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Old Dominion University

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**THE INFLUENCE OF DEMOGRAPHIC CHARACTERISTICS,
COGNITIVE AND NON-COGNITIVE ATTRIBUTES ON THE
EFFECTIVENESS OF THE LADDERS PROBATION
INTERVENTION PROGRAM**

by

Terri M. Mathews
B.S. May 1978, College of William and Mary
M.S. May 1983, Old Dominion University

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Requirement for the Degree of

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Approved by:

Linda Bol (Chair)

Dana Burnett (Member)

David Hager (Member)

ABSTRACT

THE INFLUENCE OF DEMOGRAPHIC CHARACTERISTICS, COGNITIVE AND NON-COGNITIVE ATTRIBUTES ON THE EFFECTIVENESS OF THE LADDERS PROBATION INTERVENTION PROGRAM

Terri M. Mathews
Old Dominion University, 2008
Director: Dr. Linda Bol

Retention is an important measure for institutions of higher education thereby making improved academic success and increased retention of paramount concern to university administrators. This concern has resulted in a body of literature addressing retention and the development of retention programs. Few of these programs however, have been empirically evaluated for their effectiveness and repeatedly, the literature has cited the need for evaluation of retention and probation programs across demographic, cognitive and non-cognitive characteristics. The purpose of this research was to determine whether the LADDERS (Let Academic Difficulty Disappear to Energize and Retain Students) program developed by Old Dominion University is an effective model that can be used to improve academic achievement and retention rates of probationary undergraduate students. ANOVA, Factorial ANOVA and Logistic Regression were used to compare the academic achievement and retention of probationary students who attended the LADDERS program across their demographic characteristics and cognitive and non-cognitive attributes. The results of this study showed that participation in the LADDERS program leads to higher GPA and greater retention of students. Findings further suggest that participation in LADDERS may be especially effective for improving retention rates among minority male students.

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Chapter 1

INTRODUCTION

This study seeks to determine whether the LADDERS (Let Academic Difficulty Disappear to Energize and Retain Students) program developed by Old Dominion University is an effective model that can be used to improve academic achievement and retention rates of probationary undergraduate students. In response to the needs for research cited in recent literature (Braxton, Hirschy, and McClendon, 2004, DuBrock, 2000; Seidman, 2005 and Smith, 1995), this study will also determine LADDERS effectiveness across gender, ethnicity, cognitive and non-cognitive factors.

The Importance of Retention

Retention is a crucial issue among institutions of higher education. Retention rates have become an indicator of institutional success and state governments are using retention rates as a measure of accountability (Berger & Lyon, 2005). Rankings are, in part, determined by retention rates (Berger & Lyon) and retention can affect the revenue flow of an institution (Levitz, Noel, & Richter, 1999). In a broader sense, retention is important to the individual and society. Earning a Bachelor's degree increases personal income (Carnavale, 2006) and society requires an educated workforce to meet future employment needs (Lotkowski, Robbins, & Noeth, 2004).

Although retention of students from the first to second college year has been on the rise, "retention rates remain lower than most campus officials would like on most campuses across the country" (Berger & Lyon, 2005, p. 25). Retention as an issue has continued in national discourse with organizations, journals and voluminous studies dedicated to the topic. Institutions look for ways to improve retention rates in response to

the pressure they experience as a result of accountability measures, institutional rankings, revenue flow and individual student needs.

Retention and accountability

Accountability is a growing concern in higher education. As Congress considers the reauthorization of the Higher Education Act (1998), questions of accountability looms large. Legislators are searching for mechanisms to hold institutions accountable and for a means to assess their effectiveness (Swail, 2004). Along with graduation rates, retention is a common method used to measure institutional effectiveness. A discussion paper that was provided to members of the National Association of State Universities and Land-grant Colleges and Universities calls for an accountability system that includes student retention as a measure (National Association of State Universities and Land Grant Colleges, 2006). As pressure for institutions to report retention and graduation rates increases, colleges and universities look inward to examine how they can increase retention rates. This examination has resulted in a significant growth of retention programs on campuses across the country.

Retention and rankings

Retention and graduation rates have also become important to institutions because of national and international rankings (Berger & Lyon, 2005). Both policy groups and news organizations that rank colleges and universities include retention and graduation rates as an important measure. Addressing retention rates at an institutional level can increase an institution's ranking, which, in turn, increases its reputation and standing. "Campuses around the country have become increasingly concerned about retention rates

as a source of prestige that can be converted into other kinds of symbolic, material, and human resources” (Berger & Lyon, p. 5).

The ranking of colleges and universities has recently come under scrutiny. The International Ranking Expert Group was founded in 2004 to establish international guidelines for the ranking of institutions (Institute for Higher Education Policy, 2006). At their second meeting, convened in May 2006 in Berlin, the group released the Berlin Principles on Ranking Higher Education Institutions. The principles call for a standard method of ranking national and international colleges and universities using a variety of measures including retention and graduation rates (Institute for Higher Education Policy, 2006).

The emphasis on retention and graduation rates in institutional rankings compels colleges and universities to look at outcome measures as well as student profiles. The test scores and high school performance of an entering freshman class have long been used as a yardstick to measure prestige. Using outcome measures to rank institutions escalates the importance of the retention of students over their entering characteristics. This fact has contributed to the increase in retention programs at colleges and universities (Lovett, 2005).

Retention and revenue

A student who is not retained is revenue lost (Schuh, 2005). Levitz, Noel, and Richter (1999) conducted an economic study that examined the cost of losing a student after the first year. The authors developed a cost formula and estimated that the savings to an institution when a first-year student was retained averaged between \$15,000 and

\$25,000. “Few, if any, other institutional investments will yield such a high return” (Levitz et al., p. 48) as retaining students.

