December 1999

Pre- and Post-matriculation Correlates of Student Retention Within a Community College Setting

Pamela E. Goodman
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PRE- AND POST-MATRICULATION CORRELATES
OF STUDENT RETENTION WITHIN A
COMMUNITY COLLEGE SETTING

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 in Postsecondary and Private Sector Leadership

by
Pamela E. Goodman

December 1999
APPROVAL

This is to certify that the Graduate Committee of

Pamela E. Goodman

met on the

4th day of November, 1999

The committee read and examined her dissertation, supervised her defense of it in an oral examination, and decided to recommend that her study be submitted to the Graduate Council, in partial fulfillment of the requirements for the degree of Doctor of Education in Educational Leadership and Policy Analysis.

Tennille A. Tallefson
Chair, Graduate Committee

Ronald A. Lindall

Harold W. Wilson

Louise D. Mackay

Signed on behalf of the Graduate Council

Dean, School of Graduate Studies
ABSTRACT

PRE- AND POST-MATRICULATION CORRELATES OF STUDENT RETENTION
WITHIN A COMMUNITY COLLEGE SETTING

by

Pamela E. Goodman

In the 1990s, due in part to declining enrollment numbers and prolonged budget constraints, student retention became a primary focus in higher education. Aligned with the nationwide interest, this longitudinal, archival study focused on the correlates of student retention at Walters State Community College, located in Morristown, Tennessee. The population involved 17,497 students enrolled from the fall semester of 1992 through the fall semester of 1997.

Four sets of variables were investigated—demographic variables, pre-matriculation variables, post-matriculation variables related to grades, and post-matriculation variables related to enrollment. The data were collected through the use of a computer program written to access the Tennessee Board of Regents’ Student Information System database, and the data obtained were analyzed through the application of two univariate approaches—the chi-square and the \( t \) test for independent samples.

The major findings of the study were: (1) Younger, White, females persisted at higher rates than did other students at Walters State; (2) students who: had higher high school GPAs, had higher admission test scores, attended public high schools, had pre-college residences that were located within the college's service area, and made applications for college less than two months prior to the first day of classes persisted at higher rates than did other students at Walters State; (3) students who: had higher college GPAs, were required to take one or two remedial and developmental courses, had not received any “F” grades, and had greater than zero reported absences persisted at higher rates than did other students at Walters State; and (4) students who: attended on a full-time basis, were enrolled in programs designed for transfer to four-year institutions, changed their major programs of study more than one time, and received financial assistance persisted at higher rates than did other students at Walters State.

These findings should be communicated with all college personnel in an effort to increase their sensitivity to the “special” needs of these “at-risk” constituencies. Furthermore, the findings should be used in developing a retention plan that incorporates programs and services designed to address the needs of targeted audiences as identified in this study.
DEDICATION

This study is dedicated to the memory of my father, who always wanted me to write a book. “This is a beginning, Dad. I know you would have read every word.”

This study is also dedicated to my children who define the essence of my being. On many occasions, they provided my sole source of familial encouragement. When I was only two weeks into the program and struggling to find my way on fledgling legs, my son, Eric (who had neither prior to nor has he since picked up a college textbook during the weekend) got me started on the right foot by walking through the house, book in hand, and saying, “Let’s study, Mom!” And, my daughter, my baby girl, did not complain one time in four and one-half years about not having that special blouse washed at just the right time. Without their support, this undertaking would not have come to fruition.
ACKNOWLEDGMENTS

Words seem inadequate for expressing the magnitude of my appreciation for the support and assistance provided by several individuals from both East Tennessee State University and Walters State Community College.

When I entered this program, I could not have imagined the support and assistance that I would receive from my doctoral committee—Dr. Terrence A. Tollefson, Dr. Ron Lindahl, Dr Louise MacKay, and Dr. Harold Whitmore. I remain amazed by the fact that I never made a single telephone call to these individuals that went unanswered and that I never asked for an appointment that I did not receive.

Had Dr. Terrence A. Tollefson, my Committee Chair, not introduced the doctoral program in Educational Leadership and Policy Analysis at Walters State Community College, I would not have undertaken this endeavor. Upon entering the program, Dr. Tollefson made himself available when academic advice, emotional support, or even a few kind words were needed, thereby helping me to stay focused. Through his assessments of my work from the first written assignment for the doctoral program through the completion of the dissertation, I have become a better writer. Dr. Ron Lindahl taught me to approach research in manageable increments that could be coalesced into a meaningful unit, thereby helping me to turn a seed of an idea into a full-blown research project. He also intuitively assessed my doubts and provided pertinent advise at the most critical times. Dr. Louise MacKay unfailingly found time to discuss those big issues, such as qualifying examinations and oral defenses, when my stress level was more than
slightly elevated; and I was ever confident that she would understand and support my point of view. And, under the tutelage of Dr. Harold Whitmore, which began during my master's program and has been extended through a terminal degree, I have become not only a better professional but a better human being.

I also received immeasurable support from my Walters State family. Dr. Jack E. Campbell, President, not only graciously agreed to allow me to conduct a research project at our institution, but allowed me to complete an internship under his supervision, thereby affording me an opportunity to observe visionary, and ultimately competent leadership skills first hand. Dr. R. Lynn Gilmore, Vice President for Student Affairs, encouraged me to embark upon this program and followed my progress with very focused attention and support. Ms. Ann Ford wrote the computer program through which my data could be extracted, and she never complained when numerous revisions had to be made. Had it not been for her assistance, this project would not have been completed. Ms. Qing Yuan introduced me to SPSS and repeatedly assured me that I could become the expert that I am in the use of this statistical package. And, Mr. Jim Wilder provided very selfless support by helping me to secure needed reference documents and by helping me to better understand the Student Information System database.

To each of these individuals, I offer my undying gratitude.
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CHAPTER 1

INTRODUCTION

Student retention in higher education has been a long-time concern that is neither restricted to the continental United States, nor to four-year institutions. In the 1990s, due in part to declining enrollment numbers and prolonged budget restraints, student retention has become a primary focus in both state-funded and tuition-driven colleges and universities. This fact is evidenced in the various retention studies that have been conducted recently at the institutional, state, and national levels. Aligned with this nationwide interest, this study is focused on variables associated with retention at one community college—Walters State Community College (WSCC), in Morristown, Tennessee.

WSCC is located in upper East Tennessee within a service area comprised of 10 primarily rural counties. The total enrollment for fall semester 1998 was recorded as 5,900. The activities conducted by the faculty and staff for this student body revolve around a mission that reads, in part, as follows:

The mission of Walters State is consistent with the college’s vision for guiding the college into the twenty-first century. . . . Walters State is a comprehensive community college established to provide affordable, quality higher education opportunities to the residents of upper East Tennessee. . . . The college’s management system is designed to ensure the delivery of programs and services that meet the needs of individuals, business and industry, and the community. Planning and assessment for enhancing overall institutional effectiveness are incorporated in all instructional and administrative systems. (Walters State Community College, 1997)

Commensurate with proactive stances taken by other colleges and universities, WSCC gave special attention to student retention in March of 1994 through the formation...
of a "Graduation/Retention Task Force." The need for such a task force was reflected in the fall-to-fall retention rates for the annual cohort of first-time, full-time, degree-seeking freshmen over the preceding two-year period. The fall semester 1991 to fall semester 1992 retention rate was 58.5%, and the fall semester 1992 to fall semester 1993 retention rate dropped to 56.7%. A task force was appointed by the college president on March 10, 1994, and charged with the responsibility of: (a) defining the graduation process of the college, (b) reviewing retention and graduation benchmarks, (c) collecting and reviewing cohort data, (d) developing a tracking system, and (e) recommending institutional changes to ensure achievement of goals and institutional benchmarks ("Graduation/Retention," 1995).

Based upon the task force’s recommendations, which were generated through several months of work, key college administrators approved the reactivation of a tutoring program and the purchase of a computerized advisement program that outlines graduation requirements specific to the students’ majors, as well as the students’ current status relative to completion of the requirements. Installation of the advisement package, including program access software, and training sessions for program users were finalized during the spring semester of 1998.

Shortly after the inception of WSCC’s initiative in this area, the chancellor of the Tennessee Board of Regents (TBR), WSCC’s governing board, introduced a program that focused even more attention on the retention of students in higher education. This initiative, entitled "Agenda 2000: The Board of Regents’ Commitment to the People of Tennessee," was approved on December 15, 1995. It called for each TBR institution to
set specific goals for increasing the number of college completers, to report progress
toward meeting these goals, and to assess the impact when students do not complete. In a
speech made before the State Legislature’s Select Oversight Committee on Education on
October 8, 1997, the chancellor reviewed the planned efforts of the TBR to be
accountable to the people of the state. He indicated that accountability benchmarks would
be communicated to TBR institutions, to the State Legislature, and to the general public
in the form of a report card that would address questions that are, and have been,
frequently asked by members of different constituencies.

Statement of the Problem

The original and prevailing impetus for the focus on attrition is the assessment of
attrition rates, which historically have been quite high throughout institutions of higher
education in the United States. According to Bean (1980), student attrition rates have
remained high for more than 60 years. Between 1920 and 1962 the attrition rate was
reported to have been stable, at approximately 50%. In the 1980s, the attrition rate for
first-time college entrants was cited as 40 to 45% (Hartley, 1987), and a comparable rate
was reported by Griffith (1996) for the 1990s. He stated, “Most studies show that on the
average about 40% of students leave college after the first year” (p. 3). However, attrition
rates are not comparable across institutions. Based on data gathered by the 1992 ACT
Survey, Seidman (1996) found the rates for first-year, full-time students for different
types of institutions to be as follows: 28.3% for four-year public institutions, 24% for
four-year private institutions, and 47.9% for public two-year colleges.
Consequently, WSCC, the State of Tennessee, and the nation are striving to realize a better understanding of this problem and develop intervention strategies that positively impact student attrition rates. Yet, most colleges and universities have searched for a cure for this problem without first studying the associated correlates. Very few assessments of these high attrition rates have been translated into research studies that investigate the correlates of the phenomenon. This lack of research studies is particularly evident at the community college level. Hossler (Hossler, Bean & Associates, 1990) stated, "Comparatively little is known about attrition from community colleges even though, ironically, attrition rates at such institutions are higher than at four-year schools" (pp. 148-149). Voorhees (1987) expressed a similar viewpoint by stating:

No conceptual models of student persistence behavior have been advanced, designed specifically for the two-year college setting, which adequately account for student background characteristics and how students interact within the community college environment. . . . In view of the fact that community colleges now enroll 55% of the nation's first-time college students . . . the sparse connections between conceptual studies of persistence and community college environment represent a substantial gap in the literature. (pp. 115-116)

Thus, additional research is needed to clarify those factors associated with attrition within this setting.

**Significance of the Problem**

Over a decade ago, Ferguson, Wisner, and Discenza (1986) recognized the importance of retention in view of a decreasing pool of prospective traditional-age college students and a restricted flow of resources into institutions. They stated that:

heavy emphasis on recruiting new students might be misguided or cost ineffective or both. The actions are misguided in that institutions should not be scrambling for new customers if they cannot adequately service those who are currently
enrolled, they are cost ineffective in that it costs much more to recruit a new student than to keep a current one. (p. 4)

Hartley (1987) outlined the cost in more definitive terms in the following statement:

The loss of 100 students in the first term can result in a deficit of three quarters of a million dollars—not to mention the loss in human capital. These issues are prompting college administrators to give a very high priority to the early identification and assistance of students who are headed toward academic difficulty. (p. 80)

The importance of student retention for all constituencies was accurately described in a six-part report prepared by the University System of Georgia for the State of Georgia in 1994. This report, which covered student outcomes from fall 1984 through fall 1993, reads as follows:

For the State of Georgia, student retention represents financial savings and efficiency, a stronger system of higher education, and better-educated, more adaptable citizens who will make a greater contribution to the Georgia work force and the economy. In the final analysis, the greatest incentive to invest time and effort in studying and improving students retention may be the academic success of even a single student who would have been lost to higher education through attrition. (University System of Georgia, 1994, p. 9)

Although the importance of retention is well documented, the literature is sparse relative to a specific method for pinpointing individuals who are likely to withdraw from college, especially in community colleges. Therefore, the focus of this study is on the correlates of student retention within this setting. The problem inherent in maintaining retention at the community college level, which, in turn, justifies the need for such a study, is accurately portrayed by Voorhees (1987) in the following statement:

Community colleges, with their ease of access, central locations within the communities they serve, and commitment to providing a wide diversity of educational experiences, are unique institutions serving a clientele that is much more heterogeneous with respect to both demographic characteristics and reasons
for attending than are students enrolled in other sectors of higher education. The ease with which students enter and the relatively low cost they bear may translate into less commitment toward the community college, which, in turn, means that fewer students might be expected to persist. (p. 126)

In view of this wide variation in the dynamics among different groups of students relative to their age, sex, and ethnicity, as well as curriculum and type of institution attended, Pascarella and Terenzini (1991) stressed the importance of institution-specific studies as the appropriate means of investigating the dynamics of student-institution fit. The impracticality of using research data from four-year institutions to infer conditions within the two-year college was further outlined by Mohammadi (1994) as follows:

demographic and socio-economic factors relating to community college students are somewhat different than those students attending four-year colleges. That is, on the average, community college students are older, attend part-time more often, do not reside on campus, have lower degrees of goals, have lower high school grades . . . have relatively little interaction with other students outside of class, and are not strongly involved in campus activities. (p. 3)

Once the variables related to retention have been investigated, significant findings can be used to inform special policies, and these policies can be translated into strategies and programs for targeted populations in an effort to maximize retention. The development of a program that is appropriate for all students, which has been a traditional practice in higher education, can no longer be considered a successful practice. The development of programs for targeted populations is essential to a proactive stance on student retention.

In an effort to address this problem, demographic variables (e.g., age, ethnicity, and gender), pre-matriculation variables (e.g., high school GPA and admission test scores), and post-matriculation variables (e.g., college GPA and the pattern of class
attendance) have been selected for inclusion in this study. The rationale for and significance of their inclusion follows.

The gathering of data on demographic variables should yield a better understanding of the population included in the study, and such data are expected to provide assistance with the identification of specific audiences to be targeted in retention efforts. Gathering data on the pre-matriculation correlates of students who are at risk of dropping out of school will provide a basis for the development of programs that may be implemented near the beginning of their college careers at a time when they are most vulnerable. If such programs are delayed, serious problems will already have surfaced. Tinto (1988) stated, “Most orientation programs are only partially successful in this regard, for they frequently fail to provide the long-term academic and social assistance new students require during the first months of their college careers” (p. 451). According to Hyman (1995), “One of Tinto’s action principles urges institutions to front load their efforts on behalf of student retention” (p. 4). Finally, by gathering data on the post-matriculation correlates of students who are at risk of dropping out of school, varied approaches to retain as many students as possible may be developed.

Purpose of the Study

Price (1993) stated that “there is a very intricate interaction among many variables, both academic and non-academic, which determines attrition” (p. 8). Along this line, this study investigated both academic and non-academic variables. Based on a review of the professional literature, this study focuses upon four sets of independent variables and their relationships to retention—demographic variables, pre-matriculation
variables, post-matriculation variables related to grades, and post-matriculation variables related to enrollment. The following demographic variables are included: age (Brawer, 1996; Brooks-Leonard, 1991; Feldman, 1993; Grosset, 1989; Mohammadi, 1994; Price, 1993; Tinto, 1988; Windham, 1994), ethnicity (Brawer, 1996; Clagett, 1996; Feldman, 1993; Grosset, 1989; Guthrie, 1992; Mohammadi, 1994; Pascarella, Smart, & Ethington, 1986; Price, 1993; Sarkar, 1995; Tinto, 1988; Voorhees, 1987), gender (Brawer, 1996; Feldman, 1993; Grosset, 1989; Mohammadi, 1994; Price, 1993; Sarkar, 1995; Voorhees, 1987), and marital status (Price, 1993; Sarkar, 1995). In an effort to extend the comprehensiveness of this study, one additional demographic variable—military status—is included.

