

DISSERTATION

INFLUENCE OF BEGINNING COLLEGE TYPE ON POST SECONDARY
EDUCATIONAL ACHIEVEMENT: A MATCHED PAIRS STUDY

Submitted by:

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In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy

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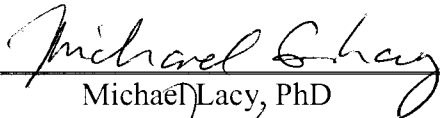
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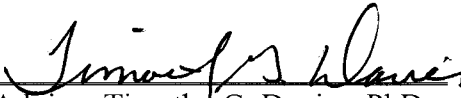
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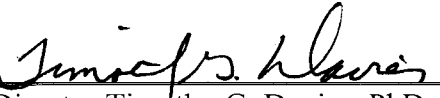
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ABSTRACT OF DISSERTATION

INFLUENCE OF BEGINNING COLLEGE TYPE ON POST SECONDARY
EDUCATIONAL ACHIEVEMENT: A MATCHED PAIRS STUDY

The purpose of this study was to gather more information about the influence of beginning higher education at a two-year college versus beginning at a four-year college on a student's educational achievement. The three outcomes of interest were: (1) whether a student remains continuously enrolled throughout college; (2) total number of college credits a student completes; and (3) highest degree, if any, a student obtains.

In order to compare students who began at two-year colleges with their peers who began at four-year colleges, students were matched on the following six variables: (1) gender, (2) ethnicity, (3) mother's highest level of education, (4) father's highest level of education, (5) total family income during the student's eighth grade year, and (6) the student's own predictions of how far they will go in post secondary education, made while seniors in high school. The study used data collected by the National Educational Longitudinal Study of 1988 (NELS:88).

The study supported previous literature, finding that students who begin at two-year schools are 48 % more likely to complete less than one year of full-time enrollment than are their four-year peers and are 42 % less likely to stay continuously enrolled over their college experience than are their four-year peers. The study also found that students who begin at four-year schools are 46 % more likely to obtain a bachelor's degree than their two-year peers.

For all three outcome variables of interest those students who began at four-year colleges achieved more academically than their matched peers who began at two-year colleges. When two students who are very similar in terms of gender, ethnicity, parents' level of education, socioeconomic status and self perceived future achievement begin their education at different colleges – one a four-year school and the other a two-year school - the four-year attendee consistently will achieve more academically. This information is important and relevant to students, parents, researchers, and policymakers alike.

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CHAPTER 1: INTRODUCTION

Overview

Two-year colleges have assumed an important role in the United States' higher education system. Between 1980 and 1994 the proportion of 18 to 24-year olds enrolled in college grew by more than a third from 26 to 36 %. Two-year colleges absorbed more than half of that increased enrollment (Kane & Rouse, 1999). The increased interest in two-year colleges, or community colleges as they have come to be known, has lead to many questions about this institution. Dougherty (1994) asks about the community college "Is it an avenue of opportunity for its many working-class, minority and female students, or is it a blind alley blocking off equality?" (p.15)

After more than ten years of exhaustive research, Brint and Karabel (1989) concluded that the dream of education as a route to upward mobility, as well as the ideal of equal educational opportunity for all, are both seriously threatened by the community college. But, not all researchers agree. Leitzel and Clowes (1994) scrutinized 18 separate reviews of Brint and Karabel's (1994) book on this topic, *The Diverted Dream*, and found that two distinct camps emerged in the reviews: those who supported their claims and those who flat out disagreed with their claims. Instead of providing conclusive evidence for the role of community colleges, Brint and Karabel (1994) provided a good starting point for a still ongoing debate.

There are many more questions than answers about the role of two-year colleges in today's higher education system. Critics and advocates both present their views, but in reality very little is known about the outcomes for students who choose to attend two-

year colleges. And, because there are now over 1200 community colleges serving 11.6 million students in the U.S. (American Association of Community Colleges, 2007), more information is needed about the two-year college and its overall function in the higher education system. This information is important and relevant to students, parents, researchers, and policymakers.

Background

The purpose of this proposed study was to gather more information about the influence of beginning higher education at a two-year college versus beginning at a four-year college on a student's educational outcomes. The three outcomes of interest were: (1) whether a student remains continuously enrolled through out college; (2) the total number of college credits a student completes; and (3) the highest degree, if any, a student obtains.

In order to compare students who begin at two-year colleges with their peers who begin at four-year colleges, students were matched on variables previously shown in the literature to affect educational outcomes. Based on previous literature, the six variables students were matched on are: (1) gender, (2) ethnicity, (3) mother's highest level of education, (4) father's highest level of education, (5) total family income during the student's eighth grade year, and (6) the student's own predictions of how far he or she will go in post secondary education, made while a senior in high school.

Extensive literature supports the selection of each matching variable. According to the National Center for Educational Statistics (2005) in 2003 women earned 60% of all associate's degrees, 58% of all bachelor's degrees, and 59% of all master's degrees. Several other researchers independently have confirmed that women now earn more

degrees at all levels than men in the United States (Jacobs, 1995; Sum, Khatiwada, & McLaughlin, 2007).

In addition, ethnicity appears to be very important in predicting academic achievement. Rose (2003) found that while Asians attain a greater share of seats in four-year colleges than their proportion of the population of 18-year-olds in the U.S., African Americans and Hispanics constituted only 6 % each of the freshman classes of the 146 “most” and “highly” selective four-year colleges in 1995. African Americans and Hispanics were 15% and 13% , respectively, of all 18-year-olds in 1995. So, Blacks and Hispanics were considerably underrepresented, even with affirmative action at selective colleges. Data from the National Center for Education Statistics (2005) confirms this finding.

Both mother’s and father’s level of education are important determinants of academic achievement. Students are least likely to aspire to earn a bachelor’s degree when their parents have a high school diploma or less (Horn & Bibbitt, 2000). Research indicates that mothers and fathers influence their children differently, which suggests the influences of each parent should be looked at separately (Flannagan & Perese, 1998; Menaghan & Parcel, 1999).

Multiple studies indicate that family wealth and socioeconomic status (SES) are important predictors of achievements. Research shows that students from low SES backgrounds have lower educational aspirations, persistence, and achievement than their peers from high SES backgrounds both prior to and during college (Astin, 1993; Davies & Guppy, 1997; DiMaggio & Mohr, 1985; Conley, 2001; Lareau, 1993; McDonough, 1997; MacLeod, 1987; Pascarella & Terenzini, 1991; Perna & Titus, 2004; Tinto, 1993).

In addition, it's important to consider a student's goals when comparing degree attainment. Community colleges serve a very diverse population, and according to student surveys compiled by Phillipe and Patton (1999), obtaining formal credentials is not necessarily a student's primary goal for attending a two-year college. Knowing what a student intends to do, and expects to do, in terms of educational achievement is a useful variable on which to match students from two-year school and four-year schools.

In order to obtain data about all of these characteristics on which students were matched, the study was an archival study, using data collected by the National Educational Longitudinal Study of 1988 (NELS:88). This is a nationally representative sample of eighth graders first surveyed in the spring of 1988. A sample of these respondents was then resurveyed through four follow-ups in 1990, 1992, 1994, and 2000. On the study's questionnaires, students, parents, teachers, and school administrators were all surveyed. Coursework and grades from students' high school and postsecondary transcripts are available as well.

This study was important for contributing to the existing knowledge base because limited research has been conducted comparing levels of academic achievement between two-year and four-year college students, when the influence of confounding background variables is minimized. Most previous comparison studies have failed to account for the background variables that lead students to enroll in each type of institution in the first place. Because of this, it is still unclear if lower academic achievement shown by two-year college attendees is due to the fact that many students who attend two-year colleges are minorities, have parents with low levels of education, low family income levels, and

other important demographic similarities or if two-year students' lower achievement is due the influence of the two-year college itself.

In addition, previous studies have not used matching designs to look at two-year versus four-year college students. This study provided a new and unique way to gain further information about factors that lead to, or detract from, student academic achievement. This study provided important information from which to work toward improving and promoting student academic achievement at all post secondary education levels.

Central Research Question

The central research question was this: Do students who begin at two-year colleges achieve less academically than otherwise similar students who begin at four-year colleges? In other words, is there reason to suspect that it is the two-year college itself that is limiting student achievement?

This question is important because there is limited information available to indicate if the same student had started college at a four-year school, instead of a two-year school, would that student have been more likely to have stayed continuously enrolled? Would that student have been more likely to have completed more total college credits? And finally, would that student have been more likely to achieve an associate's degree, bachelor's degree, or even a graduate degree?

Researchers have long speculated that two-year colleges serve a "cooling out" function in American society (Clark, 1960). This phrase refers to critics' claims that two-year colleges encourage a culture of privilege through not allowing working class children to advance in social class, protecting selective admissions at four-year

institutions for the nation's elite, and discouraging transfer through "cooling out."

However, it has been hard to document this because most previous studies fail to take into account background reasons that cause students to two-year colleges.

This study was different from previous studies because in matching students known to be similar on important background variables, the educational outcomes for a student attending a two-year college can be compared more accurately to an otherwise similar peer attending a four-year college.

Study Limitations

In designing this study one major limitation was that it would have been extremely helpful to be able to match students in terms of high school grade point average. This would have provided a summary of a student's academic achievement up to the point of beginning post secondary education. Because NELS:88 study designers also agreed this would be valuable information, a question was included in the NELS:88 survey asking each student's high school to provide his or her grade point average. To accommodate different procedures for recording grade point average (4 point scale vs. 5 point scale, for example), schools were asked to provide this information as a percentage on a 100 point scale.

When attempting to use these data, it was discovered that a very large portion of results were clustered between 3.5 and 4.0. Assuming this was the result of schools not clearly understanding and responding with a number other than in a percentage of 100, the data could not be used. In addition, there is no way to know if lack of understanding of other questions by some respondents has altered actual reported results from intended reported results.

Other researchers have reported experiencing similar problems using the NELS:88 database. According to Wittenburg and Stapleton (2000), there are two major limitations of the NELS:88 database. First, it excludes a large number of youth with severe disabilities, including those from separated special education schools, area vocational schools, those in "ungraded" classrooms, and those deemed by local staff to be unable to participate because of physical disability, mental illness, or language barriers. Therefore, the data do not provide representative information on large samples of youth with specific limitations. Second, NELS:88 only provides information on youth up to eight years post college. Therefore, these data do not provide long-term outcomes past that point.

Regarding that last point with this study, because the NELS:88 study follows students for just eight years post high school graduation, it is not possible to know whether a student in this database who has not had continuous enrollment or has dropped out of school completely will later complete further post secondary education. It is possible, and even likely, that some students included in this study will complete further post secondary education later in life, and this information is not included in the NELS:88 data.

Significance of Study

More information is needed about the influence of the type of college first attended on a student's educational achievement. Does the two-year college really serve a "cooling out" function in higher education today? Or, would those same students have similar educational achievement even if they began at a four-year school? Any further understanding that could be gained in this area will lead to better informed choices and

decisions by students, their parents, and school administrators. This information will lead future researchers to a better informed place from which to work toward studying student achievement.