Schuh (2005) identified specific costs to institutions when students are not retained. Recruitment costs increase if an institution needs to recruit additional students to replace those who leave the university. Financial aid in the form of scholarships and grants, tuition revenue, housing revenue, meal plans and activity and other fees are all lost income when a student departs.

Attrition results in lost alumni gifts and support. Only students who are satisfied and succeed provide institutional support and spread their positive feelings about their experience to potential freshmen, thereby becoming effective recruiters for the Admissions Office (Schuh, 2005).

Retention and society

Student retention and ultimately, degree attainment, positively affects both an individual’s lifetime earnings and benefits such as health care and pension plans. Economic forecasts and labor statistics both point to the need for an educated society.

Carnavale (2006) used census data to determine the personal economic impact to an individual based on his or her level of educational attainment. He found that earning a Bachelor’s degree resulted in higher incomes. “The gap between the average yearly earnings of [college] graduates and high school graduates has increased from \$18,000 to \$22,000” (Carnavale, p. B6). Additionally, Carnavale found that “95% of people with college degrees have employer-provided health-care coverage, compared with 77% of high-school graduates” (Carnavale, p. B6). This gap also exists with regard to pension

plans. Ninety percent of college graduates receive pension benefits in the workplace as compared to 81% of high-school graduates (Carnavale).

The lack of a college degree can also limit a person's opportunities in the job market. In a recent policy report prepared for ACT, Lotkowski, Robbins, and Noeth (2004) compared unemployment rates between individuals with college degrees and those individuals with high-school diplomas. "Those with a bachelor's degree had an average unemployment rate of 6% while those with a high school diploma or less had an average unemployment rate of 14%" (Lotkowski et al., p. 1). This statistic is not surprising in light of the fact that "six out of every 10 jobs require some postsecondary education and training" (Lotkowski et al., p. vi).

Degree completion not only has an important impact on the individual but on society as well. Lotkowski, Robbins, and Noeth (2004) cited the need for an educated workforce, emphasizing that "by 2012, the number of jobs requiring advanced skills will grow at twice the rate of those requiring basic skills" (Lotkowski et al., p. 1). They concluded that the economic health of the United States depended upon a labor force with postsecondary education and skills. Carnavale (2006) reviewed census data and labor statistics and determined that there would be a 30% increase in the number of jobs that require college degrees. Carnavale noted that the need for employees with postsecondary education might outpace the number of educated Americans available to fill those jobs. The retention of students therefore, is an issue with greater implication than the individual student or institution.

Factors that affect retention

Student retention has been intensely studied since the 1970's. Vincent Tinto (1975) and Alexander Astin (1984) developed similar theoretical models to explain student attrition. In Tinto's (1975) formative work, he developed his interactionist theory to explain why students leave college. His theory places a strong emphasis on the effect of a student's social integration with and commitment to an institution (Tinto, 1975). Much like Tinto, Astin (1984) also emphasized student interactions with the institution in his theory of involvement. He postulated that the more involved students are with their institutions the more likely it is they will be retained (Astin, 1984). Both Tinto and Astin developed theories that identified student relationships within an institution as the most important factor affecting retention.

Yorke and Longden (2004) argue that there is most likely no one theory or reason that explains why students leave college. Rather, they describe "layered set[s] of influences on student departure" (Yorke & Longden, p. 84). Braxton and Mundy (2001) call the problem of student retention an "ill-structured problem." The social interactions with the institution referred to by Tinto (1975) and Astin (1984) are important but recent literature on departure has identified other influences that affect retention including academic performance, demographic characteristics of the students and cognitive and non-cognitive attributes that students bring with them to college.

Retention and academic performance

Tinto (1993) recognized that students experience academic difficulties, but did not consider academic difficulty as a major factor influencing retention. He estimated that only 25% of the students who leave an institution leave due to academic difficulty.

However, other studies (Belcheir, 1997; Bradburn, 2002; Coleman and Freedman, 1996; Miller and Sonner, 1996; Newton, 1990; and Nora, Barlow, and Crisp, 2005) that examined the factors affecting retention, found that academic performance does impact student departure from an institution.

Nora, Barlow, and Crisp (2005) reported that after the first semester in college, students who persisted earned a grade point average (GPA) of 2.52 whereas students who were not retained averaged only 1.66. They state “how students perform academically during their initial semester in college may influence subsequent withdrawal decisions” (p. 140). Additionally, they found that student performance in the first semester could predict the institutional six-year graduation rate (Nora et al.). Miller and Sonner (1996) echoed that assertion and reported that less than a quarter of the students placed on academic probation were retained to graduation.

Bradburn (2002) examined data obtained from the 1996-1998 Beginning Postsecondary Students Longitudinal Study. She concluded that regardless of type of institution and when all other reasons for attrition were taken into account, lower academic performance was associated with student departure from an institution. In a study at Boise State, Belcheir (1997) found that first semester GPA was the most important factor to predict retention of first-year students.

Being placed on academic probation also impacts retention, “A significant number of students who leave college, both voluntarily and involuntarily, are placed on academic probation” (Coleman & Freedman, 1996, p. 631). Newton (1990), also studied probation students and found that “more than 50% of students whose GPAs went below a 2.0 voluntarily drop out” (Newton, 1990, p. 183).

Retention and demographic characteristics

Gender and ethnicity affect retention and ultimately graduation rates. Tab (2005) examined data published by the National Center for Educational Statistics from 2002-2003 and found that women and non-minorities graduate at a higher rate than men or minority students. This is not a new phenomenon. Bean (1980) called for research into student attrition based on gender and ethnicity after compiling data on student retention from over one thousand students. Coleman and Freedman (1996) also recommended that future research examine “the effectiveness of such [retention] programs with racially and ethnically diverse populations” (p. 635). Recently, Braxton et al (2004) cited the need for more research into retention strategies that can help minority students. They note, “the difference in departure rates suggests the need for additional remedies” (Braxton et al, p. 77).

