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A Study of First-time Full-time Freshmen's Attributes and their Associations with
Fall-to-Fall Retention Rates at a Two-year Public Community College

A dissertation
presented to
the faculty of the Department of Educational Leadership and Policy Analysis
East Tennessee State University

In partial fulfillment
of the requirements for the degree
Doctor of Education

by
Susan E. French Graybeal
May 2007

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Keywords: Persistence, Retention, First-Time Full-Time Freshmen, Community College

ABSTRACT

A Study of First-Time Full-Time Freshmen's Attributes and their Associations with Fall-To-Fall Retention Rates at a Two-Year Public Community College

by

Susan E. French Graybeal

The purpose of the study was to investigate the associations between first-time full-time freshmen's attributes and fall-to-fall retention at Northeast State Technical Community College. The 15 attributes included age, first-generation student status, gender, high school classification, race, the student's application date to the institution relative to the start of the semester, the 4 ACT test sub-scores, remedial/developmental course placement, major program of study, financial aid status, first-semester grade point average, and end-of-first-semester credit hour enrollment status. In addition to collecting the variables under study, each first-time full-time freshman's entry term and enrollment status for the subsequent fall semester was ascertained. This information was used to categorize individuals into persister and non-persister classifications for the subsequent fall. The data for this longitudinal study were housed in Northeast State's student records database, Student Information System.

A preliminary analysis of the data was conducted to ascertain descriptive statistics. Chi Square and independent samples *t* tests were used to determine if there was an association between each variable and fall-to-fall retention. A multiple linear regression model was used to estimate the effect of the predictor variables upon the criterion variable, fall-to-fall retention. The results indicated that the variables of age, first-generation student status, gender, and race were not

significantly related to fall-to-fall retention, while high school classification, application date, the 4 ACT sub-scores, remedial/developmental course placement, major program of study, financial aid award, first-semester grade point average, and end-of-semester credit hour enrollment status were significantly related to fall-to-fall retention. A multiple linear regression model indicated that the greatest influences upon fall-to-fall retention when researching the collective predictor variables were

1. first-semester grade point average,
2. the number of remedial/developmental courses required,
3. the number of hours in which the student was formally enrolled in at the end of the first semester,
4. an application date greater than or equal to 61 days prior to the start of the fall semester,
5. receipt of financial aid in the form of Pell Grant funds only (negative association),
6. associate of applied science student status (negative association), and
7. GED graduate (negative association).

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DEDICATION

This work is dedicated to my family who has been my primary source of encouragement and inspiration.

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CHAPTER 1

INTRODUCTION

Background of the Problem

Individuals who attend community colleges have unique needs and goals, as compared to their peers at 4-year colleges and universities (American Association of Community Colleges, 2006). The typical community college student is older, more likely to be female, and have more external pressures and responsibilities. Furthermore, he or she is more likely to be academically under-prepared, financially independent, and have delayed starting his or her postsecondary career. A great number of community college students are the first in their families to attend college. Therefore, they are less likely to have the same support systems and resources as peers whose parents have also been through these same processes (Cohen & Braver, 1982/2003). Especially given the aforementioned issues, community college students are to be applauded for their efforts and tenacity. Balancing college, work, and family is a difficult challenge many students face.

Community college faculty and administrators are keenly aware of the challenges faced by their students and the effects thereof. Individuals attending 2-year postsecondary institutions historically have been more likely to withdraw from college and less likely to persist to graduation than their peers attending 4-year institutions (Hoachlander, Sikora, & Horn, 2003). This fact is true even when accounting for a student's goal attainment (for some students, the completion of a postsecondary degree was never their goal). Attrition, and the association between numerous variables and this phenomenon, has been studied by postsecondary institutions for over 30 years (Leppel, 2005). Studied have been the effects of social integration, academic integration, (Bean & Eaton, 2000; Robson, 2002; Tinto, 1975, 1987, & 1993)

academic preparedness, financial barriers, (Hossler & Bean, 1990) and a whole host of other suspect issues and variables (Astin, 1993; Braxton, Duster, & Pascarella, 1988; Pascarella & Terenzini, 1978; Stage & Hossler, 1989). However, as documented in a study conducted by Townsend, Donaldson, and Wilson, the preponderance of research has been completed at 4-year colleges and universities (Hoachlander et al., 2003). And, as noted above, the typical community college student can vary greatly in demographics and needs as compared to the typical 4-year college or university student.

Statement of the Problem

Central to facilitating student success is a clear understanding of the factors associated with an individual's decision to withdraw from an institution or persist to graduation. Previous studies have noted an association between select demographic and pre- and post-matriculation variables and retention (Astin, 1993; Braxton et al., 1988; Pascarella & Terenzini, 1978; Stage, 1988; Stage & Hossler, 1989). However, the preponderance of research has focused on the 4-year college or university student (Hoachlander et al., 2003). Furthermore, research has been inconclusive regarding the association among various demographic and/or matriculation variables, including admissions test scores and first-generation student status (Bradburn, 2002; Chen, 2005; Horn & Kojaku, 2001). Multiple regression analysis specifically regarding the association between financial aid status, first-generation student status, and remedial/developmental placement status as well as other variables could not be located. Therefore, the purpose of this research was to study the associations between these attributes and fall-to-fall retention rates for first-time full-time freshmen at a 2-year public community college.

Research Questions

In order to ascertain if there were associations between first-time full-time freshmen's attributes and fall-to-fall retention at a community college, the following research questions were investigated:

1. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on age?
2. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on whether or not the student was a first-generation student?
3. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on gender?
4. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the type of high schools from which the students graduated?
5. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on race?
6. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the date the students submitted their applications for admission?
7. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' ACT English sub-scores?
8. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' ACT math sub-scores?
9. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' ACT reading sub-scores?

10. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' ACT science sub-scores?
11. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the number of remedial/developmental courses into which the students are placed?
12. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' major program of study?
13. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on financial aid award?
14. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' first-semester grade point averages?
15. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the number of credit hours in which the students are enrolled at the end of their first semester?
16. What are the characteristics of the first-time full-time freshmen who are most likely to persist to the subsequent fall semester?

Hypotheses

From the research questions, the following hypotheses were developed and tested:

- Ho1. There is no association between age and the fall-to-fall retention of first-time full-time freshmen.
- Ho2. There is no association between being a first-generation student and the fall-to-fall retention of first-time full-time freshmen.

- Ho3. There is no association between gender and the fall-to-fall retention of first-time full-time freshmen.
- Ho4. There is no association between the type of high schools from which the students graduated and the fall-to-fall retention of first-time full-time freshmen.
- Ho5. There is no association between race and the fall-to-fall retention of first-time full-time freshmen.
- Ho6. There is no association between the date the students submitted their applications for admission and the fall-to-fall retention of first-time full-time freshmen.
- Ho7. There is no association between the students' ACT English sub-scores and the fall-to-fall retention of first-time full-time freshmen.
- Ho8. There is no association between the students' ACT math sub-scores and the fall-to-fall retention of first-time full-time freshmen.
- Ho9. There is no association between the students' ACT reading sub-scores and the fall-to-fall retention of first-time full-time freshmen.
- Ho10. There is no association between the students' ACT science sub-scores and the fall-to-fall retention of first-time full-time freshmen.
- Ho11. There is no association between the number of remedial/developmental courses into which the students are placed and the fall-to-fall retention of first-time full-time freshmen.
- Ho12. There is no association between the students' major program of study and the fall-to-fall retention of first-time full-time freshmen.
- Ho13. There is no association between the awarding of financial aid and the fall-to-fall retention of first-time full-time freshmen.

Ho14. There is no association between the students' first-semester grade point averages and the fall-to-fall retention of first-time full-time freshmen.

Ho15. There is no association between the number of credit hours in which the students are enrolled at the end of their first semester and the fall-to-fall retention of first-time full-time freshmen.

Significance of the Study

Evidence suggests that there are a myriad of benefits to completing a postsecondary degree. These benefits can include financial or economic, social, and psychological benefits. More specifically, research has suggested that college graduates have higher levels of personal income, lower unemployment rates, decreased reliance on public assistance, and better levels of health (Bureau of Labor Statistics, 2003; Institute for Higher Education Policy, 2005).

Therefore, additional research that clarified the association between demographic and pre- and post-matriculation variables of persisters and non-persisters would benefit community college students as this information could be used to help develop support systems early in a student's academic career in order to facilitate success. However, the benefits of the research were not limited to individuals. Both the Bureau of Labor Statistics (2003) and the Institute for Higher Education Policy (2005) have noted that there is a "domino effect" for the community-at-large. Increasing the educational attainment levels of its citizenry undoubtedly decreases a community's required burden of public assistance. Furthermore, a community with an educated citizenry is more likely to attract business and industry with high-paying positions than is a community with low levels of educational attainment. This issue had become such a concern and an important topic at the community college level that the American Association of Community Colleges and the National Commission on Entrepreneurship helped to found the

National Association for Community College Entrepreneurship (NACCE) in 2003. NACCE's purpose is to increase regional economic development through entrepreneurial education and business incubation at the community college level (The National Association for Community College Entrepreneurship, 2006).

This research will also help to increase the body of knowledge regarding community colleges. Currently, as noted by Townsend, Donaldson, and Wilson, only 8.0% of mainstream journal articles on higher education mention community colleges, regardless of the topic of the study (as cited in Lumina Foundation for Education, 2005). Therefore, this study could help to better clarify and publicize key issues of note regarding community colleges. Most promising, however, is the fact that this study as well as additional research on the association between demographic and pre- and post-matriculation variables and fall-to-fall retention rates has the potential to promote the development/implementation of specific and targeted intervention strategies in order to increase the retention and persistence to graduation rates of community college students.

Limitations and Delimitations

With the permission of the president of Northeast State Technical Community College, Dr. William W. Locke, the population for this study was all first-time full-time freshmen enrolling at the institution in the fall semesters of 2003, 2004, and 2005, as denoted on the college's Student Information System (SIS). This research has no external validity beyond the institution. However, the use of longitudinal data within the institution increased internal validity.

Other limitations and delimitations of the study are noted below:

1. The study was delimited to Northeast State Technical Community College.
Therefore, the findings may not be applicable to other postsecondary institutions.
2. Factors and/or variables other than those identified within the research questions were not studied.
3. ACT scores were not available on students over 21 years of age or from GED graduates.
4. SAT scores were converted into comparable ACT sub-scores. However, the institution only converted to ACT sub-scores in English, math, and reading. ACT science sub-scores were not converted as they were not used for placement by the institution.
5. Age, first-generation student status, gender, and race were self-reported.
6. As the Vice President for Institutional Effectiveness at Northeast State Technical Community College, I had a vested interest in the institution, student retention and persistence to graduation. Therefore, it was my responsibility to ensure that the study was objective and my own personal biases and desires were not reflected in the outcomes of the study.

Definition of Terms

The following definitions of terms are provided on the basis of their use within the context of this study:

Associate of applied science – a terminal 2-year undergraduate degree with a limited general education core that is approximately 60 credit hours in length and prepares graduates for immediate employment.

Associate of arts - a 2-year undergraduate degree with a liberal arts emphasis that is approximately 60 credit hours in length and is designed for transfer to a bachelor of arts program at a 4-year college or university. Typically, this degree requires 2 years of a foreign language at the college level.

Associate of science - a 2-year undergraduate degree that is approximately 60 credit hours in length and is designed for transfer to a bachelor of science program at a 4-year college or university.

Community college – an institution that is accredited to award the associate degree as its highest level of degree (Cohen, 2001).

First-time, full-time freshman – An individual who has never enrolled in a postsecondary institution previously and who enrolls in 12 or more credit hours.

Non-persister – A student who is not retained from one fall term to the subsequent fall term.

Persister – A student who is retained from one fall term to the subsequent fall term.

Postsecondary education – Education that occurs after the completion of a high school diploma (Glossary of Terms, n.d.).

Remedial/developmental courses – Credit courses with the prefix of 0700 through 0999 that are specifically designed to provide the student prerequisite education in the areas of English, mathematics, reading, and/or learning strategies (Northeast State Technical Community College, 2005).

Retention – Student persistence from one fall term to the subsequent fall term.

Withdrawal – A discharge from the enrollment in all classes (Northeast State Technical Community College, 2005).

CHAPTER 2

LITERATURE REVIEW

The retention of students in higher education has been studied by theorists and researchers such as Spady, Tinto, Astin, and Bean, for more than 30 years (Leppel, 2005). According to Tinto (1993), one reason for the intense interest in retention is the fact that more students left higher education before graduating than those who persisted to degree completion. Winston and Sander (1984) also noted that changes in the college population and declining enrollments had made recruitment and retention key issues for institutions of higher education. There are various reasons including economics, from an institution's standpoint, why student retention is important. When enrollments decline, typically an institution's financial resources will decline as well. Institutional morale can also be greatly affected by high attrition rates as they can negatively impact faculty's perception of their profession, the institution, and themselves. Arguably, however, one of the most important reasons to research and promote issues affecting retention is from an ethical standpoint. An institution has a responsibility to provide for its students' academic and social integration needs in order to facilitate persistence and student success (Bean, 1986).