Summary

In summary, in order to answer the central research question “Do students who begin at two-year schools achieve less academically than students who begin at four-year schools due to the influence of the institution itself?” it was necessary to compare educational outcomes for two similar students – one who enrolls at a two-year school and one who enrolls at a four-year school. Matching students on background variables previously shown to be associated with achievement has allowed more information to be gained in answering this important question. A review of the literature has been included to support the background variables selected for matching students in this study.

CHAPTER 2: REVIEW OF LITERATURE

Introduction

Is it important to understand who succeeds in college and to what level? In the view of most Americans, it is very important for individuals to receive a higher education. According to the National Center for Public Policy and Higher Education (2000), in the view of most Americans (87%), a college education has now taken on the importance that a high school education had in the past and has become a necessary ingredient for a good job and comfortable lifestyle. And in order for college education to become a reality for more and more students, it is necessary to understand which students are succeeding in obtaining degrees, which students are not, and what the barriers to degree attainment are.

The U.S. Department of Labor (2005) reported that in 2003, workers who had a bachelor's degree had median weekly earnings of \$900, compared with \$554 a week for high school graduates—that's a difference of \$346 per week, or a 62% jump in median earnings. These figures are a bold statement about the importance of getting a college degree for attaining higher paying jobs. Many other studies support this claim. For example, according to the U.S. 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 & Newburger, 2002).

And, if increased earnings aren't reason enough to be concerned about higher education achievement among students, there are several other compelling reasons to be

concerned about college achievement. The Institute for Higher Education Policy (1998) reviewed the individual benefits that college graduates enjoy and found college degree holders experience improved health and longer life expectancy, have an improved quality of life for their offspring, participate in more hobbies and leisure activities, have improved personal and professional mobility, have better working conditions and better consumer decision making skills, to highlight benefits this review reports.

This research illustrated that obtaining a college degree is critical, and because of countless benefits, finding ways to understand and increase college success rates is worthy of further study. Unfortunately, too few students currently are able to attend college. According to the U.S. Census Bureau, in 2002 there were slightly more than four million young people who were the right age to be starting college for the first time. But the Department of Education (2003) reports that only 1.4 million students entered four-year colleges for the first time that year: a roughly 35 % rate of attendance.

This review of literature will compare achievement between students who attend two-year colleges and those who attend four-year colleges in order to establish a significant achievement difference between these two groups of students. Next the literature review will provide a basis for the variables that these two groups of students will be matched on in this study. It is important to control for the effects of background variables known to influence student achievement when comparing two-year and four-year college students. The goal is to avoid comparing high family income, White males at four-year colleges to low family income Black females at two-year colleges, for example. This study will compare like students at different colleges. The variables explored in this review of literature are gender, ethnicity, father's level of education,

mother's level of education, family income in the eighth grade, and student reported predictions of post secondary educational achievement.

Two-year College Student Achievement

The idea that students who first attend two-year colleges have lower educational achievements than those who first attend four-year colleges is not new. Clark (1960, 1980) argued that two-year colleges cause students to lower their educational expectations. Clark wrote, "The wide gap found in many democratic institutions between culturally encouraged aspiration and institutionally provided means of achievement leads to the failure of many participants. Such a situation exists in American higher education" (1960, p.569). He was a pioneer of the idea that two-year colleges are actually counterproductive in the overall educational achievement of students.

To look further into the ideas expressed by Clark, one unique, albeit somewhat controversial study was able to look at students expressing the desire to study at a four-year college who were then randomly assigned to either a four-year college or a two-year college. Alba and Lavin (1981) tracked students in the City of New York System admitted to a four-year school and subsequently either assigned to study at a four-year school or assigned to study at a two-year school, allegedly by a clerical error.

Alba and Lavin (1981) concluded that students who started at two-year colleges were less likely to stay as long in school and more likely to earn fewer total credits than those students who began in four-year schools. In addition, they reported that starting at a four-year college doubled a student's chance of earning a bachelor's degree within five years. As a result they concluded that Clark was correct; two-year colleges function as a

separate track in higher education and have an overall discouraging effect on educational attainment.

Unlike Alba and Lavin (1981), most researchers are not able to randomly assign students to either four-year schools or two-year schools and must instead track students who self select into two-year or four-year colleges. According to a broad review of the existing literature in this area done by Whitaker (1994), almost without exception, studies have indicated that students who begin at two-year schools are about 15% less likely to complete a bachelor's degree than their peers at four-year schools and have significantly lower overall levels of educational achievement. Selected examples of the studies used to make this generalization are described in the following paragraphs.

Velez (1985) used data from the National Longitudinal Survey of the High School Class of 1972 (NLS-72) which is a two-stage probability sample, first sampling schools and then students within those schools. He used multivariate analysis to determine the odds that this sample of high school seniors would earn a bachelor's degree. His conclusion was that whether a student begins at a four-year school or two-year school has a dramatic affect on the chances that a student will earn a bachelor's degree and that those who begin at four-year schools are significantly more likely to earn a bachelor's degree than students who begin at two-year schools.

A few years later, Nunley and Breneman (1988) used the same NLS-72 data to look at educational achievements of students who reported that they aspired to receive a bachelor's degree. This study is important because one can't be sure that all students entering two-year colleges have an interest in obtaining a bachelor's degree, so any such comparisons to their four-year counterparts hold no relevance. To answer this argument,

Nunley and Breneman (1988) looked exclusively at students aspiring to the bachelor's degree who entered college in 1972 and then looked at the same students again in 1979. They found that even after attempting to control for different overall educational aspirations of the students, those entering four-year schools received 11.5 % more bachelor's degrees and averaged 0.16 more years of education than those entering two-year colleges first. Anderson (1984) reported similar results using the NLS-72 follow up data from 1979. He found that two-year college attendees received 14 % fewer bachelor's degrees than their four-year counterparts.

These results are not just confined to studies using the NLS-72 database. Astin (1982) used the Cooperative Institute Research Program (CIRP) survey conducted by The American Council of Education and the University of California at Los Angeles to show that of those aspiring to at least a bachelor's degree, after nine years, two-year college attendees were significantly less likely than their four-year counterparts to have attained a bachelor's degree.

Several years later, Brint and Karabel (1989) wrote about the growth and transformation of the American community college in *The Diverted Dream*. They wrote that the idea that a community college is intended for those who wish to pursue a bachelor's degree is mistaken, and that two-year colleges were never intended for that purpose. They go as far as to state that "The very fact of attending a two-year rather than a four-year institution lowers the likelihood that a student will obtain a bachelor's degree" (p.227).

Some studies show even more drastic effects of two-year colleges on student achievement. Pascarella et al. (1998) tested the hypothesis that community college

attendance lowers students' pre-college plans to obtain a bachelor of arts degree. He reported that in the presence of controls for pre-college plans, other background factors, and college academic and nonacademic experiences, community college students initially planning to obtain a bachelor of arts degree were between 20 % and 31 % more likely than similar four-year college students to lower their plans below a bachelor of arts degree by the end of the second year of college.

One exception to the generally reported theory that two-year schools lower educational achievement of students was reported by Rouse (1995) who found that community college attendance did not appear to change the likelihood that a student would obtain a bachelor's degree. Rouse (1995) used a sample of 6,786 individuals from the High School and Beyond (HS&B) senior cohort who participated in all four rounds of the survey. She categorized respondents based on whether their first institution attended after high school was a two-year college or a four-year college and found that two-year college attendance did not appear to have a negative affect on bachelor's degree attainment.

A very recent working paper by Long and Kurlaender (2008) circulated in September by the National Bureau of Economic Research also studies educational outcomes for students beginning at a two-year college versus a four-year college. Long and Kurlaender (2008) examined how the outcomes of community college entrants compare to similar students who initially entered four-year institutions within the Ohio public higher education system. They tracked student outcomes for nine years using propensity score matching and instrumental variables. They found that even after

accounting for background variables, students who initially begin at a community college were 14.5 % less likely to complete a bachelor's degree within nine years.

With few exceptions, the literature suggests that two-year college students are consistently achieving less than their four-year college peers. More information is needed to indicate whether this is due to the influence of the institution itself. In order to look at the effect of the institution without influence from background variables, it is necessary to control for factors previously shown in the literature to influence overall educational attainment. Those factors, discussed in the following sections, include gender, ethnicity, mother's level of education, father's level of education, family income level, and student predictions of post secondary achievement.

Gender Influences Achievement

According to Jacobs (1995), who studied the gender of college degree recipients all through the 1980s, since 1982 more women than men in the United States have earned a college degree. During the last year of his study in 1990, he concluded that 53.2 % of bachelor's degree recipients were women.

This finding still holds true into the 2000s according to the National Center for Educational Statistics (2003) who report that in 2001, 56.3 % of college students were women and 43.7 % were men. In 2002, the percentage of female recent high school graduates to enroll in college was 68.4%, 6.3 % higher than that of recent male graduates (National Center for Education Statistics, 2003).

These findings are largely substantiated by Sum, Khatiwada, and McLaughlin (2007) who reported that over the past three decades women first gained on men and then surpassed them in college degree attainment. For example in 1980, 23 % of 22 to 34-

year-old males in the United States had earned a bachelor's or higher degree versus only 19 % of women. By 2005, 30 % of women in this age group in the United States held a bachelor's versus only 24 % of men.

What also is interesting is that this finding applies to degree attainment at all levels. According to the National Center for Educational Statistics (2005) in 2003 women earned 60 % of all associate's degrees, 58 % of all bachelor's degrees, and 59 % of all master's degrees. Because these statistics indicate that gender is an important component of determining degree achievement, students in this study were matched on gender.

Race / Ethnicity Influences Achievement

According to the National Center for Educational Statistics (2005) approximately 67 % of all degrees conferred during the 2002–03 academic year went to White, non-Hispanic students; 22 % to members of groups other than Whites (includes Black, non-Hispanics, Hispanics, Asians/Pacific Islanders, and American Indians/Alaska Natives); and the remainder to nonresident aliens (5 %) or individuals whose race/ethnicity was unknown (5 %).

The proportion of degrees awarded to members of groups other than Whites was highest at the associate's level, with 27 % of all degrees. These students also were awarded 22 % of bachelor's degrees, 17 % of master's degrees, 14 % of doctor's degrees, and 24 % of first-professional degrees.

What do these numbers indicate about the percentage of minorities attending college relative to their representation in the U.S. population? The U.S. Department of Education and census numbers for 2001 indicate that approximately 37 % of the White

population, 26 % of the Black population, and 15 % of the Hispanic population living in the U.S. enrolled in four-year institutions when they reached the age to do so.

What is perhaps even more telling is that access to colleges, especially selective colleges, is highly skewed by race and ethnicity, according to research by Carnevale and Rose (2003), who used the same database this proposed study uses, NELS:88, to study college attendance by race and ethnicity. They found that while Asians attain a greater share of seats in four-year colleges than their proportion of the population of eighteen-year-olds in the U.S., African Americans and Hispanics constituted only 6 % each of the freshman classes of the 146 “most” and “highly” selective four-year colleges in 1995. African Americans and Hispanics were 15 % and 13% , respectively, of all 18-year-olds in 1995. So, Blacks and Hispanics were considerably underrepresented, even with affirmative action at selective colleges.

This information supports the reason that students in the study were matched according to race / ethnicity in order to eliminate this influence on educational achievement.