The differences in retention rates based on gender have been highlighted in several studies. DuBrock (2000) reported significant differences in retention between males and females and observed that females “registered a higher overall persistence rate than males” (DuBrock, p. 8). Dixon (2002) found that males were placed on academic probation at a higher rate than females. In her study of first-semester freshmen at several institutions of higher education, Smith (1995) found “retention and graduation rates were consistently higher for females in each of the 1985-91 cohort groups and subgroups” (Smith, 1995, p. 6).

Several research studies have also determined that retention rates differ among different ethnic groups (Braxton, Hirschy, and McClendon, 2004; Dixon, 2002; DuBrock, 2000 and Smith, 1995). In separate studies of student persistence, both DuBrock (2000)

and Smith (1995) found significant differences in the retention rates among groups based upon ethnicity. Dixon (2002) found that minority students were more likely to be placed on academic probation.

Lotkowski, Robbins, and Noeth (2004) argued the importance of examining retention among minority students. They noted that as the minority population in the United States increases it becomes essential that “more students, especially those from minority backgrounds, will need to be college educated if we are to maintain and advance our labor force” (p. 1).

Retention and cognitive and non-cognitive attributes

Other studies (Arbona and Novy, 1990; Astin & Oseguera, 2005; DuBrock, 2000; Lotkowski, Robbins, and Noeth, 2004; Mayo and Christenfeld, 1999; Smith, Edminster, and Sullivan, 2001; and Tracey & Sedlacek, 1984) on student retention have resulted in the identification of cognitive and non-cognitive factors that predict student attrition. The cognitive factor most predictive of retention is high school GPA. “The pre-college characteristic that carries the most weight in estimating the student’s chances of completing college is the high school GPA” (Astin & Oseguera, 2005, p. 256).

Several studies (Astin & Oseguera, 2005; DuBrock, 2000; Lotkowski, Robbins, and Noeth, 2004 and Smith, Edminster, and Sullivan, 2001) have confirmed that high school GPA is closely correlated with student retention in higher education. DuBrock (2000) looked at the retention of over six thousand students. He found that high school GPA was significant in predicting retention and that students who were retained had a higher high school GPA. Smith, Edminster, and Sullivan (2001) examined the persistence to graduation of over twelve thousand first-year students. They found that

“high school grade point average was generally the strongest predictor of baccalaureate degree completion for students” (p. 11). In a meta-analysis of over 400 studies, Lotkowski, Robbins, and Noeth (2004) also concluded that high school GPA was strongly related to student retention.

Non-cognitive factors that affect retention include a variety of attitudes and traits that students bring with them to college. Robbins et al. (2004) have provided the most comprehensive definition and classification of non-cognitive factors in their meta-analysis of 109 studies on college students’ academic performance and retention. The non-cognitive factors that they consider important to achievement and persistence include achievement motivation, academic goals, institutional commitment, perceived social support, social involvement, academic self-efficacy, general self-concept and academic-related skills. Studies by Arbona and Novy (1990); Mayo and Christenfeld (1999) and Tracey & Sedlacek (1984) all provide evidence of the relationship between retention and non-cognitive factors.

Student retention is a highly complex issue. Hagedorn (2005) asserts that retention statistics should be parsed to include retention at an institution as well as retention in individual courses, retention in a major and retention in college in general. Braxton and Lee (2005) delineate important differences between retention at commuter and residential institutions. In studies of student retention and programs that improve retention, various views and models must be considered and the factors that affect retention; academic performance, demographic characteristics, and cognitive and non-cognitive attributes, must be taken into consideration.

Retention Programs

The increased emphasis on retention at institutions has resulted in the development of retention programs on campuses nationwide. Retention programs are designed to address the many root causes of student attrition and keep students in college. There are as many types of programs as there are causes for student departure but they fit into two general categories: those that address academic problems and those that aim to socialize or integrate students into the culture of the institution.

Braxton, Hirschy, and McClendon (2004) encourage institutions to share retention strategies and information about efforts to increase retention on their campuses. They caution, “no template of a successful retention program exists” (Braxton et al., p. 81). In their study of successful retention programs, Levitz, Noel, and Richter (1999) emphasize that retention efforts must affect a long-term change to be effective. They identify five characteristics that successful retention programs have in common. These programs:

1. are highly structured;
2. last longer and include more student contact therefore gaining student interest;
3. include reference to and contacts in other offices and services on campus;
4. include faculty and staff who have a positive attitude towards students and reach out to them building relationships; and
5. emphasize the concept of “individual student” and recognize that individual needs are as important as group needs (Levitz et al.).

Retention programs may be aimed at all students at an institution or be designed for a subset of the student population such as students on academic probation.

As previously mentioned, retention rates have been shown to vary between students based on gender and ethnicity (Braxton, Hirschy, and McClendon, 2004; Dixon, 2002; DuBrock, 2000 and Smith, 1995), high school GPA (Astin & Oseguera, 2005; DuBrock, 2000; Lotkowski, Robbins, and Noeth, 2004 and Smith, Edminster, and Sullivan, 2001), and non-cognitive attributes (Arbona and Novy, 1990; Mayo and Christenfeld, 1999; Robbins et al., 2004 and Tracey & Sedlacek, 1984). The reason for the differences is not well understood but it is clear that “there are differences across time and between groups of students in the educational pipeline” (Mortenson, 2005). The literature has cited the need to study the success of retention programs using gender and ethnicity, cognitive factors, and non-cognitive factors (Bean, 1980; Braxton et al., 2004; DuBrock, 2000; Kamphoff et al., 2007; Liu and Liu, 1999; Seidman, 2005; Smith, 1995 and Tinto, 1982). Therefore, it is clear that the efficacy of a retention program needs to be evaluated by comparing all of the numerous student subsets and subgroups because the goal of developing a retention program is to affect the largest number of students possible regardless of differences in gender, ethnicity, cognitive or non-cognitive attributes.