Spady developed a sociological model on what factors influenced students to continue or discontinue their education in 1970. His work was based upon Durkheim's 1952 suicide theory, which stressed the importance of integration within society (Robson, 2002). Spady posited that there were five important variables within the sociological model: academic potential, grade performance, intellectual development, normative congruence, and friendship support. These variables were then indirectly linked to the students' dropout decisions through the variables of satisfaction and institutional commitment (Act, 2004). Spady suggested that there were parallels

between the act of dropping a course and suicide. Both actions terminated an individual's course of action or involvement with a social system. Spady hypothesized that withdrawing from a course or institution was because of a lack of support (e.g., family, financial, or social) or because of a low educational priority setting (Hossler & Bean, 1990). Spady expanded upon his previous research and used multiple regression analysis to develop empirical models. Through his work, Spady revised his statistically significant predictors of persistence within the 4-year college setting. These predictors were academic integration, social integration, socioeconomic status, gender, choice of department, and SAT/ACT score (Chen & Thomas, 2001).

Astin published a major study on attrition in *College Dropouts: A National Profile* in 1972. He also developed an Input-Environment-Outcome (IEO) model to guide the study of student development (Astin, 1993). The intention of his model was to assess if changes in collegiate environmental experiences were associated with students' growth, development, and retention. Within Astin's model, the input was comprised of the pre-matriculation variables that students brought with them. Astin's input variables included, but were not limited to, high school grade point average, admissions test scores, parental income, student goals/expectations, choice of major, ethnicity, age, marital status, gender, full-time/part-time enrollment status, and parents' levels of education.

The student's involvement with and/or experiences at the institution constituted the environment. Astin classified the environmental variables into seven categories:

1. Institutional characteristics
2. Peer group characteristics
3. Faculty characteristics
4. Curriculum

5. Financial aid
6. Residence
7. Student involvement (1993).

The input, when combined with the environmental factors, then had the potential to affect the outcomes, including, but not limited to, satisfaction, career development, academic and cognitive abilities, values, and beliefs. Astin cautioned, however, that one must control for the input variables before an association between the environment and the output can be determined.

Tinto (1975, 1987, 1993) developed a retention model, *The Student Integration Model*, which has been widely discussed, researched, and accepted in higher education circles. His model was designed to help institutions of higher education understand why students left so the institutions could change. Tinto's model, too, was based upon the theories of Durkheim. Tinto's theory suggested that pre-matriculation attributes, such as family history, academic background, and abilities and skills, formed an individual's concepts and goals and influenced his or her level of commitment. When an individual interacted with an institution of higher education, these attributes could contribute to the individual's academic and social integration or lack thereof (Seidman, 1996). Therefore, the student's fit with the institutional environment was at the heart of Tinto's model (Pascarella, Terenzini, & Wolfe, 1986). And, the level to which the individual became academically and socially integrated into the institution's systems could heavily influence his or her decision to remain at or leave the college (Tinto, 1993). In his later work, Tinto recognized that diverse student populations, such as adult students, transfer students, and honors students, required group-specific retention strategies and programs. Likewise, he noted that varying types of postsecondary institutions required unique programs and services to facilitate student success and retention (ACT, 2004).

Bean and Eaton (2000) proposed that a student's psychological processes were at the crux of academic and social integration. Four psychological theories that were at the foundation of their model were as follows:

1. Attitude-behavior theory,
2. Attribution theory, in which an individual has a strong sense of internal locus of control,
3. Coping behavioral theory, the ability to assess and adapt to a new environment, and
4. Self-efficacy theory, an individual's self-perception as capability of dealing with specific tasks or situations (Bean & Eaton, 2001-2002).

As an outcome of their research, Bean and Eaton suggested that institutions of higher education should include service learning, learning communities and/or freshman interest groups, orientation seminars, and mentoring programs to support student success (ACT, 2004).

Demographics

In addition to these theoretical models, numerous researchers, theorists, and others have studied demographic variables that appeared to be associated with student persistence. For example, high school achievement (Braxton et al., 1988), ethnicity (Pascarella & Terenzini, 1978), and gender (Stage & Hossler, 1989) as well as the student's educational expectations (Astin, 1993) and the parents' educational attainment (Stage, 1988) all appeared to be associated. Furthermore, research completed by *The Education Trust* (2004) stated that there appears to be a large gap between persistence to graduation rates for low-income versus high-income students, as well as among the various ethnic groups.

Age

Research on the association of age and persistence has produced mixed results. Research by Sydow and Sandel (1998) at Mountain Empire Community College found that age was one of several factors that were associated with persistence, with the largest percentage of withdrawals attributed to students aged 20 to 25. Supporting this finding, Feldman (1993) found that 1-year attrition rates at Niagara County Community College were higher for traditional-aged students than for students aged 25 or older.

Some studies, however, such as research by Windham (1994), found a negative association between age and persistence. In other words, persisters tended to be younger while non-persisters tended to be older. Mohammadi (1994) found that fall-to-fall persistence was highest for those aged 22 or younger at Patrick Henry Community College. Research suggested that adult students aged 25 or older have more responsibilities, and, therefore, increased levels of stress that may contribute to attrition (McDonald & Hutcheson, 1998). These responsibilities included, but were not limited to, work and family. However, older students tended to be more goal oriented and have a better understanding of their educational needs than did traditional aged students. They also developed coping mechanisms that help to counter the additional stress under which they found themselves (Burley, Turner, & Vitulli, 1999). In as much, the research to date is inconclusive and, therefore, a supposition regarding the association between age and persistence could not be established.

First-generation Student Status

An individual who has strong and knowledgeable support systems has been identified as being more likely to persist in higher education (Elkins, Braxton, & James, 2000). Therefore, it was not surprising that research by Ishitani (2003) and Nuñez and Cuccaro-Alamin (1998)

indicated that first-generation students were less likely to persist than were those students whose parent(s) had previously attended or graduated from college. In fact, Ishitani's research indicated that first-generation students were 71.0% less likely to persist to the subsequent fall than were non-first-generation students. Supporting this finding, research by Pascarella et al. (1986), suggested that first-generation students shared common attributes that may have increased their risk of attrition (Pascarella, Pierson, Wolniak, & Terenzini, 2004).

Research by Chen (2005) concurred with some of the previous findings but differed with others. Chen noted that, in accordance with previous research, first-generation students typically did not perform as well as their peers and were less likely to earn academic credits. However, when controlling for other variables, Chen did not find a significant difference with regard to retention and graduation between first-generation students and their peers whose parents had attended college. Chen (2005) noted, however, that those other academic variables may not have been available in earlier studies. Bradburn's (2002) research found mixed results depending upon the type of institution the first-generation student attended. Bradburn noted a variance in first-generation student persistence at 4-year colleges and universities. However, she did not find any significant differences in the persistence rates at community colleges. Because the research to date is inconclusive, an assumption regarding the association between first-generation student status and persistence could not be established.

Gender

Historically, males have been the predominant gender enrolled at institutions of higher education. However, enrollment patterns have shifted and women now account for more than half of all students enrolled in American colleges and universities (Bray, Braxton, & Sullivan, 1999). The role of gender and its association with fall-to-fall persistence, however, is

inconclusive. Research by Garrett (1992) supports the theory that men are more likely to stop out of college because of academic difficulties, while women are more likely to stop out because of social and/or cultural factors. Gender-specific socialization and competing demands for time, based upon gender-roles and expectations, can impact academic success based upon one's sex (Leppel, 2002). This fact may be even more significant when combined with other variables, such as ethnicity and/or first-generation student status. For example, some ethnic or cultural factions place less importance upon the education of women, making it, therefore, more challenging for a woman as a first-generation student from this faction to complete a postsecondary degree (Bui, 2002).

Feldman (1993) noted that when researched as an independent variable, women were more likely to persist than men. However, when other variables were taken into account using regression models, gender was no longer a factor. Conversely, Sydow and Sandel (1998) found that women were less likely to persist than males at Mountain Empire Community College. Brawer (1996) and Mohammadi (1994) reported similar findings. In as much, the research to date is inconclusive and, therefore, a supposition regarding the association between gender and persistence could not be established.

High School Classification

Research regarding the type of high school from which one graduated and its association with persistence in higher education was very limited. However, GED recipients' success in the community college setting, as compared to students who had graduated from traditional high schools, was measured by Klein and Grise (1988) in the community college system of Florida. The research found that individuals who graduated from traditional high schools had an average college grade point average of 2.75 as compared to 2.54 for GED recipients. Likewise, the study

found that 46.0% of the individuals who graduated from traditional high schools graduated from college as compared to 26.0% of GED recipients. Research conducted by Rose (1999) indicated that GED recipients were less academically prepared and required some remedial/developmental coursework prior to enrollment in college-level classes. While research supports the assumption that GED students are less likely to persist in postsecondary institutions, research on other types of high schools, namely traditional high schools and private/home schooled students, was extremely limited. Therefore, a supposition regarding the association between high school classification and persistence could not be established.

Race

As was that of women, access to institutions of higher education was limited for minorities until the recent past. Within the last few decades, however, student populations in postsecondary institutions have become racially more diverse. Proportionally, the percentage of Caucasians in higher education has declined while all other major ethnic groups have increased (Dey & Hurtado, 1995). Even though community colleges comprise about only one third of the institutions of higher education, they enroll significantly higher proportions of African-American undergraduate students (47.0%), Hispanic students (55.0%), and Asian/Pacific Islander students (47.0%) (American Association of Community Colleges, 2006).

Research by Brawer (1996), Feldman (1993), and Mohammadi (1994) support the premise that ethnicity is associated with persistence. However, the researchers diverged regarding the specific ethnic groups that were found to be at greatest risk of attrition. For example, at Patrick Henry Community College, Mohammadi (1994) found that the retention rates were the highest for the ethnic category of *other*. The next highest ethnic category with regard to retention was *Caucasian* and then *African-American*. Reason (2003), on the other

hand, found that Caucasians and Asian students persisted at higher rates. Reason posited, however, that race should not be examined in isolation of other factors. Instead, it should be viewed in conjunction with other variables associated with attrition. These variables may include factors regarding socioeconomic status, such as family income, employment status, and residence (Ryland, Riordan, & Brack, 1994; Somers, 1995). Because the research to date is inconclusive, a supposition regarding the association between race and persistence could not be established.

Pre-matriculation Variables

Application Date

Research regarding the date in which applied to an institution of higher education and its association with persistence was extremely limited. One study at Walters State Community College was located. Goodman (1999) noted in her research that there was an association between application date and persistence. More specifically, students who applied to the institution less than 2 months prior to the first day of classes were more likely to persist. Goodman's study, however, was not limited to first-time full-time students but, rather, all individuals enrolling as degree-seeking students, including those enrolling part time. Therefore, because of the limited research an assumption regarding the association between application date and persistence could not be ascertained.

Admission Test Score

Academic preparedness was identified by Braxton et al. (1988) as a strong indicator of an individual's ability to persist in academia (as cited in Ishitani & Snider, 2006). Admissions tests were identified as a standardized indicator of an individual's academic preparedness and general education development (Act Assessment, 2006). The ACT admissions test is the college

entrance exam that a preponderance of Tennessee state colleges and universities use for placement and/or for acceptance criteria. The test consists of 215 questions covering four areas: English, math, reading, and science. An ACT sub-score is calculated for each of these four areas. The test is most often taken by high school juniors and seniors and is used by more postsecondary institutions nationwide than any other entrance exam. In addition to admissions decisions, colleges frequently use the ACT test results for course placement, academic advising, and in the scholarship and loan process. According to ACT, “More than 40 years of research has shown that performance on the ACT is directly related to first-year college grade point average” (Act Frequently Asked Questions, 2006).

The SAT is a college entrance exam that was developed by The College Board. It consists of three primary sections: mathematics, critical reading, and writing (About the SAT, 2006). With regard to SAT scores, Bradburn noted that individuals with combined SAT scores of 1,000 or less were more likely to withdraw from higher education without a degree than those individuals with scores above 1,000 (20.0% versus 13.0%). However, Horn and Kojaku’s (2001) findings regarding the rigor of high school curriculums and persistence in higher education indicated that, once other variables were controlled for, admissions test scores (SAT) were not a predictor of retention:

In both persistence analyses, prior to including first-year college GPA as an independent variable, SAT composite test score levels and high school academic curriculum levels were significantly associated with the outcome. However, once GPA was taken into account, high school academic curriculum remained a significant predictor of persistence (specifically, completing a rigorous versus core or lower curriculum), but the association between levels of SAT scores and persistence disappeared. In other words, once all related variables were taken into consideration including college GPA, entrance exam scores were no longer associated with the likelihood of persisting, either with respect to institutional retention or staying on track to a bachelor’s degree (p. ix-x).

Because of the mixed research results, a supposition regarding the association between admission test scores and persistence could not be established.

Remedial/Developmental Course Placement

Parsad and Lewis (2003) found that many high school students were not prepared to complete college-level work when they entered postsecondary institutions. During the period under review (1992 through 2000) the researchers noted that 40.0% of entering freshmen required at least one remedial course. More specific to community colleges, Parsad and Lewis (2003) noted that they were more likely to provide remedial education than were other types of institutions of higher education. For example, in the fall of 2000, 98.0% of community colleges offered remedial education in reading, writing, and/or mathematics as compared to 59.0% to 80.0% of other types of postsecondary institutions. Furthermore, Bradburn (2002) found that students who required remedial courses in any subject matter were more likely (28.0%) to withdraw from the institution without graduating than those who did not require any remedial courses (18.0%). Conversely, the outcomes of Feldman's (1993) research regarding remedial/developmental education could not discriminate persisters from non-persisters.

While there was a moderate body of research regarding the effectiveness of remedial/developmental programs, the subject has generally been studied at the programmatic level. As Boylan and Bonham noted (1992) and I found in my research few regional or national studies have been conducted. Therefore, the nature and direction of the association of remedial/development course placement and fall-to-fall persistence was deemed inconclusive.