The pre-matriculation variables include: high school grade-point averages (GPAs) (Bean, 1980; Grosset, 1989; Pascarella, Smart, & Ethington, 1986; Sarkar, 1995), the types of high schools from which the students graduated (Grosset, 1989; Tinto, 1988), admission test scores (Grosset, 1989; St. John, 1990), the proximity of the students' pre-college residences to the college (Bean, 1980; Sanders & Burton, 1996; Tinto, 1988), and the date of initial application for college (Billson & Terry, 1987).

Windham, 1994). Two additional grade-related, post-matriculation variables, for which professional literature is lacking, are included. These variables are the total number of “F” grades received and the patterns of class attendance.

The post-matriculation variables related to enrollment include enrollment status, or the number of credit hours undertaken in a given semester (Brawer, 1996; Brooks-Leonard, 1991; Feldman, 1993; Mohammadi, 1994; Price, 1993; St. John, 1990; Voorhees, 1987); the students’ programs of study—university parallel, two-year programs designed to meet the needs of students who plan to transfer to a four-year institution in pursuit of the baccalaureate degree; technical education, two-year programs designed to prepare the student for entry into the labor force upon completion of the program; or certificate, programs with a duration of less than two years that are designed to prepare students for entry into the labor force—(Brooks-Leonard, 1991; Feldman, 1993; Grosset, 1989; Hartley, 1987; Mohammadi, 1994; Price, 1993; St. John, 1990; Voorhees, 1987); the total number of times each student’s major was changed (Price, 1993; Sarkar, 1995; St. John, 1990); and the type of financial assistance—scholarships or needs-based awards—received (Grosset, 1989; Jensen, 1983; Somers, 1996; St. John, 1990).

**Assumptions**

Two primary assumptions underlie this study:

- As the mission of community colleges differs from that of four-year institutions in that they operate with an open-door policy, thereby admitting a different student clientele, it is assumed that factors associated
with attrition may operate differently within the community college setting;

- The background characteristics of students must be taken into account in order to best develop retention practices for targeted audiences.

**Research Questions**

In analyzing the Student Information System (SIS) database on approximately 17,500 students who were enrolled atWSCC from the fall semester of 1992 through the fall semester of 1997, the following research questions were addressed in the study:

- Are there differences between college persisters and non-persisters in the demographic variables of age, ethnicity, gender, marital status, and military status?

- Are there differences between college persisters and non-persisters in such pre-matriculation variables as high school GPAs, the types of high schools from which the students graduated, admission test scores, the proximity of the students' residences to the college campus, and the dates of the students' initial applications for admission to college?

- Are there differences between college persisters and non-persisters in post-matriculation variables related to grades, including cumulative GPAs, the students' rates of participation in remedial and developmental courses, the total number of “F” grades received, and class attendance patterns?

- Are there differences between college persisters and non-persisters in post-matriculation variables related to enrollment, such as enrollment status, or
the number of credit hours undertaken in a given semester; the programs of study undertaken; the number of changes made in the program of study, or major; and the types of financial assistance received?

Stated in the null form, the hypotheses outlined below were investigated in this study:

Hypotheses 1 - 5 - There are no differences between college persisters and non-persisters in the following demographic variables: age, ethnicity, gender, marital status, and military status.

Hypotheses 6 - 10 - There are no differences between college persisters and non-persisters in the following pre-matriculation variables: high school GPAs, the types of high schools from which the students graduated, admission test scores, the proximity of the students’ residences to the college campus, and the dates of the students’ initial applications for admission to college.

Hypotheses 11 - 14 - There are no differences between college persisters and non-persisters in the following post-matriculation variables related to grades: cumulative GPAs, the students’ rates of participation in remedial and developmental courses, the total number of “F” grades received, and class attendance patterns.

Hypotheses 15 - 18 - There are no differences between college persisters and non-persisters in the following post-matriculation variables related to enrollment: enrollment status, or the number of credit hours undertaken in a given semester;
the programs of study undertaken; the number of changes made in the program of study, or major; and the types of financial assistance received.

Definitions

The following definitions impacted the nature of the design and methodology for this study:

- **Retention** - Student persistence from matriculation through subsequent semesters of college enrollment to program completion or graduation.
- **Persisters** - Students enrolled subsequent to their initial registration with no more than five consecutive semesters’ absence, including summer sessions.
- **Non-persisters**: Students who discontinued enrollment for five or more consecutive semesters, including summer sessions.
- **Full-time students**: Students enrolled in 12 or more credit hours.
- **Part-time students**: Students enrolled in fewer than 12 credit hours.
- **Transient students**: Students who enroll in a college or university (typically for one semester only) with the expectation of transferring any courses earned back to the institution of original enrollment.
- **Special students**: Non-degree seeking students who may enroll in only ten credit hours or less within a single semester, or students who lack the credentials for admission as a regular student.
- **Remedial courses**: Courses numbered from 0700 through 0799 that are designed to assist a student in developing proficiency in the basic skills of
reading, writing, and math. Assignment to these courses is based upon the student’s performance on the Academic Assessment and Placement Profile (AAPP).

- Developmental courses: Courses numbered from 0800 through 0899 that are designed to assist a student in developing proficiency in the basic skills of reading, writing, and math. Assignment to these courses is based upon the student’s performance on the Academic Assessment and Placement Profile (AAPP).

**Limitations**

This research has no external validity beyond the college under study; however, the use of a multiple-year database increases the internal validity of the study. Furthermore, the study was not heavily oriented toward variables that can be manipulated by the institution.

**Overview of the Study**

The chapters following the introductory chapter are organized as follows. Chapter 2 includes a review of the professional literature related to student retention in higher education. Particular attention has been given to specific correlates of retention. Chapter 3 provides the research methodology for this study, including descriptions of the population, design, and collection of data. Chapter 4 includes the presentation and analysis of the data collected; and Chapter 5 provides a summary of the findings, the conclusions drawn from the significant findings, and implications for practice, as well as for future research.
CHAPTER 2

REVIEW OF LITERATURE

With the recent emphases on "total quality management" and "accountability," both financial and programmatic, students in higher education have come to be viewed as "customers"; these customers have changed not only in their number, which is decreasing, but also in their average age, which is increasing. Each of these facts has the potential to impact student retention rates negatively. In recent years, therefore, higher education administrators and faculty members have increasingly turned their attention to this area. College mission statements now include not only pledges to provide quality education programs but also assurances that students will successfully complete those programs. According to Griffith (1996), college administrators at Capital University will not take action on any initiative until the subject of retention has been addressed.

Grosset (1989) described the evolution of this focus on student retention as follows:

Institutional responses to the problem of student attrition have evolved from the development of recruitment strategies, which were aimed at maintaining enrollment during a period of anticipated decline by targeting previously untapped markets; to admission programs, which were designed to improve graduation rates and minimize the need to replace students; to the design of retention programs, which have sought to maintain enrollments by improving the quality of the educational experience for the student. (p. 7)

This evolution also closely paralleled the development of theoretical models of student attrition, which provided the basis for conducting studies of various research premises. In 1970, Spady produced the first fully-developed theoretical model of student attrition. Based on Durkheim's theory of suicide, Spady viewed the act of dropping out of

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school as being analogous to withdrawing from a social system through the act of suicide. Spady postulated that attrition stemmed either from a set of beliefs that placed education as a low priority or from inadequate financial, familial, or social support systems. At the model's core are constructs regarding the students' integration into the social and academic systems of an institution (Hossler, Bean & Associates, 1990).

In 1975, Tinto, building on the work of Spady, developed an attrition model, the assumptions of which are based on an analysis of the students' individual characteristics and which make distinctions between Spady's academic and social factors. Tinto contended that students withdrew from college as a result of experiencing difficulties in one of three areas—separation, transition, and incorporation. Some students were unable to disassociate themselves from past affiliations or support systems both within their homes and their high schools of graduation. Others experienced difficulties in adjusting to or accepting new environments inhabited by individuals with differing intellectual abilities, modes of behavior, and value systems. Still others failed to assimilate or form meaningful relationships within the college settings, in that they did not participate in any college-related activities outside the confines of the classroom (Tinto, 1988).

Over a decade later, Tinto (1988) extended his theory to include a temporal dimension that drew upon research from the field of social anthropology regarding the rites of passage in tribal societies. He argued that "[T]he longitudinal process of student persistence, and by extension the process of student departure, can be envisioned as being made up of distinct stages through which new students must typically pass during the course of their college careers" (p. 439).
In the 1980s, Bean (1980) produced a model that moved away from both Spady’s and Tinto’s suicide-analogy-based models and compared student attrition to employee turnover. He, along with Hossler (1990), continued these studies into the 1990s, but changed the focus to student attitudes and beliefs.

Expanding the work of Tinto toward an understanding of community college persistence, Pascarella, Duby, and Iverson conducted a study of commuter students. They found that “[A]mong students attending commuter institutions, student background characteristics had direct effects on persistence that were unmediated by the extent of either academic or social integration” (as cited in Voorhees, 1987, p. 115).

According to Volkwein and Lorang (1996), Cabrera and his associates have:

combined the best elements of these other models and developed refinements that explain as much as half the variance in persistence between the freshman and sophomore year. . . . Cabrera’s new model is especially valuable for increasing our understanding of the role of family, friends, and financial aid in retention and persistence. (p. 46)

The basic premises of these theoretical models emphasize the importance of student-specific variables. Four sets of these variables are described: demographic variables, pre-matriculation variables, grade-related post-matriculation variables, and enrollment-related post-matriculation variables.

Demographic Variables

There is a divergence of opinion relative to the significance of the relationship between demographic variables and persistence to graduation. Pascarella, Duby, and Iverson (as cited in Voorhees, 1987) found that “among students attending commuter institutions, student background characteristics had direct effects on persistence that were
unmediated by the extent of either academic or social integration” (p. 116). In contrast, many more researchers concluded that student demographic variables had not been very useful in predicting attrition when other factors were controlled; but there was general agreement that such student characteristics were helpful in identifying subgroups of students who were found to have larger percentages of dropouts. The demographic variables included were: age, ethnicity, gender, and marital status. One additional variable—military status—was included to extend the comprehensiveness of the investigation, but this variable was not addressed in this review due to a lack of research in the area.

Age

Several studies, including those of Brooks-Leonard (1991), Grosset (1989), Price, (1993), and Windham (1994), have found age to be an accurate predictor of persistence. However, the findings from these studies are largely inconsistent relative to the significance, as well as the direction, of the relationship.

Many people concluded, as did Tinto (1988, p. 445), that older adults were likely to experience difficulties with the task of persistence. In fact, this assumption has been substantiated in studies conducted at Indiana Vocational Technical College (Brooks-Leonard, 1991) and Alleghany Community College (Price, 1993). Specifically, Brooks-Leonard (1991) reported that a study of approximately 800 first-time students enrolled at the Indiana Vocational Technical College revealed a lower retention rate for students over age 40; and in a study conducted at Alleghany Community college that focused on the dropout behavior of students during the first three weeks of the fall semester of 1992 and
the spring semester of 1993, Price (1993) found that 70% and 74% of the students who dropped out during fall and spring, respectively, were in a non-traditional age group. Similarly, Windham (1994) conducted a study at a Florida public community college that revealed a negative relationship between age and persistence. She reported that "[F]or each standard deviation increase [in age], the ratio of remaining enrolled declines by a factor of .93 to .90" (p. 8).

On the other hand, Grosset (1989) found that persistence increased commensurate with age. In a study conducted at the Community College of Philadelphia, she found that older students were more likely to achieve sophomore status than were students of a more traditional age (21 years or younger) and that older students were also slightly more likely to earn associate degrees than were those in younger cohorts.

Two additional studies, which were conducted at Illinois Central Community College (as cited in Feldman, 1993) and Moraine Valley Community College (Retention/New Student Survey, 1996), found age to be a primary predictor of persistence. However, the direction of the correlation was not specified in either study.

Other researchers found that age was not a defining characteristic of persistence, as the findings from their studies were fragmented. In other words, within-study results reveal high attrition rates for students in more than one age category—namely, one category approaches a more traditional age, while another falls within a more non-traditional category. Such conflicting results are portrayed by Brawer (1996), who stated, "A study at Patrick Henry Community College in Virginia found attrition rates after one year to be higher for those students in the age ranges of 23 - 35 and 45 - 50" (¶ 4).
Two additional studies which revealed findings that were closely aligned with the results yielded in the Patrick Henry Community College study were those conducted at Mountain Empire Community College (Sydow & Sandel, 1996) and at Niagara County Community College (Feldman, 1993). At Mountain Empire Community College, Sydow and Sandel (1996) found that students aged 20 to 25 represented the largest percentage of withdrawals, and students aged 36 and older represented the next highest percentage of withdrawals (p. 6). At Niagara County Community College, Feldman (1993) found that students in the age range of 20 to 24 were 1.77 times more likely to drop out than were students aged 19 or younger; and students whose ages were 25 and older were less likely to drop out than were the youngest students. Thus, the results from all of the studies addressing age, when summarily considered, do not reveal a direct relationship. Therefore, additional research is warranted.

**Ethnicity**

Comparable to studies focused on the demographic variable of age, retention studies focused on the impact of ethnicity have also proven to be rather inconclusive. Many researchers suggested, as did Tinto (1988, p. 445), that students from minority backgrounds may experience difficulties with the task of persistence. Others are aptly described by Voorhees (1987), who suggested that “there is no significant difference in attrition rates between minority students and whites when other factors, such as academic ability and socioeconomic status, are controlled” (p. 117).

Those researchers who have found differences in rates of persistence relative to ethnic origin include Brawer (1996), Feldman (1993), Grosset (1989), Guthrie (1992),
Mohammadi (1994), Price (1993), Sarkar (1995), and Steele (Hummel & Steele, 1996). Most of these studies depicted minority students, with the exception of students of Asian descent, as being at a disadvantage relative to persistence toward graduation.

Steele (Hummel & Steele, 1996), a psychology professor at Stanford University, described the discrepancy in rates of persistence as follows, “[Fifty-eight] percent of African Americans who enroll in U.S. colleges never graduate, compared to 28 percent for whites” (p. 28). Similarly, Feldman (1993) found that black students at Niagara County Community College were 1.75 times more likely to drop out than were white students. She also found that Hispanic and Native American students showed a greater likelihood of dropping out than did whites, but the persistence rates for Asian students were comparable to those of white students. Guthrie’s (1992) study paralleled those of both Steele and Feldman, not only in the ethnic mix of the population involved, but also in the findings. He reported that Native Americans, African-Americans, and Hispanics were not only underrepresented in the California State University System, but that fewer students from these groups persisted to graduation. In more specific terms, he related, “While about 50 percent of regularly admitted Caucasian students are still enrolled or have graduated after five years, the figure for African-Americans is only 38.8 percent” (p. 2). In a similar vein, Sarkar (1995) reviewed a 1991 study initiated at the Saskatchewan Institute of Applied Science and Technology that revealed aboriginal students were less likely to complete their studies than were other first-year students.

Grosset (1989) conducted an analogous study, but she added a temporal element to her research design. Still, her findings revealed variations in persistence rates...
comparable to those cited above. She found that white students were more likely to graduate than were black or Hispanic students, regardless of the time frame used to obtain the measure. However, if the time frame was extended beyond two years, the graduation rates for Asian students also exceeded those for blacks and Hispanics; and if the time frame was extended to six years, the graduation rates for Asian students was greater than that of whites.

As previously cited, Mohammadi (1994) and Price (1993) also found differences in persistence rates, but their studies did not show white students as having an advantage. Specifically, Mohammadi (1994) found that among three racial groups at Patrick Henry Community College—white, black and “other”—retention rates were highest for the “other” category, followed by white, and then black. And, at Allegany Community College, Price (1993) reported that a total or 84 students, out of a total enrollment of 2,999, withdrew during the first three weeks of the fall semester of 1992; and a total of 88 students, out of a total enrollment of 2,810, withdrew during the first three weeks of the spring semester of 1993. Of the combined total of 172 students who withdrew, 97% of the students were white (pp. 9-11).