Student attendance policies in retention programs vary considerably; some programs maintain a mandatory attendance requirement while others encourage voluntary participation. The difference in the effectiveness between voluntary participation and mandatory attendance will be reviewed in the next chapter. It is not an oversimplification to state that for a retention program to be effective, students must attend. Therefore, student attendance in a retention program becomes an important variable when studying the effectiveness of any retention program.

Retention and Old Dominion University

Old Dominion University is not immune to retention problems. Old Dominion is an urban, four-year research-intensive university with a large commuter population. The first to second year retention rate in 2007 was 76% (Old Dominion University, 2007). Nationally, the average retention rate of first year students varies from 80% at selective institutions to 35% at non-selective institutions with an average rate of 74% (Seidman, 2005, p. 25). Therefore, the retention rate at Old Dominion hovers just over the average. Of first-year students who leave Old Dominion, on average, 62% leave in academic difficulty (Old Dominion University). Routinely, 24% of first-year students at Old Dominion are placed on academic probation after their first semester (Old Dominion University). Improving the academic standing of students on probation could be a first step in improving the retention rate of first-year students at Old Dominion.

Upon entering Old Dominion University, first-year students who have chosen a major are assigned to their major college. Students who are undecided or who have a high school GPA of less than 2.8 are assigned to a central advising office. This office houses professional advisors who assist students with choosing a major and provide intrusive advising. Students assigned to the central advising office participate in retention programs their first semester and if they encounter academic difficulty attend programs provided by the professional advisors. Students who are assigned to a major college usually do not participate in a retention program and although advisors are available to them they are not required to interact with them. This population of students have decided on their major and based on high school GPA are predicted to be academically successful yet many still find themselves on academic probation after their

first semester. Academic probation is defined as earning a cumulative GPA of less than 2.0.

Typically about 500 first-year students per year find themselves on academic probation at Old Dominion University. About a third of these students, approximately 130, were decided about a major and predicted to be successful using high school GPA yet they struggled academically. This population of students was assigned to a college upon entering Old Dominion, and hence no retention program existed for these students when they encountered academic difficulty. The LADDERS program was designed to fill that void. Between 2003 and 2005, 192 students have attended at least one session of the LADDERS program.

A response to retention issues at Old Dominion University: LADDERS

Old Dominion University has a tradition of supporting activities that encourage student engagement and student success. Learning communities have been an integral part of the first year experience at Old Dominion, as have university orientation classes, first year halls and an advising structure that is modeled after best practices recommended by the National Academic Advising Association. The LADDERS program therefore was created in an institutional culture that embraces student success programs.

The LADDERS program targets first-year students who have decided upon a major but are placed on academic probation after their first semester. The program uses group advising and mentoring to encourage students and help them:

1. improve personal student behaviors such as study skills, time management and test taking;

2. learn about institutional policies that can affect their academic progress such as policies on withdrawal from classes, continuance and suspension and grade forgiveness; and
3. set personal goals and make better major choices.

First-year students placed on academic probation after their first semester at Old Dominion receive an invitation to the LADDERS program. LADDERS presents relevant information about university policies and resources, provides students with strategies for college success and uses small group format for discussions. The program is voluntary and normally about 50% of the invited students attend at least one session. Butler (1999) and Coleman and Freedman (1996) both found that mandatory intervention programs were less effective than voluntary programs.

LADDERS meets for one hour a week, for an entire semester (14 weeks), in a large lecture hall style classroom. Pizza lunch is served to the students. The length and frequency of LADDERS was determined by reviewing the descriptions of other probation intervention programs found in the literature (Coleman & Freedman, 1996; Humphrey, 2006 and Lipsky & Ender, 1990).

The opening of every session involves a short “candy bar toss” warm-up exercise designed to enhance motivation. In the candy bar toss, students are asked to share any success that they have enjoyed over the previous week; students are tossed a candy bar if they share a success story. Success could mean a good grade on an assignment or test or it could be as simple as a student having attended all of his or her classes for the week. The purpose of sharing success is for students to motivate each other. Humphrey (2006) and Kamphoff et al. (2007) both successfully used motivation in retention programs.

The heart of the program is a weekly presentation on a relevant topic, which includes university policies such as the withdrawal policy, financial aid policies, continuance and suspension policies and assistance with registration. College success strategies are also presented and include dealing with and overcoming test anxiety, time management, goal setting, GPA calculation and study strategies. Guest speakers present information to the students about resources available to them on campus and include representatives from the career management center, the counseling center, the financial aid office and advisors from colleges across campus.

A cornerstone of the LADDERS program is assisting students in identifying their academic strengths. Students use the Cognitive Profile Inventory, a learning style assessment tool developed by Lois Breur Krause (Krause, 2003) to determine their academic strengths. The Cognitive Profile Inventory identifies four distinct Learning Styles and suggests learning environments and learning strategies that are most appropriate for each of the individual learning styles. Recognition of their learning style enables students to adopt strategies that will improve their reading comprehension, memorization of information, the learning of complex material and solving problems and calculations. Students are divided into small discussion groups by learning style, which is led by a facilitator with the same learning style.

Throughout the semester, students are asked to critically review their choice of major and explore other possibilities. They are asked to reflect on their strengths and weaknesses and to formulate long and short-term goals. Most importantly, students are guided through weekly discussions in small groups by facilitators who encourage peer support and advising from all group members. The program facilitators are faculty and

administrator volunteers who may themselves have experienced academic difficulty at one point during their educational process.