Post-matriculation Variables

Major Program of Study

Selecting one's major program of study is a challenge that many students face (Peterson, 1993). While the majority of students have selected their majors prior to enrollment in college, including whether they will pursue a 2- or 4-year degree, many do so with limited information or in light of previous academic difficulties (Kramer, Higley, & Olsen, 1994). Research, however, regarding the persistence rate at community colleges for those individuals whose major programs of study are classified by associate of applied science versus associate of arts or associate of science was very limited. In general, a review of literature reveals that students with higher career or degree aspirations are more likely to persist than those with lower degree aspirations (Feldman, 1993; Horn & Nevill, 2006; Sydow & Sandel, 1998). The only direct study found that compared persistence rates at community colleges based upon major program of study/degree classification was completed by the National Center for Education Statistics (2003). This study found that, of the community college students who began in 1995-1996, 37.8% of students who initially indicated they were seeking an associate of applied science degree had completed a certificate, 2-year, or 4-year degree by 2001. Likewise, 39.2% of students who initially indicated they were seeking an associate of arts or associate of science degree had completed a certificate, 2-year, or 4-year degree by 2001 (Hoachlander et al., 2003). Because of the limited research, however, an assumption regarding the association between major program of study and persistence could not be ascertained.

Financial Aid Status

One's ability to pay for and/or finance his or her education can significantly impact enrollment in higher education as well as retention and persistence to graduation (Furr & Elling,

2002). There are various types of financial aid, from need-based aid, such as federal Pell Grants, to academic scholarships that may assist an individual in financing his or her degree.

In a study of short-term (3-year) enrollment in postsecondary institutions, Bradburn (2002) noted that, when comparing all students who received financial aid, those individuals who received greater amounts of aid were more likely to persist than those who received lesser amounts. However, when comparing individuals who received financial aid in any amount with those individuals who did not receive aid, Bradburn did not find any significant differences in retention. However, he did note that community college students who left the institution were more likely to indicate the need to work as the reason for withdrawing than were non-persisters attending 4-year colleges and universities.

When researching federal Pell Grant recipient profiles, Wei and Horn (2002) noted that recipients of those funds were more likely to possess other factors associated with attrition than were individuals who did not receive Pell Grant monies. These factors included academic preparation, their degree objectives, and their employment statuses. With regard with loans, whether as a sole source of financial aid or received in combination with various forms of grants, loans have been noted as having a positive effect upon retention (St. John, Kirshstein, & Noell, 1991). In summary, while various studies have shown a positive association between financial aid and persistence, others studies have not found such an association. Therefore, because of the mixed research results, a supposition regarding the association between financial aid status and persistence could not be established.

First-semester Grade Point Average

Grade point averages have long been considered a mark of a student's academic success. They function as an indicator of an individual's synthesis of the concepts and/or material

presented in a course of study (Allen, 1999; Tross, Harper, Osher, & Kneidinger, 2000).

Furthermore, grade point averages achieved during the first year of college, including analyses of first-semester-only grade point averages, have been identified as having a stronger association with retention and persistence-to-graduation than many other variables researched (Adelman, 1999; Allen, 1999; Murtaugh, Burns, & Schuster, 1999; O'Toole & Peterson, 1999). Further supporting this theory is research conducted at Iona College by McGrath and Braunstein (1997), in which the students' academic preparations and first-semester grade point averages were found to have a significant association with persistence. Moreover, research indicates that the combined affects of an individual's gender, ethnicity, and socioeconomic status is less a predictor of persistence than the individual's first-year grade point average (McGrath & Braunstein, 1997). The preponderance of professional literature, therefore, has established a direct and positive association between grade point averages and persistence.

End-of-first-semester Credit Hour Enrollment Status

Research about end-of-first-semester credit hour enrollment, without regard to earned hours, and its association with persistence could not be located. However, Szafran found in his studies on academic load that more was not always better. In his research, Szafran found that students who were enrolled in high numbers of credit hours had higher grade point averages and were more likely to persist. However, a sub-analysis of those who enrolled in higher numbers of credit hours found that those who registered for more academically challenging courses had lower grade point averages and lower levels of persistence than those in courses considered average in difficulty. Consequently, one must consider the academic abilities of those registering for high numbers of credit hours along with the rigor of the courses for which they

are enrolling. Given the limited body of research, therefore, a supposition regarding end-of-first-semester credit hour enrollment and its association with persistence could not be established.

Characteristics of Community College Students

According to the National Center for Education Statistics, 4 out of 10 U.S. college students, or approximately 7.6 million students, attended community colleges during the 2003-2004 academic year (Horn & Nevill, 2006). Currently, there are 986 public, 171 independent, and 29 tribal community colleges in the United States. The five most popular terminal degree programs at community colleges nationwide are nursing, law enforcement, licensed practical nursing, radiology, and computer technologies. Even though community colleges comprise about only one third of the institutions of higher education, they enroll 47.0% of African-American undergraduate students, 55.0% of Hispanic students, and 47.0% of Asian/Pacific Islander students (American Association of Community Colleges, 2006).

Other characteristics of typical community college students include that they are more likely than those individuals who attend 4-year colleges and universities to delay entering college after high school graduation, work full-time, and enroll in college part-time (American Association of Community Colleges, 2006). Furthermore, Robert McCabe, a senior fellow with the League for Innovation in the Community College and a former president of Miami-Dade Community College, reported in a national study that 41.0% of entering community college students required some form of remediation (e.g., reading, writing, and/or math). This is in comparison to 29.0% of undergraduate students overall. The typical community college student required seven credit hours of remedial/developmental education (Callan, 2000).

As noted above, community colleges have served a diverse student population when compared to their 4-year college and university counterparts. As primarily open-door

institutions, they accept a varied array of students (Walters, 2003), including individuals with fewer financial resources and those who are the first in their families to attend postsecondary institutions (Cohen & Brawer, 1982/2003). Therefore, community colleges are more likely to enroll students with demographic risk factors that challenge the students' abilities to complete their degrees than their peers at 4-year institutions (Cofer & Somers, 2001).

The National Center for Education Statistics conducted a research study in 2003-2004 to help develop a "statistical snapshot of the undergraduate population" (Horn & Nevill, 2006, p. iii). The study included about 80,000 undergraduates, including 25,000 students from community colleges. These individuals were enrolled in approximately 1,400 institutions of higher education across the nation. The study revealed that, when compared to 4-year colleges and universities, community college students were more likely to be female, older, and from lower-income families. Furthermore, 61.0% of community college students were independent, as compared to only 35.0% of students enrolled in undergraduate 4-year college or university programs. One fourth of community college students were single parents and one third were married and had children. The preponderance of community college students worked at least part time (79.0%). Just under half (47.0%) of the community college students received some form of financial aid, with the vast majority receiving grants (Horn & Nevill, 2006).

In order to determine the likelihood of a community college student to persist, this 1-year study developed a classification system, called the *Community College Track*, which categorized students into groups based upon their perceived commitment to completing their degree programs. The three categories defined in the study were defined as listed below:

1. More committed - Students categorized as more committed attended college at least half time during the year under study. Furthermore, they listed either transfer to a 4-

- year college or university or the obtainment of an associate or certificate program degree as the reason for their enrollment at the community college.
2. Less committed - Students who were categorized as less committed also had listed either transfer to a 4-year college or university or the obtainment of an associate or certificate program degree as the reason for their enrollment at the community college. However, they were enrolled for less than half time.
 3. Not committed - Students categorized as not committed did not list transfer to a senior institution or degree completion at the community college as their reasons for enrolling (Horn & Nevill, 2006).

Commitment to completing one's degree had previously been established by Tinto (1993) as an indicator of an individual's likelihood to succeed. Overall, 49.0% of the community college students in the study were classified as *more committed*, 39.0% were classified as *less committed*, and 12.0% were classified as *not committed*. However, variances were observed when reviewing the data by student age distributions. For example, traditional college-age students (aged 23 and younger) constituted 58.0% in the *more committed* track. In contrast, 56.0% of the individuals in the *not committed* track were aged 30 or older (Horn & Nevill, 2006).

Variances by age, however, were not the only issue noted. Variances by gender and ethnicity were also prevalent. Women were *more committed* to the associate of applied science track, whereas men were *more committed* to the university transfer track. Furthermore, the study revealed that Hispanic individuals were more likely to fall into the non-degree or *not committed* track. The study also revealed that a significant number of students enrolled in community colleges for personal interest or to upgrade job skills. For some individuals, therefore, degree completion was never a goal (Horn & Nevill, 2006).

Regarding student involvement, Coley noted significant differences in involvement, depending upon the type of institution of higher education the student first attended (as cited in Schmid & Abell, 2003). Students enrolled in community colleges were less likely to participate in study groups, speak to faculty outside of class, and participate in clubs or organizations as compared to their counterparts in 4-year colleges and universities (Schmid & Abell, 2003).

The fact that community colleges have multiple missions and their students have diverse goals was underscored by the results of the *Community College Survey of Student Engagement* (2006). Also emphasized was the importance of the faculty member-student relationship in community colleges. This relationship was determined to be even more important to the community college student as compared to the traditional university or 4-year college student because the vast majority of community college students commuted. Therefore, the primary, and sometimes only, contact the community college student had with the college faculty and staff occurred within the classroom.

Persistence in Community Colleges

Persistence within the community college has long been a concern for higher education faculty and administration as well as for policy makers, both at the state and federal level. In 1995-1996, for example, among a cohort of first-time freshmen who were enrolled in community colleges, only approximately 48.0% had either completed a credential or transferred to a 4-year institution 6 years after first enrolling at the community college. Of those, 36.0% completed a credential and 12.0% transferred to a 4-year institution (Hoachlander et al., 2003). By comparison, Berkner, He, and Cataldi, indicated in the report, *Descriptive Summary of 1995–96 Beginning Postsecondary Students: Six Years Later*, that 63.0% of first-time freshmen who were enrolled in 4-year colleges or universities had completed their bachelors' degrees. Additionally,

18.0% were either still enrolled or had completed certificate or associates' degrees (as cited in Horn & Nevill, 2006).

Some of the most common characteristics of the typical community college student are also attributes that have been associated with attrition, including delaying entry into college directly out of high school; attending college part-time; working while attending college; and being independent or self-supportive; and lacking finances (Community College Survey of Student Engagement, 2006). Compounding the problem, nearly one fifth of traditional-aged community college students had never completed 10 credits toward their degrees, with that total hypothesized as being higher for adult college students (Lumina Foundation for Education, 2005). Cohen and Brawer noted that, in many instances, the community college student was at-risk and faced numerous barriers to academic success (as cited in McArthur, 2005).

Within the Tennessee Board of Regents system of higher education (TBR), there are 6 universities and 13 community colleges located throughout the state. These institutions enroll more than 80.0% of all in-state residents attending public institutions of higher education (Tennessee Board of Regents, 2005a). However, a review of fall-to-fall retention rates within the TBR system reveals that there is a wide variance between the fall-to-fall retention rates of universities (81.8%) and community colleges (58.1%). Furthermore, discrepancies were noted when reviewing 6-year graduation rates, with 43.4% of 4-year college and university students graduating within 6 years as opposed to 30.5% of community college students (Tennessee Board of Regents, 2005b). While there is less variance between the graduation rates for Tennessee community colleges and universities regarding graduation rates, it should be noted that both groups' percentages were based upon graduation rates 6 years after the initial enrollment of the

first-time full-time cohort group. However, associate degree programs are typically 2 years in length and bachelor's degree programs are typically 4 years in length.

A brief written by the Tennessee Board of Regents (2006) identified four factors that influence initial participation and then withdrawal from TBR institutions:

1. The rigor of the student's high school curriculum. The Board noted that academically unprepared students are disadvantaged from the start of their postsecondary careers and rarely have been able to make up the ground lost.
2. Graduating high school seniors have significant academic preparation gaps in math, English, and science,
3. Enrolling in college full-time has been a major determining factor in retention. However, economic factors have been found to limit many students' abilities to enroll full-time. Many students reported that they must work, either full-time or part-time, while attending classes.
4. Student concerns regarding the rise in tuition costs are being compounded by their concerns about lose of wages while attending classes.

Limitations of Research

There is a broad base of research on the study of retention and persistence to graduation at 4-year colleges and universities and numerous articles on the subject can be found in professional journals. The work of Astin (1972, 1993), Bean and Eaton (2000, 2001-2002), Braxton et al. (1988), *The Education Trust* (2004), Tinto (1987, 1993), Pascarella et al (1986), and Stage (1988) were all based solely or primarily on research completed at 4-year colleges and universities. In addition, Pascarella and Terenzini published an 800 page report that reviewed nearly 3,000 studies on *How College Affects Students* (as cited in Lumina Foundation for Education, 2005). Many of these studies involved student retention and persistence to

graduation. While, obviously, some parallels can be drawn between community college students and their 4-year college and university peers, as noted above, there are clear distinctions as well. The demographics of the typical first-time full-time freshman at the community college may be vastly different than that of the typical first-time full-time freshman at a 4-year college or university. Of particular note is the fact that the traditional community college student commutes, whereas the traditional 4-year college or university student resides on campus. This fact alone changes the dynamics of the student-faculty member and student-college interaction. Therefore, policies and practices designed for the traditional aged university student often fail at the community college.

The Lumina Foundation for Education noted four issues, or concerns, regarding the available research:

1. most research is about 4-year colleges or universities,
2. current data do not include measures to promote retention and persistence to graduation,
3. flaws in methodology were often purported, and
4. there is little dissemination and/or discussion of the results of research about community colleges (2005).