Other researchers, including Brooks-Leonard (as cited in Feldman, 1993), Clagett (1996), Fischbach (as cited in Feldman, 1993), and Voorhees (1987), found nonsignificant relationships between persistence and minority status. Therefore, even though many studies indicate that persistence rates of black and Hispanic students have been lower than comparable rates for white students, an almost equal number of studies refute this premise. Thus, further investigation is warranted.
Gender

As with the foregoing demographic variables, the literature is also inconclusive relative to the correlation between gender and persistence patterns. Some studies show that females have higher persistence rates, whereas others show males with higher rates. Still other studies indicate that a direct relationship does not exist. This divergence in research findings may be attributed to the fact that "Gender . . . has been reported to interact significantly with other variables in studies of university student persistence . . . and two-year college student persistence" (Voorhees, 1987, p. 117).

Feldman (1993), Sarkar (1995), and Voorhees (1987) reported findings that revealed higher persistence rates for females. Voorhees (1987) found a significant association between sex and persistence, in that females persisted at a higher rate than did males, irrespective of full-time or part-time status (p. 122-123). And, Feldman (1993) found that, although retention rates were lower for males, gender did not hold up when other factors were taken into account.

In contrast, Brawer (1996) referred to the female gender as an attribute found to influence students’ decisions to leave college before completing their programs or degrees, and her assessment has been corroborated by the research findings of Mohammadi (1994), Price (1993), and Sydow and Sandel (1996). In a study conducted at Mountain Empire Community College during the fall semester of 1995, Sydow and Sandel (1996) found that “More females than males withdrew between the census date and the last official day to withdraw—weeks 2-10 of the semester” (p. 5). The actual male-to-female enrollment ratio was 1 to 1.7, and the respective dropout rate was 1 to
2.44 (p. 6). Price (1993) also found higher rates of attrition for females enrolled at Allegany Community College. Seventy-one percent and 60% of the students who dropped during the first three weeks of the fall semester of 1992 and the spring semester of 1993, respectively, were females. Similarly, Mohammadi (1994) found that male retention rates were higher than were female retention rates at Patrick Henry Community College. In a similar vein, Pascarella et al. (1986) conducted a nine-year study of a national sample of 825 students enrolled in two-year institutions and found that being a white male had a positive indirect influence on persistence.

In contrast, Brooks-Leonard (as cited in Feldman, 1993), Clagett (1996), Fischbach (as cited in Feldman, 1993), and Grosset (1989) found that gender did not distinguish persisters from non-persisters. Therefore, such inconclusive findings preclude an assumption that a direct relationship exists.

**Marital Status**

Research studies related to the impact of marital status on persistence are limited, and the results obtained in such studies are inconsistent. At Allegany Community College, Price (1993) found that 65% of the students who dropped out during the fall semester of 1992 and 57% who dropped out during the spring semester of 1993 were single. In a review of a study conducted at the Saskatchewan Institute of Applied Science and Technology, Sarkar (1995) indicated that single students were more likely to continue their education, but less likely to complete their programs than were other first-year students. On the other hand, Brooks-Leonard (as cited in Feldman, 1993) conducted a study of approximately 800 first-time students enrolled at Indiana Vocational Technical...
College during the fall semester of 1989 and the spring semester of 1990 and found that marital status did not distinguish persisters from non-persisters. Therefore, as the research related to this demographic variable is both limited and inconsistent, a direct relationship cannot be assumed.

Pre-Matriculation Variables

Tinto (1988) posited that pre-entry college attributes, including ability and prior schooling, formed an individual’s goals and commitments. These goals and commitments significantly impacted decisions to leave or remain in school. The pre-entry variables investigated in this study and included in this review are: high school GPA, type of high school attended, admission test scores, proximity to campus, and date of college application.

High School GPA

High school grades generally have been found to be one of the best predictors of student persistence in higher education. Referencing typical research studies conducted prior to 1966, Irvine (as cited in Wilson, Mason, & Ewing, 1997) reported that the correlation between high school grade-point average and graduation from college after five years of enrollment accounted for between 10% and 12% of the variance in student dropout/persistence rates. Grosset (1989), on the other hand, concluded that this issue was more complex than surface appearances would indicate. She reported:

Most of the studies that have supported the validity of the relationship of high school achievement and persistence represent samples based on 18 to 24 year olds. However, the predictive ability of these types of factors erode the further removed in time the student is from these high school experiences. (p. 31)
Still, most studies reveal a direct relationship between high school GPA and student retention. Studies conducted at Illinois Central Community College (Feldman, 1993), Mountain Empire Community College (Sydow & Sandel, 1996), Niagra County Community College (Feldman, 1993), and the Saskatchewan Institute of Applied Science and Technology (Sarkar, 1995) have consistently documented a negative relationship between low high school GPAs and student retention. The University System of Georgia (1994) reported a comparable finding from studies conducted throughout this state-wide system.

The actual relationship was defined more precisely by Feldman (1993), based on a study conducted at Niagara County Community College. She found that the average high school GPA was significantly lower for students who did not return, compared to students who were retained. In a logistic regression analysis, high school GPA was the most important factor related to retention. Each one-point increase in high school GPA was associated with a decrease in dropout rate, which implied that a student with a 3.00 GPA was about one-half as likely to drop out as a student whose GPA was 2.00. Additionally, Bean (1980) contended that the negative impact of low high school GPAs was especially pronounced for women. Consequently, the preponderance of evidence corroborates a direct relationship between high school GPA and student retention.

**Type of High School Attended**

Research studies related to the type of high school attended are limited. Nevertheless, Tinto (1988) suggested that individuals from very small rural communities might experience lower rates of persistence. This issue has also been addressed at the
Community College of Philadelphia. Based upon internally-prepared reports, Grosset (1989) related that students with private high school backgrounds outperformed academically and had lower attrition rates than was the case for students with public secondary school backgrounds. Due to the lack of research in this area, a direct relationship has not been determined and cannot be assumed.

**Admission Test Scores**

Both Grosset (1989) and St. John (1990) reported that much of the retention literature reveals that low admission test scores were related to higher attrition, which implies that students with lower entering abilities must work harder to succeed in college. However, St. John’s study included a temporal element. Based on research conducted among 4,000 members of the high school class of 1980, he suggested that admission test scores were significantly and positively associated with second- to third-year persistence. On the other hand, Fischbach (as cited in Feldman, 1993) conducted a retention study at Illinois Central Community College and found that ACT scores were not predictive of persistence. Therefore, such inconclusive results preclude an assumption that a direct relationship exists.

**Proximity to Campus**

Tinto (1988) suggested that students who did not live on campus may not have been able to reap the full social and intellectual rewards that residence within the college community brought. He contended further that such a lack of integration resulted in an increased likelihood of attrition over the long run. This premise was investigated by Bean in 1980 and Sanders and Burton in 1996, and the results obtained were contradictory.
Bean (1980) found that on-campus housing was not related to dropout behavior. However, when proximity was extended beyond state boundaries, the relationship became more direct. Based on the work of Pascarella and Terenzini, Sanders and Burton (1996) conducted a study of freshman retention at DePaul University. Compared to students who did not return for their sophomore year, returning students were in-state residents. In fact, out-of-state status ranked among the three most important variables that increased the likelihood that freshmen would leave. Although a direct relationship was implied, such a relationship cannot be assumed due to the limited information available.

Date of College Application

Only one reference to the date of the student’s original application for college was found in the professional literature—that of Billson and Terry (1987). They suggested that last-minute entrants typically lacked support and that their late entry into college limited campus integration, which made them more susceptible to attrition. As research relative to this variable is extremely limited, a direct relationship cannot be assumed. Further investigation related to this pre-matriculation variable is obviously needed.

Grade-Related, Post-Matriculation Variables

Compared to studies of the relationships between pre-matriculation variables and student retention, many more studies have been conducted relative to a comparable relationship of post-matriculation variables. Consequently, post-matriculation variables are divided into two categories—those that are related to grades and those that are related to enrollment. The grade-related, post-matriculation variables investigated in this study and included in this review are college GPA, the student’s participation in remedial and
developmental classes, and the pattern of class attendance. One additional variable that was included in the investigation but not in this review, due to a lack of research in the area, is the number of "F" grades received by the student.

College GPA

Grosset (1989) reported that:

It appears that voluntary withdrawals are more common than those of an involuntary nature; however, many students who choose to leave on their own do so for academic reasons. National estimates indicate that between 10 to 30% of voluntary withdrawals leave because of academic difficulties, either perceived or actual. (p. 29)

The academic factor to which Grosset referred was more precisely defined by Voorhees (1987) as follows, "The most common indicator of academic integration is grade-point average. . . . The higher the level of reinforcement, the more likely a student will remain in school" (p. 118).

A significant positive direct relationship between college GPA and student retention has been documented in several studies, including those of Bean (1980); Brawer (1996); Brooks-Leonard (1991); Mohammadi (1994); Pascarella et al. (1986); Sanders and Burton (1996); St. John (1990); Volkwein and Lorang (1996); and Windham (1994). The significance of the relationship is portrayed in the studies of Sanders and Burton (1996) and Windham (1994).

Based on the work of Pascarella and Terenzini, Sanders and Burton (1996), in a study of freshman retention at DePaul University, found that a low cumulative GPA was among the three most important variables that increased the likelihood of freshmen dropping out. In a study that tracked for two years the 1990 first-time students at a Florida
public community college, Windham (1994) found that the most important continuous variable was GPA. Specifically, she determined that one standard deviation increase in the first semester GPA would improve the probability of remaining in college by a factor of 1.40 the first year and 1.30 the second year.

Two studies investigated temporal elements related to the relationship between college GPA and retention. One study was that conducted by St. John (1990). His study revealed that, among the 4,000 students involved, having high grades in college was significantly and positively associated with first- to second-year, second- to third-year, and third- to fourth-year persistence. The second study was that of Daubman, Williams, Johnson, and Crump (1985). Based on a study conducted with approximately 470 student who had withdrawn from a state school on the East Coast during the fall semester of 1981 and the spring semester of 1982, they found that students who withdrew late in the semester experienced more academic difficulties than did students who withdrew earlier.

Working with a targeted constituency, Somers (1996) conducted a study that involved approximately 1,900 students who were enrolled in an urban, public institution. The results of her study differed from those cited above. She found a positive association between persistence and financial aid recipients whose GPAs were in the bottom third; they were 12.9% more likely to persist. However, Somers related that this association could have been reflective of continuation policies that encouraged low-achieving student to re-enroll until they were dropped for academic reasons. Additionally, these students were involved in a special persistence program. Overall, these results indicate that retention and high college GPAs were directly and positively related.
Participation in Remedial and Developmental Classes

As might be intuitively expected, many studies indicate that students who enter college with remedial deficiencies are at a disadvantage relative to persistence, but this assumption has not been substantiated in all studies that focus upon the relationship. The findings from such studies are inconsistent, both in the direction of the relationship and the areas of deficiency that are most closely associated with attrition.

The Office of Research and Planning for the University System of Georgia (1994) conducted a study in 1993 that revealed a negative relationship between persistence and participation in remedial or developmental classes. The retention rate disparities cited by this study were further delineated by the students' ethnicity. Specifically, black developmental studies students were 17.9% more likely to withdraw than were other black freshmen; and non-black development studies students were 15.6% more likely to withdraw than were other non-black freshmen (p. 16). The findings of this study indicated further that academic preparedness was more relevant to persistence than was race.

Similar findings were documented by Clagett (1996), Grosset (1989), and Windham (1994), whose studies looked at specific academic deficiencies as they relate to retention. Grosset (1989) reported that reading and writing placement test scores were generally good predictors of student persistence, in that students who entered college with deficiencies in these skill areas were less likely to graduate in four to six years and more likely to be dropped for academic reasons (p. 23).

Clagett (1996) and Windham (1994) also reported differences in the attrition rates of developmental studies and non-developmental studies students; however, they found
math deficiencies were more closely associated with persistence than were other deficiencies. Windham (1994) found the second most important continuous variable following GPA to be predictive of persistence was the students’ scores on the math portion of a placement test. She stated that “for each standard deviation increase in the test results, the odds ratio for remaining in school was 1.12 the first year and 1.16 the second year” (p. 8). Similarly, Clagett, (1996) found that 50% of the students who needed no remediation could be classified as persisters, whereas only 20% of those who needed remediation in math and at least one other area could be so classified. He also found that “relatively few students identified as needing developmental education succeed in completing remediation” (p. 19).

In contrast, Brooks-Leonard (1991), Feldman (1993), and Price (1993) found that the need for remediation did not distinguish persisters from non-persisters. Therefore, the results of studies which focus upon the relationship between retention and the students participation in remedial and developmental coursework is inconclusive; further investigation is warranted.

**Class Attendance**

As reflected in most class attendance policies, there is general agreement among higher education faculty members that class participation facilitates successful completion of assigned coursework. Nevertheless, research in this area is greatly lacking.

At Moraine Valley Community College (MVCC) in Illinois, a random sample of students who were first-time transfer (those who planned to enroll in four-year institutions upon leaving MVCC) or career students (those who planned to enter the labor
force upon leaving MVCC) during the fall of 1994 and who were still enrolled in the spring of 1995 received a “Retention/New student Survey.” The purpose of this survey was to identify variables predictive of retention or attrition. The results showed that failure to attend class every day was a predictor variable that was significantly related to attrition. The researchers also found that as the difficulty in attending class increased, the likelihood of retention decreased (Retention/New Student Survey, 1996). During the fall of 1995, a comparable study was conducted at Mountain Empire Community College in Virginia. Faculty members were surveyed relative to their perceptions of reasons for student withdrawals from their classes; and they consistently reported poor class attendance as an academic obstacle relative to retention (Sydow & Sandel, 1996). Although the results of the surveys conducted at these community colleges revealed direct relationships between class attendance and persistence, further research is needed due to the limited amount of research available and the statistical impreciseness of the results obtained.

**Enrollment-Related, Post-Matriculation Variables**

As previously indicated, many research studies have focused upon the relationships between several enrollment-related variables and higher education students’ persistence toward graduation. The enrollment-related, post-matriculation variables investigated in this study and included in this review are the enrollment status (part-time students—those registered for less than 12 credit hours, or full-time students—those registered for 12 or more credit hours); the program of study undertaken; the number of changes in the major program of study; and the type(s) of financial assistance received.
**Enrollment Status**

It is commonly assumed that students who enroll in college on a part-time basis are more likely to drop out. In fact, the soundness of this assumption is broadly supported by findings from research that is focused on retention. Brooks-Leonard (1991) addressed this phenomenon as follows:

The literature on retention is strikingly inconclusive and at times contradictory. Virtually the only theme that repeats itself throughout the literature is that students who attend college on a full-time basis return at a much higher rate than those who attend on a part-time basis. (p. 58)

This theme is aptly reflected in the findings from a national study of the high school graduating class of 1980. Referencing the results from this study, St. John (1990) reported that, among the 4,000 students in the study, attending full time was significantly and positively associated with first- to second-year, second- to third-year, and third- to fourth-year persistence.

Findings from institution-specific studies also substantiate, and thereby strengthen, the significance of the relationship between persistence and part-time/full-time enrollment. Brooks-Leonard (1991) conducted one such study at the Indiana Vocational Technical College. Working with approximately 800 first-time students from fall 1989 to spring 1990, she found a lower rate of retention for part-time students. And, in statements that almost identically mirror those of Brooks-Leonard, Brawer (1996) reported that full-time attendance was the most prevalent characteristic of persisters and part-time attendance was the most prevalent characteristic among non-persisters. She cited findings from a study conducted at San Juan College in Mexico, in which
researchers found that, in 1991 and 1992, fall-to-fall persistence rates for part-time degree-seeking students were 42% and 35%, as compared to 59% and 46% for full-time students (¶ 3).

In a similar vein, many people assume that the community college setting embodies the arena wherein the impact of part-time attendance may be greatest, in that the typical community college student body is primarily comprised of part-time students. Once again, research findings consistently corroborate this assumption. The professional literature is filled with references to the fact that part-time community college students are generally older and typically have commitments, such as families and jobs, outside the college. Thus, the potential for their integration into the college environment is limited.