The LADDERS program was developed to meet the needs of students who were predicted to be successful yet were not. The rationale for the development of LADDERS can be traced to the literature. Braxton et al. (2004) emphasized that academics is an important trigger for student attrition in commuter schools. At Old Dominion University an average of 62% of students leaving the university leave in academic difficulty (Old Dominion University, 2007). Levitz et al. (1999) reported that other institutions have experienced success working with similar populations of students, those predicted to be successful. Freshmen were chosen as the focus of the LADDERS program because research has shown that “the first-to-second year attrition rate is perhaps the most important determiner of an institution’s graduation rate” (Levitz et al., 1999, p. 36). By focusing on students who are predicted to be successful upon entrance to the institution yet are placed on academic probation, Old Dominion may increase its first-year retention rate and ultimately its graduation rate.

Statement of Problem

The purpose of this research is to determine whether the LADDERS program developed by Old Dominion University is an effective model that can be used to improve academic achievement and retention rates of probationary undergraduate students. The retention rate at Old Dominion for first-year students averages 76%. Of students who leave after their freshman year an average of 62% leave due to academic difficulty (Old Dominion University, 2007). LADDERS’ goal is to improve students’ performance through academic assistance and social support. As at other colleges and universities,

retention is an important issue at Old Dominion so it is in the institution's best interest to provide a program to those students on academic probation after their first semester, thereby reducing attrition.

Although a significant amount of research has been conducted on retention, no single solution to the problem of student attrition has emerged. For example, Astin (1984) and Tinto (1975) emphasized the socialization and integration of students into an institution as factors that affect retention. They each developed theoretical models to explain student attrition using social indicators. Using these models as a guide, programs that help students feel connected to the institution should have the effect of improving retention. In contrast, Braxton et al. (2004) and Nora et al. (2005) consider academic issues important in retaining students. Using their model, programs that emphasize study skills and academic improvements should increase retention. The LADDERS program adopted a hybrid approach that combines both institutional socialization and integration with academic-related skills improvement. It is the intent of this study that the results contribute to the literature on effective retention programs.

The success of first-year probationary students who attended the LADDERS program will be compared to the success of students who did not participate. Success will be measured by semester GPA and retention from the students' first to second year. The results will also be compared based on the students' gender, ethnicity, cognitive attributes and non-cognitive attributes. The cognitive attribute will be defined as high school GPA. Several studies reviewed in the literature have established the link between high school GPA and academic success and retention in college (e.g. Astin and Oseguera, 2005; DuBrock, 1999; Hagedorn et al., 2001; and Smith, Lotkowski, Robbins, and Noeth.

2004). The non-cognitive attributes will be measured using the Transition to College Inventory (TCI), a survey instrument that has been used at Old Dominion for the last twelve years to predict the academic success of first-year students (Pickering, Calliotte, & McAuliffe, 1992). Both Arbona and Novy (1990) and Tracey and Sedlacek (1984 and 1985) determined that non-cognitive attributes are important predictors of success and retention in college. The design of this study comprehensively addresses many of the largely unanswered questions found in the literature on retention, specifically those related to differences in student retention based on gender, ethnicity, cognitive and non-cognitive attributes.

The specific research questions that will be addressed in this study are:

1. Is there a difference in academic achievement, as measured by GPA and retention rates, between students who attend the LADDERS program for students on academic probation and those who do not?
2. Is there a difference in the effectiveness of the LADDERS program, based on demographic characteristics (gender and ethnicity) of the student and LADDERS attendance?
3. Is there a difference in the effectiveness of the LADDERS program, based on the cognitive attributes (high school GPA) of the student and LADDERS attendance?
4. Is there a difference in the effectiveness of the LADDERS program, based on non-cognitive attributes (as measured by the TCI score) of the student and LADDERS attendance?

Overview of Method

Approximately 130 first-year students are invited to participate in the LADDERS program each academic year. These are students who began their first year of college at Old Dominion University; this population does not include transfer students. The invitees were predicted to be successful in college using cognitive measures yet ended their first semester on academic probation. Typically about half of the students invited will attend the program.

To determine the efficacy of LADDERS, the college GPA and retention rates of invited students will be compared based on the number of sessions they attended. Additional research questions seek to determine if there is a difference in the efficacy of the program based on the demographic characteristics of gender and ethnicity; the cognitive attribute of high school GPA; and non-cognitive factors, as reflected by the Transition to College Inventory score. The Transition to College Inventory is an instrument developed by researchers at Old Dominion. It measures a student's risk for academic difficulty based on a series of non-cognitive factors such as self-perceived academic ability, time management skills and motivation along with a self-reporting of the time spent on non-academic activities and working in high school, and the student's anticipated success in college. Therefore, the retention rates and college GPA of students who participated in LADDERS will be compared based on gender, ethnicity, high school GPA, and TCI score.

Significance of the Study

The importance of retention in today's era of accountability cannot be overstated. The literature abounds with descriptions and studies of retention programs. Although

some of these programs address students in academic difficulty, there is no template for retention programs (Braxton et al., 2004).

The need for studying the efficacy of retention programs has been noted in the literature for over twenty years. Kulik, Kulik, and Shwalb (1983) looked at over 50 retention programs. Some were designed for students predicted to fail and others were designed for students who had, in fact, failed. Although they found that most programs had a positive effect on student performance, the evaluation and reporting of findings on retention programs need improvement. They also found that institutions had difficulty maintaining the success of retention programs. “Colleges seemed to be better at setting up special programs for high-risk students than they were at keeping these programs going” (Kulik et al., p. 408).

Twenty-three years later Hossler (2006) examined retention programs across numerous institutions. He found “little support for the efficacy of counseling and career planning interventions, programs to increase student involvement in campus life, and living, learning, academic advising and general academic support centers” (Hossler, p. 12). His most important finding however, echoed Kulik et al. in citing the need for more research on retention programs.

Although many programs for probationary students have been developed and reviewed, the LADDERS program is unique in that it incorporates both 1) socialization and integration to an institution as espoused by Astin (1984) and Tinto (1975); and 2) assistance with academic skills deemed important to retention by Braxton et al. (2004) and Nora et al. (2005). This study examines the efficacy of a retention program that is specifically designed to address both the social and academic factors that cause attrition.