Even the most extensive meta-research about retention and persistence completed on 4-year colleges and schools is 15 years old. Furthermore, during the years since this noted research by Pascarella and Terenzini, little research has been conducted, or at least published, on community colleges. Townsend, Donaldson, and Wilson conducted a review of articles on community colleges in five mainstream journals on higher education. Their study found that

only 8% of the more than 2,300 articles mentioned community colleges – regardless of the topic of the study (as cited in Lumina Foundation for Education, 2005).

The Integrated Postsecondary Education Data System (IPEDS), a part of the National Center for Education Statistics, is the largest source of data on institutions of higher education. The Higher Education Act of 1992 mandated that all institutions that participate in the disbursement of federal student financial assistance programs complete the IPEDS reports (About IPEDS, 2006). While IPEDS is a rich source of data, it does not include large quantities of information useful for measuring and affecting retention and persistence. Student surveys have primarily been the instrument of choice regarding self-reported retention and persistence information. Localized surveys allow community colleges to customize their instruments. However, the results lack national comparative data. Furthermore, self-reported information may be skewed because of participant bias.

A national student survey, the *Community College Survey of Student Engagement*, (CCSSE) is available. CCSSE, which was established in 2001, provides comparative data specifically to and for community colleges. Its purpose is to provide information to improve learning and retention in community colleges and inform policymakers (About CCSSE, n.d.). CCSSE is emerging as a leading instrument for the assessment of student satisfaction in community colleges. Again, however, the results of this national study may still be skewed because of the collection of self-reported data. Moreover, the cost of participation may be prohibitive to some institutions.

Summary

Since the formalization of institutions of higher education, students have entered college with varying backgrounds, academic abilities, goals, expectations, and resources. Postsecondary

institutions have made the development of numerous support systems a priority to facilitate first-year student success given student-specific demographic and/or matriculation variables (Upcraft & Gardner, 1989). However, first-year attrition remains greater among community college students than among individuals who attend any other type of institution of higher education (Bradburn, 2002). While volumes have been written about retention in general, Townsend, Donaldson, and Wilson noted that research specifically on community colleges was not as readily available (as cited in the Lumina Foundation for Education, 2005). Furthermore, research has been inconclusive regarding the association between various demographic and pre- and post-matriculation variables, including admissions test scores and first-generation student status (Bradburn, 2002; Chen, 2005; Horn & Kojaku, 2001). Multiple regression analysis specifically regarding the association between financial aid status, first-generation student status, and remedial/developmental placement status as well as other variables could not be located. Therefore, additional research was warranted to study the associations between these attributes and fall-to-fall retention rates for first-time full-time freshmen at a 2-year public community college.

CHAPTER 3

RESEARCH METHODOLOGY

First-time full-time community college freshmen historically have faced greater challenges in obtaining postsecondary degrees than have their counterparts attending 4-year colleges and universities. Research has identified several factors associated with this phenomenon. As open-door institutions, community colleges enroll a much wider variety of students than what is typically found at universities and 4-year colleges (Lumina Foundation for Education, 2005). First-generation students, individuals with lower levels of academic preparedness, and individuals with greater financial challenges are more commonly found at community colleges, as compared to universities. Within the Tennessee Board of Regents system, wide variance can be seen between the fall-to-fall retention rates of universities (81.8%) and community colleges (58.1%) (Tennessee Board of Regents, 2005b).

This study focused on first-time full-time freshmen's attributes and their associations with fall-to-fall retention rates within a public community college setting. Both cognitive and non-cognitive demographic and pre- and post-matriculation variables were researched in the study. This chapter describes the population, research design, data collection, and data analysis procedures used in the study.

Population

Northeast State Technical Community College, a comprehensive 2-year institution, is governed by the Tennessee Board of Regents. It was founded in 1966 as an area vocational school and came under the Board of Regents' jurisdiction in 1983. In 1990, a university parallel component was added and the name was changed from Tri-Cities State Technical Institute to Northeast State Technical Community College. The college is located in the upper east corner of

the state and serves Carter, Johnson, Sullivan, Unicoi, and Washington Counties as its primary service area (Northeast State Technical Community College, 2005). For the first time in the history of the institution, Northeast State's unduplicated headcount enrollment exceeded 5,000 students in fall 2004. In fall 2005, the institution's enrollment dropped slightly to 4,860 students, with 88.0% of the student population residing within the institution's main service area. Furthermore, in fall 2005, 53.0% of the student population was enrolled full-time, with 55.0% of the student population being female. With a mean age of 27.5, the institution's age distribution by category was as follows: under 18 (2.0%), 18-24 (51.0%), 25-34 (27.0%), 35 and over (20.0%). Ethnically, the college is quite homogeneous, with 96.0% of the student population being Caucasian, 3.0% being African American, and 1.0% being other ethnicities or not reported. The mean ACT composite score for entering freshmen was 19.0. While the aforementioned statistics only reflect the fall 2005 semester, a study of Northeast State's historical trends indicates these data are indicative of the institution (Northeast State Technical Community College, 2005-2006).

The population for this study was all first-time full-time freshmen enrolling at Northeast State Technical Community College in the fall semesters of 2003, 2004, and 2005, as denoted on the college's Student Information System (SIS). This system also houses the following data for each individual student: age, first-generation student status, gender, high school classification, race, application date, admissions test sub-scores (English, math, reading, and science), remedial/developmental course placement, major program of study, financial aid status, first-semester grade point average, and end-of-first-semester credit hour enrollment status. These data were researched in the study.

Research Design

A quantitative study was conducted to examine the association between identified first-time full-time freshmen's attributes with their fall-to-fall retention rates. A quantitative study was selected as this type of research is the most commonly the chosen approach when the investigator is primarily using postpositive assertions for constructing knowledge and collecting data that will produce statistical data (Creswell, 2003). The study was based upon the following 15 prediction variables:

1. Age,
2. First-generation student status,
3. Gender,
4. High school classification,
5. Race,
6. Application date,
7. Admissions test (ACT) English sub-score,
8. Admissions test (ACT) math sub-score,
9. Admissions test (ACT) reading sub-score,
10. Admissions test (ACT) science sub-score,
11. Remedial/developmental course placement,
12. Major program of study,
13. Financial aid status,
14. First-semester grade point average, and
15. End-of-first-semester credit hour enrollment status

The criterion variable was retention. Retention was defined as re-enrolling at the institution the subsequent fall semester (e.g., fall-to-fall retention).

Data Collection

The data for this longitudinal study were housed in Northeast State's student records database, Student Information System (SIS). The SIS system is also the Tennessee Board of Regents' primary database for the collection and storage of student information for all universities, community colleges, and technology centers under its purview. SIS has been in use since 1992. The longevity of the system facilitated validity as data entry has been highly standardized over the years. Using database information versus gathering information directly from the subjects can reduce bias as most biases occur when the data are being collected (Good & Hardin, 2003).

A FOCUS program was developed to extract the data under review. Included in the program was a routine to randomly assign an identification number to each student's record, negating the need to include student names or SIS student identification numbers in the extract. Using randomly assigned identification numbers also protected the identity of the students' records under review.

In addition to collecting data regarding the 15 variables under study, each first-time full-time freshman's entry term and enrollment status for the subsequent fall semester was ascertained. This information was used to categorize individuals into persister and non-persister classifications. The use of fall-to-fall persistence as measure of retention was congruent with the reporting requirements and practices of the Tennessee Board of Regents. Upon extraction, the data were transferred to the Statistical Package for Social Sciences (SPSS), version 14.0.

Data Analysis

The data were analyzed using appropriate statistical techniques for the hypotheses under consideration. The first series of research questions were

1. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on age?
2. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on whether or not the student was a first-generation student?
3. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on gender?
4. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the type of high schools from which the students graduated?
5. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on race?
6. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the date the students submitted their applications for admission?
7. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' ACT English sub-scores?
8. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' ACT math sub-scores?
9. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' ACT reading sub-scores?

10. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' ACT science sub-scores?
11. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the number of remedial/developmental courses into which the students are placed?
12. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' major program of study?
13. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on financial aid award?
14. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' first-semester grade point averages?
15. Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the number of credit hours in which the students are enrolled at the end of their first semester?

For this series of research questions, corresponding hypotheses were developed. The data were analyzed using Chi Square test of independence (two-way contingency table) and the independent-samples *t* test, as appropriate. The .05 level of significance was used as the alpha level to test each hypothesis.

The second research question was

16. What are the characteristics of the first-time full-time freshmen who are most likely to persist to the subsequent fall semester?

A backwards multiple linear regression model to eliminate non-significant variables.

With the exception of the ACT sub-scores, all predictor variables were initially entered into the

multiple linear regression model, regardless of the significance of the univariable analysis. The ACT sub-scores were not included because to do so would have eliminated GED recipients, those aged 21 or over, and students with SAT-converted ACT scores (as the institution does not convert SAT scores into the ACT science sub-score because it is not used for placement). It was my opinion that including the full population set was more important than using the ACT sub-scores in the multiple linear regression analysis, especially given the effect size of the ACT sub-scores relative to persistence.

Then, a multicollinearity test was run. According to the SPSS Base Manual (2005), multicollinearity occurs when one variable is a linear function of another variable, which could cause an *overfit* when running the regression model. Finally a stepwise multiple linear regression model was run. For the aforementioned process, dichotomous dummy variables were developed or actual parametric data were used, as noted in Table 1:

Table 1

Multiple Linear Regression Variable Values

Variable Name	Description of Variable
Age	Student's age in years
First-generation Student	1 = First-generation student; 0 = Otherwise
Gender	0 = Female; 1 = Male
Traditional High School Graduate	1 = Traditional high school graduate; 0 = Otherwise

Table 1 (continued)

Variable Name	Description of Variable
Private High School Graduate	1 = Private high school graduate; 0 = Otherwise
Other Type of High School or Unknown	1 = Graduate of another type of high school or unknown; 0 = Otherwise
GED Graduate	1 = GED graduate; 0 = Otherwise
Asian	1 = Asian; 0 = Otherwise
Black	1 = Black; 0 = Otherwise
Hispanic	1 = Hispanic; 0 = Otherwise
White	1 = White; 0 = Otherwise
Other Race/Not Listed	1 = Another race/not listed; 0 = Otherwise
Application Date	1 = Submitted application 61 days or more prior to start of fall semester; 0 = Otherwise
R/D Placement	0 – 8 courses
AAS Major	1= AAS major; 0 = Otherwise
AA/AS - Other than General Concentration	1 = AA/AS - Other than General Concentration; 0 = Otherwise
AA/AS - General Concentration	1 = AA/AS - general concentration; 0 = Otherwise

Table 1 (continued)

Variable Name	Description of Variable
Undecided Major	1= Undecided major; 0 = Otherwise
No Financial Aid	1= Did not receive financial aid; 0 = Otherwise
Pell Grant Recipient	1 = Received the Pell Grant as the only form of financial aid; 0 = Otherwise
Lottery Grant Recipient	1 = Received the Lottery Grant as the only form of financial aid; 0 = Otherwise
Other Single Forms of Financial Aid	1 = Received another other single form of financial aid; 0 = Otherwise
Multiple Forms of Financial Aid	1 = Received multiple forms of financial aid; 0 = Otherwise
First-semester GPA	0.0 – 4.0
End-of-first-semester credit hour enrollment	0 – 19

Summary information, tables, and figures were used, as appropriate, to facilitate the understanding and interpretation of the results.

Summary

The information regarding the research design, methods, and procedures that were used in this study were outlined in Chapter 3. The population of the study consisted of all first-time full-time freshmen enrolling at Northeast State Technical Community College in the fall

semesters of 2003, 2004, and 2005. Quantitative procedures were used to analyze the association of first-time full-time freshmen's attributes and fall-to-fall retention rates. An analysis of the data is provided in Chapter 4, and implications and conclusions of the study as well as recommendations for further research are presented in Chapter 5.

CHAPTER 4

RESULTS AND ANALYSIS OF DATA

The importance of attaining a postsecondary degree, not only for the individual obtaining the credential, but also for the community in which he or she lives, is well documented.

Research has established that earning a postsecondary degree has many benefits, including, but not limited to, monetary, socioeconomic, and health (Bureau of Labor Statistics, 2003; Institute for Higher Education Policy, 2005). The purpose of this study, therefore, was to investigate the associations between select first-time full-time freshmen's attributes and fall-to-fall retention at Northeast State Technical Community College in order to provide base research to aid in retention and persistence initiatives.

The data for this longitudinal study were housed in Northeast State's student records database, Student Information System (SIS). The population consisted of all 2,240 first-time full-time freshmen enrolled at Northeast State during the 2003, 2004, and 2005 fall semesters. Those individuals not seeking degrees (e.g., taking courses for personal interest or categorized as transient students) were classified as special students in SIS and not first-time freshmen, and, therefore, they were excluded from the study. The population set was then classified into two categories: persisters and non-persisters. Individuals were classified as persisters if they re-enrolled at the institution the subsequent fall semester. For example, a first-time full-time freshman enrolling in fall 2003 was considered a *persister* if he or she re-enrolled at the institution in fall 2004. Conversely, individuals were classified as *non-persisters* if they did not re-enroll at the institution the subsequent fall semester. There were 1,294 persisters (57.8%) and 946 non-persisters (42.2%).

Sixteen research questions were developed to direct the study, and 15 corresponding hypotheses were tested. A preliminary analysis of the data was conducted to ascertain descriptive statistics. Chi Square and independent samples *t* tests were used to determine if there was an association between each variable and fall-to-fall retention. A stepwise multiple linear regression model was used to estimate the effect of the predictor variables upon the criterion variable, fall-to-fall retention.