Brooks-Leonard (1991) portrayed the extent of the problem by citing the disparity in retention rates for full-time students versus part-time students from several community colleges. At Prince George's Community College, the full-time student return rate was 78%, compared to 52% for part-time students; at Piedmont Virginia Community College, the retention rate was 88.1% for full-time students and 48.6% for part-time students; and at John Tyler Community College, 95% of the second-term, non-returning students had attended part-time during their first term (pp. 58-59). Price (1993) reported similar findings from a study conducted at Allegany Community College that was focused on the dropout behavior of students during the first three weeks of the fall semester of 1992 and the spring semester of 1993. She found that 58% of the students who had dropped during the fall and 68% who had dropped during the spring had been enrolled on a part-time basis. The negative impact of part-time attendance is further documented in studies.
conducted at Mountain Empire Community college (Sydow & Sandel, 1996) and Patrick Henry Community College (Mohammadi, 1994).

The actual relationship is more precisely defined in studies conducted at Moraine Valley Community College and Niagara County Community College. At Moraine Valley Community College, researchers found that as the number of semester credit hours in which the student was enrolled increased the likelihood of retention increased as well. In fact, this was the second most important predictor of retention in this study (Retention/New Student Survey, 1996). And, in a 1990 study conducted at Niagara County Community College, Feldman (1993) applied a logistic regression analysis and found that full-time status was the third most important factor related to retention. Specifically, part-time students were 2.23 times more likely to drop out than were full-time students.

On the other hand, Voorhees (1987) cited findings that indicated there was no disparity between the retention rates of part-time and full-time college attenders. He studied 369 new and continuing students enrolled at a suburban community college in 1984 and found a nonsignificant association between full-time versus part-time enrollment and persistence. Still, the preponderance of evidence reflected the existence of a direct negative relationship between part-time attendance and retention and suggested that the impact of the relationship was quite extensive at the community college level.

Program of Study

Research results show that students with higher degree aspirations are more likely to persist than those with lower or no degree aspirations. Specifically, the studies of Brooks-Leonard (1991) at Indiana Vocational Technical College, Daniels (as cited in

The significance of this relationship is depicted in Hartley’s (1987) review of two separate studies. Referencing a study conducted by Beal and Noel in 1980, Hartley (1987) stated, “A national study of student retention found that the factor contributing most to attrition included indecision about major/career goals and limited educational aspirations” (p. 88). And, at Cook College of Rutgers, approximately 100 students identified as underachievers were participants in an intensive interview process aimed at identifying the predominant concerns of a defined “at-risk” student population. Of this number, about one-third reported that they were uncertain about their choices of majors, and approximately one-half had changed their career objectives at least once, usually lowering their sights in the process (Hartley, 1987, p. 89). Additionally, Mohammadi (1994), in a study conducted at Patrick Henry Community College, found that the students’ goals were the single most important variable in determining retention rates. Specifically, the highest rate of attrition occurred in the unclassified or “non-degree” category. Finally, St. John (1990) found that the academic programs in which the students were enrolled were significantly and positively associated with second- to third-year persistence.
Consequently, the professional literature overwhelmingly documents a direct and positive relationship between higher degree aspirations and persistence to graduation.

**Number of Changes in Major Program of Study**

Only one direct reference to the relationship between the number of changes in students’ major program of study and retention was found. Price (1993) reported that:

> The degree of certainty regarding the academic program selected by the student is positively related to persistence. . . . The more committed students are to the goal of completing a program, the more likely they are to persist, particularly at two-year colleges. (p. 7)

Therefore, even though a direct relationship is documented by this researcher, further investigation is warranted due to the scarcity of the information available.

**Type of Financial Assistance Received**

There is no unity in opinion as to the impact of student financial aid awards on college persistence. Furthermore, the divergence in “educated” opinions becomes even more pronounced when the various types of financial aid received are investigated relative to their individual impact on persistence.

Crawford (as cited in Jensen, 1983) reported a positive relationship between persistence and the receipt of aid by National Merit Scholarship finalists with similar levels of achievement. He found that “16.9 per cent of aid recipients withdrew in the first five semesters of college, whereas 34.3 per cent of the non-recipients withdrew in the same period. In addition, increasing amounts of assistance were related to decreasing chances of withdrawal” (p. 298). Zeilke (as cited in Jensen, 1983) found a comparable relationship within a less academically select student population. He reported that non-
Pell Grant recipients had considerably higher rates of withdrawal during the first two weeks of their initial semester than did Pell Grant recipients.

Both Astin (as cited in Jensen, 1983) and Price (1993) found positive relationships between persistence and another type of assistance—work study awards. Using self-reported data from a large representative national sample, Astin (as cited in Jensen, 1983) found that work study had the most consistent and pronounced positive impact on persistence of any type of financial aid. Similarly, Price (1993) reported the impact of working on campus, as follows:

Allowing students to work on campus yields higher retention rates. . . . working does not necessarily lower grades; grades improve when the job is related to a student’s academic program; the more hours the student works in a campus job the more likely the student is to persist. (pp. 6-7)

St. John (as cited in Somers, 1996), who conducted extensive research in this area over a period that spanned two decades, discovered both positive and negative relationships between the receipt of financial assistance and persistence. He found that loans, as the sole source of financial aid, had a negative association with year-to-year persistence in a 1970s cohort. In contrast, any combinations of loans, grants, scholarships, and work study had a positive association with year-to-year persistence. In a later report, St. John (1990) related that, during the 1980s, student enrollment decisions were responsive to the amounts of loans offered. He conducted a study of approximately 4,000 college students who were in the high school class of 1980 and found that both grants and loans were positively associated with first- to second-year persistence, whereas work study was not significant. Relative to second- to third-year persistence, the amounts of
grants, loans, and work study were all positively associated. Finally, the amounts of the
loans and work study awards were significantly and positively associated with third- to
fourth-year persistence, whereas grants were not (pp. 392-396). He concluded that
persistence decisions were responsive to grants, loans, and work study in some
combination, but that this responsiveness was not related to any one type of aid.

As did St. John, Astin (as cited in Jensen, 1983) and Crawford (as cited in Jensen,
1983) found a negative relationship between loan support and persistence. In fact,
Crawford (as cited in Jensen, 1983) concluded that loan recipients had a nearly three
times greater likelihood of withdrawal than did scholarship and grant recipients.

Somers (1996) also conducted extensive research in this area, but her efforts
yielded evidence of a more broad-based negative impact. She conducted a study that
involved approximately 1,900 students who were enrolled in an urban, public institution
that relied primarily on federal programs for financial aid, except for the award of full
scholarships granted to National Merit finalists. She found a significant and negative
association between the receipt of financial aid and persistence, in that students who
received any type of aid were 23.5% less likely to persist. Furthermore, the amount of aid
received also was negatively associated with persistence; students were 3.9% less likely
to persist with the addition of each $1,000 in aid awarded.

In assessing the various types of aid, Somers (1996) found that scholarship funds
also were negatively associated with persistence; for every $1,000 in scholarship funds
awarded, students were 24.5 % less likely to persist. She concluded that "while large
scholarships may be useful in attracting students to the institution, a high attrition rate is
associated with these programs. This suggests . . . the money awarded may not be as important as the ‘fit’ between student and institution” (p. 101).

In contrast to all of the aforementioned financial aid studies, Fields and LeMay (as cited in Jensen, 1983), Grosset (1989), and Pend and Fetters (as cited in Jensen, 1983) found that the student’s need for financial aid was not predictive of persistence. Consequently, this pronounced divergence in opinion precludes the assumption of a direct relationship between persistence and the receipt of financial assistance.

**Summary**

Based on the research literature reviewed in this chapter, direct relationships between retention and essentially all of the variables addressed therein could not be assumed due to either inconclusive findings or a scarcity of research. Therefore, further research was warranted for such variables. Furthermore, even though direct relationships between retention and the pre- and post-matriculation variables including high school GPA, college GPA, college enrollment status, and college program of study were cited in several investigations, additional research was also warranted for these variables, in that the need for institution-specific studies was extensively documented throughout the literature.

The research design for investigating these variables is detailed in Chapter 3.
CHAPTER 3
RESEARCH METHODS

Even though the professional literature is rife with opinions, theoretical viewpoints, studies, and strategies or programs that deal with student retention in higher education, specific pieces of literature that focus upon retention within community colleges are sparse. Therefore, the focus of this study was on the correlates of student retention within a community college setting.

Population

The location for this study was Walters State Community College (WSCC), which enrolled approximately 5,900 students during the fall semester of 1998. WSCC, one of 14 community colleges governed by the Tennessee Board of Regents, is centrally located within the 10 rural counties that comprise its service area. Based on enrollment statistics for the fall semester of 1998, approximately 88% of the students who enrolled at WSCC maintained residences within the service area. An additional 11.4% resided within the state, and the remaining 0.6% was comprised of out-of-state residents and foreign students. The ethnic composition of the student body was 95.3% white and 4.7% non-white; and the gender composition was 63.5% female and 36.5% male. The percentage of total enrollment by age category was as follows: under 18 (6.7%), 18 to 20 (31.7%), 21 to 24 (16.3%), 25 to 34 (23.9%), 35 to 64 (21.1%), and over 64 (0.3%). The mean age of the entire student body was 27.1.

Forty-seven percent of the students attended on a full-time basis, whereas 53% attended only part-time. The breakdown in percentages for degree- versus nondegree-
seeking students was 67.5% and 32.5%, respectively. Five percent of the students enrolled in remediation courses exclusively. Although these numbers precisely defined only the student body enrolled during the most recent fall semester, they closely resemble historical averages.

The actual population included in this study numbered 17,497. This size was larger than that included in most studies, and the internal validity of the study was underscored by the fact that an entire population was used. The population included those students who attended WSCC from the fall semester of 1992 through the fall semester of 1997. The only students excluded from this number were “transient” students, those who enrolled for one semester only with the expectation of transferring credits earned back to an institution of prior enrollment, and “special” students, those who were not seeking degrees. These groups were excluded because they typically would not have been expected to return to the college in upcoming semesters.

Design

The design of this study involved a longitudinal, archival approach to the investigation of a selected set of factors and their relative importance to student retention within a single campus setting. The investigation focused upon four sets of variables:

- demographic variables, including age, ethnicity, gender, marital status, and military status;
- pre-matriculations variables, including high school GPAs, the types of high schools from which the students graduated, admission test scores, the
proximity of the students’ residences to the college campus, and the dates of the students’ initial applications for admission to college;

- post-matriculation variables related to grades, including cumulative GPAs, the students’ rates of participation in remedial and developmental courses, the total number of “F” grades received, and class attendance patterns; and

- post-matriculation variables related to enrollment, including enrollment status (part-time versus full-time), the students’ programs of study (university parallel, technical education, or certificate), the number of changes made in the major program of study, and the types of financial assistance received (scholarship or needs-based).

These factors were selected from a larger set of factors, in that they had been shown to be significantly related to retention at other community colleges.

Data Collection

The data obtained were not based on survey results; thus, they were not biased by return rates from individuals with varying levels of interest. Relative to this issue, Price (1993) stated, “Research has shown . . . that students tend not to be honest when pressed to give reasons for their choice to withdraw [from school], especially if these reasons may be regarded by others as evidence of failure” (pp. 5-6). Instead, the data for this study were collected through the use of a computer program that was written to access the Tennessee Board of Regents’ Student Information System (SIS) database. Once the needed data were attained, they were stored on a personal computer and analyzed using the SPSS Base 9.0 (1999) statistical package.
The process for longitudinal tracking was based on the identification numbers of the students at the time of their initial registration at WSCC. Whenever the same student identification number in the SIS database showed active course registration without a break for five consecutive semesters, the student was classified as a persister. Students who had withdrawn for five or more consecutive semesters were classified as non-persisters. Although the TBR defines retention as persistence from fall semester one year to fall semester the second year (Tennessee Board of Regents, 1994), the criterion of five consecutive semesters' absence was chosen for this study based on preliminary research that revealed re-enrollment at WSCC following a two-year absence was not an isolated occurrence. This design had internal validity for studying the factors associated with retention and afforded a measure of confidence in findings and the associated conclusions that would not have been available with other designs.

Persisters and non-persisters were assigned to groups by student identification numbers, and names were never matched with the student identification numbers. Persisters were assigned to Group 1, and non-persisters were assigned to Group 2. Only group numbers were imported into SPSS.

**Methodology**

The first step in the study was to identify those demographic variables that were significantly related to retention. The null hypotheses were that the proportion of students who persisted did not differ from the proportion of students who did not persist among the categories of the following variables: age, ethnicity, gender, marital status, and military status.
The second step was to identify those pre-matriculation variables that were significantly related to retention. The null hypotheses were that the proportion of students who persisted did not differ from the proportion of students who did not persist among the categories of the following variables: high school GPAs, the types of high schools from which the students graduated, admission test scores, the proximity of the students' residences to the college campus, and the dates of the students' initial applications for admission to college.

The third step was to identify those grade-related, post-matriculation variables that were significantly related to retention. The null hypotheses were that students who persisted were the same as students who did not persist in terms of the students' cumulative GPAs, rates of participation in remedial and developmental courses, total number of "F" grades received, and class attendance patterns.

The final step was to identify those enrollment-related, post-matriculation variables that were significantly related to retention. The null hypotheses were that students who persisted were the same as students who did not persist in terms of the students' enrollment status, programs of study, number of changes made in the major program of study, and type(s) of financial assistance received.

Data Analysis

Two univariate approaches were used in the analyses of the aforementioned sets of variables—chi-square and t-test for independent samples. Each variable was evaluated separately through the use of one of these test statistics according to the scale of measurement involved.
The statistical procedures are discussed in further detail in Chapter 4. The findings generated through their application are also described.
CHAPTER 4

PRESENTATION AND ANALYSIS OF THE DATA

This study investigated the relationships of four sets of independent variables to retention—demographic variables, pre-matriculation variables, post-matriculation variables related to grades, and post-matriculation variables related to enrollment. The population included in the study numbered 17,497 students who were enrolled at Walters State Community College (WSCC) within the period from the fall semester of 1992 through the fall semester of 1997. "Transient" students and "special," or nondegree-seeking, students who were not expected to return in upcoming semesters were excluded; thus, zero invalid cases were included. The population was divided into two groups who were identified as persisters and non-persisters. Students who had completed their programs of study or maintained enrollment with less than a five-semester break were classified as persisters, and those who had missed five or more consecutive semesters were classified as non-persisters. The persisters, who numbered 8,680, comprised 49.6% of the population; and the non-persisters, who numbered 8,817, comprised 50.4% of the population. Although the groups were not deliberately limited in membership, they were roughly equal in number, which facilitated the analyses of data.

Analyses of Demographic Variables

In an effort to better understand the population as a whole and to identify specific audiences to be targeted in retention efforts, the study analyzed several demographic variables. Stated in the null form, the hypotheses investigated were: There are no differences between college persisters and non-persisters regarding the demographic
variables of age, ethnicity, gender, marital status, and military status. The findings of these analyses follow.

**Age**

The age range for persisters was 17 through 88, and the age range for non-persisters was 19 through 88. The measures of central tendency and the standard deviations of the ages of students in both groups are presented in Table 1.

**TABLE 1**

**ANALYSIS OF AGE STATISTICS FOR PERSISTERS AND NON-PERSISTERS**

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Mode</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persisters</td>
<td>8,860</td>
<td>28.14</td>
<td>25</td>
<td>21</td>
<td>9.17</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>8,817</td>
<td>31.59</td>
<td>28</td>
<td>25</td>
<td>8.88</td>
</tr>
</tbody>
</table>

A t test was conducted on the means for persisters and non-persisters in order to determine if there was a significant difference in age between the two groups. This t test for equality of means ($t = 25.315$) resulted in a two-tail probability of $<0.0005$ that the observed means occurred by chance if the null hypothesis was true. Therefore, the null hypothesis was rejected; it was concluded that younger students at WSCC persisted at a higher rate than did older students. However, as is true for each of the statistical applications that follow, this difference in group means should be interpreted with a
degree of caution, because a large population artificially increases the chances of obtaining statistical significance.

Ethnicity

The ethnic compositions of persisters, non-persisters, and the total population are depicted in Table 2. The total population was comprised of the following categories, and corresponding percentages, of ethnicity: white (94.7%), black (3.9%), Hispanic (0.7%), Asian (0.4%), American Indian (0.4%), and other (0.0%/N=7).