Additionally, this study addresses the effect of the retention program across gender and ethnicity and attempts to determine the effectiveness of a retention program on students based on their cognitive and non-cognitive factors. Finally, in the broadest sense, this study seeks to determine whether the LADDERS program is an effective model that can be used to improve academic achievement and retention rates of probationary undergraduate students.

Chapter 2

LITERATURE REVIEW

The LADDERS program was developed for students on academic probation to help them become academically successful thereby contributing to the improvement of retention at Old Dominion University. In reviewing the literature on effective characteristics of retention and probation intervention programs, two main themes emerge: socialization to an institution and student study skills. The LADDERS program incorporated both themes into its design and adopted the most effective elements and individual activities found in the literature. LADDERS, therefore, is a hybrid program that uses practices shown to be successful in several different research studies.

The following review of literature is divided into three sections, literature pertaining to 1) the format elements and 2) content provided in the LADDERS program and 3) literature related to the background variables examined in this study, (i.e. gender, ethnicity, cognitive attributes and non-cognitive attributes). In the first two sections, the literature review focuses on studies of probation intervention programs. Although considerable literature exists that pertains to each format element (group programs, voluntary participation, length of programs and use of faculty and staff as program facilitators) individually; these format elements are reviewed for this study in the context of probation intervention programs. Similarly, the literature that targets the content of LADDERS (academic skills, goal setting, knowledge of institutional policies and procedures, learning styles and motivation) is by itself, voluminous. Therefore, the literature pertaining to the content of LADDERS is reviewed only in the context of

probation intervention programs. In light of the proposed study, this literature is the most relevant.

The primary focus of this study is to determine the effectiveness of the LADDERS program. However, the literature on such intervention programs has stressed the need for more in-depth research into who or what “subset of students” benefits most from retention programs. Therefore, this study will also compare the effect of the LADDERS program on different groups of students on the basis of gender, ethnicity, cognitive attributes (high school GPA) and non-cognitive attributes (as measured by the Transition to College Inventory, TCI). The review of literature pertaining to the background variables (gender and ethnicity and cognitive and non-cognitive factors) is focused on the effect that these variables have on academic success and rate of probation of college students.

The LADDERS program has adopted the best practices from many different probation intervention and retention programs described in the literature and combined them with learning style awareness and motivational techniques to create a unique probation intervention program. The program targets students who, using admissions criteria were predicted to succeed, yet they wound up in academic difficulty after one semester in college. Prior research and theories provided the basis for the design of the LADDERS program.

Tinto (1999) identified four conditions that enhance retention at colleges and universities, which should be considered in the design of probation intervention programs.

- “The most important condition that fosters student retention is learning” (p. 6);
- “Settings [should] provide clear and consistent information about institutional requirements” (p. 5);
- “Institutions that provide academic, social and personal support encourage persistence” (p. 5);
- “Students are more likely to stay in schools that involve them as valued members of the institution” (p. 5).

These four conditions provide a broad base upon which to develop a probation intervention program: education and knowledge; support in reaching a goal; group support; and feelings of belonging.

Using the four conditions identified by Tinto as a foundation, the LADDERS program incorporated elements from successful retention and probation intervention programs. These programs all seek to improve students’ academic achievement, yet they vary widely in their format and content.

Program format

As noted, the LADDERS program format incorporates the key features from effective retention and probation intervention programs found in the literature. The format of the LADDERS program is as follows: it meets weekly, it is voluntary and it relies on group support and advising rather than individual counseling. Faculty, staff, and administrators act as facilitators in small-group sessions and although they are available to the students as advisors and mentors, the emphasis in LADDERS is on the group. Students are not required to meet individually with their facilitators.

The format elements included in LADDERS; (i.e. group interventions, weekly sessions, voluntary attendance, facilitated by faculty and staff) are found in successful programs whose effectiveness has been empirically evaluated. However, the format of LADDERS must be considered holistically since no research could be found that isolates one particular format element and evaluates its effectiveness individually.

Group interventions

Tinto (1997) emphasizes the concept of “collaborative pedagogy” in the classroom when discussing learning communities (p. 613). In the LADDERS program, this idea has been applied to probation intervention. Tinto’s conclusion, that “participation in a collaborative or shared learning group enables students to develop a network of support” (p. 613), can be adapted from learning communities to a probation intervention program.

Damashek (2003) reviewed several different probation programs. One of the key ingredients for the success of these programs was that students need “strong interpersonal connections to other students” (p. 5). He expanded this idea by suggesting that “former probation students who have achieved academic good standing” (p. 5) be included as peer mentors in probation groups.

The use of group interventions or group activities is common in programs for students on probation. Group interventions can take the form of seminar classes, workshops or group meetings. The seminar classes and workshops tend to be more formalized and often offer the student credit.

Lipsky and Ender (1990) examined the grade point average (GPA) and retention rates of two cohorts of students who participated in a group seminar for probationary students. They found statistically significant differences in GPA between students who

participated in the seminar and those who did not. However, retention rates varied. For one cohort year, there was a statistically significant difference in retention rates between participants and non-participants. The other cohort year showed no significant difference in retention rates, although retention rates were higher for students who participated in the seminar. Coleman and Freedman (1996) also reported on a group seminar designed for probationary students. The GPA of students who attended the seminar were found to be significantly higher than the GPA of students who did not attend the seminar.

Some group interventions for students on probation are more loosely defined and function as a structured support group rather than a formal seminar. Humphrey (2006) reported on such a structured support group program for students on probation. In addition to focusing on goal-setting and study strategies, this program “strives to simultaneously give students a sense of personal, smaller support group and a feeling of belonging to the larger [community]” (Humphrey, p. 149). Humphrey reported statistically significant differences in the GPA of students who participated in the group support program but did not find statistically significant differences in retention rates.