Father's Level of Education Influences Achievement

Students are least likely to aspire to earn a bachelor's degree when their parents have a high school diploma or less (Horn & Bibbitt, 2000). In addition, that same group of students is least likely to be qualified for college (Barkner & Chavez, 1997). Horn and Bobbitt (2000) found that even after controlling for high school achievement, family income, and single versus two parent households, students who were the first in their families to attend college were less likely than their peers to participate in programs leading to college enrollment and application to college.

Traditional research on parental education level and child achievement has focused on father's level of education much more so than mother's level of education (Amato, 1998). Additionally, much of this research has been focused on first generation college students (those who parents never enrolled in post secondary education). Researchers have largely come to the consensus that those students whose parents have attained college degrees are much more likely to attain degrees themselves (NCES, 1998). First-generation students persist in postsecondary education and attain credentials at lower rates than their non-first-generation counterparts. This finding held for students at 4-year institutions and public 2-year institutions (NCES, 1998).

Amato (1998) used two methods to look at the effects fathers have on their children. He conducted an extensive review of the literature from 1980 through the early 1990s, as well as a data analysis using 12-year longitudinal data on parent and young adult offspring. Using both the literature review and data analysis, Amato (1998) concluded that the higher the father's level of education, the better off the children are. It appears that fathers' high levels of education are important for children's success by increasing children's levels of education, which in turn increases the quality of the children's lives in many different ways.

This work supports earlier research by Smith (1989) who reports that paternal education affects student educational expectations. The more education a father has completed, the more likely a child is to expect to complete a high level of post secondary education. Because fathers clearly influence their children's educational plans and achievement, it is necessary to match students based on this variable.

Mother's Level of Education Influences Achievement

If maternal influence does have a separate and significant impact on the child's academic achievement as some researchers have suggested (Menaghan & Parcel, 1999), then it makes sense to separate these variables whenever possible. Smith (1981) showed through multiple regression that the statistical effect of perceived maternal goals (highly influenced by mother's own education level) is 50% greater for children than that of perceived paternal goals, further indicating the importance of differentiating between parents.

This seems logical given the work of Flannagan and Perese (1998) who found that mothers differentially interact with and influence daughters and sons than fathers do. In any case, there is no doubt that mothers influence their children. Research suggests that mothers influence almost every aspect of a child's life from cognitive and social development (Menaghan & Parcel, 1991; Parcel & Menaghan, 1994), to political orientations (McAdam, VanDyke, Munch, & Shockey, 1997), to how children view or accept gender stereotypes (Powell & Steelman, 1982). It comes as no surprise then that researchers have linked maternal education level to a child's academic achievement throughout life.

According to Downey, Ainsworth-Darnell, and Dufur (1998) the greatest predictors of a child's academic success, listed in order, are (1) the educational level of a child's mother and (2) the socioeconomic level of the home. Some researchers have suggested that mothers' level of education influences the location of family residence which often helps determine the school experience their children will have if they attend public school. Parents' resources sometimes also affect whether a child attends the local

public school or a private school, which could result in differential access to specific types of academic preparation (Simpson, 2003). For this proposed study, in order to accurately match students, mother's education level was a matching variable.

Family Income Level Influences Achievement

Since the publication of Blau and Duncan's (1967) *The American Occupational Structure*, regarded as a classic study of social structure and mobility, educational attainment has been extensively studied in relation to family income and socioeconomic (SES) status. Their sociological investigation of the role of family influences on the life chances of children assessed the achievement-related outcomes of family socioeconomic characteristics in late adolescence, showing a major role of family income in academic achievement.

In more recent years, there has been no shortage of studies supporting the idea that students from low SES backgrounds have lower educational aspirations, persistence, and achievement than their peers from high SES backgrounds both prior to and during college (Astin, 1993; Davies & Guppy, 1997; DiMaggio & Mohr, 1985; Conley, 2001; Lareau, 1993; McDonough, 1997; MacLeod, 1987; Pascarella & Terenzini, 1991; Perna & Titus, 2004; Tinto, 1993). This idea holds true even with different definitions of SES (some include only income, and some include other variables in addition to income). Details of four of the most influential of these studies are included in the next paragraphs.

DiMaggio and Mohr (1985) were among the first researchers to look at the effects of SES on children's educational attainment. They used data from Project Talent, which surveyed 1,427 males and 1,479 females in 1960 when they were in eleventh grade, and then resurveyed this same group in 1971. Analyses of data from the follow-up study 11

years later show significant effects of family SES on educational attainment, college attendance, college completion and graduate attendance for both men and women.

Many years later, Davies and Guppy (1997) selected just over 6,000 students at random from the National Longitudinal Survey of Youth (NLSY). The NLSY has been widely used for studies of marriage, family, and earnings and is now commonly used in education related studies. As expected, Davies and Guppy (1997) found that students from advantaged socioeconomic backgrounds are more likely to enroll in college, and often in more selective colleges, than those from disadvantaged socioeconomic backgrounds. He also found that students from advantaged socioeconomic backgrounds are more likely to enter lucrative fields of study at selective colleges than their socioeconomically disadvantaged peers.

Reporting a similar result, Conley (2001) used data from the Panel Study of Income Dynamics (PSID). The PSID, begun in 1968, is a longitudinal study of a representative sample of U.S. individuals (men, women, and children) and the family units in which they reside. The sample size grew from 4,800 families in 1968 to more than 7,000 families in 2001. Using these data, Conley (2001) reported that parental wealth has a significant impact on overall years of schooling a child receives. She found that the doubling of assets raises the associated total number of years of schooling by .12 years. Doubling of parental assets is also associated with an increase of .11 years in the number of post high school years of formal education. In addition, Conley (2001) found that doubling of assets results in an 8.3% increase in the probability of going to college after graduating from high school. Furthermore, once an individual is enrolled in college,

the chances of him or her graduating with a bachelor's degree increase by 5.6 % when parental assets are doubled.

Showing similar results using data from the National Educational Longitudinal Study in 1992 and 1994 (NELS: 92/94) Perna and Titus (2004) showed that the pattern of college enrollment among 1992 high school graduates varied by SES. She showed that “about one half (49 %) of high school graduates in the lowest quartile of SES, but only 7 % of high school graduates in the highest quartile of SES, did not enroll in any type of college or university in the fall after high school” (p.517). Perna and Titus (2004) also reported that the students with the highest levels of SES are more likely to attend private four-year institutions while students with the lowest levels of SES are more likely to attend public two-year institutions, if they do attend a college at all.

Additional research has speculated that parental income may be influencing children through the views the parents project to the children. Low SES parents are more likely to view a high-school diploma as the norm for their children than high SES parents, to whom a bachelor's or even an advanced degree is considered the norm (Halle, 1984; Lareau, 1987, 1993; MacLeod, 1987).

One limitation in this field of research is failure to agree on one standard definition of SES. Does this variable include only income or only family net wealth? Does it include a combination of the two? Are any other values included? And furthermore, how reliable are self reports of income which are used in most studies of this kind? Despite the inconsistencies used in terminology, because such extensive research has been conducted linking parental income to educational achievement, it was necessary to match students on this variable to compare similar students.

Student Aspirations Influence Achievement

A variable measuring student post secondary aspirations is needed as a way to control for “experimenters” included in the student population. Grubb (1991) defines experimenters as students who earn fewer than 12 equivalent semester hours of college credit throughout their college careers. These are students who did not necessarily ever intend on achieving any specific degree at the onset of their college attendance. Several previous researchers have suggested that one reason for the difference in degree attainment between students at two-year and four-year institutions may be the enrollment of students experimenting with higher education. It is not surprising that research suggests the experimenters disproportionately attend two-year colleges. Grubb (1991) documented an increase in the proportion of such experimenters at two-year colleges, from 10.5 % in 1972 to 18.3 % in 1980.

Cohen and Brawer (2006) report that only half of students who begin at two-year colleges persist long enough to earn credit for a single term. Additionally, Tinto (1993) reports that departure within the first year of college is 31 % for two-year college students and 17 % for their four-year peers.

Because not all students at community colleges obtain degrees or certificates of any kind, it seems important to consider whether they ever intended to. Community colleges serve a very diverse population, and according to student surveys compiled by Phillipe and Patton (1999), obtaining formal credentials is not necessarily a student’s primary goal for attending a two-year college. Many community college students attain their personal goals without ever completing a certificate or degree program. Knowing

what a student intends to do, and expects to do, in terms of educational achievement was a useful variable on which to match students from two-year school and four-year schools.

In conclusion, it made sense to compare a two-year student's educational outcomes with a four-year student's educational outcomes when those students have very similar background characteristics. This literature review has identified six important variables on which students were matched in the study.

CHAPTER 3: METHODOLOGY

Introduction

This chapter provides details about the research design that was used. It also provides information about the study participants, how data were collected, what information is available from the NELS:88 database, and information about the reliability and validity of these data. The chapter ends with information about how the data will be analyzed in order to answer the proposed research questions.

Research Design and Rationale

This study attempted to define and give a detailed description of the quantitative relationship that exists between beginning college institution type (two-year versus four-year-college) and three specific educational outcomes. The three outcomes of interest are: (1) whether a student remains continuously enrolled through out college; (2) the total number of college credits a student completes; and (3) the highest degree, if any, a student obtains.

The purpose of providing data about this relationship is so that additional progress can later be made in predicting student educational success. The goal is not to explain the meaning of this relationship, as future qualitative research may do.

Participants and Site

In accordance with its congressional mandate to collect and disseminate statistics and statistical analyses, and in response to the need for policy-relevant longitudinal data on nationally representative samples of elementary and secondary students, the National

Center for Education Statistics (NCES) initiated a continuing, long-term program called the National Education Longitudinal Studies (NELS). The overall goal of this program is “to study the educational, vocational, and personal development of students at various grade levels, and the personal, familial, social, institutional, and cultural factors that may affect that development” (NCES, 1994). NELS:88, used in this study, represents the third major study in the NELS program, and follows the National Longitudinal Study of the High School Class of 1972 (NLS-72) and the High School and Beyond Study (HS&B) started in 1980.

NELS:88 began with a base year survey of eighth grade students in 1988 and followed up with these students in 1990, 1992, 1994, and 2000. For NELs:88, surveying all eighth grade students in the United States would have been an impossible task, so the goal was to create a representative sample of all eighth grade students in the United States. To do this, the study employed a two-stage, stratified sample design with schools as the first-stage unit and students within schools as the second-stage unit.

From a national frame of about 39,000 schools containing the eighth grade, a target sample size of 1,032 schools was selected. The target schools were selected after accounting for school type (public, private religious, other private, etc), geographical region (Northeast, Mountain, Pacific, etc) and urbanization (whether the school was in an urban, suburban or rural area). As a result, 815 public schools and 237 private schools participated and provided usable eighth grade student data.

Within each school, approximately 26 students were randomly selected to participate. In schools with fewer than 24 eighth graders, all eligible students were selected. Because of the incidence of small schools in the NELs:88 sample, the average

within-school sample size for the base year was 25 students, of which 23 students ultimately participated. The number of students sampled in each selected school ranged from 1 to 73 students.

General Data Collection of NELS:88

The NELS:88 surveys collected data from students, dropouts, parents, teachers, and schools with an initial focus on an eighth grade cohort and follow-up studies taking place at two-year intervals.