As revealed in Table 2, whites comprised a predominant portion of the total population (94.7%), and they were relatively equally distributed among both persisters (95.1%) and non-persisters (94.3%). Consequently, the ethnicity variable was of little practical significance in this population. Nevertheless, the categories of black, Hispanic, Asian, American Indian, and Other were collapsed into a non-white category, and a comparison of the categories was conducted using the chi-square statistic. The computed $X^2$ of 6.384 had an associated probability level of .041, which exceeded the .05 confidence level and implied the existence of a significant association between persistence and ethnicity. Therefore, the null hypothesis was rejected.

As the $X^2$ values do not indicate where the statistical significance lies, adjusted residuals were used to make these determinations. Adjusted residuals should be read roughly as z scores; thus, values well below -2 or above +2 depart markedly from the model of independence. A negative number indicates that there are fewer cases than expected under independence, and a positive number indicates that there are more cases than expected under independence (SPSS, 1999, pp. 70-71). The adjusted residuals for
<table>
<thead>
<tr>
<th>Group</th>
<th>White</th>
<th>%</th>
<th>Black</th>
<th>%</th>
<th>Hispanic</th>
<th>%</th>
<th>Asian</th>
<th>%</th>
<th>American Indian</th>
<th>%</th>
<th>Other</th>
<th>%</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persisters</td>
<td>8,253</td>
<td>95.1</td>
<td>320</td>
<td>3.7</td>
<td>48</td>
<td>0.6</td>
<td>29</td>
<td>0.3</td>
<td>27</td>
<td>0.3</td>
<td>3</td>
<td>0.0</td>
<td>8,680</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>8,315</td>
<td>94.3</td>
<td>360</td>
<td>4.1</td>
<td>66</td>
<td>0.7</td>
<td>37</td>
<td>0.4</td>
<td>35</td>
<td>0.4</td>
<td>4</td>
<td>0.0</td>
<td>8,817</td>
</tr>
<tr>
<td>Total</td>
<td>16,568</td>
<td>94.7</td>
<td>680</td>
<td>3.9</td>
<td>114</td>
<td>0.7</td>
<td>66</td>
<td>0.4</td>
<td>62</td>
<td>0.4</td>
<td>7</td>
<td>0.0</td>
<td>17,497</td>
</tr>
</tbody>
</table>
the association between persistence and ethnicity are provided in Table 3; these residuals revealed that White students at WSCC persisted at a higher rate than did non-white students.

**TABLE 3**  
**ADJUSTED RESIDUALS FOR THE ASSOCIATION BETWEEN PERSISTENCE AND ETHNICITY**

<table>
<thead>
<tr>
<th>Group</th>
<th>White</th>
<th>Non-White</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Adjusted Residual</td>
</tr>
<tr>
<td>Persisters</td>
<td>8,253</td>
<td>2.3</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>8,315</td>
<td>-2.3</td>
</tr>
<tr>
<td>Total</td>
<td>16,568</td>
<td>929</td>
</tr>
</tbody>
</table>

**Gender**

The frequencies, and accompanying percentages, of males, females, and others (those who chose not to be classified as either male or female) represented in the persister and non-persister categories, as well as in the total population, are provided in Table 4. As revealed in Table 4, the percentages of both males and females were comparable across the persister and non-persister groups, and their combined percentages equaled virtually 100%. Therefore, the "other" category of students, defined by a minuscule number of six, was excluded from the chi-square statistic used to test the independence of persistence and the remaining categories—females and males. The
### Table 4

**ANALYSIS OF PERSISTERS' AND NON-PERSISTERS' GENDER**

<table>
<thead>
<tr>
<th>Group</th>
<th>Females</th>
<th>Males</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Persisters</td>
<td>5,703</td>
<td>65.7</td>
<td>2,975</td>
<td>34.3</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>5,460</td>
<td>61.9</td>
<td>3,353</td>
<td>38.0</td>
</tr>
<tr>
<td>Total</td>
<td>11,163</td>
<td>63.8</td>
<td>6,328</td>
<td>36.2</td>
</tr>
</tbody>
</table>

The computed $X^2$ was 26.829, and the associated probability was <0.0005. Thus, there was a significant association between persistence and gender; the null hypothesis was rejected.

The adjusted residuals for this association are depicted in Table 5. The adjusted residuals computed for this association revealed that female students at WSCC persisted at a higher rate than did male students.

**Marital Status**

The frequencies, and accompanying percentages, of the marital status categories of single, married, and other (those students with living arrangements other than single and married) in the persister and non-persister groups, as well as in the total population, are provided in Table 6. Beginning in 1995, the marital status item was no longer required for inclusion on student applications; consequently, there were 7,135 missing cases in the Table 6 breakdown.
### TABLE 5

**ADJUSTED RESIDUALS FOR THE ASSOCIATION BETWEEN PERSISTENCE AND GENDER**

<table>
<thead>
<tr>
<th>Group</th>
<th>Females</th>
<th></th>
<th></th>
<th>Males</th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Adjusted</td>
<td>N</td>
<td>Residual</td>
<td>N</td>
<td>Residual</td>
<td></td>
</tr>
<tr>
<td>Persisters</td>
<td>5,703</td>
<td>5.2</td>
<td>2,975</td>
<td>-5.2</td>
<td>8,678</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>5,460</td>
<td>-5.2</td>
<td>3,353</td>
<td>5.2</td>
<td>8,813</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>11,163</td>
<td></td>
<td>6,328</td>
<td></td>
<td>17,491</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 6

**ANALYSIS OF PERSISTERS' AND NON-PERSISTERS' MARITAL STATUS**

<table>
<thead>
<tr>
<th>Group</th>
<th>Single</th>
<th>Married</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Persisters</td>
<td>2,153</td>
<td>70.5</td>
<td>896</td>
<td>29.3</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>5,139</td>
<td>70.3</td>
<td>2,168</td>
<td>29.7</td>
</tr>
<tr>
<td>Total</td>
<td>7,292</td>
<td>70.4</td>
<td>3,064</td>
<td>29.6</td>
</tr>
</tbody>
</table>
Non-persisters were much more heavily represented in the pre-1995 cases, for whom these data were available, than in the total population. However, within these pre-1995 cases, the percentages across persisters and non-persisters and the marital status categories were nearly equal. Comparable to the gender variable, the "other" category included only six cases; thus, it was excluded from the chi-square statistic used to test the independence of persistence and the remaining categories—single and married. The computed $X^2$ was .083, and the associated probability was .773. Thus, there was not a significant association between persistence and marital status, and the null hypothesis was not rejected.

**Military Status**

The frequencies, and accompanying percentages, of the military status categories of veteran and non-veteran in the persister and non-persister groups, as well as in the total population, are provided in Table 7. As reflected in this table, only a small number (3.3%) of veterans was represented in the total population; this percentage did not vary much between persisters (3.5%) and non-persisters (3.2%).

Although the percentages across this variable were essentially equal, a chi-square statistic was applied in an effort to attain a more accurate representation of the independence of persistence and military status. The computed $X^2$ was .825, and the associated probability was .364. Therefore, there was not a significant association between persistence and military status, and the null hypothesis was not rejected.
TABLE 7

ANALYSIS OF PERSISTERS' AND NON-PERSISTERS' MILITARY STATUS

<table>
<thead>
<tr>
<th>Group</th>
<th>Non-Veterans</th>
<th></th>
<th>Veterans</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Persisters</td>
<td>8,380</td>
<td>96.5</td>
<td>300</td>
<td>3.5</td>
<td>8,680</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>8,534</td>
<td>96.8</td>
<td>283</td>
<td>3.2</td>
<td>8,817</td>
</tr>
<tr>
<td>Total</td>
<td>1,6914</td>
<td>96.7</td>
<td>583</td>
<td>3.3</td>
<td>17,497</td>
</tr>
</tbody>
</table>

Analyses of Pre-Matriculation Variables

In an effort to identify variables that defined students who were more “at risk” of leaving school at the earliest possible stage in their pursuit of higher education, several pre-matriculation variables were used in this study. Stated in the null form, the hypotheses investigated were: There are no differences between college persisters and non-persisters in the pre-matriculation variables of high school GPAs, the types of high schools from which the students graduated, admission test scores, the proximity of the students’ residences to the campus, and the dates of the students’ initial applications for admission to the college. The findings from the analyses of these hypotheses follow.

High School GPA

Because many students enterWSCC with GED credentials that do not reflect grade-point averages corresponding to those earned with regular high school diplomas, this variable contained 5,553 missing cases. The valid cases for persisters numbered...
6,317, and the valid cases for non-persisters numbered 5,627. The high school GPAs for persisters ranged from .19 through 4.00, and the GPAs for non-persisters ranged from .02 through 4.00. The measures of central tendency and the standard deviations of the GPAs for the valid cases are presented in Table 8.

**TABLE 8**

**ANALYSIS OF HIGH SCHOOL GPA STATISTICS FOR PERSISTERS AND NON-PERSISTERS**

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Mode</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persisters</td>
<td>6,317</td>
<td>2.76</td>
<td>2.77</td>
<td>3.00</td>
<td>.6010</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>5,627</td>
<td>2.63</td>
<td>2.61</td>
<td>3.00</td>
<td>.6004</td>
</tr>
</tbody>
</table>

A t test was conducted on the mean GPAs for persisters and non-persisters in order to determine if there was a significant difference in high school GPAs between the two groups. This t test for equality of means ($t = 12.501$) resulted in a two-tail probability of $<0.0005$ that the observed means occurred by chance if the null hypothesis were true. Therefore, the null hypotheses was rejected, and it was concluded that students who entered WSCC with higher high school GPAs persisted at a higher rate than did students with lower GPAs.

**Types of High School Attended**

The types of high schools attended by persisters and non-persisters are depicted in Table 9. This variable was divided into three categories—public, private, and other. (The
TABLE 9

ANALYSIS OF THE TYPES OF HIGH SCHOOLS ATTENDED BY PERSISTERS AND NON-PERSISTERS

<table>
<thead>
<tr>
<th>Group</th>
<th>Public</th>
<th>%</th>
<th>N</th>
<th>Private</th>
<th>%</th>
<th>N</th>
<th>Other</th>
<th>%</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persisters</td>
<td>7,596</td>
<td>87.5</td>
<td>126</td>
<td>1.5</td>
<td></td>
<td>958</td>
<td>11.0</td>
<td></td>
<td>8,680</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>7,470</td>
<td>84.7</td>
<td>140</td>
<td>1.6</td>
<td></td>
<td>1,207</td>
<td>13.7</td>
<td></td>
<td>8,817</td>
</tr>
<tr>
<td>Total</td>
<td>15,066</td>
<td>86.1</td>
<td>266</td>
<td>1.5</td>
<td></td>
<td>2,165</td>
<td>12.4</td>
<td></td>
<td>17,497</td>
</tr>
</tbody>
</table>

resources used in classifying the high school as public and private are listed in the Appendix. The “other” category was comprised of those students who enteredWSCC with GED credentials, those who entered from home schools, and those who entered as international students, thus, presenting academic progress reports that differed from those used in traditional high schools in the United States.

The bulk of the population depicted in Table 9 attended public schools (86.1%); the second largest group comprised the “other” category, which was largely populated by GED recipients; and very few students entered from private schools. A chi-square statistic was applied to test the independence of persistence and type of high school attended. The computed \( X^2 \) was 29.358, and the associated probability was <0.0005. Thus, there was a significant association between persistence and the type of high school attended; and the
null hypothesis was rejected. The adjusted residuals for this association are presented in Table 10.

**TABLE 10**

**ADJUSTED RESIDUALS FOR THE ASSOCIATION BETWEEN PERSISTENCE AND THE TYPE OF HIGH SCHOOL ATTENDED**

<table>
<thead>
<tr>
<th>Group</th>
<th>Public School Students</th>
<th>Private School Students</th>
<th>Other Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persisters</td>
<td>5.3</td>
<td>-.7</td>
<td>-5.3</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>-5.3</td>
<td>.7</td>
<td>5.3</td>
</tr>
</tbody>
</table>

The adjusted residuals computed for this association revealed that students who entered WSCC from public high schools persisted at a higher rate than did foreign students, home-schooled students, and students who entered with GED credentials. However, there was not a significant association between persisters and non-persisters who entered WSCC from private schools.

**Admission Test Scores**

As only a minuscule number of students enter WSCC with SAT scores, these scores were excluded from the analysis of persisters' and non-persisters' admission test scores. Consequently, this variable was defined by ACT scores. The number of cases included in the analysis was further limited by the fact that ACT scores are not required for students who enroll in college following their 21st birthdays. Thus, the admission test
score variable included only 7,171 valid cases. Of this number, the persisters numbered 4,041 (missing cases = 4,639); and the non-persisters numbered 3,130 (missing cases = 5,687).

Only the composite ACT scores were analyzed. The composite scores for persisters ranged from seven through 32, and the composite scores for non-persisters ranged from five through 30. The measures of central tendency and standard deviations for both persisters and non-persisters are reflected in Table 11.

**TABLE 11**

**ANALYSIS OF PERSISTERS' AND NON-PERSISTERS' ADMISSION TEST SCORES**

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Mode</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persisters</td>
<td>4,041</td>
<td>18.72</td>
<td>18</td>
<td>18</td>
<td>3.58</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>3,130</td>
<td>18.35</td>
<td>18</td>
<td>16</td>
<td>3.62</td>
</tr>
</tbody>
</table>

A t test was conducted on the mean ACT scores for persisters and non-persisters in order to determine if there was a significant difference between these scores. This t test for equality of means ($t = 4.328$) resulted in a two-tail probability of $<0.0005$ that the observed means occurred by chance if the null hypothesis were true. Thus, the null hypothesis was rejected, and it was concluded that persisters entered WSCC with higher composite ACT scores than did non-persisters.
Proximity to Campus

Persisters and non-persisters were divided into four groups according to the proximity of their pre-college enrollment residences to the main and branch campuses. Those students who lived within those counties in which the main and branch campuses were located, including Claiborne, Greene, Hamblen, and Sevier Counties in Tennessee, were included in Group 1. Students who lived in the other counties that comprise WSCC’s service area, including Cocke, Grainger, Hancock, Hawkins, Jefferson, and Union Counties in Tennessee, were included in Group 2. Students who lived in the remaining 85 counties that make up the state of Tennessee were included in Group 3. And, those students who lived in states other than Tennessee, as well as those from foreign countries, were included in Group 4. The frequencies, and accompanying percentages, of persisters and non-persisters in each group are provided in Table 12.

Overall, 55.5% of this population had pre-college enrollment residences within a county in which the main campus or branch campuses were located. An additional 31.6% of the population had residences in the college’s service area, and an additional 12.5% had residences within the state of Tennessee. A very small group of students—0.4%—had pre-college enrollment residences in other states or foreign countries.Persisters and non-persisters were relatively equally distributed across all categories. A chi-square statistic was applied to test the independence of persistence and the proximity of the students’ pre-college enrollment residences to campus. The computed $X^2$ was 67.790, and the associated probability was <0.0005. Thus, there was a significant association between persistence and the proximity of the students’ pre-college
**TABLE 12**

**ANALYSIS OF THE PROXIMITY OF PERSISTERS' AND NON-PERSISTERS' PRE-COLLEGE ENROLLMENT RESIDENCES TO CAMPUS**

<table>
<thead>
<tr>
<th>Group</th>
<th>1* N</th>
<th>%</th>
<th>2** N</th>
<th>%</th>
<th>3*** N</th>
<th>%</th>
<th>4**** N</th>
<th>%</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persisters</td>
<td>4,842</td>
<td>55.8</td>
<td>2,882</td>
<td>33.2</td>
<td>934</td>
<td>10.8</td>
<td>22</td>
<td>0.3</td>
<td>8,680</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>4,866</td>
<td>55.2</td>
<td>2,642</td>
<td>30.0</td>
<td>1,261</td>
<td>14.3</td>
<td>48</td>
<td>0.5</td>
<td>8,817</td>
</tr>
<tr>
<td>Total</td>
<td>9,708</td>
<td>55.5</td>
<td>5,524</td>
<td>31.6</td>
<td>2,195</td>
<td>12.5</td>
<td>70</td>
<td>0.4</td>
<td>17,497</td>
</tr>
</tbody>
</table>

* Students with pre-college enrollment residences in counties of institution
** Students with residences in service area, excluding counties of institution
*** Students with residences in Tennessee, excluding service area
**** Out-of-State/Country students

enrollment residences to campus; and the null hypothesis was rejected. The adjusted residuals for this association are provided in Table 13.