Foreman and Rossi (1996) also developed a program for students on probation that stressed the concept of group support. Students met weekly to identify why they had failed and to build their self-confidence. “The group approach attempts to empower the academic probation student to critically address those issues that interfere with learning and academic success” (Foreman & Rossi, p. 6). The researchers reported high student satisfaction with the program. Participants in the program earned higher GPAs than those students who chose not to participate; however, the authors did not report the results of statistical significance tests (Foreman & Rossi).

Sometimes group interventions are combined with individual meetings between the student and a faculty member or advisor. Foreman, Wilkie, and Keilen (1990) described a group workshop that included such individual meetings. They found statistically significant differences in the GPA of students who attended the workshop and those who did not.

Several other studies in the literature describe group programs designed to improve the academic standing of probationary students, but these programs were not evaluated using scientifically sound methods or statistical techniques. Brocato (2000) administered a satisfaction survey to students who had participated in his probation intervention program and although information on students' GPA was reported, it was not compared to probation students who did not attend the program. Heerman and Maleki (1994) measured the success of their probation seminar program by the number of students who completed the seminar and the number of attendees over time. Miller and Sonner (1996) also developed a group support program for probationary students. They reported their success as the "smiling faces [that] cross the dais at graduation" (Miller & Sonner, p. 5). Brooks-Harris, Mori, and Higa (1999) and Austin, Cherney, Crowner, and Hill (1997) developed group programs for probationary students but neither reported measures nor results. Although these programs do not provide sound empirical evidence to support the use of a group format, they illustrate the prevalence of group formats in probation programs.

Voluntary participation

Bednar and Weinberg (1970) reviewed voluntary participation in intervention programs for college students on academic probation to determine which elements were

common to successful programs. Using GPA to measure success, they found that students in voluntary programs were more successful than students in mandatory programs. Jeschke, Johnson, and Williams (2001) investigated the academic performance of students who received intrusive advising, the opposite approach to voluntary participation. Their results echoed those of Bednar and Weinberg that “no relation exist[s] between intrusive advising and heightened academic success” (Jeschke et al., p. 54).

Many of the successful probation intervention programs found in the literature are voluntary for students. Lipsky and Ender (1990), Coleman and Freedman (1996) and Humphrey (2006) all reported on such voluntary probation intervention programs. They found that in these programs the students who participated earned statistically higher GPAs than the students who chose not to participate. Of these three studies only Humphrey (2006) examined retention rates between participants and non-participants. She determined that there was no statistically significant difference in retention between students who participated and those who did not. There is a need for research that examines the effectiveness of probation intervention programs on student retention as well as GPA.

Students who attended a voluntary probation intervention program designed by Lipsky and Ender (1990) earned significantly higher GPAs than students who did not attend. In a discussion of their study, Lipsky and Ender posited that students who attend voluntary programs appear to be more motivated than students who choose not to attend an intervention program and this could account for the success of the intervention programs. However, they point out that although “motivation is important, it is not

enough if students do not have direction in how to appropriately use study techniques” (Lipsky and Ender, p. 14).

Length of intervention

Several studies examined the length of an intervention in a probation program. Bednar and Weinberg (1970) reviewed intervention programs for students in academic difficulty focusing on program length. The authors referred to intervention programs as “lengthy” if the program involved 10 or more hours of student contact. They found that “lengthy programs [are] the most effective in improving academic performance as measured by GPA, [and] the effects are lasting” (Bednar and Weinberg, p. 6).

The probation intervention program designed by Lipsky and Ender (1990) provided 14 hours of contact. The length of time over which the contact occurred varied from 5 to 14 weeks. Although students in the program earned significantly higher GPAs than students who did not participate in the program, the authors did not compare group differences based on the length of time over which the contact occurred.

Another probation program that involved weekly small group meetings (Humphrey, 2006) monitored students’ attendance at the meetings. The weekly attendance “provide[d] timely insight into the participation, behavior and decisions of the participant” (Humphrey, p. 155). Students who participated in the program earned significantly higher GPAs than students who did not participate. Additionally, students in the program reported satisfaction with the program and reported that they “no longer feel alone or as if they are failures” (Humphrey, p. 158). Coleman and Freedman (1996) also reported statistically significant differences in the GPA for students who participated in their weekly program.

In a study on probation intervention, Brotherton (2001) examined seven successful retention programs, most of which involved longer interventions. Damashek (2003) reviewed several models for student assistance programs and noted that more interaction was preferable. Other probation intervention programs reviewed in the literature (Foreman and Rossi 1996; Newton, 1990 and Sherman, 1991) advocate for weekly meetings with students. These studies did not report empirical results to support this conclusion, but promote the common practice of weekly meetings.

Program facilitators

A review of the literature on probation intervention programs indicates the qualifications of facilitators who work with probation students varies. Some probation intervention programs use experts in a particular field. Others use faculty and staff members or graduate and undergraduate students. Tinto has consistently asserted that the key to improving retention lies in the relationships formed between faculty and students (Tinto, 1990, 1996, 1999). He stated, "The frequency and quality of contact with faculty, staff and other students have repeatedly been shown to be independent predictors of student persistence" (Tinto, 1999 p. 5). According to Tinto (1996), involving faculty in retention efforts is critical to the success of these initiatives. He emphasized that this is particularly important at institutions with large commuter-student populations.

Foreman et al. (1990) reported statistically significant differences in GPAs between students who participated in a probation intervention program that utilized faculty and staff as facilitators, and those who did not. Humphrey (2006) reviewed a probation intervention program that used faculty, administrators, staff and graduate

students, along with peer mentors, as facilitators. With their wide range of experience, these different types of facilitators “offer a diverse lens through which students can view their situation, their school and themselves” (Humphrey, 2006, p. 149). She found statistically significant differences in the GPAs of students who attended the probation intervention program and those who did not. Several other probation intervention programs reviewed in the literature used faculty, advisors or staff as facilitators including Brocato (2000), Austin, Cherney, Crowner, and Hill (1997) and Heerman and Maleki (1994). None of these authors empirically evaluated their results but these studies emphasize the use of faculty, staff and administrators as program facilitators.