The chapter is divided into three primary sections. The first section provides the results of the demographic variables analysis. The second section provides the results pre-matriculation variable analysis, while the third section provides the results of the post-matriculation variables analysis.

Demographic Variables Analysis

Demographic variables were researched in order to determine if students of high risk for non-persistence can be identified at the onset of their initial fall semester in order to provide them with specific and targeted retention strategies. The demographic variables researched were age, first-generation student status, gender, high school classification, and race.

Research Question 1: Age

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on age?

H₀₁. There is no association between age and the fall-to-fall retention of first-time full-time freshmen.

As indicated in Table 2, the age range for persisters was 16 to 56. The age range for non-persisters was 17 to 49. Standard deviations and measures of central tendency are also reported in Table 2.

Table 2

Age Analysis of Persisters and Non-persisters

Group	N	Mean	Median	Mode	Standard Deviation	Range
Persisters	1,294	20.21	18.00	18.00	5.53	16 – 56
Non-persisters	946	20.38	18.00	18.00	4.78	17 - 49

An independent-samples *t* test was conducted to evaluate the null hypothesis that there is no association between age and the fall-to-fall retention of first-time full-time freshmen. The test was not significant, $t(2,238) = -0.76, p = .45$. The 95% confidence interval for the differences in the means was -0.61 to 0.27. The difference between means was 0.17. Therefore, the null hypothesis was retained.

Research Question 2: First-generation Student Status

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on whether or not the student was a first-generation student?

Ho2. There is no association between being a first-generation student and the fall-to-fall retention of first-time full-time freshmen.

A two-way contingency table analysis was conducted to evaluate the null hypothesis that there is no association between being a first-generation student and the fall-to-fall retention of first-time full-time freshmen. The analysis indicated that retention and first-generation student status were not significantly related, $X^2(1, N = 2,240) = 0.25, p = .62$. Therefore, the null

hypothesis was retained. Table 3 indicates the frequencies and associated percentages of persisters and non-persisters by first-generation status as well as for the total population.

Table 3

First-generation Student Status Analysis of Persisters and Non-persisters

	First-generation Students		Others		Total
	N	%	N	%	
Persisters	226	56.6	1,068	58.0	1,294
Non-persisters	173	43.4	773	42.0	946
Total	399		1,841		2,240

Research Question 3: Gender

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on gender?

Ho3. There is no association between gender and the fall-to-fall retention of first-time full-time freshmen.

The gender composition of the population was fairly evenly distributed with 53.0% of the population classified female and 47.0% of the population classified as male. A two-way contingency table analysis was conducted to evaluate the null hypothesis that there is no association between gender and the fall-to-fall retention of first-time full-time freshmen. The analysis indicated that retention and gender were not significantly related, $\chi^2(1, N = 2,240) =$

1.38, $p = .24$. Therefore, the null hypothesis was retained. Table 4 indicates the frequencies and associated percentages of persisters and non-persisters by gender as well as for the total population.

Table 4

Gender Analysis of Persisters and Non-persisters

Group	Females		Males		Total
	N	%	N	%	
Persisters	700	58.9	594	56.5	1,294
Non-persisters	488	41.1	458	43.5	946
Total	1,188		1,052		2,240

Research Question 4: High School Classification

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the type of high schools from which the students graduated?

Ho4. There is no association between the type of high schools from which the students graduated and the fall-to-fall retention of first-time full-time freshmen.

The composition of the population with regard to high school classification was skewed. Seventy-seven percent graduated from a traditional high school, 1.2% graduated from a private high school, 4.8% obtained their GEDs, and 17.1% graduated from another type of high school or their high school type was listed as unknown. (Percentages may not add up to 100 because of rounding.) A two-way contingency table analysis was conducted to evaluate the null hypothesis

that there is no association between the type of high schools from which the students graduated (traditional, private, GED, or other/unknown) and the fall-to-fall retention of first-time full-time freshmen. The analysis indicated that retention and high school classification were significantly related, $X^2(3, N = 2,240) = 23.74, p < .01$ exceeds the critical value (7.815) at the .05 level of significance with three degrees of freedom; therefore, the null hypothesis was rejected. The effect size, however, was small ($\phi^2 = .01$). Table 5 indicates the frequencies and associated percentages of persisters and non-persisters by high school classification as well as for the total population. Table 6 indicates the adjusted residuals regarding the association between high school classification and retention.

Adjusted residuals are roughly equivalent to z scores. Therefore, values greater than 2.0 or less than -2.0 are of significance (Von Eye & Niedermeier, 1999, p. 103). These residuals indicated that students who graduated from traditional high schools persisted at rates higher than expected, while GED graduates and those who graduated from institutions classified as *other/unknown* persisted at rates lower than expected.

Table 5

High School Classification Analysis of Persisters and Non-persisters

Group	Traditional		Private		GED		Other/Unknown		Total
	N	%	N	%	N	%	N	%	
Persisters	1,038	60.2	17	63.0	44	41.1	195	51.0	1,294
Non-persisters	686	39.8	10	37.0	63	58.9	187	49.0	946
Total	1,724		27		107		382		2,240

Table 6

Adjusted Residuals Regarding the Association Between High School Classification and Retention

Group	Traditional		Private		GED		Other/Unknown		Total
	N	Adjusted Residual	N	Adjusted Residual	N	Adjusted Residual	N	Adjusted Residual	
Persisters	1,038	4.3	17	0.5	44	-3.6	195	-2.9	1,294
Non-persisters	686	-4.3	10	-0.5	63	3.6	187	2.9	946
Total	1,724		27		107		382		2,240

Research Question 5: Race

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on race?

Ho5. There is no association between race and the fall-to-fall retention of first-time full-time freshmen.

The race, or ethnicity, composition of the population was skewed. Less than 1.0% of the population was classified as Asian, 2.8% were classified as Black, 1.0% was classified as Hispanic, 88.0% were classified as White, and 7.6% were classified as Ethnicity Unknown. A two-way contingency table analysis was conducted to evaluate the null hypothesis that there is no association between race and the fall-to-fall retention of first-time full-time freshmen. The analysis indicated that retention and race were not significantly related, $\chi^2(4, N = 2,240) = 5.74$, $p = .22$. Therefore, the null hypothesis was retained. Table 7 indicates the frequencies and associated percentages of persisters and non-persisters by race as well as for the total population.

Table 7

Race Analysis of Persisters and Non-persisters

Group	Asian		Black		Hispanic		White		Other/Not Listed		Total
	N	%	N	%	N	%	N	%	N	%	
Persisters	10	71.4	30	48.4	14	63.6	1,150	58.3	90	63.6	1,294
Non-persisters	4	28.6	32	51.6	8	36.4	821	41.7	81	36.4	946
Total	14		62		22		1971		171		2,240

Pre-matriculation Variable Analysis

Pre-matriculation variables were also researched in order to determine if students of high risk for non-persistence can be identified at the onset of their initial fall semester in order to

provide them with specific and targeted retention strategies. The pre-matriculation variables researched were application date, admission test scores (ACT sub-scores), and remedial/developmental course placement.

Research Question 6: Application Date

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the date the students submitted their applications for admission?

Ho6. There is no association between the date the students submitted their applications for admission and the fall-to-fall retention of first-time full-time freshmen.

The dates the students made application to the college relative to the start of their initial term were as follows: 0-30 days (17.0%), 31-60 days (15.5%), 61-90 days (17.9%), 91-120 days (14.2%), and 121 or more days (35.4%). A two-way contingency table analysis was conducted to evaluate the null hypothesis that there is no association between the date the students submitted their applications for admission and the fall-to-fall retention of first-time full-time freshmen. The analysis indicated that retention and application date were significantly related, $X^2(4, N = 2,240) = 42.57, p < .01$ exceeds the critical value (9.49) at the .05 level of significance with four degrees of freedom; therefore, the null hypothesis was rejected. The effect size, however, was small ($\phi^2 = .02$). Table 8 indicates the frequencies and associated percentages of persisters and non-persisters by application date as well as for the total population. Table 9 indicates the adjusted residuals regarding the association between application date and retention. These residuals indicated that students who submitted their applications for admission 121 days or more before the start of the fall semester persisted at rates higher than expected, while students who submitted their applications for admission 60 days or fewer before the start of the fall semester persisted at rates lower than expected.

Table 8

Application Date Analysis of Persisters and Non-persisters by the Number of Days the Application was Submitted Prior to the Start of the Fall Semester

Group	0 – 30 Days		31 – 60 Days		61 – 90 Days		91 – 120 Days		121+ Days		Total
	N	%	N	%	N	%	N	%	N	%	
Persisters	176	46.2	176	50.6	241	60.1	197	62.1	504	63.6	1,294
Non-persisters	205	53.8	172	49.4	160	39.9	120	37.9	289	36.4	946
Total	381		348		401		317		793		2,240

Table 9

Adjusted Residuals Regarding the Association Between Application Date and Persistence

Group	0-30 Days		31-60 Days		61-90 Days		91-120 Days		121+ Days		Total
	N	Adjusted Residual	N	Adjusted Residual	N	Adjusted Residual	N	Adjusted Residual	N	Adjusted Residual	
Persisters	176	-5.0	176	-3.0	241	1.0	197	1.7	504	4.1	1,294
Non-Persisters	205	5.0	172	3.0	160	-1.0	120	-1.7	289	-4.1	946
Total	381		348		401		317		793		2,240

Research Question 7: ACT English Sub-score

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' ACT English sub-scores?

Composite ACT test scores and sub-scores were submitted by the majority of Northeast State applicants. However, the institution also accepts SAT scores, converting them to ACT scores. For this analysis SAT-converted ACT scores were included. However, the science ACT sub-score was not converted by the institution because it was not used for placement. Therefore, SAT-converted ACT science sub-scores were not available for those students who submitted SAT scores. Furthermore, GED graduates were assessed by the COMPASS test and not by the ACT exam. Finally, all first-time full-time freshmen entering the institution after their 21st birthday were also assessed using the COMPASS test rather than the ACT exam. Therefore, the data records for GED graduates and first-time full-time students who entered Northeast State after their 21st birthdays were missing all 4 ACT sub-scores. Students submitting SAT scores were missing their ACT science sub-scores only. Therefore, there were only 1,852 valid cases for evaluation for the ACT English, math, and reading sub-scores and 1,813 valid cases for the evaluation of the ACT science sub-score.

As noted previously, there were 1,852 valid cases with regard to the ACT English sub-score. The ACT English sub-score range for persisters was 7 to 34 (N=1,094). The ACT English sub-score range for non-persisters was 7 to 32 (N=758). There were 200 persisters with missing cases and 188 non-persisters with missing cases. Standard deviations and measures of central tendency are also reported in Table 10.

Table 10

ACT English Sub-score Analysis of Persisters and Non-persisters

Group	N	Mean	Median	Mode	Standard Deviation	Range
Persisters	1,094	18.55	19	19	4.43	7 - 34
Non-persisters	758	17.81	18	19	4.29	7 - 32

Ho7. There is no association between the students' ACT English sub-scores and the fall-to-fall retention of first-time full-time freshmen.

An independent-samples *t* test was conducted to evaluate the null hypothesis that there is no association between the students' ACT English sub-scores and the fall-to-fall retention of first-time full-time freshmen. The test was significant, $t(1,850) = 3.58, p < .01$. Individuals who persisted tended to have higher ACT English sub-scores than non-persisters. The 95% confidence interval for the differences in the means was 0.33 to 1.14. The difference between means was 0.74. Therefore, the null hypothesis was rejected. The effect size, however, was small ($\eta^2 = .01$).

Research Question 8: ACT Math Sub-score

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' ACT math sub-scores?

As noted previously, there were 1,852 valid cases with regard to the ACT math sub-score. The ACT math sub-score range for persisters was 11 to 30. The ACT math sub-score range for non-persisters was 9 to 34. There were 200 persisters with missing cases and 188 non-

persisters with missing cases. Standard deviations and measures of central tendency are also reported in Table 11.

Table 11

ACT Math Sub-score Analysis of Persisters and Non-persisters

Group	N	Mean	Median	Mode	Standard Deviation	Range
Persisters	1,094	17.96	17	16	3.14	11 - 30
Non-persisters	758	17.32	17	16	3.22	9 - 34

Ho8. There is no association between the students' ACT math sub-scores and the fall-to-fall retention of first-time full-time freshmen.

An independent-samples *t* test was conducted to evaluate the null hypothesis that there is no association between the students' ACT math sub-scores and the fall-to-fall retention of first-time full-time freshmen. The test was significant, $t(1,850) = 4.27, p < .01$. Individuals who persisted tended to have higher ACT math sub-scores than non-persisters. The 95% confidence interval for the differences in the means was 0.35 to 0.93. The difference between means was 0.64. Therefore, the null hypothesis was rejected. The effect size, however, was small ($\eta^2 = .01$).

Research Question 9: ACT Reading Sub-score

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' ACT reading sub-scores?

As noted previously, there were 1,852 valid cases with regard to the ACT reading sub-score. The ACT reading sub-score range for persisters was 6 to 34. The ACT reading sub-score range for non-persisters was 10 to 34. There were 200 persisters with missing cases and 188 non-persisters with missing cases. Standard deviations and measures of central tendency are also reported in Table 12.

Table 12

ACT Reading Sub-score Analysis of Persisters and Non-persisters

Group	N	Mean	Median	Mode	Standard Deviation	Range
Persisters	1,094	19.64	19	20	4.74	6 - 34
Non-persisters	758	18.94	19	15	4.86	10 - 34

Ho9. There is no association between the students' ACT reading sub-scores and the fall-to-fall retention of first-time full-time freshmen.