The 1988 eighth grade base-year study design consisted of four components: survey and tests of students, and surveys only of parents, school administrators, and teachers. The students completed both surveys and cognitive tests. One parent of each student was asked to complete a survey. Selected teachers in two of four of each student's core subject areas (reading, math, science, and social studies) completed a survey, and one school administrator from each school completed a survey.

The 1990 first follow-up of the NELS:88 comprised the same components as the base-year study, with the exception of the parent survey, which was not repeated in the 1990 round. As in the first year, students completed both a survey and cognitive tests. Two teachers, as well as a school administrator also completed surveys. An additional dropout survey was added during the 1990 follow up and was given to students who had dropped out of school at some point between the spring term of the 1987-88 school year and the spring term of the 1989-90 school year.

The 1992 second follow-up of the NELS:88 (NELS:88/92) repeated all the components of the first follow-up study as well as including a follow-up parent survey. In this second follow-up, only one teacher of each student was asked to complete the

teacher survey. Two new components, the high school transcript and course offering components, were initiated in the second follow-up study.

The 1994 third follow-up of the NELS:88 (NELS:88/94) was designed to follow the progress of the sample cohort as members moved to post secondary activities and other work activities. The data were collected during the spring of 1993-94, two years after most of the sample members had graduated from high school. Also included in this group were students who had dropped out of school, or who had dropped out and subsequently returned. Data collection changed from the school-based survey methods used in previous collections and employed computer-assisted telephone interviews (CATI), with field follow-up. The sample for this follow-up was created based on student response history, dropout status, eligibility status, school sector types, race, test scores and socioeconomic status. The sample for this follow-up included 15,875 individuals.

The 2000 fourth follow up of the NELS:88 (NELS:88/00) involved data collection via a mixed mode approach. Data were collected primarily through CATI but also computer-assisted personal interviews (CAPI) for telephone non-respondents. In addition to interviews with the sample members, the fourth follow-up included a special postsecondary education transcript study for NELS:88 cohort members who responded to the fourth follow-up study and reported postsecondary education experience. The transcript study included requests to 3,213 postsecondary institutions, representing 16,020 postsecondary transcripts for the NELS:88 cohort.

General Measures of NELS:88

The in-school student surveys were 60-minute self administered surveys that gathered information about basic background variables as well as information about school work, educational and occupational aspirations, and social relationships. Student tests were cognitive in nature and measured educational achievement and cognitive growth in the areas of reading, math, science, and social studies. The tests combined all four subjects and included 116 items to be completed in 85 minutes. The Educational Testing Service (ETS) developed these assessments. Each study survey also collected locating information to aid in tracing the sample members for the next follow-up study. Items included a sample member's current address and telephone number; addresses, telephone numbers, and relationship of two contacts; and driver's license information.

Parent surveys collected data about parental aspirations for children, family willingness to commit resources to children's education, the home educational support system, and other family characteristics relevant to student achievement. In-school teacher surveys collected data about school and teacher characteristics, evaluations of selected students, course content and classroom teacher practices. In-school administrator surveys collected descriptive information about the school's teaching staff, the school climate, characteristics of the student body, and school policies and offerings.

The dropout survey, begun in the 1990 follow up, collected information on reasons for leaving school, school experiences, absenteeism, family characteristics, future plans, employment, attitudes and self-concept, and home environment. Dropouts completed a 60-minute survey, as well as the 85 minute cognitive test.

The two new components added to the NELS:88/90 second year follow up, the transcript and course offerings components, provide archival data that describes the academic experience of high school students and the curricula offered by their schools.

NELS:88/94 survey information collected post high school by CATI/CAPI focused on academic achievement, perceptions and feelings about school and job, detailed work experiences, work-related training, and family structure and environment. The NELS:88/00 CATI/CAPI instrument comprised 10 sections: current activities, employment, job-related training, high school completion, postsecondary education, adult education, family formation, income and expenses, other outcomes, and race-ethnicity/residence.

Specific Measures Relevant to Study

The following tables display relevant variables in this study. The first six tables display information about the matching variables. In each case, the variable name is given, and a description of the collection method is included. For each variable, matching categories are identified at the bottom of the table. The seventh table displays information on how student matching groups are divided by beginning college type. The last three tables in this section show the outcome variables of interest.

Variable: Sex of Respondent

Question on student survey: What is your sex? (MARK ONE)

Category	Percent of Respondents
Male	43.7%
Female	49.3%
Refusal/skip/missing	7.0%

Note. Matching categories: Male, Female

Variable: Respondent's Race / Ethnic Background

Question on student survey: Which best describes you? (MARK ONE)

Category	Percent of Respondents
Asian or Pacific Islander	6.3%
Hispanic	11.9%
Black	8.6%
White	62.8%
American Indian	3.3%
Multiple Response	0.1%
Refusal/skip/missing	7.1%

Note. Matching categories: Hispanic, Black, White, Asian or Pacific Islander, American Indian

Variable: Father's Highest Level of Education

Question on student survey: How far in school did your parents go? Father (or male guardian) (MARK ONE)

Category	Percent of Respondents
Not finished H.S.	13.8%
Graduated H.S.	25.5%
Junior College	9.1%
College (less than 4 yrs)	6.6%
Graduated College	12.6%
Master's Degree	7.2%
PhD, MD, etc	5.1%
Don't know	12.6%
Refusal/skip/missing	7.7%

Note. Matching categories: Less than high school education, High school graduate / Junior College / College less than four years, Graduated college, Master's degree, Ph.D., MD, etc.

Variable: Mother's Highest Level of Education

Question on student survey: How far in school did your parents go? Mother (or male guardian) (MARK ONE)

Category	Percent of Respondents
Not finished H.S.	13.9%
Graduated H.S.	30.5%
Junior College	10.1%
College (less than 4 yrs)	7.5%
Graduated College	12.5%
Master's Degree	6.2%
PhD, MD, etc	2.0%
Don't know	10.2%
Refusal/skip/missing	6.9%

Note. Matching categories: Less than high school education, High school graduate / Junior College / College less than four years, Graduated college, Master's degree, Ph.D., MD, etc.

Variable: Total Family Income from All Sources in 1987

Question on student survey: What was your total family income from all sources in 1987? (If you are not sure about the amount, please estimate.) (MARK ONE)

Category	Percent of Respondents
None	0.3%
Less than \$1,000	0.7%
\$1000 - \$2,999	1.2%
\$3,000 - \$4,999	1.5%
\$5,000 - \$7,499	2.5%
\$7,500 - \$9,999	2.9%
\$10,000 - \$14,999	6.8%
\$15,000 - \$19,999	6.5%
\$20,000 - \$24,999	8.9%
\$25,000 - \$34,999	16.2%
\$35,000 - \$49,999	18%
\$50,000 - \$74,999	11.9%
\$75,000 - \$99,000	3.3%
\$100,000 - \$199,000	3.3%
\$200,000 or more	1.3%
Refusal/skip/missing	14.8%

Note. Matching categories: None to \$24,999, \$25,000 to \$49,999, \$50,000 and above

Variable: How Far In School Respondent Thinks S/he Will Get (Asked in 12th Grade)
Question on student survey: As things stand now, how far in school do you think you will get?

Category	Percent of Respondents
Less than HS	0.2%
HS only	4.2%
Less than 2 year degree	1.4%
More than 2 year degree	2.8%
Trade school	4.7%
Less than 2 years college	1.6%
More than 2 years college	9.7%
Finish college	28.8%
Master's	15.7%
PhD / MD	12.7%
Refusal/skip/missing	7.3%

Note. Matching categories: Two-year degree or less, More than a two-year degree to finishing college, Master's / PhD / MD

Matches differed in terms of the variable shown in the following table:

Variable: Type of First Post Secondary Institution Attended
Collection method: This variable contains the type of postsecondary institution (recoded from IPEDS 93/94) for each student with the earliest enrollment date.

Category	Percent of Respondents
Private for profit	2.7%
Private non-profit (< 4 year)	0.7%
Public < 2 year	0.3%
Public 2 year	21.4%
Private non-profit 4 year	13.4%
Public 4 year	25.3%
Refusal/skip/missing	36.2%

Note. Matching categories: Public 2 year, Public 4 year and private 4 year

Outcome variables were collected as showing in the following tables:

Variable: Continuity of Enrollment

Collection method: This variable shows whether a student reported a continuous period of enrollment or if there were interruptions in the enrollment (other than summers) at this institution. Military training programs had this variable coded as a legitimate skip.

Category	Percent of Respondents
Continuous enrollment	94.4%
Interrupted enrollment	4.8%
Refusal/skip/missing	0.3%

Note. Matching categories: Continuous enrollment, Interruptions in enrollment

Variable: Years of Post Secondary Education Coursework

*Student survey question: Adding up all of the courses you have taken in postsecondary education, how many years of full-time coursework have you completed? (**Applies only to: 2000 respondents with postsecondary education experience since last contact currently without a degree.)*

Category	Percent of Respondents
< 1 year full-time credit	5.6%
1 year full-time credit	3.7%
More than 1, less than 2	3.2%
2 years full-time credit	2.6%
> 2 years full-time credit	4.0%
Refusal/skip/missing	80.9%

Note. Matching categories: Less than one year or one year, One year, and more than one less than two, Two years, and more than two years

Variable: Highest Post Secondary Education Level Attained as of 2000
Data collection: Highest PSE degree attained as of 2000 using transcript records.

Category	Percent of Respondents
Some PSE, no degree	29.6%
Certificate / license	7.9%
Associate's degree	7.3%
Bachelor's degree	29.6%
Master's degree	3.2%
Ph.D. or professional	0.6%
Refusal/skip/missing	21.8%

Note. Matching categories: Some PSE, no degree or certificate / license, Associate's degree, Bachelor's degree, Master's degree, Ph.D. or professional

Reliability and Validity

The ability to generalize to students outside of this data set from responses to items on the NELS:88 surveys and tests is necessary if researchers want to suggest that certain outcomes are likely in the general population based on outcomes from this data set. In order to generalize about these outcomes, it is important to look at both the reliability and validity of the NELS:88 data.

All of the items in NELS:88 are multiple choice items, and the wording of both the question and the response alternatives affects the responses given. Even if questions are worded identically and understood identically by different respondents, discrepancies emerge because each individual has unique knowledge and a unique perspective on the situation specified by the item (e.g., "Is the school safe?"). These discrepancies can be interpreted in several different ways, and in most cases, data are not sufficient to determine which interpretation is more accurate.

Several outside studies have questioned the external validity of large scale educational databases. As an example of an external validity issue questioned in the NELS:88 study, indicators of student disability were obtained from students, parents, teachers, and school officials. Each indicator was worded differently, but all were intended to measure "student disability." Results of comparisons of these measures showed that very little overlap (well under 50%) in the population of students identified as disabled by these separate sources. The logic was that different groups should have identified largely the same students as disabled, but they did not. This could mean all the similar instruments were invalid. But Rossi et al (1997) chose to think it meant the different wording had a big effect and that the instruments measured different constructs even though that was the opposite of their intent.

There are many other examples of studies questioning large education databases, including NELS:88. For example in NELS:88, teenagers and their parents provide different reports on the frequency of non-English language use in the home. Both may be accurately viewing the same language use, but from different perspectives. In addition, teenagers and teachers differ on the extent to which they report that students do experiments in class, both may be accurately viewing the same classroom experiences, but again from different perspectives. To the extent that a student reports different expectations for college graduation between base year and second follow-up surveys, the base year measure may capture more variation related to choices the student makes in ninth and tenth grades (e.g., course selection), while the second follow-up measure captures more variation related to student achievement during high school (e.g., GPA, test scores) (NCES, 1997).

