transferred to a four-year institution, respectively (Table 4). And, while women who attended rural high schools appeared to earn baccalaureate degrees at rates lower than men (41% and 59%, respectively), the difference was not statistically significant. Thus, suggesting that men and women who attended rural high schools attained the baccalaureate degree at similar rates (Table 5). One possible explanation, however, could be that more women began their postsecondary education at a four-year institution than men.

These findings suggest that women who begin in a two-year institution do not fare as well as their male counterparts. This could be perhaps due to any number of factors specific to women. For example, certain risk factors such as having dependents or being a single parent often hinder a woman's postsecondary education—particularly baccalaureate degree attainment. Next we explore the risk factor index relative to baccalaureate outcomes.

Risk Factor Index.

Risk factors play an important role in the educational pipeline for two-year beginners. The fewer risk factors a student has, the more likely he or she will enroll in a four-year institution than a two-year institution. Similarly, the more risk factors a student has, the less likely they are to have baccalaureate intentions, to transfer to a four-year institution, or to attain a baccalaureate degree within six years.

For example, 70% of students with no risk factors began their postsecondary education in a four-year institution compared with 30% who began in a two-year institution. On the other hand, significantly higher percentages of students who had just one risk factor began their postsecondary education in a two-year institution (66%) than a four-year institution (34%). As the number of risk factors increased so too did the percentage of students beginning their postsecondary education in a two-year institution. Nearly all students who had six risk factors or more (92%) first attended two year institutions. Findings were similar for beginning postsecondary students who attended a rural high school. Approximately two-thirds of beginners with no risk factors began their postsecondary education in a four-year institution compared with 33% who began in a two-year institution. Conversely, 60% of beginning postsecondary students who had attended a rural high school and had just one risk factor began postsecondary education in a two-year institution compared with 40% who began in a four-year institution. However, an interesting finding with regard to students who attended rural high schools was that there were insufficient cases to report estimates by type of first postsecondary institution attended suggesting that those with more than two risk factors may not be beginning postsecondary education at all (see Table 2).

Those with no risk factors who began their postsecondary education in a two-year institution had similar baccalaureate degree intentions as the population of beginning postsecondary students generally. Approximately two-thirds of students who expected to attain a baccalaureate degree had either no or just one risk factor. The more risk factors students had the less likely they were to have intentions of attaining a baccalaureate degree. While the percentage of beginning postsecondary students who attended rural high schools, first attended a two-year institution and expressed intentions of attaining a baccalaureate degree appears lower than the percentage of students overall, (66% vs. 80%), this was not a statistically significant difference likely due to the magnitude of the standard error of the estimate of students who had attended rural high schools (6.83) (See Table 3).

As Table 4 indicates, those beginning postsecondary students who attended a rural high school and transferred, 90% had either no or only one risk factor. Clearly, risk factors matter in the postsecondary education pipeline overall. While inconclusive, evidence suggests risk factors may matter even more for students who attend rural high schools. This may be a product of (a) the small number of rural high school students, generally, (b) a lack of representation of rural high school students in the beginning postsecondary student sample, (c) students who attend rural high schools are not attending postsecondary education at rates similar to other students, or (d) some combination thereof. It may be also that risk factors pose even more of an obstacle to successful progression through the postsecondary education pipeline for rural beginning postsecondary students. Interestingly, however, the percentage of students who had attended a rural high school, began their postsecondary education in a two-year

institution, and transferred increased as the number of risk factors increased. Seventeen percent of those with no risk factors transferred, 18% of those with 1 risk factor transferred, and 25% of those with 2 risk factors transferred. Again, there were insufficient cases to report for those who had more than 2 risk factors (See Table 4). One possible explanation for these findings is that students with risk factors, to a point, are persistent in their goal to attain a baccalaureate degree.

Of those who began their postsecondary education in a two-year institution and attained a baccalaureate degree within six years, 85% had no or only one risk factor. These findings were even more pronounced for beginning postsecondary students who had attended rural high schools. The overwhelming majority of beginning postsecondary students who attended a rural high school, began their postsecondary education in a two-year institution and attained a baccalaureate degree within six years had no or only one risk factor (97%). None of these students attained a baccalaureate degree within six years if they had more than two risk factors. While risk factors play an important role in the educational pipeline for students with similar characteristics, some students who attended non-rural high schools attained a baccalaureate degree within six years with as many as five risk factors (1.3%). Further research is needed to determine if risk factors are more of an obstacle to success for students who attend rural high schools.