An independent-samples *t* test was conducted to evaluate the null hypothesis that there is no association between the students' ACT reading sub-scores and the fall-to-fall retention of first-time full-time freshmen. The test was significant, $t(1,850) = 3.13, p < .01$. Individuals who persisted tended to have higher ACT reading sub-scores than non-persisters. The 95% confidence interval for the differences in the means was 0.26 to 1.15. The difference between means was 0.70. Therefore, the null hypothesis was rejected. The effect size, however, was small ($\eta^2 = .01$).

Research Question 10: ACT Science Sub-score

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' ACT science sub-scores?

As noted previously, there were 1,813 valid cases with regard to the ACT science sub-score. The ACT science sub-score range for persisters was 9 to 35 (N=1,075). The ACT science sub-score range for non-persisters was 8 to 32 (N=738). There were 219 persisters with missing cases and 208 non-persisters with missing cases. Standard deviations and measures of central tendency are also reported in Table 13.

Table 13

ACT Science Sub-score Analysis of Persisters and Non-persisters

Group	N	Mean	Median	Mode	Standard Deviation	Range
Persisters	1,075	19.42	20	20	3.37	9 – 35
Non-persisters	738	18.81	19	19	3.62	8 - 32

Ho10. There is no association between the students' ACT science sub-scores and the fall-to-fall retention of first-time full-time freshmen.

An independent-samples *t* test was conducted to evaluate the null hypothesis that there is no association between the students' ACT science sub-scores and the fall-to-fall retention of first-time full-time freshmen. The test was significant, $t(1,811) = 3.65, p < .01$. Individuals who persisted tended to have higher ACT science sub-scores than non-persisters. The 95%

confidence interval for the differences in the means was 0.28 to 0.93. The difference between means was 0.61. Therefore, the null hypothesis was rejected. The effect size, however, was small ($\eta^2 = .01$).

Research Question 11: Remedial/Developmental Course Placement

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the number of remedial/developmental courses into which the students are placed?

As indicated in Table 14, the range of the number of remedial and/or developmental (R/D) courses required for persisters was zero to seven. The range of the number of remedial and/or developmental courses required for non-persisters was zero to eight. Standard deviations and measures of central tendency are also reported in Table 14.

Table 14

Remedial/Developmental Course Placement Analysis of Persisters and Non-persisters

Group	N	Mean	Median	Mode	Standard Deviation	Range
Persisters	1,294	2.15	2	0	2.00	0 – 7
Non-persisters	946	2.64	2	1	2.08	0 – 8

Ho11. There is no association between the number of remedial/developmental courses into which the students are placed and the fall-to-fall retention of first-time full-time freshmen.

An independent-samples t test was conducted to evaluate the null hypothesis that there is no association between the number of remedial/developmental courses into which the students are placed and the fall-to-fall retention of first-time full-time freshmen. The test was significant, $t(2,238) = -5.68, p < .01$. Individuals who persisted tended to require fewer remedial and/or developmental courses than non-persisters. The 95% confidence interval for the differences in the means was -0.66 to -0.32. The difference between means was 0.49. Therefore, the null hypothesis was rejected. The effect size, however, was small ($\eta^2 = .02$).

Post-matriculation Variable Analysis

Post-matriculation variables were researched in order to ascertain what factors that are available after the students have enrolled were associated with *high risk* with regard to persistence in order to provide them with specific and targeted retention strategies. The post-matriculation variables researched were major program of study, financial aid award, first-semester grade point average, and end-of-first-semester credit hour enrollment status.

Research Question 12: Major Program of Study

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' major program of study?

Ho12. There is no association between the students' major program of study and the fall-to-fall retention of first-time full-time freshmen.

The students' major programs of study were as follows: associate of applied science, or AAS, (27.4%); associate of arts or associate of science with a concentration other than *general*, AA/AS – Other than General Concentration (46.6%); associate of arts or associate of science with a *general* concentration, AA/AS –General Concentration (25.7%); and major program of study undecided (0.4%). Because of the extremely low number of individuals who were listed as

having a major program of study of *undecided* (8), the category was excluded from further analysis.

A two-way contingency table analysis was conducted to evaluate the null hypothesis that there is no association between the students' major programs of study and the fall-to-fall retention of first-time full-time freshmen. The analysis indicated that retention and major program of study were significantly related, $\chi^2(2, N = 2,232) = 10.08, p < .01$ exceeds the critical value (5.991) at the .05 level of significance with two degrees of freedom; therefore, the null hypothesis was rejected. The effect size, however, was small ($\phi^2 = .01$).

Table 15 indicates the frequencies and associated percentages of persisters and non-persisters by major program of study as well as for the total population. Table 16 indicates the adjusted residuals regarding the association between major program of study and retention. These residuals indicated that associate of applied science majors persisted at rates lower than expected.

Table 15

Major Program of Study Analysis of Persisters and Non-persisters

Group	AAS		AA/AS – Other than General Concentration		AA/AS – General Concentration		Total
	N	%	N	%	N	%	
Persisters	321	52.4	626	60.0	342	59.5	1,289
Non-persisters	292	47.6	418	40.0	233	40.5	943
Total	613		1,044		575		2,232

Table 16

Adjusted Residuals Regarding the Association Between Major Program of Study and Retention

Group	AAS		AA/AS – Other than General Concentration		AA/AS – General Concentration		Total
	N	Adjusted Residual	N	Adjusted Residual	N	Adjusted Residual	
Persisters	321	-3.2	626	2.0	342	1.0	1,289
Non-persisters	292	3.2	418	-2.0	233	-1.0	943
Total	613		1,044		575		2,232

Research Question 13: Financial Aid Award

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on financial aid award?

Ho13. There is no association between the awarding of financial aid and the fall-to-fall retention of first-time full-time freshmen.

The students' statuses with regard to financial aid awards were as follows: did not receive financial aid (22.0%), received Pell Grant funds as their only form of financial aid (18.6%), received Lottery Grant funds as their only form of financial aid (7.4%), received another single form of financial aid (8.7%), and received multiple forms of financial aid (43.3%). A two-way contingency table analysis was conducted to evaluate the null hypothesis that there is no association between the awarding of financial aid and the fall-to-fall retention of first-time full-time freshmen. The analysis indicated that retention and the awarding of financial aid were significantly related, $X^2(4, N = 2,240) = 44.55, p < .01$ exceeds the critical value (9.49) at the .05 level of significance with four degrees of freedom; therefore, the null hypothesis was rejected. The effect size, however, was small ($\phi^2 = .02$). Table 17 indicates the frequencies and associated percentages of persisters and non-persisters by financial aid award as well as for the total population. Table 18 indicates the adjusted residuals regarding the association between financial aid award and retention. These residuals indicated that students who received the Lottery Grant as their only form of financial aid persisted at rates higher than expected, while students who received the Pell Grant as their only form of financial aid persisted at rates lower than expected.

Table 17

Financial Aid Award Analysis of Persisters and Non-persisters

Group	No Financial Aid		Pell Grant Funds Only		Lottery Grant Only		Other Single Forms of Financial Aid		Multiple Forms of Financial Aid		Total
	N	%	N	%	N	%	N	%	N	%	
Persisters	280	21.6	190	14.7	119	9.2	123	9.5	582	45.0	1,294
Non-persisters	213	22.5	226	23.9	47	5.0	72	7.6	388	41.0	946
Total	493		416		166		195		970		2,240

Table 18

Adjusted Residuals Regarding the Association Between Financial Aid Award and Retention

Group	No Financial Aid		Pell Grant Funds Only		Lottery Grant Only		Other Single Forms of Financial Aid		Multiple Forms of Financial Aid		Total
	N	Adjusted Residual	N	Adjusted Residual	N	Adjusted Residual	N	Adjusted Residual	N	Adjusted Residual	
Persisters	280	-0.5	190	-5.5	119	3.8	123	1.6	582	1.9	1,294
Non-persisters	213	0.5	226	5.5	47	-3.8	72	-1.6	388	-1.9	946
Total	493		416		166		195		970		2,240

Research Question 14: First-semester Grade Point Average

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' first-semester grade point averages?

Because individuals who withdrew from the institution prior to the end of their first semester had the same grade point averages (GPA) as those individuals who failed all their courses (0.0 GPA), those individuals who withdrew were excluded from the analysis in order to better study the association of first-semester grade point averages with fall-to-fall retention. Therefore, there were 2,124 valid cases examined for this analysis. An additional test, as described later, examined the association of the number of hours in which the student was enrolled at the end of the first semester and its association with fall-to-fall retention.

As indicated in Table 19, the range for first-semester grade point averages for persisters was 0.0 to 4.0 (N=1,276). The range for first-semester grade point averages for non-persisters was also 0.0 to 4.0 (N=848). Standard deviations and measures of central tendency are also reported in Table 19.

Table 19

Grade Point Averages Analysis of Persisters and Non-persisters

Group	N	Mean	Median	Mode	Standard Deviation	Range
Persisters	1,276	2.39	2.75	0.0	1.25	0.0 – 4.0
Non-persisters	848	1.45	1.33	0.0	1.35	0.0 – 4.0

Ho14. There is no association between the students' first-semester grade point averages and the fall-to-fall retention of first-time full-time freshmen.

An independent-samples t test was conducted to evaluate the null hypothesis that there is no association between the students' first-semester grade point averages and the fall-to-fall retention of first-time full-time freshmen. The test was significant, $t(2,122) = 16.47, p < .01$. Individuals who persisted tended to have higher grade point averages than non-persisters. The 95% confidence interval for the differences in the means was 0.83 to 1.05. The difference between means was 0.94. Therefore, the null hypothesis was rejected. The effect size was medium-to-large ($\eta^2 = .11$).

Research Question 15: End-of-first-semester Credit Hour Enrollment Status

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the number of credit hours in which the students are enrolled at the end of their first semester?

As indicated in Table 20, the range for the end-of-first-semester credit hour enrollment status for persisters was zero to 19 credit hours. The range for the end-of-first-semester credit hour enrollment status for non-persisters was zero to 18 credit hours. Standard deviations and measures of central tendency are also reported in Table 20.

Table 20

End-of-first-semester Credit Hour Enrollment Status Analysis of Persisters and Non-persisters

Group	N	Mean	Median	Mode	Standard Deviation	Range
Persisters	1,294	12.55	12.00	12.00	2.44	0 – 19
Non-persisters	946	10.69	12.00	12.00	4.23	0 – 18

Ho15. There is no association between the number of credit hours in which the students are enrolled at the end of their first semester and the fall-to-fall retention of first-time full-time freshmen.

An independent-samples *t* test was conducted to evaluate the null hypothesis that there is no association between the number of credit hours in which the students are enrolled at the end of their first semester and the fall-to-fall retention of first-time full-time freshmen. The test was significant, $t(2,238) = 13.15, p < .01$. Individuals who persisted tended to be enrolled in more credit hours at the end-of-the-term, regardless of attendance or grade point averages, than non-persisters. The 95% confidence interval for the differences in the means was 1.59 to 2.14. The difference between means was 1.86. Therefore, the null hypothesis was rejected. The effect size was medium ($\eta^2 = .07$).

Characteristics of Persisters

Research Question 16: Characteristics of Persisters

What are the characteristics of the first-time full-time freshmen who are most likely to persist to the subsequent fall semester?

Multiple linear regression models were used to estimate the effect of the predictor variables upon the criterion variable, fall-to-fall retention. Because GED graduates and those first-time freshmen who entered the institution after their 21st birthday did not have ACT sub-scores as they were placed using COMPASS, ACT sub-scores were not analyzed via the multiple linear regression models. It was my opinion that including GED graduates and individuals over the age of 21 was of greater importance to the study. Furthermore, while the 4 ACT sub-scores were found to be significant in the univariable analysis, the effect size of each was small.

With the exception of the ACT sub-scores, all predictor variables were initially entered into the multiple linear regression model, regardless of the significance of the univariable analysis. After testing numerous combinations of the variables under study and through the backwards elimination process available through the multiple linear regression model in SPSS, version 14, those variables determined to give the highest R^2 were GED graduate status, number of remedial/developmental (R/D) courses required, application date greater than or equal to 61 days prior to the start of the fall semester, first-semester grade point average (GPA), receipt of financial aid in the form of Pell Grant funds only, the number of hours in which the student was formally enrolled at the end of the first semester, and associate of applied science student status. These seven elements were selected as predictor variables.

The intercorrelations among the predictor variables were then assessed for multicollinearity (Table 21). Collinearity diagnostics identify redundancies among predictor

variables, which, if not accounted for, could cause an *overfit* within the model. While there were two dimensions that were moderately intercorrelated, the assessment indicated no critical associations.

Table 21

Collinearity Diagnostics for Predictor Variables

Dimension	Eigenvalue	Index	Constant	GED	R/D Course	Application Date	GPA	Ending Hours	Pell Funds	AAS Major
1	4.854	1.000	.00	.00	.01	.00	.01	.00	.01	.01
2	.950	2.261	.00	.92	.00	.00	.00	.00	.03	.00
3	.796	2.470	.00	.04	.00	.00	.00	.00	.80	.10
4	.669	2.693	.00	.02	.00	.00	.02	.00	.07	.87
5	.367	3.637	.00	.00	.89	.01	.02	.01	.06	.00
6	.269	4.245	.01	.00	.00	.05	.83	.01	.00	.02
7	.070	8.343	.00	.00	.01	.52	.10	.51	.00	.01
8	.026	13.749	.98	.00	.08	.42	.01	.47	.02	.00

A stepwise multiple linear regression was then conducted. The linear combination of predictor variables was significantly related to fall-to-fall retention, $F(7, 2232) = 82.33, p < .01$, with 20.3% of the variance in fall-to-fall retention being accounted for by the predictor variables (Table 22).