Reliability can be looked at in terms of convergence of responses (about the same student) from either the same student at different points in time, or from multiple different sources (student, parents, teachers, etc) about the same student. One interesting finding about reliability in the NELS:88 database is that reading ability affected reliability of answers for nearly every student in the student survey, although for some questions the effect was greater than for others. There are several explanations for why this occurred. It could be that some items are more difficult to read, so poorer readers tended to make discrepant responses because they didn't understand the items. Another explanation could be that low reading students change more on some measures over time and may have a greater difference of perspectives relative to parents and teachers than high readers do (NCES, 1997).

To decide among these interpretations requires an independent source of information—either a separate, accurate measure of the reliability of the items or a logical argument that one of the measures can be treated as meeting the researcher's purposes. This information is generally not available for measures in NELS:88 or any other large government survey. Researchers who might use NELS:88 for substantive research on educational policy and practice can take lack of convergence into account in their interpretations of results, no matter which of the explanations of discrepancies is accurate (NCES, 1997).

Because the variables from the NELS:88 database that were used in this proposed study are quantitative (i.e. How many years have you completed?) instead of qualitative (i.e. What is your opinion of your school environment?), previous researchers have expressed less concern over these type of questions, and it is expected that both reliability

and validity are high in this context, and that one can safely generalize from these quantitative responses.

Data Analysis

Students from two groups (began post secondary education at a two-year college vs. began at a four-year college) were matched on six variables. These six variables are gender, race/ethnicity, father's level of education, mother's level of education, family income in the eighth grade, and twelfth grade predictions of how far they will go in post secondary education.

For each variable there are established numbers of categories, as presented in the tables above. For example, with gender there were just two categories that were used (male = 1 and female = 2). As a second example, for mother's highest level of education there are five categories that were used (less than high school education = 1, high school graduate / Junior College / College less than four years = 2, graduated college = 3, Master's degree = 4 and Ph.D., MD, etc = 5). In all cases, these categories developed naturally from the data that existed.

After the categories for each variable were given numerical values as described above, a new variable was created for each student. These new six digit student variables are referred to as "index variables." An example of a six digit index variable for an individual student is 115613. This represents the category that a student falls into in each of the six variables. For example the first digit in this index code tells that this student is male, the second digit tells that this student is Hispanic, and so forth. Students were then matched based on this six digit index variable.

The maximum number of students for each unique combination that is available to both groups (two-year group and four-year group) were used for analysis. For example, if five students from the two-year group have the index variable 115613 and two students from the four-year group have the index variable 115613, then two pairs were matched with this index variable.

Once the matches had been made, the goal of this study was to learn more about the between-group differences in terms of the magnitude of the outcome variables. Those three outcome variables are continuity of enrollment, years of total college credit (applicable only to students with no degree and not currently enrolled), and highest degree level obtained.

Using absolute differences provided one way to look at these between group differences. For example, if it is concluded that 20 % of students in the two-year group complete a bachelor's degree, and 40 % of students in the four-year group complete a bachelor's degree, that will indicate that the bachelor's degree completion rate is 20 percentage points higher in the four-year group. Absolute differences were explored for all three outcome variables.

In addition, relative difference provided another way to look at between group differences. Using the same example, if it was concluded that 20 % of students in the two-year group complete a bachelor's degree, and 40 % of students in the four-year group complete a bachelor's degree, this would indicate that students in the four-year group are 50 % more likely to obtain a bachelor's degree.

All results are displayed in a series of tables with an accompanying written explanation of the results. Because the goal of this study was to present initial

quantitative data from which to work, a future qualitative researcher would have a substantial starting point from which to explore *why* the results turn out the way they do and what can be done to positively influence future student achievement.

Matched Pairs

A matched pairs design was a unique way to approach the research problem that rarely has been used in previous studies of this nature. Matching was a good choice because if matching were not done, then one would have needed to fit models, more complex than the chi-square test models, to 'adjust' for disproportionate levels of the various variables that were used for matching. Once matching had been done, distribution of the selected variables was proportional between the two groups and chi-square test results were independent of them. Hence, there was no need to fit a model with the additional variables.

Once matches were made for the six selected variables, distributions of those variables was proportional between the two groups (2 year and 4 year) and as noted the chi-square test results was independent of them. In other words, when the two groups (2 year and 4 year) have the same proportion of persons in levels of another factor (gender for example), then when the two groups are compared with respect to one of the outcome variables, there is no longer a need to "adjust" for gender. The concept is the same for all of the matching variables. Once the groups are matched, those variables no longer have an affect on the comparison between groups for the three outcomes variables.

If the groups were not matched on the six selected variables, then one would need to include the six variables in a more complex model that compares the groups on the outcomes variables, adjusting for differences that might be due to disproportionate

matching variables. The goal of this study was to present a clear and simple approach to looking at similar students attending different beginning college types, thus a matched pairs approach was an appropriate way to answer the research questions presented.

CHAPTER 4: RESULTS

Introduction

Differences were found between matched students who began their post secondary education at two-year schools and students who began at four-year schools across all levels of the three outcome variables of interest: highest degree attained, total years of full-time enrollment, and continuity of enrollment.

A total of 9,875 students were available for study from the NELS:88 data set. After removing students who had missing data on any of the matching variables, there were 6,022 students who remained eligible to be matched. After matching students on the six selected variables, there were 1,553 matches for a total of 3,106 students. Each of the three outcome variables of interest for this group of matched students is discussed in detail here.

Highest Degree Attained

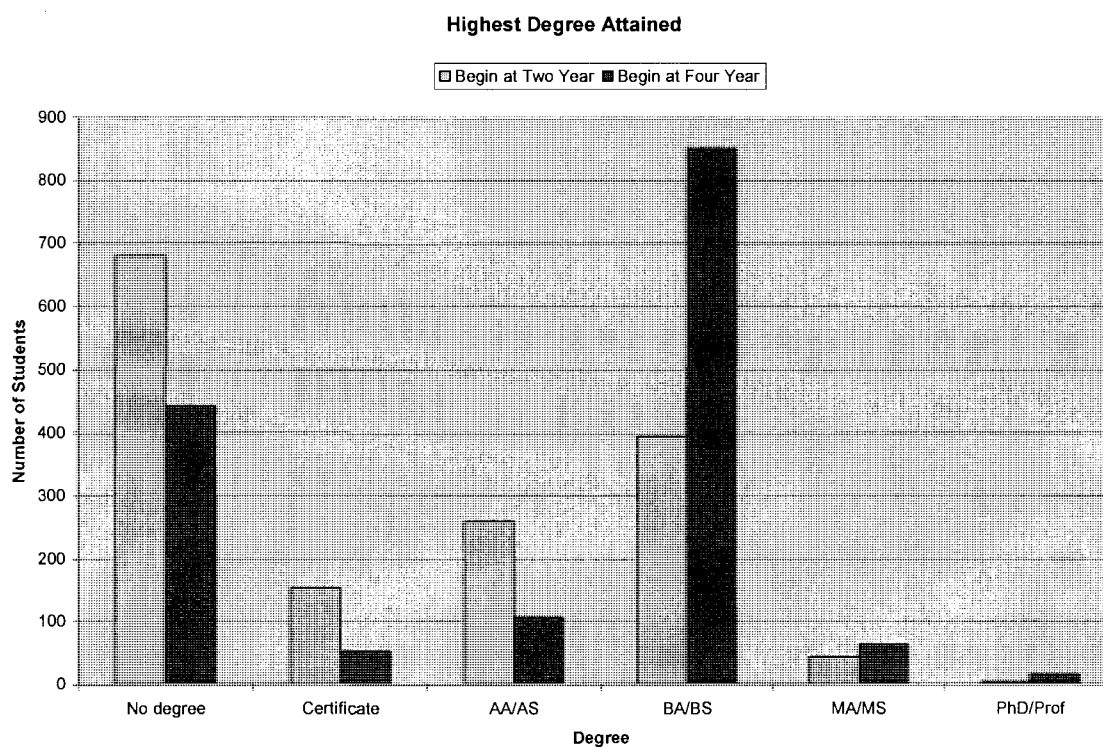


Figure 1: Highest Degree Attained as of 2000 (8 years post High School) showing Number of Students

Highest Degree Attained as of 2000 Shown by Number of Students

	Some PSE, No Degree	Certificate/ License	AA/AS Degree	BA/BS Degree	MA/MS Degree	PhD/ Prof
2-year Group	680	153	260	394	43	4
4-year Group	442	52	106	851	63	15

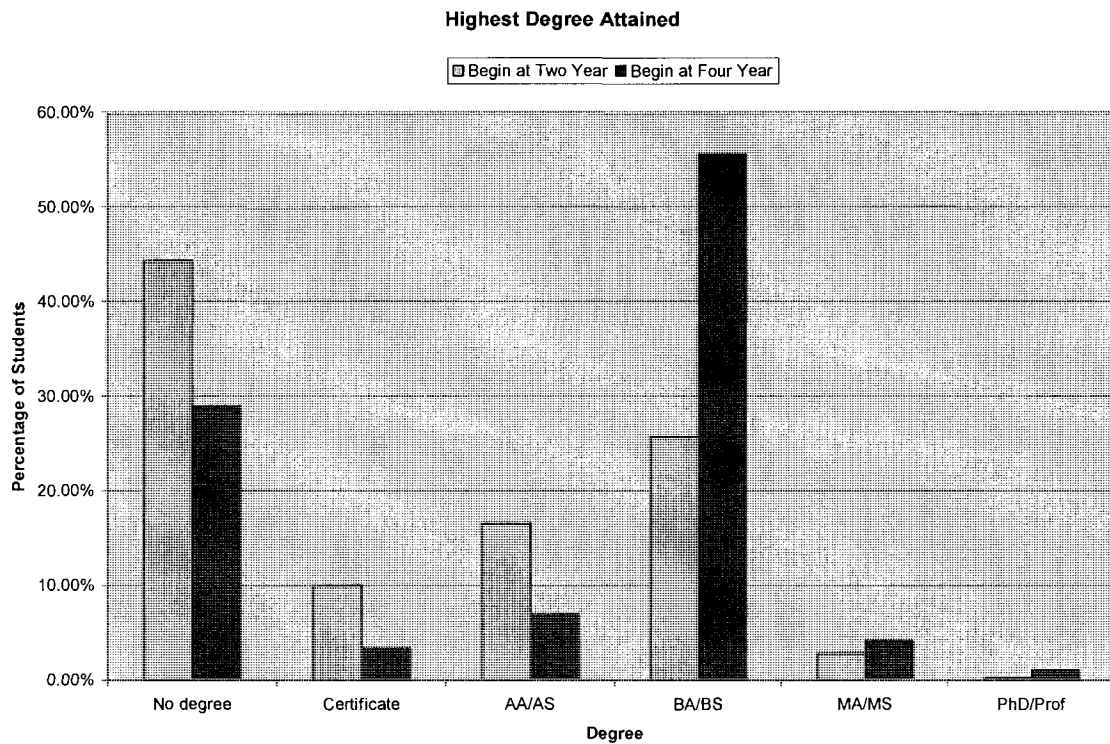


Figure 2: Figure 1: Highest Degree Attained as of 2000 (8 years post High School) showing Percentage of Students

*Highest Degree Attained as of 2000
Shown by Percentage of Students*

	Some PSE, No Degree	Certificate/ License	AA/AS Degree	BA/BS Degree	MA/MS Degree	PhD/ Prof
2-year Group	44.33%	9.97%	16.59%	25.68%	2.80%	0.26%
4-year Group	28.89%	3.40%	6.69%	55.62%	4.12%	1.05%

Students who begin at two-year schools are 15 % more likely to complete some post secondary education but obtain no degree or certificate than are their four-year peers. Two-year students are 7 % more likely to earn only a certificate or license, and 10 % more likely to end their post secondary education with an associate's degree as the highest degree obtained than are their four-year peers.