Logistic Regression Analysis

The descriptive results suggest individual characteristics and risk are related to postsecondary outcomes including transfer and baccalaureate degree attainment. In this section we will explore factors such as the impact of level of geography (rural vs. non-rural) and individual characteristics such as gender, age, and risk on baccalaureate

attainment of those who began in a two-year institution. Any number of individual characteristics can play a role in whether or not a student is successful in postsecondary education. Researchers have identified characteristics that are important to consider, recognizing their tendency to be intertwined. Toward that end, we explore the extent to which geographic and individual characteristics are related to baccalaureate attainment for students who began their postsecondary education in a two-year institution.

We used logistic regression analysis to answer the second research question, which had three parts and thus, three corresponding models. Logistic regression was used to determine the likelihood of the population of a) all students, b) women only and c) men only completing a baccalaureate degree within six years given the independent variables identified in the model. Additionally, this is one of the first pieces of postsecondary research using the new geographic coding scheme for schools, colleges, and universities developed by the U.S. Department of Education. The results are as follows.

The first model, which included both men and women and as shown in Table 6, revealed two variables were statistically significant. First, women were 2.34 times more likely to attain the baccalaureate degree than men (p=.0006). Second, traditional-aged students were 2.61 times more likely to attain the baccalaureate degree than were nontraditional-aged students (p=.01). The finding with regard to women being more successful is particularly interesting in light of the findings above. The descriptive statistics indicated marginal aspirations, transfer, and attainment rates for women who began postsecondary education in a two-year institution. However, when other variables were entered into the equation, women were significantly more likely to be successful.

This finding warrants further exploration given the contradiction with the descriptive analysis.

Table 6

Regression Coefficients for Men and Women

	B	SE	Wald	df	p	Odds Ratio
Gender	.85	.23	13.57	1	.0006***	2.34
Age	.96	.36	7.13	1	.01***	2.61
Risk factor index	-.15	.11	1.74	1	.19	.86
High school new locale (rural)	-.73	.47	2.39	1	.12	.48
First institution new locale (rural)	-.57	1.61	.12	1	.72	.57
Stay rural	1.25	1.51	.68	1	.41	3.48
Constant	-1.29	.39	---	---	---	.28

Note: Approximate n=330

*p < .10. **p < .05. ***p < .01.

The finding regarding traditional-aged students is not surprising given the descriptive statistics found in Research Question 1 above as well as previous research conducted by a number of scholars. Being traditional-aged is particularly advantageous to baccalaureate success for students, particularly for those who begin in a two-year institution.

The second model attempted to look at the independent variables and their effects on women only. Thus, did geography, age or risk have any special impact on women?

This model showed no statistical significance. Thus, the independent variables in the model do not impact women in any particular way.

However, the third model which included men only found three variables to be significant. First, traditional-aged men were 3.15 times more likely to attain a baccalaureate degree than nontraditional-aged men (p = .009). Second, men who had more risk factors had odds of attaining a baccalaureate degree that were 1.66 times greater than men who had fewer risk factors (p = .06). Finally, men who attended a non-rural high school had odds of attaining a baccalaureate degree that were 16.66 times greater than men who attended a rural high school (p = .004). (Table 7).

Table 7

Regression Coefficients for Men Only

	B	SE	Wald	df	p	Odds Ratio	Inverse Odds Ratio
Age	1.15	.42	7.33	1	.009***	3.15	
Risk factor index	-.51	.27	3.66	1	.06*	.60	1.66
High school old locale (rural)	-2.74	.91	9.05	1	.004***	.06	16.66
First institution old locale (rural)	-.97	3.64	.07	1	.79	.38	
Stay rural	3.11	3.49	.79	1	.37	22.35	
Constant	-.81	.52	---	---	---	.44	

Note: Approximate n=150

*p < .10. **p < .05. ***p < .01.

The first finding, that traditional-aged men were more likely than nontraditional-aged men to attain a baccalaureate degree is a finding that was expected, especially in light of the traditional-aged findings above. However, the second two variables of

significance were particularly interesting as they conflicted with the descriptive statistics results in Research Question 1. First, the notion that the more risk factors men had, the more likely they were to attain a baccalaureate degree is counterintuitive. As the outcomes in Research Question 1 (and previous research) indicated, risk factors typically hinder baccalaureate attainment. Perhaps, however, for men, risk factors are critical to their success. Having dependents, working part-time, etc could be an incentive for completion.