The adjusted residuals computed for this association revealed that there was not a significant association between persisters and non-persisters whose pre-college enrollment residences were in counties in which the main and branch campuses were located. However, WSCC students with pre-college enrollment residences within the college's service area, excluding those counties in which campuses were located, persisted at a higher rate than did students with residences in the remaining counties of Tennessee, as well as those with residences in other states and foreign countries.
TABLE 13

ADJUSTED RESIDUALS FOR THE ASSOCIATION BETWEEN THE PROXIMITY
OF PERSISTERS' AND NON-PERSISTERS' PRE-COLLEGE ENROLLMENT
RESIDENCES TO CAMPUS

<table>
<thead>
<tr>
<th>Group</th>
<th>Adjusted Residuals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1*</td>
</tr>
<tr>
<td>Persisters</td>
<td>.8</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>-.8</td>
</tr>
</tbody>
</table>

* Students with pre-college enrollment residences in counties of institution
** Students with residences in service area, excluding counties of institution
*** Students with residences in Tennessee, excluding service area
**** Out-of-State/Country students

Date of College Application

Persisters and non-persisters were divided into three groups, based upon the dates of their initial applications for admission to college. Those students who made application more than two months prior to the first day of classes were included in Group 1. Those students who applied less than one month prior to the first day of classes, or during the late registration period that extends through the first week of classes, were included in Group 2; and Group 3 was defined by students who had applied for college less than two months but more than one month prior to the first day of classes. As an application date must be recorded for each entrant, there were no missing cases for this variable; the

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frequencies, and accompanying percentages, of persisters and non-persisters in each
group are provided in Table 14.

**TABLE 14**

**ANALYSIS OF PERSISTERS’ AND NON-PERSISTERS’**

**DATES OF APPLICATIONS FOR COLLEGE**

<table>
<thead>
<tr>
<th>Group</th>
<th>1*</th>
<th>2**</th>
<th>3***</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Persisters</td>
<td>4,032</td>
<td>46.5</td>
<td>2,527</td>
<td>29.1</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>4,963</td>
<td>56.3</td>
<td>2,097</td>
<td>23.8</td>
</tr>
<tr>
<td>Total</td>
<td>8,995</td>
<td>51.4</td>
<td>4,624</td>
<td>26.4</td>
</tr>
</tbody>
</table>

* Students who made application for college more than two months prior to the first day of classes
** Students who made application for college less than one month prior to the first day of classes
*** Students who made application for college less than two months but more than one month prior to the first day of classes

As revealed in Table 14, the greatest percentage (51.4%) of applications was received more than two months prior to the first day of classes. Of particular interest was the fact that the remaining 48.6% of the students, or essentially half of the total population, made application less than two months prior to the first day of classes. A chi-square statistic was applied to test the independence of persistence and the dates of the students’ initial applications for admission to college. The computed $X^2$ was 169.451,
and the associated probability was <0.0005. Thus, there was a significant association between persistence and the date of application for college; and the null hypothesis was rejected. The adjusted residuals for this association are depicted in Table 15.

**TABLE 15**

**ADJUSTED RESIDUALS FOR PERSISTERS' AND NON-PERSISTERS' INITIAL DATES OF APPLICATION FOR COLLEGE**

<table>
<thead>
<tr>
<th>Group</th>
<th>Adjusted Residuals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1*</td>
</tr>
<tr>
<td>Persisters</td>
<td>-13.0</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>13.0</td>
</tr>
</tbody>
</table>

* Students who made application for college more than two months prior to the first day of classes
** Students who made application for college less than one month prior to the first day of classes
*** Students who made application for college less than two months but more than one month prior to the first day of classes

The adjusted residuals computed for this association revealed that students who made application for admission to WSCC less than two months prior to the first day of classes persisted at a higher rate than did students who made application more than two months prior to the first day of classes.

**Analyses of Grade-Related, Post-Matriculation Variables**

In an effort to gather data for the purpose of informing policies and practices intended to increase the retention of as many students as possible, and acknowledging the
fact that grades by their very nature delineate the circumstances under which some students must leave college, several post-matriculation variables related to grades were investigated in this study. Stated in the null form, the hypotheses investigated were: There are no differences between college persisters and non-persisters in the grade-related, post-matriculation variables of cumulative GPAs, the students’ rates of participation in remedial and developmental courses, the total number of “F” grades received, and class attendance patterns. The findings from the analyses of these hypotheses follow.

**College GPA**

In accordance with the guidelines specified in WSCC’s academic calendar, many students voluntarily withdraw from college prior to the last date for dropping classes (approximately mid-semester) in an effort to avoid earning unwanted grades. Because GPAs of .00 were recorded for these students and because such GPAs were not reflective of innate capabilities, these GPAs were excluded from this variable; thus, only those GPAs of .00 “earned” by students who had completed at least one semester of coursework were included. Consequently, there were 1,109 missing cases for this variable. The valid cases for persisters numbered 8,211, and the valid cases for non-persisters numbered 8,177. The cumulative GPAs for both persisters and non-persisters ranged from .00 through 4.00. The measures of central tendency and the standard deviations of the cumulative GPAs for the valid cases are presented in Table 16.

A t test was conducted on the mean college GPAs for persisters and non-persisters in order to determine if there was a significant difference between the GPAs of the two groups. The t test for equality of means ($t = 18.276$) resulted in a two-tail probability of
TABLE 16

ANALYSIS OF COLLEGE GPA STATISTICS FOR

PERSISTERS AND NON-PERSISTERS

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Mode</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persisters</td>
<td>8,211</td>
<td>2.51</td>
<td>2.66</td>
<td>.00</td>
<td>0.9707</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>8,177</td>
<td>2.21</td>
<td>2.40</td>
<td>.00</td>
<td>1.183</td>
</tr>
</tbody>
</table>

<0.0005 that the observed means occurred by chance if the null hypothesis were true.

Therefore, the null hypothesis was rejected, and it was concluded that persisters at WSCC maintained higher cumulative GPAs than did non-persisters.

Participation in Remedial and Developmental (R&D) Courses

As a result of having English, mathematics, or composite ACT scores below 19, students at WSCC are required to take the Academic Assessment and Placement Profile (AAPP). Based upon their performance on this assessment profile, students may be placed into R&D courses. During the period encompassed in this study, 7,760 students, or 44.4% of the population, were not required to enroll in such courses, whereas the remaining students, who numbered 9,737, were required to enroll in R&D classes. The numbers of classes in which these students enrolled ranged from one through 20. The range for persisters was from one through 20, and the range for non-persisters was from one through 14. As the incidences of participation were obviously aggregated around certain numbers, the population was grouped as follows: Group 1 was comprised of
students who did not enroll in any R&D courses, Group 2 was comprised of students who enrolled in only one or two courses, Group 3 was defined by students who enrolled in three through eight courses, and Group 4 was comprised of students who enrolled in more than eight courses. The frequencies and accompanying percentages of persisters and non-persisters in each group are provided in Table 17.

**TABLE 17**

**ANALYSIS OF REMEDIAL AND DEVELOPMENTAL COURSES**

**ATTENDED BY PERSISTERS AND NON-PERSISTERS**

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persisters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1*</td>
<td>3,562</td>
<td>41.0</td>
<td>2,362</td>
<td>27.2</td>
<td>2,601</td>
<td>30.0</td>
<td>155</td>
<td>1.8</td>
<td>8,680</td>
</tr>
<tr>
<td>2**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>4,198</td>
<td>47.6</td>
<td>1,940</td>
<td>22.0</td>
<td>2,523</td>
<td>28.6</td>
<td>156</td>
<td>1.8</td>
<td>8,817</td>
</tr>
<tr>
<td>Total</td>
<td>7,760</td>
<td>44.4</td>
<td>4,302</td>
<td>24.6</td>
<td>5,124</td>
<td>29.3</td>
<td>311</td>
<td>1.8</td>
<td>17,497</td>
</tr>
</tbody>
</table>

* Students who did not enroll in R&D courses  
** Students who enrolled in only one or two R&D courses  
*** Students who enrolled in three through eight R&D courses  
**** Students who enrolled in more than eight R&D courses

As depicted in Table 17, 44.4% of the total population was not required to take any R&D courses. However, the percentages among persisters and non-persisters were not evenly distributed within this group, nor were they evenly distributed in Group 2, which was comprised of students who were required to take only one or two R&D
courses. Non-persisters outnumbered persisters by 636, or 8.2%, in Group 1; and, as would be expected based on the percentages reflected for Group 1, persisters outnumbered non-persisters by 422, or 9.8%, in Group 2. Conversely, the percentages of persisters and non-persisters in Group 3, who were defined by those students who were required to take three through eight R & D courses, were evenly distributed, as were the persisters and non-persisters in Group 4, who were required to take more than eight R&D courses. Even though an obvious disparity between persisters and non-persisters existed in two of the four groups, a chi-square statistic was applied in order to more precisely define the relationship between persistence and the rates of persisters' and non-persisters' participation in R&D courses. The computed $X^2$ was 93.645, and the associated probability was <0.0005. Thus, there was a significant association between persistence and the numbers of R&D courses required; the null hypothesis was rejected. The adjusted residuals for this association are presented in Table 18.

Surprisingly, the adjusted residuals computed for this association revealed that students who were required to take one or two R&D courses persisted at a higher rate than did students who were not required to take any R&D courses. However, there was not a significant association between persisters and non-persisters who were required to take three or more R&D courses.

**Number of “F” Grades Received**

Of the total population, 10,620, or 60.7% of the students did not receive any “F” grades during the period encompassed in this study, and 5,746 (66.2%) of the persisters and 4,874 (55.3%) of the non-persisters fell within this category. The remaining students...
TABLE 18

ADJUSTED RESIDUALS FOR PERSISTERS' AND NON-PERSISTERS' RATES OF PARTICIPATION IN R&D COURSES

<table>
<thead>
<tr>
<th>Group</th>
<th>Adjusted Residuals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1*</td>
</tr>
<tr>
<td>Persisters</td>
<td>-8.8</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>8.8</td>
</tr>
</tbody>
</table>

* Students who did not enroll in R&D courses
** Students who enrolled in only one or two R&D courses
*** Students who enrolled in three through eight R&D courses
**** Students who enrolled in more than eight R&D courses

received “F” grades that ranged in number from one through 21. The range of “F” grades received by persisters was from one through 21, and the range for non-persisters was from one through 18. Once again, as there were aggregates of numbers, the population was grouped as follows: Group 1 was defined by students who had not received any “F” grades, Group 2 was comprised of students who received only one “F,” Group 3 included students who received two through eight “F” grades, Group 4 included students who received nine through 13 “F” grades, and Group 5 was comprised of students who received 14 or more “F” grades. The frequencies and accompanying percentages of persisters and non-persisters in each group are provided in Table 19.

As revealed in Table 19, the percentages of persisters and non-persisters were evenly distributed in three groups—those who received only one “F,” those who received
TABLE 19

ANALYSIS OF THE NUMBERS OF “F” GRADES RECEIVED BY PERSISTERS AND NON-PERSISTERS

<table>
<thead>
<tr>
<th>Group</th>
<th>1*</th>
<th>2**</th>
<th>3***</th>
<th>4****</th>
<th>5*****</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Persisters</td>
<td>5,746</td>
<td>66.2</td>
<td>1,078</td>
<td>12.4</td>
<td>1,734</td>
<td>20.0</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>4,874</td>
<td>55.3</td>
<td>1,112</td>
<td>12.6</td>
<td>2,608</td>
<td>29.6</td>
</tr>
<tr>
<td>Total</td>
<td>10,620</td>
<td>60.7</td>
<td>2,190</td>
<td>12.5</td>
<td>4,342</td>
<td>24.8</td>
</tr>
</tbody>
</table>

* Students who had not received any “F” grades
** Students who received only one “F”
*** Students who received two through eight “F” grades
**** Students who received nine through 13 “F” grades
***** Students who received 14 or more “F” grades
nine through 13 “F” grades, and those who received 14 or more “F” grades. In the two remaining categories, the disparity in numbers was notable. Specifically, persisters who had not received any “F” grades outnumbered non-persisters by 8.2% (N = 872); non-persisters who received two through eight “F” grades outnumbered persisters by 20.1% (N = 874). This observation becomes even more important in view of the fact that persisters, in most cases, have taken more classes than non-persisters and, consequently, have had greater opportunity to earn failing grades. Even though an obvious disparity between persisters and non-persisters existed in two of the five categories, a chi-square statistic was applied to test the independence of persistence and the number of “F” grades received. The computed $X^2$ was 279.651, and the associated probability was <$0.0005. Thus, there was a significant association between persistence and the number of “F” grades received; consequently, the null hypothesis was rejected. The adjusted residuals for this association are presented in Table 20.

The adjusted residuals for this association revealed that students who had not received any “F” grades persisted at a higher rate than did those students who had received two through eight “F” grades or those who received nine through 13 “F” grades. However, there was not a significant association between persisters and non-persisters who had received only one “F” or those who had received 14 or more “F” grades.

Class Attendance

Each semester at WSCC, faculty members are requested to report the number of absences for each student included on the report of final grades. Although the reporting of
TABLE 20

ADJUSTED RESIDUALS FOR THE NUMBERS OF "F" GRADES RECEIVED BY PERSISTERS AND NON-PERSISTERS

<table>
<thead>
<tr>
<th>Group</th>
<th>1*</th>
<th>2**</th>
<th>3***</th>
<th>4****</th>
<th>5*****</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persisters</td>
<td>14.8</td>
<td>-.4</td>
<td>-14.7</td>
<td>-5.6</td>
<td>-.2</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>-14.8</td>
<td>.4</td>
<td>14.7</td>
<td>5.6</td>
<td>.2</td>
</tr>
</tbody>
</table>

* Students who had not received any "F" grades
** Students who received only one "F"
*** Students who received two through eight "F" grades
**** Students who received nine through 13 "F" grades
***** Students who received 14 or more "F" grades

absences is strongly encouraged by both academic and non-academic administrators, past performance in this regard has not been consistent across the faculty. Therefore, even though there are no missing cases reflected for this variable, the findings must be interpreted with caution, as the accuracy of reported absences cannot be assumed. The reported absences ranged from zero through 159, and there were no points at which the number of absences obviously increased or decreased. Therefore, this variable was collapsed into two groups of students—those with zero absences and those with greater than zero absences. The numbers and percentages of persisters and non-persisters in each group are depicted in Table 21.

Interestingly, 96.6% of the non-persisters had zero absences reported, whereas only 64.5% of the persisters had zero absences reported. Even though this disparity
TABLE 21

ANALYSIS OF THE NUMBERS OF REPORTED CLASS ABSENCES FOR
PERSISTERS AND NON-PERSISTERS

<table>
<thead>
<tr>
<th>Group</th>
<th>Students with 0 Absences</th>
<th>Students with Greater Than 0 Absences</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Persisters</td>
<td>5,597</td>
<td>64.5</td>
<td>3,083</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>8,521</td>
<td>96.6</td>
<td>296</td>
</tr>
<tr>
<td>Total</td>
<td>14,118</td>
<td>80.7</td>
<td>3,379</td>
</tr>
</tbody>
</table>

appeared substantial, a chi-square statistic was applied to test the independence of persistence and the patterns of class attendance. The computed $X^2$ was 2903.418, and the associated probability was <0.0005. Thus, there was a significant association between persistence and class attendance; and the null hypothesis was rejected. The adjusted residuals for this association are presented in Table 22. The adjusted residuals for this association revealed that students who had greater than zero reported absences persisted at a higher rate than did students who had not missed any classes. However, persisters had a greater opportunity to miss classes as they were enrolled longer than were non-persisters.