Students who begin at four-year schools are 30 % more likely to obtain a bachelor's degree than their two-year peers, are 1 % more likely to obtain a master's degree, and 1 % more likely to obtain a doctorate or professional degree than are their two-year peers.

Looking at relative differences, students who begin at two-year schools are 65 % more likely to complete some post secondary education but obtain no degree or certificate than are their four-year peers. Two-year students are 34 % more likely to earn only a certificate or license and are 40 % more likely to end their post secondary education with an associate's degree as the highest degree obtained than are their four-year peers.

Students who begin at four-year schools are 46 % more likely to obtain a bachelor's degree than their two year peers, are 68 % more likely to obtain a master's degree, and 25 % more likely to obtain a doctorate or professional degree than are their two-year peers.

Total Years of Full-Time Enrollment

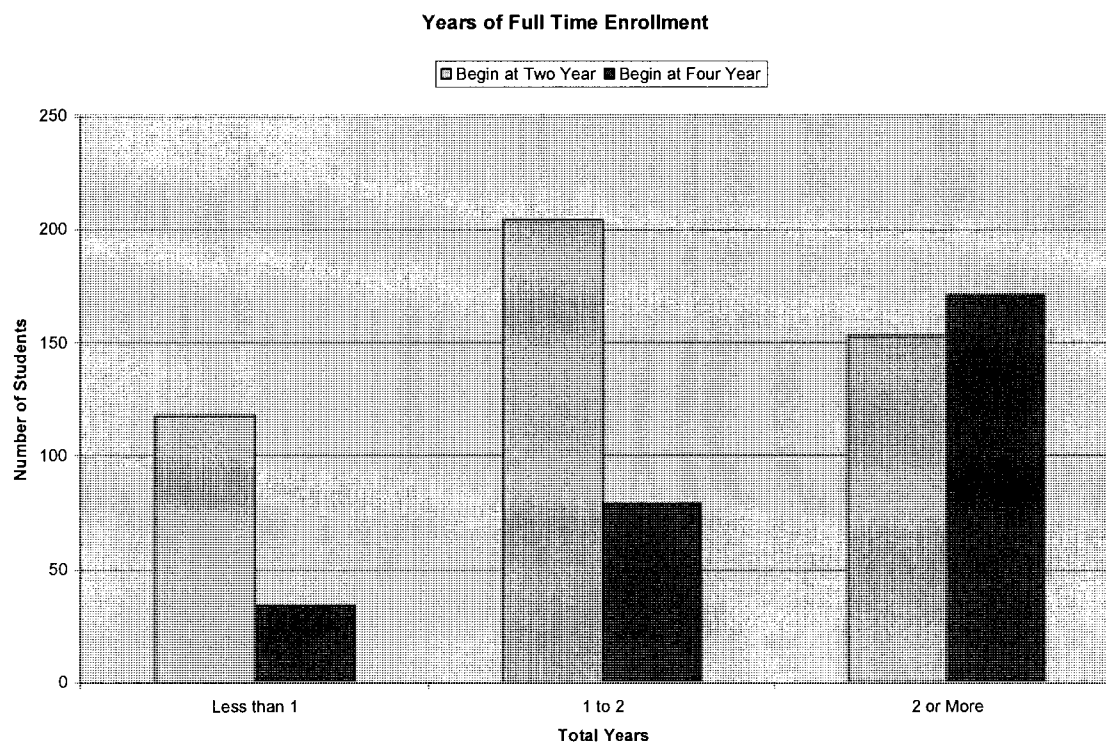


Figure 3: Years of Full-Time Enrollment (One Year equals 24 Credits) showing Number of Students

Total Years of Full-Time Enrollment Shown by Number of Students

	Less than 1 year	1 year to 2 years	More than 2 years
2-year Group	118	204	153
4-year Group	34	79	117

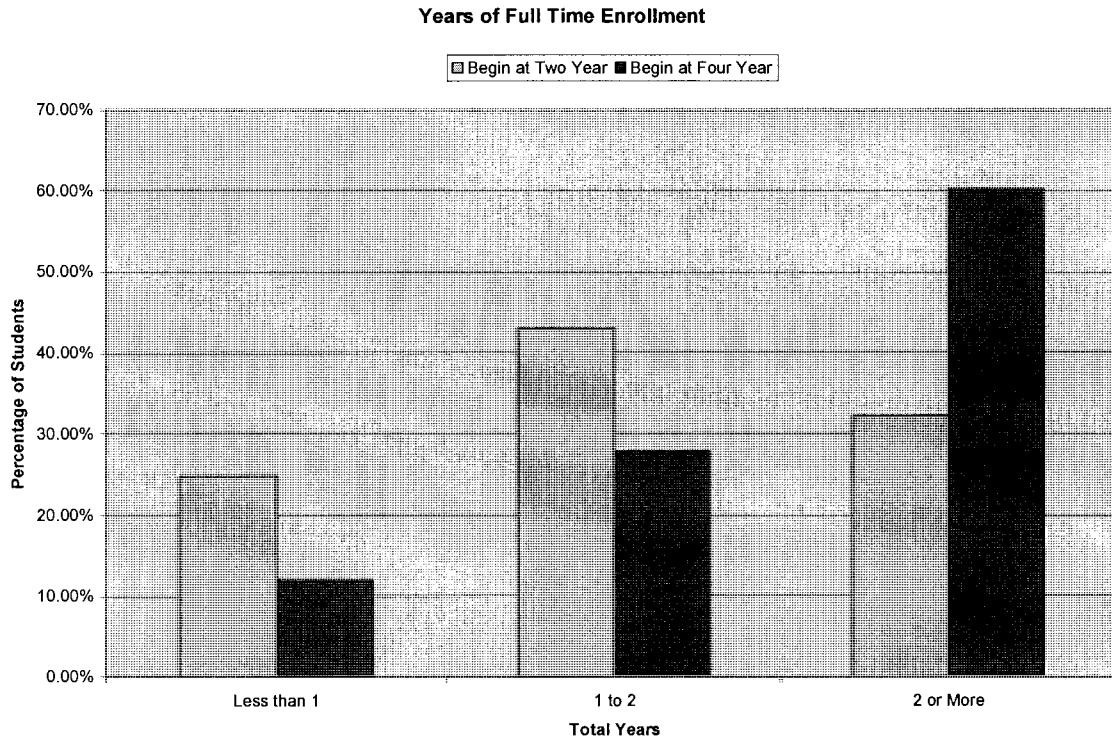


Figure 4: Years of Full-Time Enrollment (One Year equals 24 Credits) showing Percentage of Students

*Total Years of Full-Time Enrollment
Shown by Percentage of Students*

	Less than 1 year	1 year to 2 years	More than 2 years
2-year Group	24.84%	42.95%	32.21%
4-year Group	11.97%	27.82%	60.21%

Students who begin at two-year schools are 13 % more likely to complete less than one year of full-time enrollment than are their four-year peers. Two-year students are also 15 % more likely to complete between one and two years of full-time enrollment than their four-year peers.

Students who begin four-year schools are 28 % more likely to complete more than two years of full-time enrollment than are their two-year peers.

Looking at relative differences, students who begin at two-year schools are 48 % more likely to complete less than one year of full-time enrollment than their four-year peers. They are also 65 % more likely to complete between one and two years of full-time enrollment.

Conversely, students who begin four-year schools are 54 % more likely to complete more than two years of full-time enrollment than are their two-year peers.

Continuity of Enrollment

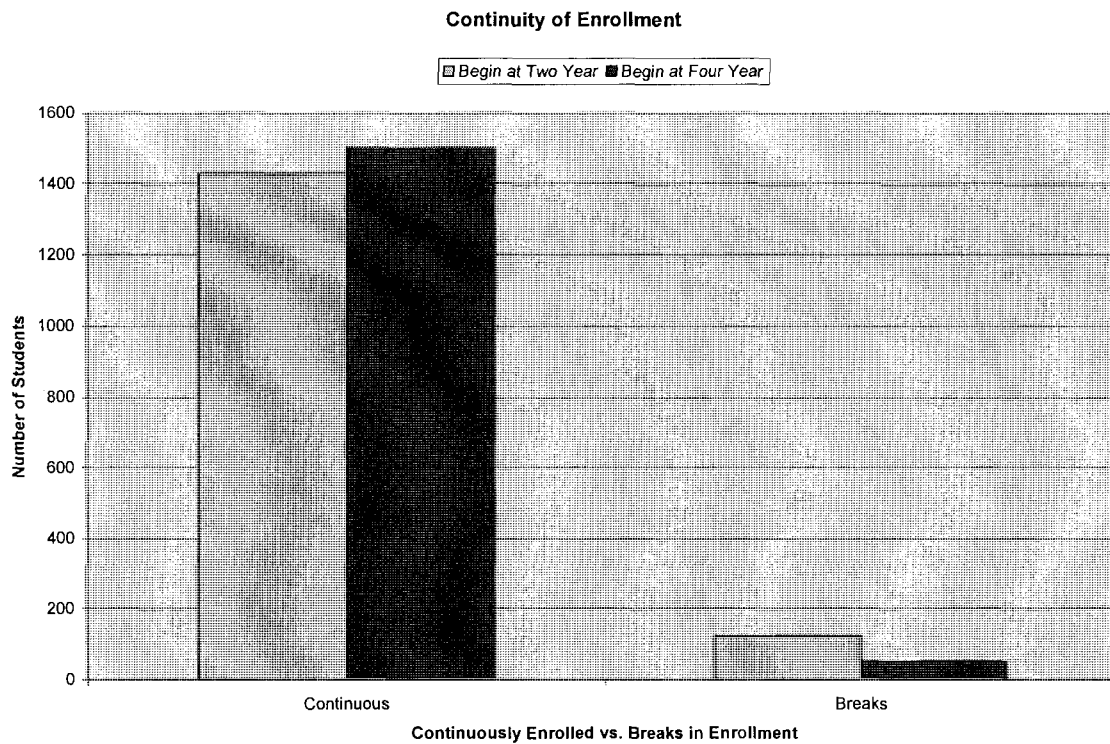


Figure 5: Continuity of Enrollment showing Number of Students

Continuity of Enrollment Shown by Number of Students

	Continuously Enrolled	Breaks in Enrollment
2-year Group	1428	122
4-year Group	1500	51