Second, the finding about non-rural men having greater odds of attaining a baccalaureate degree is consistent with Census (2000) data. And, at first, this is a finding which appears to be understood. However, findings from the descriptive statistics in Research Question 1 indicated no statistical significance between rural and non-rural men and baccalaureate attainment. This is a contradiction to the multivariate outcomes above. This finding is particularly vexing, as when other variables are entered into the equation, non-rural men become much more likely to succeed. Again, these findings warrant further exploration given the contradiction with the descriptive statistics in Research Question 1.

Overall, it is interesting to note that level of geography was significant in the men only-model. As described above, the descriptive statistics found no significant differences among rural and non-rural male outcomes. However, as other variables came into play, it appears as though being non-rural and male has its advantages to baccalaureate success. This finding indicates that perhaps geographic access and close proximity to the four-year institution does indeed play a significant role in baccalaureate success, at least for non-

rural men. However, why non-rural women do not seem to experience greater levels of success is a mystery worthy of further consideration.

Discussion

This line of research—rural postsecondary education/students—is innovative in two ways. First, postsecondary scholars, if they focus on geography, tend to focus on urban students. There is a significant lack of research in rural postsecondary education. Second, the measurement of rural/non-rural is based on a new coding scheme of geography employed by the US Department of Education—particularly in K-12 education. This is the first piece of literature (of which we are aware) to use the new coding scheme to look at postsecondary education outcomes.

This study was designed to examine factors influencing baccalaureate attainment of students who began in a two-year institution. Specifically, we looked at level of geography and individual characteristics. While exploratory in nature, the findings of this research merit some discussion.

First, findings indicated that overall very few students (12%) who began in a two-year institution actually transferred to a four-year institution; despite the fact that 20% indicated they had baccalaureate intentions. If students who begin in a two-year institution do not transfer, they most certainly will not attain a baccalaureate degree. This is of concern given the increased focus on the 2+2 model as a way to increase access to a postsecondary education, hold down costs, and increase baccalaureate degree attainment.

Second, the results of this study differ from previous research with regard to student outcomes. For example, Freeman (2007) sought to understand *persistence* to the baccalaureate degree—either (a) attained the baccalaureate degree or (b) still enrolled as

of 2001—a slightly different dependent variable than used in this research, which was attainment *only*. Freeman (2007) found no statistical significance when using persistence as the dependent variable. Thus, if students transferred, they persisted. This was true for rural students, especially rural men. Even women who, began in a two-year institution—with any number of risk factors and who were nontraditional-aged—persisted. Her results and the results of this study suggest two important points. First, transfer appears to act a barrier to baccalaureate completion for students who begin in a two-year institution. Second, for those who do manage to transfer, successful baccalaureate attainment takes longer than six years.

Finally, rural students have aspirations to attain a baccalaureate degree (Lykins, Spohn, & Crowther, 1991). Yet, Census (2000) tells us that they do not attain baccalaureate degrees at rates similar to their non-rural counterparts. The results here indicated that 40% of students from rural high schools attended a two-year institution. However, only 39% of them transferred to a four-year institution. This means that only 16% of rural students vertically transferred to a four-year institution. These are very small numbers by any measure. Yet, the results of the multivariate analysis seem to indicate that attending a rural high school, rural two-year institution, or both, for the most part does not matter. However, men attending non-rural high schools were more than 16 times more likely to attain a baccalaureate degree than rural men. Results suggest students from rural areas may face barriers to baccalaureate attainment that non-rural students do not. Interestingly, our findings regarding baccalaureate degree attainment are considerably different than Freeman's (2007) analysis of persistence. Her findings suggested that attending both a rural high school and rural two-year institution was a positive indicator

for men. Again, the difference is the dependent variable. Non-rural men are *attaining* within six years. Rural men are *persisting* six years out. The outcome depends upon the way in which the dependent variable is operationalized. These findings add to the complexity of understanding what makes for successful baccalaureate attainment of rural students. These findings, though inconclusive, raise questions regarding the importance of socially and culturally distinctive aspects of geography which warrant further research. Further, the results of this study suggest we need better ways in which we define, operationalize, and study geographic access, which includes issues related to level of geography and proximity.