Analyses of Enrollment-Related, Post-Matriculation Variables

Comparable to other studies that have focused on post-matriculation variables other than grades, and in an effort to gather as much institution-specific data for
TABLE 22

ADJUSTED RESIDUALS FOR THE REPORTED CLASS ABSENCES OF PERSISTERS AND NON-PERSISTERS

<table>
<thead>
<tr>
<th>Group</th>
<th>Adjusted Residuals</th>
<th>Students with 0 Absences</th>
<th>Students with Greater Than 0 Absences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persisters</td>
<td></td>
<td>-53.9</td>
<td>53.9</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td></td>
<td>53.9</td>
<td>-53.9</td>
</tr>
</tbody>
</table>

informing policies and practices intended to increase the retention of students, four additional independent variables related to enrollment were included. Specifically, the number of credit hours in which the students were enrolled, the programs of study in which they were enrolled, their satisfaction with their chosen program of study, and their financial resources for remaining in school were investigated. Stated in null form, the hypotheses for these enrollment-related, post-matriculation variables were: There are no differences between college persisters and non-persisters in the enrollment-related, post-matriculation variables of enrollment status (full-time/part-time), the program of study undertaken, the number of changes in the major program of study, and the type of financial assistance received. The findings from the analyses of these hypotheses follow.

Enrollment Status

The enrollment status of persisters and non-persisters was divided into three groups, according to the following classifications. Group 1 included “full-time” students
who were consistently enrolled in 12 or more credit hours of study per semester; Group 2 was comprised of “part-time” students who were consistently enrolled in fewer than 12 credit hours of study per semester; and Group 3 students were classified as “other,” in that they were not consistently enrolled on either a full-time or part-time basis. The numbers and accompanying percentages of persisters and non-persisters in each group are reflected in Table 23.

TABLE 23

ANALYSIS OF PERSISTERS’ AND NON-PERSISTERS’ ENROLLMENT CLASSIFICATIONS

<table>
<thead>
<tr>
<th>Group</th>
<th>Full-Time Students</th>
<th>Part-Time Students</th>
<th>Other Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Persisters</td>
<td>3,825</td>
<td>44.1</td>
<td>4,327</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>2,921</td>
<td>33.1</td>
<td>5,606</td>
</tr>
<tr>
<td>Total</td>
<td>6,746</td>
<td>38.6</td>
<td>9,933</td>
</tr>
</tbody>
</table>

As reflected in Table 23, 56.8% of the total population attended WSCC on a part-time basis, whereas only 38.6% attended on a full-time basis. Only 4.7%, were not consistently enrolled on either a full-time or a part-time basis. Non-persisters who were enrolled on a part-time basis outnumbered persisters by 1,279, or 12.9%. A chi-square statistic was applied to test the independence of persistence and enrollment status. The computed $X^2$ was 354.024, and the associated probability was <0.0005. Thus, there was a
significant association between persistence and enrollment status; the null hypothesis was rejected. The adjusted residuals for this association are presented in Table 24.

**TABLE 24**

**ADJUSTED RESIDUALS FOR PERSISTERS’ AND NON-PERSISTERS’ ENROLLMENT STATUS**

<table>
<thead>
<tr>
<th></th>
<th>Adjusted Residuals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full-Time Students</td>
</tr>
<tr>
<td>Persisters</td>
<td>14.9</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>-14.9</td>
</tr>
</tbody>
</table>

The adjusted residuals for this association revealed that students who consistently attended WSCC on a full-time basis persisted at the highest rate, and those students who attended on an intermittent full-time/part-time basis persisted at a higher rate than did those who always attended on a part-time basis.

**Program of Study**

Only students who were seeking degrees or certificates were included in this variable, because “transient” and “special” students were not expected to re-enroll at WSCC following the semesters in which they were initially admitted. The students included were divided into three groups according to the program of study in which they were enrolled. Students who were enrolled in either a two-year Associate of Arts (A.A.) or a two-year Associate of Science (A.S.) degree and who planned to transfer to a four-year...
year institution upon the completion of their degree were included in Group 1; those who were enrolled in a two-year Associate of Applied Science (A.A.S.) degree and who planned to enter the labor force upon completion of their degree were included in Group 2; and students who were enrolled in a Certificate program, which involved less than two years of college work and yielded a license or credential to enter the labor force upon completion, were included in Group 3. The numbers and percentages of persisters and non-persisters involved in each group are presented in Table 25.

TABLE 25

ANALYSIS OF PERSISTERS' AND NON-PERSISTERS' PROGRAMS OF STUDY

<table>
<thead>
<tr>
<th>Group</th>
<th>A.A./A.S. Degree</th>
<th>A.A.S. Degree</th>
<th>Certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Persisters</td>
<td>4,685</td>
<td>54.0</td>
<td>3,805</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>4,293</td>
<td>48.7</td>
<td>4,395</td>
</tr>
<tr>
<td>Total</td>
<td>8,978</td>
<td>51.3</td>
<td>8,200</td>
</tr>
</tbody>
</table>

As Table 25 reflects, the percentages of persisters and non-persisters were comparable across the A.A./A.S. degree, the A.A.S. degree, and the Certificate groups. The vast majority of both persisters and non-persisters, or 98.2%, was enrolled in degree programs. Whereas non-persisters were equally distributed among the A.A./A.S. and A.A.S. degree programs, persisters were much more likely (N = 880) to enroll in degree...
programs (A.A./A.S.) that allowed completers to transfer to four-year institutions than in
degree programs (A.A.S.) that allowed completers to enter the labor force. A chi-square
statistic was applied to test the independence of persistence and the program of study in
which students enrolled. The computed $X^2$ was 70.163, and the associated probability was
<0.0005. Thus, there was a significant association between persistence and the program
of study undertaken; the null hypothesis was rejected. The adjusted residuals for this
association are reported in Table 26.

**TABLE 26**

**ADJUSTED RESIDUALS FOR PERSISTERS’ AND NON-PERSISTERS’
PROGRAMS OF STUDY**

<table>
<thead>
<tr>
<th>Group</th>
<th>A.A./A.S. Degree</th>
<th>A.A.S. Degree</th>
<th>Certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persisters</td>
<td>7.0</td>
<td>-8.0</td>
<td>3.6</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>-7.0</td>
<td>8.0</td>
<td>-3.6</td>
</tr>
</tbody>
</table>

The adjusted residuals for this association revealed that WSCC students who
enrolled in A.A./A.S. degree programs, or those designed to transfer to four-year
institutions upon completion, persisted at the highest rate. Of the remaining students who
enrolled in programs of study designed for entry into the labor force upon completion,
those who enrolled in certificate programs of less than two years’ duration persisted at a
higher rate than did students who enrolled in two-year A.A.S. degree programs.
Number of Changes in Major Program of Study

Of the total population, only 16.7% completed, or maintained throughout their tenure at WSCC, the programs of study in which they initially enrolled. The remaining students made changes in their major programs of study as follows: Persisters made changes in their major programs of study from one through 14 times, and the number of changes made by non-persisters ranged from one through 11. The measures of central tendency and the standard deviations of the numbers of changes made by both groups are presented in Table 27.

TABLE 27

ANALYSIS OF THE NUMBERS OF CHANGES MADE IN THE MAJOR PROGRAM OF STUDY BY PERSISTERS AND NON-PERSISTERS

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Mode</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persisters</td>
<td>8,680</td>
<td>2.65</td>
<td>2</td>
<td>2</td>
<td>1.17</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>8,817</td>
<td>2.14</td>
<td>2</td>
<td>2</td>
<td>.99</td>
</tr>
</tbody>
</table>

A t test was conducted on the means for persisters and non-persisters in order to determine if there was a significant difference between the groups in the numbers of times the programs of study were changed. This t test for equality of means ($t = 31.190$) resulted in a two-tail probability of $<0.0005$ that the observed means occurred by chance if the null hypothesis were true. Therefore, the null hypothesis was rejected, and it was concluded that non-persisters at WSCC were much more likely to maintain the same
program of study or to change it only one time than were persisters. However, the fact that persisters remain in college longer than non-persisters could account for the increased number of changes which they make.

Type(s) of Financial Assistance Received

For purposes of assessing the impact of the receipt of financial aid on persistence, persisters and non-persisters were divided into groups according to the following classifications. Group 1 included those students who had not received any type of financial assistance. Group 2 involved students who had received scholarships only. Group 3 was comprised of students who had received grants only. Group 4 included students who had received loans only. Group 5 was defined by students who had received a combination of scholarships and grants. Group 6 involved students who had received a combination of scholarships and loans. Group 7 was comprised of students who had received a combination of grants and loans. Group 8 included students who had received a combination of scholarships, grants, and loans. The numbers and accompanying percentages of persisters and non-persisters in each group are presented in Table 28.

As Table 28 depicts, the largest group of students (36.6%) included those who had not received any type of financial assistance. In fact, the number of students in this group (6,401) was double that of any other single group. The second largest group (19.3%) was defined by students who had received grants only; however, this group was closely followed in size by those students who had received scholarships only (15.1%) and those who had received both scholarships and grants (12.5%). The remaining groups were
TABLE 28

ANALYSIS OF THE TYPES OF FINANCIAL ASSISTANCE RECEIVED BY PERSISTERS AND NON-PERSISTERS

<table>
<thead>
<tr>
<th>Group</th>
<th>1*</th>
<th></th>
<th>2**</th>
<th></th>
<th>3***</th>
<th></th>
<th>4****</th>
<th></th>
<th>5*****</th>
<th></th>
<th>6******</th>
<th></th>
<th>7*******</th>
<th></th>
<th>8*******</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Persisters</td>
<td>2,686</td>
<td>30.9</td>
<td>1,557</td>
<td>17.9</td>
<td>1,459</td>
<td>16.8</td>
<td>154</td>
<td>1.8</td>
<td>1,294</td>
<td>14.9</td>
<td>323</td>
<td>3.7</td>
<td>417</td>
<td>4.8</td>
<td>790</td>
<td>9.1</td>
<td>8,680</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>3,715</td>
<td>42.1</td>
<td>1,082</td>
<td>12.3</td>
<td>1,913</td>
<td>21.7</td>
<td>150</td>
<td>1.7</td>
<td>888</td>
<td>10.1</td>
<td>145</td>
<td>1.6</td>
<td>479</td>
<td>5.4</td>
<td>445</td>
<td>5.0</td>
<td>8,817</td>
</tr>
<tr>
<td>Total</td>
<td>6,401</td>
<td>36.6</td>
<td>2,639</td>
<td>15.1</td>
<td>3,372</td>
<td>19.3</td>
<td>304</td>
<td>1.7</td>
<td>2,182</td>
<td>12.5</td>
<td>468</td>
<td>2.7</td>
<td>896</td>
<td>5.1</td>
<td>1,235</td>
<td>7.1</td>
<td>17,497</td>
</tr>
</tbody>
</table>

* Students who had not received any type of financial assistance  
** Students who had received scholarships only  
*** Students who had received grants only  
**** Students who had received loans only  
***** Students who had received both scholarships and grants  
****** Students who had received both scholarship and loans  
******* Students who had received both grants and loans  
******** Students who had received a combination of scholarships, grants, and loans
considerably smaller. With regard to the distributions of persisters and non-persisters, the largest disparity was found among those students who had received both scholarships and loans, wherein persisters outnumbered non-persisters by 38.0%. Persisters also substantially outnumbered non-persisters within the groups and by the percentages that follow: students who had received a combination of scholarships, grants, and loans (28.0%); students who had received both scholarship and loans (18.6%); and students who had received scholarships only (18.0%). Conversely, non-persisters substantially outnumbered persisters within two groups—those students who had not received any type of financial assistance (by 16.1%) and those students who had received grants only (by 13.5%). Persisters and non-persisters were fairly evenly distributed among the two remaining groups—those students who had received loans only and those who had received both grants and loans.

A chi-square statistic was applied to test the independence of persistence and the type of financial assistance received. The computed $X^2$ was 554.965, and the associated probability was $<0.0005$. Thus, there was a significant association between persistence and the type of financial assistance received; therefore, the null hypothesis was rejected. The adjusted residuals for this association are reported in Table 29.

The adjusted residuals for this association revealed that WSCC students who received financial assistance persisted at a higher rate than did students who did not receive such assistance. Specifically, those students who received scholarships only, grants only, or combinations of scholarships with grants or loans persisted at higher rates than did other students. On the other hand, there was not a significant association between
**TABLE 29**

**ADJUSTED RESIDUALS FOR THE TYPES OF FINANCIAL ASSISTANCE RECEIVED**

**BY PERSISTERS AND NON-PERSISTERS**

<table>
<thead>
<tr>
<th>Group</th>
<th>1*</th>
<th>2**</th>
<th>3***</th>
<th>4****</th>
<th>5*****</th>
<th>6******</th>
<th>7*******</th>
<th>8*******</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persisters</td>
<td>-15.4</td>
<td>10.5</td>
<td>-8.2</td>
<td>.4</td>
<td>9.7</td>
<td>8.5</td>
<td>-1.9</td>
<td>10.5</td>
</tr>
<tr>
<td>Non-Persisters</td>
<td>15.4</td>
<td>-10.5</td>
<td>8.2</td>
<td>-.4</td>
<td>-9.7</td>
<td>-8.5</td>
<td>1.9</td>
<td>-10.5</td>
</tr>
</tbody>
</table>

* Students who had not received any type of financial assistance
** Students who had received scholarships only
*** Students who had received grants only
**** Students who had received loans only
***** Students who had received both scholarships and grants
****** Students who had received both scholarship and loans
******* Students who had received both grants and loans
******** Students who had received a combination of scholarships, grants, and loans
persisters and non-persisters who had received loans only or a combination of grants and loans.

The findings from all four sets of variables detailed in this chapter are summarized in Chapter 5. The conclusions derived from these findings, as well as implications for practice and future research, are also included in Chapter 5.
CHAPTER 5

SUMMARY, CONCLUSIONS, IMPLICATIONS FOR PRACTICE, AND RECOMMENDATIONS FOR FUTURE RESEARCH

Summary

Researchers and practitioners commonly cite student attrition in higher education as a prominent problem. Like many institutions throughout the nation, Walters State Community College (WSCC) in 1994 identified student retention as an area of concern and, consequently, introduced measures to alleviate this unwanted phenomenon. However, as this study demonstrates, rates of attrition have not decreased substantially. In fact, during the period covered in this study from the fall semester of 1992 through the fall semester of 1997, slightly more than half, or 50.1%, of the student population did not persist to graduation. The attrition rate for the year immediately preceding the study was 41.5%, and this rate rose to 43.3% during the first year of the study. This trend became inflated during the early years of the study, in that the investigation of one variable included in the study, which involved pre-1995 data, suggested that the retention rates increased during the latter part of the study. Nevertheless, the justification for this study is aptly reflected in the overall percentage of non-persisters.

Making use of institution-specific data, the study focused on the correlates of student retention at WSCC, with a primary goal of garnering information to be used in informing policies and practices intended to stem, and ultimately decrease, student attrition. The study included four sets of correlates, or variables—demographic variables, pre-matriculation variables, post-matriculation variables related to grades, and post-
matriculation variables related to enrollment. In an effort to extend comprehensiveness, the research design included a population rather than a sample. This population involved 17,497 students, identified by student identification numbers only, who attended Walters State from the fall semester of 1992 through the fall semester of 1997. The only students excluded were “transient” or “special” students who were not expected to return following their initial semesters of enrollment.

The study addressed the following demographic variables—age, ethnicity, gender, marital status, and military status. Although the professional literature was largely inconclusive relative to direct relationships between persistence and each of the demographic variables except military status, which was not previously studied, available research reports consistently advocated that further research was warranted.

The findings of this study revealed that age was a predictor of persistence. Aligned with the work of Brooks-Leonard (1991), Price, (1993), and Windham (1994), younger students at WSCC persisted at a higher rate than did older students. Consistent with the studies of Feldman (1993), Grosset (1989), Guthrie (1992), and Steele (Hummel & Steele, 1996), this study found that white students at WSCC persisted at a higher rate than did non-white students. Similar to Feldman’s (1993), Sarkar’s (1995), and Voorhees’ (1987) research, the findings of this study showed that females at WSCC persisted at a higher rate than did males. On the other hand, significant associations between either marital status or military status and persistence were not revealed.