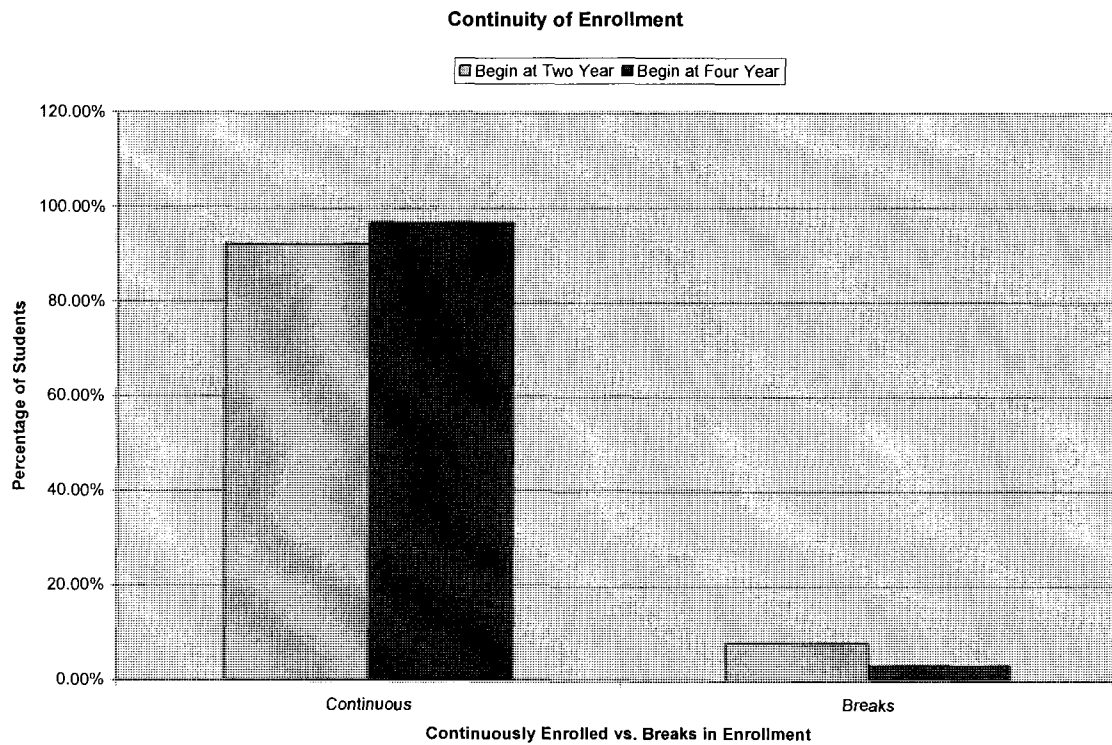


Figure 6: Continuity of Enrollment showing Percentage of Students

*Continuity of Enrollment
Shown by Percentage of Students*

	Continuously Enrolled	Breaks in Enrollment
2-year Group	92.13%	7.87%
4-year Group	96.71%	3.29%

Students who begin at two-year schools are 5 % more likely to have breaks in their college enrollment than are their four-year peers.

Students who begin at two-year schools are 42 % less likely to stay continuously enrolled over their college experience than are their four-year peers.

Interpretation of Results

These findings suggest that if two students were matched on the basis of the following six variables - gender, race/ethnicity, mother's highest level of education, father's highest level of education, total family income during the student's eighth grade year, and the student's own predictions of how far they will go in post secondary education, made while seniors in high school - and then one of those students enrolled first at a two-year college and one of those students enrolled first at a four-year college, the four-year attendee would be more likely to stay continuously enrolled, would complete a larger number of years of full-time enrollment, and would earn a higher degree.

It seems that there is something more going on than simply influence from the background variables that often lead a student to enroll in a two-year college that is limiting two-year college students' academic achievement compared to their four-year peers.

CHAPTER 5: DISCUSSION

Comparison of Current Findings to Existing Literature

The purpose of this study was to gather more information about the influence of beginning higher education at a two-year college versus beginning at a four-year college on a student's educational outcomes. The three outcomes of interest were: (1) whether a student remains continuously enrolled throughout college; (2) the total number of college credits a student completes; and (3) the highest degree, if any, a student obtains.

In order to compare students who began at two-year colleges with their peers who began at four-year colleges, students were matched on variables previously shown in the literature to affect educational outcomes. Based on previous literature, the six variables students were matched on were: (1) gender, (2) ethnicity, (3) mother's highest level of education, (4) father's highest level of education, (5) total family income during the student's eighth grade year, and (6) the student's own predictions of how far they will go in post secondary education, made while seniors in high school.

The central research question was: Do students who begin at two-year colleges achieve less academically than otherwise similar students who begin at four-year colleges? In other words, is there reason to suspect that it is the two-year college itself that is limiting student achievement?

Continuous Enrollment

Alba and Lavin (1981) reported that starting at a four-year college doubled a student's chance of earning a bachelor's degree within five years because four-year students were more likely to stay continuously enrolled and complete their degree

without gaps in enrollment. Valez (1985) also indicated that those who begin at four-year schools are significantly more likely to earn a bachelor's degree by staying continuously enrolled than are students who begin at two-year schools. Pascarella et al. (1998) reported that community college students initially planning to obtain a bachelor of arts degree were between 20 % and 31 % more likely than similar four-year college students to lower their plans below a bachelor of arts degree by the end of the second year of college, largely due to gaps in enrollment for the two-year college group.

This current study agrees with the previous literature, finding that students who begin at two-year schools are 48 % more likely to complete less than one year of full-time enrollment than are their four-year peers. They are also 65 % more likely to complete between one and two years of full-time enrollment. Additionally, students who begin four-year schools are 54 % more likely to complete more than two years of full-time enrollment than are their two year peers.

Years of Full-Time Enrollment

Alba and Lavin (1981) concluded that students who started at two-year colleges were less likely to stay as long in school and more likely to earn fewer total credits than those students who began in four-year schools. Nunley and Breneman (1985) found that students entering four-year schools averaged 0.16 more years of education than those entering two-year colleges first. This study again supports the findings of previous research in reporting that students who begin at two year schools are 42 % less likely to stay continuously enrolled over their college experience than are their four year peers.

Highest Degree

Astin (1982) reported that of students who were aspiring to at least a bachelor's degree, after nine years, two-year college attendees were significantly less likely than their four-year counterparts to have attained a bachelor's degree. Anderson (1984) reported similar results using the NLS-72 follow up data from 1979. He found that two-year college attendees received 14 % fewer bachelor's degrees than their four-year counterparts. Nunley and Breneman (1985) found that students entering four-year schools received 11.5 % more bachelor's degrees and averaged 0.16 more years of education than those entering two-year colleges first.

Brint and Karabel (1989) state that "The very fact of attending a two-year rather than a four-year institution lowers the likelihood that a student will obtain a bachelor's degree." (p.227) Very recently, Long and Kurlaender (2008), who used similar matching methodology to the present study, report that even after accounting for background variables, students who initially begin at a community college are 14.5 % less likely to complete a bachelor's degree within nine years.

They are not alone in expressing this sentiment. Over the years, leading researchers in the field of student achievement including Alba and Lavin (1981), Astin (1982), Anderson (1984) , Velez (1985), Nunley and Breneman (1988), Pascarella (1998), and Brint and Karabel (1989) all came to the same conclusion - that two-year college students are consistently achieving less than their four-year peers.

The results of this study agree with those of previous researchers by concluding that that students who begin at four-year schools are 46 % more likely to obtain a bachelor's degree than their two year peers.

For all three outcome variables of interest (highest degree attained, total number of credits obtained, and continuity of enrollment) those students who began at four-year colleges achieved more than their matched peers who began at two-year colleges. When two students who are very similar in terms of gender, ethnicity, parents' level of education, socioeconomic status and self perceived future achievement begin their education at different colleges – one a four-year school and the other a two-year school, the four-year attendee will consistently achieve more.

The only difference between this study and the existing literature was the methodology employed to come up with the same results. Previous studies have not matched pairs of students as this current study has, although the overall outcome obtained proved no different from the existing literature.

This study made important contributions to the existing knowledge base because limited research has been conducted comparing levels of academic achievement between two-year and four-year college students, when the influence of confounding background variables is minimized. Most previous comparison studies have failed to account for the background variables that lead students to enroll in each type of institution in the first place. Because of this, it is still unclear if lower academic achievement shown by two-year college attendees is due to the fact that many students who attend two-year colleges are minorities, have parents with low levels of education, low family income levels, and other important demographic similarities - or if two-year students' lower achievement is due the influence of the two-year college itself.

In addition, only one previous study used matching designs to look at two-year versus four-year college students. This other study was conducted by Long and

Kurlaender (2008), who very recently published a working paper matching students who began at two-year and four-year schools. They acknowledged the same problem this study acknowledged. The difficulty with comparing degree completion rates between two-year and four-year colleges is that the profile of students attending each isn't necessarily comparable. Long and Kurlaender (2008) used propensity score matching to determine if they were comparing similar students, as well as looking at students' self reported goals and ACT scores. Like this study and other previous studies, Long and Kurlaender (2008) found what they call a significant "penalty" or decreased likelihood of completing a degree, for students who started out in two-year colleges compared to those who started at four-year institutions.

This study provides another unique way to gain further information about factors that lead to, or detract from, student academic achievement. This study also provided important information from which to work toward improving and promoting student academic achievement at all post secondary education levels.

Because the same results have now been obtained using various methodologies and by multiple researchers, it lends support to Clark (1960, 1980), who argued that two-year colleges are counterproductive by causing students to lower their educational expectations. Clark wrote, "The wide gap found in many democratic institutions between culturally encouraged aspiration and institutionally provided means of achievement leads to the failure of many participants. Such a situation exists in American higher education" (1960, p.569). He was a pioneer of the idea that two-year colleges are counterproductive in the overall educational achievement of students and this study once again supports those early findings.

Limitations of the Present Study

There are several limitations that should be addressed. First, because the NELS:88 data collection follows students for just eight years post high school graduation, it is not possible to know whether a student who has not initially completed a degree will return to school later in life. Dropouts may later choose to return to complete a degree and there is no way to take this into consideration given the constraints of the NELS:88 measurements.

In addition, using the previously collected data from the NELS:88 database did not always allow for the precision of information desired. For example, when students were asked about their expected level of degree attainment in the NELS:88 survey, they had only the option to select less than four-year degree, four-year degree, master's degree or professional degree. It would have been very helpful to know which students who aspired to less than a four-year degree expected to obtain a license, certificate, or associate's degree.

In addition, matching students based on high school grade point average would have been perhaps a better matching variable than self reported expectations. However, it's clear that a majority of schools misunderstood the wording of this question and incorrectly reported student grade point averages. Schools were asked to report scores on a percentage basis, to avoid the confusion of some schools using a four point scale while others used a five point scale. The majority of recorded grade point averages were clustered around four % with a smaller cluster of scores between 60 and 100 %, so this variable was not a useful measure of grade point average as had been hoped.

One additional limitation to the study was that it did not consider geographical constraints for students. First, there is no consideration of how different community college systems function in different states. States each approach the function and role of community colleges quite differently, and this is not accounted for in the current study. In addition, some students either already live in or are able to move to locations with four-year colleges available to them, while other students are geographically limited in their access to four-year colleges or their ability to move to attend college. There is no consideration for these important geographical constraints many students experience when selecting a college and pursuing a degree or program.