Recommendations for Future Research

Several recommendations for future research are offered here. First, we need to explore why transfer appears to act as a barrier to baccalaureate attainment. Researchers need a better understanding of why only 12% of students who began their postsecondary education at two-year institutions transferred, when 20% of them indicated baccalaureate intentions. There are two possibilities. Either (a) students' intentions change over time or (b) there is a block in the path from the two-year to the four-year institution. If intentions change over time, then that is research worthy of future exploration. If there is a block in the path, we need to know which variables affect transfer rates and how state policies may have an impact.

Second, researchers need to rethink the lens through which they view persistence as it pertains to community college students. More focus is needed on student outcomes, rather than institutional retention to fully understand what makes for success. Related to this is the need for longer data collection at the national level. Six years is an insufficient

length of time to fully understand baccalaureate attainment. Today's students often attend part-time, while working and/or attending to familial responsibilities. Their projected completion is at least 9 years from when they first began. When thinking about persistence through the student lens, longitudinal studies need to be designed in a similar manner.

Third, the contradictory findings between the descriptive statistics in Research Question 1 and the multivariate analysis in Research Question 2 warrant further research. The first contradictory finding had to do with successful outcomes for women. While the descriptive findings indicated marginal aspirations, transfer, and attainment rates for women, the multivariate analysis indicated that women were significantly more likely to be successful. Perhaps for women, being a particular age or having a particular number of risk factors provides an incentive to attain a baccalaureate degree. For example, women who have dependents or are single parents need to finish the baccalaureate degree in order to provide for her family.

The second contradictory finding had to do with the successful outcomes for non-rural men. On the one hand, Census (2000) supports the finding of non-rural student success. Yet, findings from the descriptive statistics in Research Question 1 of this study indicated no statistical significance between rural and non-rural men and baccalaureate attainment. However, the multivariate analysis found that non-rural men had odds of successful completion that were more than *16 times* more likely than rural men. This is a large discrepancy by any measure. Thus, additional research which attempts to understand why non-rural men are attaining a baccalaureate degree within 6 years compared to rural men, who persist 6 years out (Freeman, 2007) is critical to this line of

research. Perhaps, as with women, non-rural men have certain characteristics which provide greater incentive to finish the baccalaureate degree and proximity to a four-year institution makes this easier.

Finally, and probably the most important finding has to do with the need for additional research to better understand geographic access and rural student outcomes. The results of this study raise interesting questions and important points worthy of future consideration. They are addressed below.

First, level of geography found in the national datasets is currently derived from ACT and SAT data. Students who begin in a two-year institution often do not take these exams. There is a large gap in the literature with regard to students from rural areas and postsecondary educational attendance and attainment. Additional research, for example at the state level or by geographic region, could help to better understand rural student postsecondary outcomes. Conducting research at the state level or by geographic region could provide additional answers that may be dependent upon state policy and geographic region—particularly with regard to geographic access and the impact of funding, SES, race/ethnicity, etc.

Closely related is the need for level of geography data on all postsecondary institutions that a student attends. Thus, following the student through the entire educational pipeline is critical to understanding student outcomes. This is particularly true as today's students do not attend one institution from beginning to end. Student mobility is increasing at unprecedented rates (Adelman, 2007).

Second, the results of this research seem to contradict earlier research after a slight modification of the dependent variable. This suggests the need for researchers to

look at rural students only. Thus, follow-up studies which filter on rural, while conducting the same or similar analyses may help us understand more fully what is critical to and impacts rural student success. Certain characteristics may be more important to rural student success than non-rural students. For example, studying the intersection between rural and race/ethnicity and socioeconomic status (SES), in particular, may find some interesting results not previously considered. Additionally, rural student plans, pathways, and persistence need more focused attention. Studies which try to untangle the web of rural student postsecondary plans, the pathways they follow to realize those plans and the persistence rates are critical to understanding rural student success.

The results of this study and previous studies related to it articulate a clear need for better understanding about geographic access and baccalaureate persistence and attainment. Additionally, we do not have a thorough understanding of why transfer appears to act as barrier to baccalaureate persistence and eventual attainment. While some scholars would undoubtedly argue that beginning at a two-year institution is part of the problem, the results presented here are not so conclusive. Yes, few students who begin in a two-year institution transfer. But, if they transfer, they persist.