Table 22

Stepwise Multiple Linear Regression on Selected Predictor Variables

Variable	<i>R</i>	<i>R</i> ²	<i>R</i> ² Adjusted	Increase in <i>R</i> ²	<i>B</i>	<i>SE</i>	<i>β</i>	<i>T</i>
Constant					.089	.048		1.840
First- semester GPA	.372	.138	.138	.138	.121	.007	.344	17.026
Number of R/D Courses	.408	.166	.166	.028	-.030	.005	-.121	-6.157
End-of- first- semester credit hour enrollment	.429	.184	.183	.017	.019	.003	.135	6.673
Applica- tion Date	.439	.193	.191	.009	.087	.019	.086	4.483
Pell Grant Recipient	.446	.199	.197	.006	-.095	.025	-.075	-3.892
AAS Major	.451	.203	.201	.004	-.071	.021	-.064	-3.390
GED Graduate	.453	.205	.203	.002	-.110	.044	-.048	-2.506

Figure 1 illustrates the plot of the 2,240 observed cases in relation to the expected regression line and indicates the overall fit of the model.

Normal P-P Plot of Regression Standardized Residual

Criterion Variable: Return Following Fall Semester

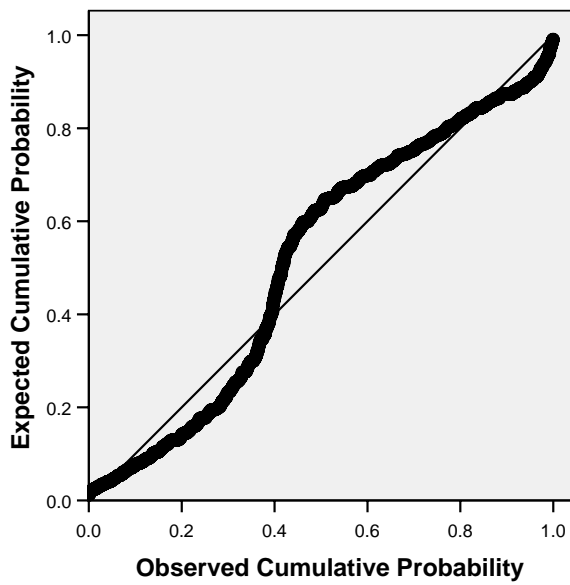


Figure 1 Plot of Retention Regression Line

The beta weights indicated the relative contributions of the variables to the prediction of fall-to-fall retention. From the data presented it was evident that the greatest influences were

1. first-semester grade point average,

2. number of remedial/developmental courses required,
3. the number of hours in which the student was formally enrolled at the end of the first semester,
4. application date greater than or equal to 61 days prior to the start of the fall semester,
5. receipt of financial aid in the form of Pell Grant funds only,
6. associate of applied science student status, and
7. GED graduate.

A negative beta weight indicates an inverse association with the criterion variable, fall-to-fall retention. In as much, as noted in Table 22, there was a negative association between being

1. placed in remedial/developmental courses,
2. a Pell Grant recipient,
3. an associate of applied science major, or
4. a GED graduate and fall-to-fall retention.

Likewise, there was a positive association between

1. first-semester grade point average,
2. the number of hours the student was formally enrolled in at the end of the first semester, and
3. the student's application date being greater than or equal to 61 days prior to the start of the fall semester and fall-to-fall retention.

Summary

Chapter 4 presented the 16 research questions along with the 15 associated hypotheses. Also included were the analyses of the data and the related tables and figures. Chapter 5 summarizes and interprets the findings and then presents conclusions based upon the analysis. In

closing, the limitations of the study, recommendations for practice, and recommendations for further research are presented.

CHAPTER 5

SUMMARY, CONCLUSIONS, IMPLICATIONS FOR PRACTICE, AND RECOMMENDATIONS

Summary of the Study

Ascertaining what influences students to remain in or stop out of higher education has been studied by researchers for decades. Questions regarding influential factors, however, persist. The complexity of the issue is compounded at the community college level as these students have unique needs and goals, as compared to their 4-year college and university peers (American Association of Community Colleges, 2006). Yet, the vast majority of the research on the issue of persistence has been based upon the 4-year college or university student (Hoachlander et al., 2003). In fact, a study conducted by Townsend, Donaldson, and Wilson on articles in five higher education refereed journals found that a mere 8% of the articles mentioned community colleges, regardless of the topic of the study (as cited in Lumina Foundation for Education, 2005). This leaves faculty and administrators at a disadvantage in knowing how best to help the community college student to persist and attain their ultimate goal of graduation.

The purpose of this study, therefore, was to investigate the associations between select first-time full-time freshmen's attributes and fall-to-fall retention at a community college, namely, Northeast State Technical Community College. The population for the study consisted of all first-time full-time freshmen enrolling at the institution in the fall semesters of 2003, 2004, and 2005, as denoted on the college's Student Information System (SIS). Persistence, or retention, was determined by examining whether or not the student re-enrolled the subsequent

fall semester. There were 15 attributes of first-time full-time freshmen studied. These attributes, or variables, fell into three categories:

1. Demographic variables:
 - a. Age
 - b. First-generation Student Status
 - c. Gender
 - d. High School Classification
 - e. Race
2. Pre-matriculation Variables
 - a. Application Date
 - b. ACT English Sub-score
 - c. ACT Math Sub-score
 - d. ACT Reading Sub-score,
 - e. ACT Science Sub-score
 - f. Remedial/Developmental Course Placement
3. Post-matriculation Variables
 - a. Major Program of Study
 - b. Financial Aid Award
 - c. First-semester Grade Point Average
 - d. End-of-first-semester Credit Hour Enrollment

The goal of the study was to provide recommendations to Northeast State Technical Community College regarding professional practice as they strive to enhance and/or develop strategies to facilitate student success as well as to offer recommendations for future research.

Summary of the Findings

The following section delineates the findings of the data analysis conducted to address the 16 research questions.

Demographic Variables Analysis

Research Question 1: Age

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on age?

The population's ages were calculated as of the first day of class of their initial semester at Northeast State. Descriptive statistics indicated the mean age for persisters was 20.21 years, while the mean age for non-persisters was 20.38 years. An independent-samples *t* test indicated that there was no significant association between age and fall-to-fall persistence. A review of literature on the association of age and persistence indicates that research has produced mixed results. Studies by Mohammadi (1994) at Patrick Henry Community College and Windham (1994) have found that more students of a more traditional age persist at higher rates. Traditional-aged students are generally considered to be those who are aged 24 or younger. Feldman (1993) and Sydow and Sandel (1998), however, have found that adult students were more likely to persist. Suppositions regarding the higher persistence rates for adult students, as noted in research, included the fact that older students tend to be more goal oriented and have a better understanding of their educational needs than traditional-aged students. Furthermore, they have developed coping mechanisms that help to counter the additional stress that they find themselves under (Burley et al., 1999). Given, however, the mixed results of the various studies, additional research is recommended.

Research Question 2: First-generation Student Status

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on whether or not the student was a first-generation student?

A two-way contingency table analysis indicated that there was no significant association between first-generation student status and fall-to-fall persistence. As noted in Chapter 4, however, these results should be interpreted with a degree of caution as the number of students who self-reported that they were first-generation students (17.8%) is incongruent with 2000 U.S. Census data as cited in First Tennessee Development District (2006). U.S. Census data indicate that approximately 77.0% of the population within Northeast State's primary service area who were aged 25 or older did not possess a postsecondary degree. It is unlikely, therefore, that only 17.8% of Northeast State's students are first-generation students. Northeast State's primary service area includes Carter, Johnson, Sullivan, Unicoi, and Washington Counties in Tennessee.

As with age, a review of literature on the association of first-generation student status and persistence indicates mixed findings. Ishitani (2003) and Nuñez and Cuccaro-Alamin (1998) found that first-generation students were less likely to persist than were those students whose parent(s) had previously attended or graduated from college. Chen (2005), however, noted that when controlling for other variables, there was not a significant difference between first-generation students and their peers whose parents attended college with regard to persistence and graduation. While there may be an association between first-generation student status, it appears to depend upon the type of institution of higher education the student attends (Bradburn, 2002). Variances in first-generation student persistence at 4-year colleges and universities have been noted; however, significant differences in the persistence rates at community colleges were not noted. Therefore, additional research is warranted.

Research Question 3: Gender

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on gender?

A two-way contingency table analysis indicated that there was no significant association between gender and fall-to-fall persistence. The related literature review regarding gender and its association with fall-to-fall persistence proved inconclusive. Bui (2002), Garrett (1992), Leppel (2002) all indicated that mitigating factors could influence one or the other genders to stop out. Garrett noted that men are more likely to stop out of college because of academic difficulties, while women are more likely to stop out because of social and/or cultural factors or conflicts. Leppel also noted that women are more often faced with issues related to typical gender roles and expectations. Feldman (1993) noted that when researched as an independent variable, women were more likely to persist than men. However, when other variables were taken into account using regression models, gender was no longer a factor. Conversely, Sydow and Sandel (1998) found that women were less likely to persist than males at Mountain Empire Community College. The research to date on this topic remains inconclusive and, therefore, additional research is recommended.

Research Question 4: High School Classification

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the type of high schools from which the students graduated?

A two-way contingency table analysis indicated that there was a significant association between the type of high school from which the student graduated (traditional, private, GED, or other/unknown) and fall-to-fall persistence. The adjusted residuals indicated that students who

graduated from traditional high schools (adjusted residual: 4.3) persisted at rates higher than expected, while GED graduates (adjusted residual: -3.6) and those who graduated from institutions classified as *other/unknown* (adjusted residual: -2.9) persisted at rates lower than expected. The effect size, however, was small ($\phi^2 = .01$).

Research on GED recipients supports the findings of this study. Rose (1999) noted that GED recipients are typically less academically prepared than traditional high school graduates. Klein and Grise (1988) found that individuals who graduated from traditional high schools had an average college grade point average of 2.75 as compared to 2.54 for GED recipients. Overwhelmingly research shows a negative association between being a GED recipient and persistence in higher education. Research on individuals who obtain their high school degrees via traditional or private high schools as well as those individuals who were home schooled, however, was extremely limited. In as much, additional research is recommended.

Research Question 5: Race

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on race?

A two-way contingency table analysis indicated that there was no significant association between race and fall-to-fall persistence. These findings are contradictory to previous research, which has indicated an association between race and persistence. Researchers, however, have diverged regarding what ethnic groups are at risk of attrition. Mohammadi (1994) found that the retention rates were the highest for the ethnic category of *other*, with the next highest ethnic category with regard to retention being Caucasian and then African-American. Reason (2003), on the other hand, found that Caucasians and Asian students persisted at higher rates. Given the differing findings, additional research is warranted.

Pre-matriculation Variable Analysis

Research Question 6: Application Date

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the date the students submitted their applications for admission?

A two-way contingency table analysis indicated that there was a significant association between the student's date of application relative to his or her first semester of college and fall-to-fall persistence. The adjusted residuals indicated that students who submitted their applications for admission 121 days or more before the start of the fall semester persisted at rates higher than expected (adjusted residual: 4.1) while students who submitted their applications for admission 60 days or fewer before the start of the fall semester persisted at rates lower than expected (adjusted residual: -5.0).

In contrast to this study, research conducted by Goodman (1999) at Walters State Community College found that students who applied to the institution less than 2 months prior to the first day of classes were more likely to persist. The population in Goodman's study, however, included all students who attended Walters State from fall 1992 through fall 1997, with the exception of those students who were listed as *special*. My research was limited to first-time full-time freshmen enrolling at Northeast State for the first time in fall 2003, fall 2004, and fall 2005. No other studies regarding the association of the student's application date and persistence were located. Therefore, additional research is warranted.

Admission Test Scores

It should be noted that composite ACT test scores and sub-scores were submitted by the majority of Northeast State applicants. However, the institution also accepts SAT scores, converting them to comparable ACT scores. For this analysis SAT-converted ACT scores were

included. However, the science ACT sub-score was not converted by the institution, as it was not used for placement. Therefore, SAT-converted ACT science sub-scores were not available for those students who submitted SAT scores. Furthermore, GED graduates were assessed by the COMPASS test and not by the ACT exam. Additionally, all first-time full-time freshmen entering the institution after their 21st birthday were also assessed via the COMPASS test rather than the ACT exam. Therefore, the data records for GED graduates and first-time full-time students who entered Northeast State after their 21st birthdays were missing all 4 ACT sub-scores. Students submitting SAT scores were missing their ACT science sub-scores only. Therefore, there were only 1,852 valid cases for evaluation for the ACT English, math, and reading sub-scores and 1,813 valid cases for the evaluation of the ACT science sub-score.

As indicated below in the findings summary regarding research questions 7 through 10, associations were noted between each of the four variables, ACT English sub-score, ACT math sub-score, ACT reading, sub-score, and ACT science sub-score, and fall-to-fall persistence. The effect size for each one, however, was small. Braxton et al. (1988) noted that academic preparedness was a strong indicator of an individual's ability to persist in academia (as cited in Ishitani & Snider, 2006), and admissions tests were identified as a standardized indicator of an individual's academic preparedness and general education development (Act Assessment, 2006). However, Horn and Kojaku's (2001) found that, once other variables were controlled for, admissions test scores were not a predictor of retention. Because of the mixed research results, therefore, additional research is warranted.