The study included the following pre-matriculation variables—high school GPAs, the types of high schools from which the students graduated, admission test scores, the
proximity of the students’ residences to the college campus, and the dates of the students’ initial applications for admission to college. Researchers frequently include high school GPAs and admission test scores as variables in their retention studies; however, literature related to the types of high schools attended, the proximity of students’ residences to campus, and the dates of students’ initial applications for college is sparse.

There is general agreement among researchers, including Feldman (1993), Sarkar (1995), and Sydow and Sandel (1996), that high school GPAs are excellent predictors of persistence, in that students with higher high school GPAs persist at a higher rate than do students with lower high school GPAs; this study corroborated a similar relationship. The professional literature is not as conclusive relative to admission test scores, but, this study found that students who entered WSCC with higher composite ACT scores persisted at a higher rate than did students who entered with lower composite ACT scores. With regard to the remaining pre-matriculation variables, this study revealed the following relationships. Students who entered WSCC from public high schools persisted at a higher rate than did foreign students, home-schooled students, and students who entered with GED credentials; but there was not a significant association between private school attendance and persistence. Although there was not a significant association between persisters and non-persisters whose pre-college enrollment residences were in counties in which Walters State’s main and branch campuses were located, students who had lived within the college’s service area, excluding the aforementioned counties, persisted at a higher rate than did students who had lived in the remaining counties of Tennessee, as well as those who had lived in other states and foreign countries. Finally, students who
made application for admission to WSCC less than two months prior to the first day of classes persisted at a higher rate than did students who made application more than two months prior to the first day of classes.

The study addressed the following post-matriculation variables related to grades—cumulative GPAs, the students' rates of participation in remedial and developmental courses, the total number of “F” grades received, and class attendance patterns. Numerous studies focused on the relationship between college GPA and persistence, and participation in remedial and developmental courses and persistence have been conducted. However, only two studies that addressed class attendance patterns were found; studies that focused on the number of “F” grades received were not found.

Most researchers, including Bean (1980), Brawer (1996), Brooks-Leonard (1991), Mohammadi (1994), Pascarella et al. (1986), Sanders and Burton (1996), St. John, (1990), Volkwein and Lorang (1996), and Windham (1994), have found college GPAs to be directly and positively related to student retention; this study revealed a comparable relationship. The literature is inconclusive regarding the relationship between academic deficiencies and persistence. In a similar vein, this study indicated that students who were required to take one or two R&D courses persisted at a higher rate than did students who were not required to take any R&D courses. However, there was not a significant association between a requirement of three or more R&D courses and persistence.

Relative to the remaining post-matriculation variables related to grades, the study yielded the following findings. Students who had not received any “F” grades persisted at a higher rate than did those who received two through 13 “F” grades, but there was not a
significant association between the receipt of only one "F" or the receipt of 14 or more
"F" grades and persistence. Also, students who had greater than zero reported absences persisted at a higher rate than did students who had not missed any classes.

The study addressed the following post-matriculation variables related to enrollment—enrollment status, or the number of credit hours undertaken in a given semester; the programs of study undertaken; the number of changes made in the program of study, or major; and the types of financial assistance received. The professional literature is rife with references to retention studies that include the variables of enrollment status, the programs of study undertaken, and the types of financial assistance received. However, only one study that focused on the number of changes made in the major program of study was found.

The professional literature overwhelmingly substantiates the fact that students who enroll in college on a part-time basis are more likely to drop out. This study, which aligned with those of Brooks-Leonard (1991), Mohammadi (1994), St. John (1990), and Sydow and Sandel (1996), revealed that students who consistently attended WSCC on a full-time basis persisted at the highest rate, and those students who attended on an intermittent full-time/part-time basis persisted at a higher rate than did students who attended solely on a part-time basis. Relative to the program of study undertaken, most researchers agree that students with higher degree aspirations are more likely to persist than those with lower or no degree aspirations. Consistent with the studies of Brooks-Leonard (1991), Feldman (1993), Grosset (1989), Price (1993), Sydow and Sandel (1996), and Voorhees (1987), this study corroborates a similar relationship, in that
students at WSCC who enrolled in programs designed for transfer to four-year institutions upon completion persisted at the highest rate. However, of the remaining students who enrolled in programs designed for entry into the labor force upon completion, those who enrolled in programs of less than two years' duration (certificate programs) persisted at a higher rate than did students who enrolled in two-year (degree) programs.

In contrast, there is no consensus among researchers relative to the relationship between student financial aid awards and college persistence. Comparable to the findings of Astin (as cited in Jensen, 1983), Price (1993), and Zeilke (as cited in Jensen, 1983), this study found that WSCC students who received financial assistance persisted at a higher rate than did students who did not receive such assistance. Nevertheless, in direct opposition to the findings of Somers (1996), which showed a negative association between persistence and the receipt of scholarship funds, this study demonstrated that WSCC students who received scholarships only, grants only, or a combination of scholarships and grants, loans, or both, persisted at higher rates than did students who did not receive such awards. The study also revealed that students who received grants only persisted at a higher rate than did other students. Contrary to the findings of St. John (as cited in Somers, 1996), which revealed a negative association between persistence and the receipt of loans as the sole source of financial aid, this study did not find a significant association between the receipt of loans and persistence. Finally, this study showed that non-persisters at Walters State were much more likely to maintain the same program of study or to change it only one time than were persisters.
Overall, most of the findings generated in this study closely paralleled findings from other research studies, which increases the credibility of the findings. However, a few findings, surprisingly, differed from the majority of findings reviewed in the professional literature. Specifically, students who submitted applications closer to the first day of class persisted at a higher rate than did students who submitted applications early. Additionally, students who were required to take one or two R&D courses persisted at a higher rate than did students who were not required to take any R&D courses. And, students who had one or more class absences persisted at a higher rate than did students who had not had any absences.

Conclusions

The findings of the study revealed significant associations between persistence and the demographic variables of age, ethnicity, and gender. Younger, white, and female students, respectively, persisted at higher rates did older, non-white, and male students. On the other hand, marital status and veteran status were not strongly with persistence.

With regard to the pre-matriculation variables, the findings revealed that students who entered WSCC with higher GPAs and higher composite ACT scores respectively persisted at higher rate than did students with lower GPAs and lower composite ACT scores. Additionally, students who entered WSCC from public high schools persisted at a higher rate than did foreign students, home-schooled students, and GED-credentialed students; students whose pre-colleges residences were located within the college’s service area, excluding those counties in which the main and branch campuses were located, persisted at a higher rate than did students who lived in the remaining counties of
Tennessee, as well as those who lived in other states and foreign countries; and, students who made application for admission to WSCC less than two months prior to the first day of classes persisted at a higher rate than did students who made application more than two months prior to the first day of classes.

Relative to the grade-related, post-matriculation variables, the findings revealed that students with higher cumulative GPAs and more than zero reported absences, respectively, persisted at higher rates than did students with lower cumulative GPAs and zero reported absences. Furthermore, students who were required to take one or two R&D courses persisted at a higher rate than did students who were not required to take any R&D courses; and, students who had not received any “F” grades persisted at a higher rate than did those who had received two through 13 “F” grades.

With regard to the enrollment-related, post-matriculation variables, the findings revealed that students who consistently attended WSCC on a full-time basis and those who attended on an intermittent full-time/part-time basis persisted at higher rates than did those who attended solely on a part-time basis. Additionally, students who enrolled in degree programs designed for transfer to four-year institutions upon completion persisted at a higher rate than did students enrolled in programs of study designed for entry into the labor force upon completion; and non-persisters were significantly more likely to maintain the same program of study or to change it only one time than were persisters. Finally, students who received financial assistance persisted at a higher rate than did students who did not receive such assistance.
Although most of the variables included in the study were found to be significantly associated with persistence, some associations were stronger than others. Based on the degree to which the means of the individual variables departed from the measure of independence (as evidenced by adjusted residuals), post-matriculation variables were found to have a stronger association with persistence than did either the demographic variables or the pre-matriculation variables. And, among the two sets of post-matriculation variables, the grade-related variable of class attendance patterns had the strongest association (adjusted residual = 53.9), inasmuch as students with one or more absences persisted at a much higher rate than did students without any absences. The variable with the next highest adjusted residual was the enrollment-related variable defined by full-time/part-time enrollment (adjusted residual = 18.3). Specifically, students who attended WSCC on a part-time only basis were much more likely to drop out. The other variables with noteworthy associations (adjusted residuals> ±10) included the following in descending order: the receipt of financial aid (15.4), the number of “F” grades received (14.8), and the dates of initial applications for admission to college (13.0). Walters State students who received financial assistance, who did not receive any “F” grades, and who made application for college less than two months prior to the first day of classes persisted at higher rates than did other students in these categories.

Such findings lend credibility to the rationale for conducting this study; but, even more importantly, the findings form a basis for the development of procedures and programs that should greatly benefit those students who are more “at risk” of leaving college. Furthermore, with the successful application of new programs designed for
decreasing the attrition rate, business and industry administrators from surrounding communities should benefit from an increased number of employable graduates who are better educated and more highly skilled. This factor should reduce the amount of money required for company training programs. Finally, the current budget restraints faced by WSCC should be eased somewhat in that increased retention rates yield higher headcounts and full-time equivalent (FTE) hours which, in turn, prescribe the funding level that the college receives.

**Implications for Practice**

Armed with the realization that retaining current students is more cost-effective than recruiting new ones, and given the fact that significant associations between several variables and persistence have been identified in this study, Walters State, as an institution of higher learning, should address the needs of its majority population (non-persisters) by reviewing the individual findings generated through this study and formulating programs or services that accommodate the needs of various “at-risk” student constituencies. Administrators, faculty members, professional staff members, and support staff members should be apprised of information pertinent to the identified predictors of attrition. They should be encouraged to look beyond more traditional conceptions that view grades and personal finances as the best predictors of persistence and, thus, should come to a realization that there are other predictors, such as enrollment status and the type of program undertaken, that are of equal, or even greater, importance. Along this line, part-time students must be given special consideration. Although these students do not generate as many full-time-equivalent credits, on an individual basis, as do full-time
students, they make up a substantial portion of the student body; also they are significantly more likely to drop out than are full-time students.

The provision of such pertinent information to college personnel should increase their sensitivity to the “special” needs of these “at-risk” students who must be cultivated. However, information alone will not cure the phenomenon of attrition. In many cases, faculty members and counselors will have to be trained in the provision of interventive measures that target these students.

Furthermore, key college administrators should collectively develop a retention plan that takes into account each category of need. These administrators should enthusiastically communicate this plan; ultimately, they should enlist the services of all college personnel in its implementation.

Finally, the same administrators must not only realize the need for additional research, they must mandate that such research be undertaken. This research must be an ongoing process and must address both the predictors of attrition, as well as the appropriateness and timeliness of current interventive, as well as preventive, practices. In combination, these efforts should produce a more satisfied student body which, in turn, should lead to more graduates who will then become satisfied alumni.

Using the predictors of attrition identified in this study, Walters State personnel should invoke the following strategies as a minimal effort to stem the overwhelming loss of a majority of the student population. These strategies should also be incorporated into a comprehensive student retention plan that is developed from the collective input of faculty members, professional staff members, support staff members, currently-enrolled
students, and students who have not persisted. The plan should also be re-examined annually for purposes of evaluation and modification. The strategies recommended for practice include, but are not limited to, the following:

1. Separate support groups that are led by both college students and college personnel should be established for male students, minority students, students whose ages are 25 and older, part-time students, foreign students and home-schooled students, students who enter with GED credentials, and students who reside outside the service area. These groups should focus on the communication of common problems and the sharing of techniques or activities that help to alleviate such problems. Support group leaders should strongly encourage participation in other groups, including clubs, service organizations, etc. Support group members should also be encouraged to campaign for leadership offices in clubs/organizations and to seek positions affiliated with special events/recognition, such as homecoming celebrations, Who’s Who, student memberships on various committees, etc. These “at-risk” groups should never be allowed to develop a “second class citizen” mentality. Therefore, a “special recognition” day, during which members from each of the aforementioned groups are “celebrated” for their accomplishments, should be initiated; selections for such recognition should be made based on peer recommendations/nominations.
2. A voluntary mentoring program for each of the aforementioned “at-risk” constituencies should be activated. Extensive training should be provided for those individuals who volunteer to serve as mentors, and students should be encouraged to serve as peer mentors. The participation of students should be encouraged through the award of service learning credits to those who mentor peer constituents.

3. The peer tutoring program should be better promoted and its services expanded. Students who present high school GPAs of 2.5 or lower and/or ACT composite scores of 18 (or its equivalent) or lower should be notified of, and encouraged to participate in, the peer tutoring program that is made available at no cost to the student. This action should be undertaken by the Student Services Division. Along this line, the same division should provide all students with mid-term academic status reports that detail any borderline or failing grades, the numbers of class absences, and the availability of tutoring services.

4. If the college’s funding formula allows latitude in the amount of funds that may be expended on the work-study program, it should be substantially expanded, in that program participation not only improves personal finances but provides another avenue for students to become a more integral part of the college environment. Additionally, federal funds could also be supplemented through the solicitation of private corporation contributions.
5. As part-time students are strongly associated with attrition, a special orientation program should be implemented and made mandatory for those part-time students who attend classes on the main or branch campuses in an effort to assist their assimilation into the college environment. In addition to the standard program provided during this session, these students should be apprised of and assigned to the previously referenced support group(s), mentoring program, and tutoring program (if applicable). Because many of these students must juggle education, job, and family responsibilities, including child care, they also should be encouraged to enroll in special workshops focused on time management. For those students whose enrollment status is primarily predicated on their work schedules, consideration should be given to developing and conducting as many classes as possible at the workplace. If a substantial portion of the certificates or degrees is completed at the workplace, the students should be much more likely to complete, on the main or branch campuses, those courses that are not easily adaptable to on-site, workplace instruction.

6. A communication link should be established with non-persisters. Written surveys of non-persisters that focus on potential weaknesses within the college environment do not always portray an accurate picture. Many students who are satisfied with their programs of study and the available student services leave college for reasons that are not identified because they cannot be easily codified within a survey. Thus, these students should
be interviewed, either in person or by telephone, to more accurately assess their special needs.

7. In an effort to extend the programs and services for “at-risk” students, consideration also should be given to becoming affiliated with a national organization whose primary goal is ensuring student success from matriculation to graduation, thereby creating an avenue for networking with other institutions throughout the nation that are also dealing with the phenomenon of attrition.

Recommendations for Future Research

Studies such as this could be further refined by examining the interactions of certain variables and by conducting qualitative studies of information gleaned from students who have not persisted to graduation. Furthermore, as intervention strategies or preventive measures are invoked, rates of persistence should be evaluated minimally following the first semester and following the first year of their implementation.

Because the findings of this study have been generated through institution-specific research, these findings may not be generalized to other institutions. Therefore, it is imperative for other institutions that want to focus fundamental attention on retention to designate personnel who will be responsible for conducting institution-specific research in order to learn as much as possible about their own indigenous population. As much of the basic information for this type study is available in student records, studies similar to this one could be replicated easily at other institutions with a minimal investment of manpower.
In summary, given the facts that attrition is a nationwide phenomenon that obstructs the achievement of an institution's most basic goals and that all institutions of higher education are required to maintain extensive student records, a multi-institution research project should yield invaluable insight into the correlates of student retention. Such a study should be embarked upon by institutions that are not juxtaposed by service area, state, or even regional boundaries. Specifically, various institutions should initiate retention studies defined by a common research design, such as that used in this study, and evenly matched, to the extent possible, student populations or samples. The studies should be conducted simultaneously, and the results should be collectively evaluated. Finally, the commonalities and divergences should be coalesced into a national picture of the correlates of student attrition. A nationwide undertaking of this nature should bring attention to the fact that colleges and universities are not only concerned about the welfare of their student populations but are striving to better understand and ultimately stem this non-endemic phenomenon of high attrition rates solely for the benefit of their students.
REFERENCES


APPENDIX

ON-LINE REFERENCES USED IN THE CLASSIFICATION OF
HIGH SCHOOLS AS PUBLIC OR PRIVATE


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State of New Mexico Department Of Education [On-line]. Available:

http://sde.state.nm.us/


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