Researchers, practitioners, and policymakers at every level, must work collaboratively in order to ensure the success of students who wish to attain a baccalaureate degree, regardless of the institution in which they began their postsecondary education. With the increased importance of a higher education, and particularly the notion that the baccalaureate degree is becoming a requirement for entry

into the workforce demands not only a better understanding of the issues raised here, but also demands cooperation and collaboration among stakeholders.

References

Adelman, C. (1994). The way we are: The community college as American thermometer. In J. Ratcliff, S. Schwarz, & L. H. Ebbers (Eds.). *ASHE Reader on Community Colleges*. Boston: Pearson Custom Publishing.

Adelman, C. (1999). *Answers in the toolbox: Academic intensity, attendance patterns, and bachelor's degree attainment*. Washington, DC: U.S. Department of Education.

Adelman, C. (2005). *Moving into town—and moving on: The community college in the lives of traditional-age students*. Washington, DC: U.S. Department of Education.

Adelman, C. (2007, July). *Building a culture of transfer*. Keynote speech presented at the 4th Bienniel Conference on Transfer and Articulation, Phoenix, AZ.

Advisory Committee on Student Financial Assistance. (2002). *Empty promises: The myth of college access in America*. Washington, DC: author.

American Association of Community Colleges. (2004). *Fast facts*. Retrieved November 11, 2005 from http://www.aacc.nche.edu

Astin, A. (1975). *Preventing students from dropping out*. San Francisco: Jossey-Bass Publishers.

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

Bean, J. P. (1981). *The synthesis of a theoretical model of student attrition*. Paper presented at the annual meeting of the American Education Research Association, Los Angeles, California.

Bean, J. P. & Metzner, B. S. (1985). A conceptual model of nontraditional undergraduate student attrition. *Review of Educational Research, 55,* 485-540.

Berkner, L., He, S., & Cataldi, E. F. (2002). *Descriptive summary of 1995-96 beginning postsecondary students: Six years later* (NCES 2003-151). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Brint, S. & Karabel, J. (1989). *The diverted dream: Community colleges and the promise of educational opportunity in America, 1900*-1985. New York: Oxford University Press.

Brown, D. L. & Swanson, L. E. (Eds.). (2003). *Challenges for rural America in the twenty-first century*. University Park, PA: The Pennsylvania State University Press.

Chen, X. & Carroll, C. D. (2005). *First-generation students in postsecondary education: A look at their college transcripts* (NCES 2005-171). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Choy, S. P. & Ottinger, C. (1998). *Choosing a postsecondary institution* (NCES 98-080). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Clark, B. R. (1960). The "Cooling-Out" function in higher education. *The American Journal of Sociology, 65*(6), 569-576.

Cohen, A. M. & Brawer, F. B. (2003). *The American Community College, 4th Edition*. San Francisco, CA: Jossey-Bass.

Coley, R. (2000, March). *The American community college turns 100: A look at its students, programs and prospects*. Princeton, NJ: Educational Testing Service.

College Board (2006a). *Education pays 2006 second update: A supplement to education pays 2004: The benefits of higher education for individuals and society*. Retrieved December 4, 2006, from http://www.collegeboard.com/prod_downloads/press/cost06/education_pays_06.pdf

College Board (2006b). *Trends in college pricing 2006*. Retrieved December 4, 2006, from http://www.collegeboard.com/prod_downloads/press/cost06/trends_college_pricing_06.pdf

DesJardins, S. L. (2001). A comment on interpreting odds-ratios when logistic regression coefficients are negative. AIR Professional File, No.81. Tallahassee, FL: Association for Institutional Research.

Dougherty, K. (1987). The effects of community colleges: Aid or hindrance to socioeconomic attainment?. *Sociology of Education, 60,* 86-103.

Freeman, C. E. (2004). Trends in educational equity of girls and women: 2004 (NCES 2005-016). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Freeman, M. L. (2007). Selected characteristics related to persistence to the baccalaureate degree for vertical transfer students: Geography, age, gender, and risk (Doctoral dissertation, Ohio University, 2007). *Dissertation Abstracts International, forthcoming*.