Research Question 7: ACT English Sub-score

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' ACT English sub-scores?

Descriptive statistics indicated the mean ACT English sub-score for persisters was 18.55, while the mean ACT English sub-score for non-persisters was 17.81. An independent-samples t test indicated that there was a significant association between the ACT English sub-score and fall-to-fall persistence. The effect size, however, was small ($\eta^2 = .01$).

Research Question 8: ACT Math Sub-score

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' ACT math sub-scores?

Descriptive statistics indicated the mean ACT math sub-score for persisters was 17.96, while the mean ACT math sub-score for non-persisters was 17.32. Interestingly, the range for persisters was 11 - 30, while the range for non-persisters was 9 to 34. An independent-samples t test indicated that there was a significant association between the ACT math sub-score and fall-to-fall persistence. The effect size, however, was small ($\eta^2 = .01$).

Research Question 9: ACT Reading Sub-score

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' ACT reading sub-scores?

Descriptive statistics indicated the mean ACT reading sub-score for persisters was 19.64, while the mean ACT reading sub-score for non-persisters was 18.94. An independent-samples t test indicated that there was a significant association between the ACT reading sub-score and fall-to-fall persistence. The effect size, however, was small ($\eta^2 = .01$).

Research Question 10: ACT Science Sub-score

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' ACT science sub-scores?

Descriptive statistics indicated the mean ACT science sub-score for persisters was 19.42, while the mean ACT science sub-score for non-persisters was 18.81. An independent-samples *t* test indicated that there was a significant association between the ACT science sub-score and fall-to-fall persistence. The effect size, however, was small ($\eta^2 = .01$).

Research Question 11: Remedial/Developmental Course Placement

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the number of remedial/developmental courses into which the students are placed?

As primarily open-door institutions, Parsad and Lewis (2003) noted that community colleges were more likely to provide remedial education than were other types of institutions of higher education. Therefore, the study of the affects of remedial/developmental course placement is critically important to community colleges. Within this study, the descriptive statistics indicated the mean number of remedial/developmental courses required for persisters was 2.15, while the mean number of remedial/developmental courses required for non-persisters was 2.64. An independent-samples *t* test indicated that there was a significant association between the number of remedial/developmental courses required and fall-to-fall persistence. These findings were consistent with previous research. Many high school students were not academically prepared to complete college-level work (Parsad & Lewis3). In fact, research indicates that students who required remedial courses in any subject matter were more likely to withdraw from institutions of higher education without graduating than those who did not require any remedial courses (Bradburn, 2002). The preponderance of professional literature, therefore, has established a direct and negative association between the number of remedial/developmental courses a student requires and persistence.

Post-matriculation Variable Analysis

Research Question 12: Major Program of Study

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' major program of study?

A two-way contingency table analysis indicated that there was a significant association between the student's major program of study and fall-to-fall persistence. For this study, majors were grouped in the following four categories:

1. associate of applied science degree majors,
2. associate of arts or associate of science degree majors with concentrations other than *general*,
3. associate of arts or associate of science degree majors with a *general* concentration, and
4. degree-seeking students whose majors were still undecided.

The adjusted residuals indicated that associate of applied science majors persisted at rates lower than expected (adjusted residual: -3.2). The effect size, however, was small ($\phi^2 = .01$).

Research regarding the persistence rate at community colleges for those individuals whose major programs of study are classified by associate of applied science versus associate of arts or associate of science was very limited. The National Center for Education Statistics (2003) conducted the only direct study that compared persistence rates at community colleges based upon major program of study/degree classification. This study found that of the community college students who began in 1995-1996, 37.8% of students who initially indicated they were seeking an associate of applied science degree had completed a certificate, 2-year, or 4-year degree by 2001. Likewise, 39.2% of students who initially indicated they were seeking an

associate of arts or associate of science degree had completed a certificate, 2-year, or 4-year degree by 2001 (Hoachlander et al., 2003). In general, a review of literature reveals that students with higher career or degree aspirations are more likely to persist than those with lower degree aspirations (Feldman, 1993; Horn & Nevill, 2006; Sydow & Sandel, 1998). Because of the limited research, however, additional research is recommended.

Research Question 13: Financial Aid Award

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on financial aid award?

A two-way contingency table analysis indicated that there was a significant association between the student's financial aid award status and fall-to-fall persistence. The effect size, however, was small ($\phi^2 = .02$). For this study, majors were grouped in the following five categories:

1. No financial aid,
2. Pell Grant funds only,
3. Lottery Grant funds only,
4. Other single forms of financial aid, and
5. Multiple forms of financial aid.

The adjusted residuals indicated that students who received Lottery Grant funds only persisted at rates higher than expected (adjusted residual: 3.8) while students who received Pell Grant funds only persisted at rates lower than expected (adjusted residual: -5.5).

Wei and Horn (2002) noted in previous research that recipients of Pell Grant funds were more likely to possess other factors associated with attrition than were individuals who did not receive Pell Grant monies. These factors included academic preparation, their degree objectives,

and their employment status. St. John et al. (1991), on the other hand, found that loans have a positive association with retention. In a study of short-term (3-year) enrollments in postsecondary institutions, Bradburn (2002) noted that, when comparing all students who received financial aid, those individuals who received greater amounts of aid were more likely to persist than those who received lesser amounts. However, when comparing individuals who received financial aid in any amount with those individuals who did not receive aid, Bradburn did not find any significant differences in retention. However, he did note that community college students who left the institution were more likely to indicate the need to work as the reason for withdrawing than were dropouts attending 4-year colleges and universities. Given the mixed results regarding the association of a student's financial aid status to persistence, additional research is warranted.

Research Question 14: First-semester Grade Point Average

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the students' first-semester grade point averages?

Descriptive statistics indicated the mean grade point average for persisters was 2.39, while the mean grade point average for non-persisters was 1.45. An independent-samples *t* test indicated that there was a significant association between grade point averages and fall-to-fall persistence, with a medium-to-large effect size. Interestingly, the effect size for each of the 4 ACT sub-score areas was small. These findings tend to support research conducted by Horn and Kojaku (2001) that found entrance exam scores were no longer a factor when taking into account college grade point averages.

Furthermore, Adelman (1999), Allen (1999), Murtaugh et al. (1999), and O'Toole and Peterson (1999) found that grade point averages achieved during the first year of college,

including analyses of first-semester-only grade point averages, had a stronger association with retention and persistence-to-graduation than many other variables researched. Further supporting this theory is research conducted at Iona College by McGrath and Braunstein (1997), in which the students' academic preparations and first-semester grade point averages were found to have a significant association with persistence. Moreover, research indicates that the combined affects of an individual's gender, ethnicity, and socioeconomic status is less a predictor of persistence than the individual's first-year grade point average (McGrath & Braunstein, 1997). The preponderance of professional literature, therefore, has established a direct and positive association between grade point averages and persistence.

Research Question 15: End-of-first-semester Credit Hour Enrollment Status

Are there differences between first-time full-time freshmen fall-to-fall persisters and non-persisters based on the number of credit hours in which the students are enrolled at the end of their first semester?

Descriptive statistics indicated the mean end-of-first-semester credit hour enrollment for persisters was 12.55, while the mean end-of-first-semester credit hour enrollment for non-persisters was 10.69. As noted previously, at the onset of the semester, all students within the study were enrolled full-time, carrying 12 or more credit hours. Furthermore, this specific test did not take into account the students' grade point averages or attendance, only the number of credit hours the students remained in enrolled in at the end of the semester. An independent-samples *t* test indicated that there was a significant association between end-of-first-semester credit hour enrollment and fall-to-fall persistence. The effect size was medium ($\eta^2 = .07$).

Research regarding end-of-first-semester credit hour enrollment, without regard to earned hours, and its association with persistence could not be located. Szafran, however, found in his

studies on academic load that carrying more credit hours is not always better. He noted that students who were enrolled in high numbers of credit hours had higher grade point averages and were more likely to persist. However, a sub-analysis of those who enrolled in higher numbers of credit hours found that those who registered for more academically challenging courses had lower grade point averages and lower levels of persistence than those in courses considered average in difficulty. Given the limited body of research, therefore, additional research is recommended.

Characteristics of Persisters

Research Question 16: Characteristics of Persisters

What are the characteristics of the first-time full-time freshmen who are most likely to persist to the subsequent fall semester?

The study revealed that academic preparation was an important factor in retention.

Individuals who

1. maintained high first-semester grade point averages,
2. required few to no remedial/developmental courses were the most likely to persist to the subsequent fall semester, and
3. remained enrolled full-time at the end of their first semester.
4. Furthermore, these individuals were more likely to have applied to Northeast State 61 or more days prior to the start of the fall semester.

Finally, individuals who were most likely to persist were more likely to not be

1. receipt of financial aid in the form of Pell Grant funds only,
2. enrolled in an associate of applied science major, or
3. a GED graduate.

Implications for Practice

This study may serve to guide Northeast State as it strives to facilitate student success through first-time full-time freshmen's persistence from fall-to-fall and, subsequently, until their graduation. The implications of the study were that the indicator that was by far the most strongly associated with persistence, first-semester grade point average, cannot be ascertained at the onset of the individual's enrollment at the institution. This finding is in concert with previous research (Adelman, 1999; Allen, 1999; Murtaugh et al., 1999) that revealed that grade point averages achieved during the first year of college, including analyses of first-semester-only grade point averages, have a stronger association with retention and persistence-to-graduation than many other variables researched. This finding is also in line with research conducted by O'Toole and Peterson (1999) and the Department of Education (1999) that revealed that students usually decide to stop out of college based upon factors that were not available at the time of their initial enrollment, such as grade point averages and academic standing. It is also congruent with research by McGrath and Braunstein (1997) that indicated that the combined affects of an individual's gender, ethnicity, and socioeconomic status is less a predictor of persistence than the individual's first-year grade point average. Further supporting this theory is research conducted at Iona College by McGrath and Braunstein. The outcomes of their empirical research revealed two variables that had a significant association with persistence

1. academic preparation (e.g., students who persisted were academically prepared for college), and
2. first-semester grade point averages (e.g., students with higher first-semester grade point averages were more likely to persist).

Therefore, the college is encouraged to research and implement and/or revise strategies that have been associated with facilitating persistence through the first-year of college, including, but not limited to, intrusive and individualized advising (Tinto, 1999), the role of faculty interactions with students (Astin, 1993, *Community College*, 2006; Tinto, 1993), early alert systems (Heisserer & Parette, 2002), freshmen orientation courses (Birnie-Lefcovitch, 2000), and academic support systems (Commander & Stratton, 1996).

The college, however, is encouraged not to overlook other variables within this study that were associated with persistence, albeit not as significantly as first-semester grade point averages. Those factors included remedial/developmental course placement, end-of-first-semester credit hour enrollment status, the student's date of application to the institution relative to the first day of classes, receiving Pell Grant funds as the only form of financial aid, pursuing an associate of applied science major, graduating from high school with a GED, and the student's ACT sub-scores. Several of these factors can be determined prior to the student's enrollment.

Finally, the college is encouraged to review its processes and procedures for the collection of the first-generation student status variable. As noted in this study, the number of Northeast State students who self-reported that they were first-generation students (17.8%) is incongruent with 2000 U.S. Census data as cited in First Tennessee Development District (2006). U.S. Census data indicate that approximately 77.0% of the population within Northeast State's primary service area who were aged 25 or older did not possess a postsecondary degree. It is unlikely, therefore, that only 17.8% of Northeast State's first-time full-time freshmen were first-generation students. While a review of the literature found that research is inconclusive regarding the association of first-generation student status and persistence, Northeast State will

not be able to ascertain the importance of this variable to fall-to-fall retention without more precise data.

In summary, Northeast State is encouraged to frontload its efforts to promote retention and student success. The achievement of this goal can be facilitated by the classification of at-risk students, in as much as they can be identified prior to the start of the semester. Initiatives that have been associated with facilitating persistence through the first-year of college should then be researched and implemented and/or revised, as appropriate. These initiatives will require a campus culture that emanates the institution's motto, *We're here to get you there!* It will also require a coordinated effort that encourages collaboration and includes broad-based involvement from campus constituents in nearly all organizational divisions and through all levels.

Recommendations for Future Research

It should be noted that this study focused on one particular institution, and, therefore, the results thereof may not be generalized to community colleges-at-large. Therefore, other community colleges are encouraged to undertake similar studies. Single institution studies presumably provide the most specific and targeted information for use in continuous improvement efforts within the institution. Studies using multiple institutions or a meta-analysis of single institution research may help to generalize the findings to community colleges-at-large. However, regardless of the type of future study undertaken, additional research is warranted to further refine first-time full-time freshmen's attributes and their associations with retention rates in community colleges. To maximize the value of the findings, researchers are encouraged to standardize methodologies and population sets.

Recommendations for additional research specifically for Northeast State are as follows:

1. Research strategies that have been associated with facilitating persistence through the first year of college, including, but not limited to, intrusive and individualized advising, the role of faculty interactions with students, early alert systems, freshmen orientation courses, and academic support systems and the applicability of these and other strategies for the population under study at Northeast State.
2. Expand the current research model to ascertain retention or persistence-to-graduation through 150.0% of the expected time-to-completion, as defined by the state (e.g., 3 years).
3. Expand the current research model to include first-time part-time freshmen's attributes and their associations with retention rates.
4. Research the correlate of qualitative freshmen attributes and their association with retention and persistence-to-graduation.

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