Suggestions for Future Research

Two major areas seem like viable options for future research branching out from this study. First, it would be interesting and important to look at how geographical constraints impacted these students' achievements. Second, it seems worth looking at the influence of mentors such as faculty members at these different institutions on the achievement of students in this study. Neither of these questions could easily be answered from the data provided in the NELS:88 database.

With the way data were collected and recorded in the NELS:88 database there is no convenient way to look at students' ability or willingness to move to attend college. As a result, questions left unanswered include knowing about the comparable success rates for these matched students who have both a two-year college and a four-college easily accessible in their home town, or just one of these kinds of institutions close to home, or neither. With the ability to look at where students live relative to their higher education options and where they selected to attend school, important questions could be

answered. Are some students failing to achieve by being needed at home? Does living far away at a residential campus influence achievement for the students in this particular study negatively or positively? In short, how much influence, if any, does where students from this study live have on their achievement levels?

The second major area that would be interesting to look at for students in these matched pairs is the quality and type of interactions students have with mentors at their first college, and whether this influences student achievement to any significant level. Are the type of faculty members who are attracted to four-year colleges influential on those students more ambitious achievements? Research has shown over and over again that community college students do achieve less than their four year peers and one potential future direction could be to monitor interactions of students with their primary faculty members. If the community college is a counterproductive education institution, as first suggested by Clark (1960), then 48 years later researchers should know why and still this isn't clear.

Conclusions

Two-year colleges have assumed an important role in the higher education system of the United States in recent years and because of this, many questions about this institution are being asked. Dougherty (1994) asked of the community college, "Is it an avenue of opportunity for its many working-class, minority and female students, or is it a blind alley blocking off equality?" (p.15). Is the ideal of equal educational opportunity for all is seriously threatened by the community college, as Brint and Karabel (1989) asked?

This information is important and relevant to students, parents, researchers, and policymakers alike. Because this study once again lends support to the differing cultures of success at two-year and four-year colleges, the time may have come to shift the focus off of the kinds of students attending each type of institution and on to the cultural experiences students are having at each type of institution.

Having more information about why students are achieving, and not achieving, will help interested parties decide how their money should be spent, how their time should be spent, where support efforts should be focused, and how to make better informed policy decisions.

In conclusion, extensive research now points to the fact that two-year students don't achieve at the same level as their four-year peers. The missing link now is why? This research indicates there could be more going on in this achievement gap than a student's demographic background. It is possible that the achievement gap between two-year and four-year students is in part due to cultural influences at these different institutions.

The numerical data presented in this quantitative exploration should serve as a good jumping off point for future qualitative exploration. Exploring and learning about an institution's culture is not easily done with databases and numbers. Researchers now need to go into these institutions and talk to students, faculty, and administrators about their cultural values and perceptions to find out what exactly is limiting two-year students' academic achievement.

References

- Alba, R. & Lavin, D. (1981). Community colleges and tracking in higher education. *Sociology of Education*. 54:223-247.
- Amato, P. R. (1998). More than money? Men's contributions to their children's lives. In A. Booth & A. C. Crouter (Eds.), *Men in families. When do they get involved? What difference does it make?* (pp. 248-258). Mahwah, NJ: Lawrence Erlbaum.
- American Association of Community Colleges. (2007). Community College Fact Sheet. Retrieved August 22, 2007 from <http://www.aacc.nche.edu>.
- Anderson, K. (1984). Institutional Differences in College Effects. Boca Raton, FL: Florida Atlantic University. ERIC 256-204.
- Astin, A. (1982). *Minorities in Higher Education*. San Francisco: Jossey-Bass.
- Astin, A. (1993). *What Matters in College? Four Critical Years Revisited*. San Francisco: Jossey-Bass.
- Berkner, L. B. & Chavez, L. (1997). Access to postsecondary education for the 1992 high school graduates. (NCES Publication No. 98-105). Washington, DC: U.S. Government Printing Office.
- Blau, P. & Duncan, O. (1967). *The American Occupational Structure*. New York: John Wiley & Sons.
- Brint, S. & Karabel, J. (1989). *The Diverted Dream: Community Colleges and the Promise of Educational Opportunity in America*. New York: Oxford University Press.
- Carnevale, A. & Rose, S. (2003). Socioeconomic status, race/ethnicity and selective college admissions. A Century Foundation Paper.
- Clark, B. (1960). The "cooling-out" function in higher education. *American Journal of Sociology*, 65,6:569-576.
- Clark, B. (1980). The "cooling-out" function revisited. *New Directions for Community Colleges*. 32: 15-31.
- Cohen, A., & Brawer, F. (2006). *The American community college*. San Francisco: Jossey Bass.
- Conley, D. (2001). Capital for college: parental assets and postsecondary schooling.

Sociology of Education, 74, 1; 59-72.

- Davies, S. & Guppy, N. (1997). Fields of study, college selectivity, and student inequalities in higher education. *Social Forces*. 75, 4: 1417-1438.
- Day, J.C., & Newburger, E.C. (2002). The big payoff: educational attainment and synthetic estimates of work-life earnings. (Current Population Reports, Special Studies, P23-210). Washington, DC: Commerce Dept., Economics and Statistics Administration, Census Bureau.
- DiMaggio, P. & Mohr, J. (1985). Cultural capital, educational attainment, and marital selection. *American Journal of Sociology*. 90, 1231-1261.
- Downey, D. B., Ainsworth-Darnell, J. W., & Dufur, M. J. (1998). Sex of parent and children's well-being in single-parent households. *Journal of Marriage and the Family*, 60(4), 878-893.
- Dougherty, K. (1994). *The Contradictory College: The Conflicting Origins, Impacts and Futures of the Community College*. State University of New York Press.
- Flannagan, D., & Perese, S. (1998). Emotional references in mother-daughter and mother-son dyads' conversations about school. *Sex Roles*, 39, 353-367.
- Grubb, W. (1991). The decline of community college transfer rates: Evidence from national longitudinal studies. *Journal of Higher Education*, 62, 194-222.
- Halle, D. (1984). *America's Working Man*. Chicago: University of Chicago Press.
- Horn, L. & Bobbitt, L. (2000). Mapping the road to college: First generation students' math track, planning strategies, and context of support (NCES Publication No. 2000-153). Washington, DC: U.S. Government Printing Office.
- Hill, M. (1992). *The Panel Study of Income Dynamics: A User's Guide*. Newbury Park, CA: Sage.
- Institute for Higher Education Policy. (1998). Reaping the benefits: defining the public and private value of going to college. The New Millennium Project on Higher Education Costs, Pricing, and Productivity. Washington, DC: Author.
- Jacobs, J. (1995). Gender and academic specialties: Trends among recipients of college degrees in the 1980s. *Sociology of Education*. 68, 2; 81-98.
- Kane, T. & Rouse, C. (1999). The community college: educating students at the margin between college and work. *Journal of Economic Perspectives*. 13; 1: 63-84.
- Lareau, A. (1987). Social class differences in family-school relationships: The

- importance of cultural capital. *Sociology of Education*. 60, 73-85.
- Lareau, A. (1993). Home advantage: social class and parental intervention in elementary education. Philadelphia: Palmer Press.
- Leitzel, T. & Clowes, D. (1994). The diverted dream revisited. *Virginia Polytechnic Institute and State University: The Community Services Catalyst*. 24,1.
- Long, B. and Kurlaender, M. (2008). Do community colleges provide a viable pathway to a baccalaureate degree? National Bureau of Economic Research Working Paper No. 14367
- MacLeod, J. (1987). Ain't no makin' it: The leveled aspirations of a low-income neighborhood. Boulder, CO: Westview Press.
- McDonough, P. (1997). Choosing Colleges: How Social Class and Schools Structure Opportunity. New York: SUNY Press.
- Mare, R. & Mason, W. (1980). Children's reports of parental socioeconomic status: a multiple group measurement model. *Sociological Methods and Research*. 9:178-98.
- McAdam, D., VanDyke, N., Munch, A., & Shockey, J. (1997). Social movements as a source of change in life course dynamics. Unpublished manuscript, University of Arizona.
- Menaghan, E. G., & Parcel, T. L. (1991). Determining children's home environments: The impact of maternal characteristics and current occupational and family conditions. *Journal of Marriage and the Family*, 53, 417-431.
- National Center for Public Policy and Higher Education. (2000). Great expectations: how the public and parents – White, African American and Hispanic – view higher education.
- National Center for Educational Statistics. (1997). Technical Report: NELS:88 Survey Item Evaluation Report. (NCES 97-052).
- National Center for Education Statistics. (1998). First Generation Students: Undergraduates Whose Parents Never Enrolled in Postsecondary Education. (NCES 1998-082).
- National Center for Education Statistics. (2005). Postsecondary Institutions in the United States: Fall 2003 and Degrees and Other Awards Conferred: 2002-03. (NCES 2005-154).

- Nunley, C. & Breneman, D. (1988). Defining and measuring quality in community college education. *Colleges of Choice*. Edited by Judith Eaton. New York: Macmillan. 62-92.
- Pascarella, E. & Terenzini, P. (1991). *How College Affects Students*. San Francisco: Jossey-Bass.
- Perna, L. & Titus, M. (2004). Understanding differences in the choice of college attended: the role of state public policies. *The Review of Higher Education*. 27, 4; 501-525.
- Pascarella, E., Whitt, E., Edison, M., Nora, A. & Hagedorn, L. (1998). Does community college versus four-year college attendance influence students' educational plans? *Journal of College Student Development*. 39, 179-193.
- Powell, B., & Steelman, L. C. (1982). Testing an undertested comparison: Maternal effects on sons' and daughters' attitudes toward women in the labor force. *Journal of Marriage and the Family*. 44, 349-355.
- Rouse, C. (1995). Democratization or diversion? The effect of community colleges on educational attainment. *Journal of Business & Economic Statistics*. 13,2: 217-224.
- Rossi, R., Herting, J. & Wolman, J. (1997). Profiles of students with disabilities as identified in NELS:88 (NCES 97-254).
- Smith, T. (1981). Adolescent agreement with perceived maternal and paternal educational goals. *Journal of Marriage and the Family*. 43, 1; 85-93.
- Smith, T. (1989). Mother-father differences in paternal influence on school grades and educational goals. *Sociological Inquiry*. 59, 1, 88-98.
- Simpson, J. (2003). Mom matters: maternal influence on the choice of academic major. *Sex Roles*. May 2003.
- Sum, A., Khatiwada, I & McLaughlin, J. (2007). Gender gaps: the gaps in college degree attainment between New England men and women are rising. Northeastern University working paper.
- Tinto, V. (1993). *Leaving College: Rethinking the Causes and Cures of Student Attrition*. (2d ed.) Chicago: University of Chicago Press.
- United States Department of Labor. (2005). Job outlook for people who don't have a bachelor's degree. *Occupational Outlook Quarterly*. 48,4.
- Velez, W. (1985). Finishing college: the effects of college type. *Sociology of Education*. 58, 91-200.

Whitaker, D. (1994). Two-year college attendance and socioeconomic attainment: some additional evidence. *The Journal of Higher Education*. 65,2:194-210.

Whittenburg, D. & Stapleton, D. (2000). Summary review of data sources to evaluate school to work transitions by youth with disabilities. Rehabilitation Research and Training Center for Economic Research on Employment Policy for Persons with Disabilities at Cornell University.