Freeman, M. L. & Conley, V. M. (2005). *Course applicability system (CAS) survey of advisors' awareness and usage analysis report*. Athens, OH: Center for Higher Education.

Freeman, M. L. & Conley, V. M. (May, 2006). *Women, transfer, and baccalaureate completion*. Paper presented at the Annual Forum for the Association for Institutional Research (AIR), Chicago, Illinois.

Freeman, M. L., Conley, V. M., & Brooks, G. P. (2006). Successful vertical transitions: What separates community college transfers who earn the baccalaureate from those who don't? *Journal of Applied Researched on the Community College, 13*(2), 141-150.

Geverdt, D. (2006). *Documentation to the NCES common core of data public elementary/secondary school locale code file: School year 2003-04*. U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Heller, D.E. (2001). Introduction: The changing dynamics of affordability, access, and accountability in public higher education. In D. Heller (Ed.). *The States and Public Higher Education Policy: Affordability, Access, and Accountability*. Baltimore: Johns Hopkins Press.

Hoachlander, G., Sikora, A. C., & Horn, L. (2003). *Community college students: Goals, academic preparation, and outcomes* (NCES 2003-164). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Horn, L. J. & Premo, M. D. (1995). *Profile of undergraduates in U.S. postsecondary education institutions: 1992-93. With an essay on undergraduates at-risk* (NCES 96-237). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Hungar, J. Y. & Lieberman, J. (2001). *The road to equality: Report on transfer for the Ford Foundation*. New York: Ford Foundation.

Johnson, J. & Strange, M. (2005). *Why rural matters 2005: The facts about rural education in the 50 states*. Arlington, VA: Rural School and Community Trust Policy Program.

Johnson, J. & Strange, M. (2007). *Why rural matters 2007: The realities of rural education growth*. Arlington, VA: Rural School and Community Trust Policy Program.

King, J. E. (2000). *Gender equity in higher education: Are male students at a disadvantage?* Washington, DC: American Center on Education, Center for Policy Analysis.

Knoell, D.M. & Medsker, L.L. (1965). *From junior to senior college: A national study of the transfer student*. Washington, DC: American Council on Education.

Lee, V. E. & Frank, K. A. (1990). Students' characteristics that facilitate the transfer from two-year to four-year colleges. *Sociology of Education, 63*, 178-193.

Long, B. T. (2005). *State financial aid: Policies to enhance articulation and transfer*. Boulder, CO: Western Interstate Commission on Higher Education (WICHE).

Lykins, D., Spohn, K., & Crowther, T. (1991). *Appalachian access and success*. Athens, OH: Institute for Local Government Administration and Rural Development.

Monroe, A & Richtig, R. (2002). Factors affecting transfer decisions. *Community College Enterprise, 8*(2), 19-40.

Mumper, M. (1996). *Removing college price barriers: What the government has done and why it hasn't worked.* Albany, NY: State University of New York Press.

Mumper, M. & Freeman, M. L. (2005). The causes and consequences of public college tuition inflation. In J. Smart (Ed.). *Higher education: A handbook of theory and research*. New York, NY: Agathon Press.

Peter, K., Horn, L., & Carroll, C. D. (2005). *Gender differences in participation and completion of undergraduate education and how they have changed over time* (NCES 2005-169). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Rouse, C. (1995). Democratizing or diversion: The effect of community colleges on educational attainment. *Journal of Business and Economics Statistics, 13*(2), 217-224.

Ryland, E. B., Riordan, R. J., & Brack, G. (1994). Selected characteristics of high-risk students and their enrollment persistence. Journal of College Student Development, 35, 54-58.

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

Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition.* Chicago: University of Chicago Press.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition, 2nd ed*. Chicago: University of Chicago Press.

Tinto, V. (2004, July). *Student retention and graduation: Facing the truth, living with the consequences* (Occasional Paper No. 1). Washington, DC: The Pell Institute.

Treadway, D. M. (1984). *Higher education in rural America: Serving the adult learner*. New York: College Entrance Examination Board.

Trent, W. T. (1984). Equity considerations in higher education: Race and sex differences in degree attainment and major field from 1976 through 1981. American Journal of Education, 92(3), 280-305.

Velez, W. & Javalgi, R. G. (1987). Two-year college to four-year college: The likelihood of transfer. *American Journal of Education, 96*(1), 81-94.