Summary of program format

The LADDERS program features components shown to be effective in other studies. The program meets weekly, is voluntary, emphasizes group support and utilizes faculty, staff and administrators as facilitators.

A meta-analysis was conducted by Bednar and Weinberg (1970) to determine the effective elements of a probation intervention program. They found that volunteer group programs that met for longer periods of time were more effective. Those findings were echoed in three more recent studies (Coleman & Freedman, 1996; Humphrey, 2006 and Lipsky & Ender, 1990). The design of all three programs included group format, voluntary attendance and a lengthy intervention; Humphrey met weekly for an entire semester and Coleman and Freedman and Lipsky and Ender met for at least 12 hours over varying numbers of weeks. Each of the studies found significantly higher GPAs for students who attended the probation intervention program compared to those who did not. Other probation programs using one or more of those elements (group format,

voluntary and lengthy) were described as successful in increasing student GPA.

However, either the methodology employed or the statistical results were not reported (Austin, Cherney, Crowner, and Hill, 1997; Brocato, 2000; Brooks-Harris, Mori, and Higa, 1999; Foreman and Rossi, 1996; Heerman and Maleki, 1994; Miller and Sonner, 1996; Newton, 1990; and Sherman, 1991).

Tinto (1990, 1996, 1999) repeatedly emphasized the link between student integration into an institution and persistence. Tinto also posits that students who form social connections with faculty, administrators and other students at an institution are more likely to be retained. The LADDERS program uses faculty, staff and administrators as program facilitators. The students participating in LADDERS form connections to both the facilitators and the other students in small breakout groups. The use of faculty, staff and administrators as facilitators and the strong emphasis on the group dynamic were incorporated into the LADDERS program design to help improve retention and GPA. Only two studies (Foreman, Wilkie, & Keilen, 1990 and Humphrey, 2006) that used faculty, staff and administrators as facilitators, applied statistical analyses to evaluate their results. In both studies, students who participated in the probation program earned a significantly higher GPA than students who did not.

The current research utilizes both GPA and retention as a measure of effectiveness for the LADDERS program. Of the studies reviewed in the literature, only Lipsky and Ender (1990) and Humphrey (2006) used retention rates as a measure of program effectiveness. Lipsky and Ender compared retention rates for two separate cohort groups that participated in their program. In one cohort group, students who attended the program were retained at a significantly higher rate. There was no statistically significant

difference in retention rates for the other cohort group. Humphrey also did not find statistically significant differences in retention rates between participants and non-participants. The research on LADDERS is intended to contribute to the literature on probation intervention by including student retention as a measure of program effectiveness.

Program content

The LADDERS program is designed to assist students with improving their academic performance. The individual studies reviewed in this section all incorporate different approaches to working with probationary students. It is difficult to isolate any one element as the key to success for students in academic difficulty however some common content exists across successful programs. The literature on successful probation intervention programs suggests content common to effective programming that includes information on improving academic skills, goal setting, and obtaining information on institutional policies and procedures. Additionally, participants in LADDERS are instructed on how to use their personal learning styles to become more effective students and they are provided with motivation and encouragement to achieve this goal.

Academic skills

Student learning is one of the four institutional conditions that promote student retention described by Tinto (1999). “Students who learn are students who stay” (Tinto, 1999, p. 6). Yet, students with “insufficient academic skills or poor study habits” (Tinto, 1996, p. 1) often leave college because they find themselves in academic difficulty. Therefore, academic skills commonly provide the cornerstone of content in probation

intervention programs. These may include time management, reading skills, note-taking skills, study strategies, memorization tips and a host of additional skills, strategies and approaches. A review of several probation intervention programs illustrates that some programs incorporate many academic skills in their design while some may emphasize only one or two.

Other studies have emphasized that learning academic skills is important to the success of all college students. “Many college students, even those who show evidence of past academic achievement in high school need to learn specific study skills and strategies necessary for success in college” (Lipsky and Ender, p. 14). Sax (2003) reiterated that assessment of first-year college students in her profile of incoming students. In reference to student deficiencies, she pointed out “they may not have developed the study habits necessary for success at the college level” (Sax, p. 19), and called for institutions to provide assistance with academic skills.

To support their assertion that learning academic skills is essential to student success and retention, Lipsky and Ender (1990) researched the effectiveness of an intervention program for probationary students over a two-year period using a separate cohort of students each year. They compared the GPAs and retention rates of students who participated in the program each year to probationary students who did not participate in the program. The content of the intervention program covered a wide range of academic skills including time management, study skills and reading. Students who participated in the program earned statistically higher GPAs than students who did not. Retention rates varied. One cohort year there was a statistically significant difference in

retention rates favoring students who participated compared to non-participants. The other cohort year showed no significant difference in retention rates.

In her probation intervention program Humphrey (2006) also included time management techniques. Foreman, Wilkie, and Keilen (1990) combined required supervised study along with study skills seminars in a program for probationary students. For both of these programs, students who attended earned statistically higher GPAs than students who did not attend.

Providing academic skills training in probation intervention programs is frequently described in the literature, yet most did not include empirical results to support their effectiveness (Brocato , 2000; Heerman and Maleki, 1994; Miller and Sonner, 1996; and Newton, 1990). Although these studies were not empirically evaluated, they illustrate the inclusion of different academic skills training in probation intervention programs.

Goal setting

A strong and intimate connection exists between goal setting and academic success. Ramirez and Evans (1988) researched the factors that contribute to academic difficulty. They found that “without clear, attainable, or satisfying goals, students necessarily found it difficult to sustain the essential level of commitment and effort to succeed academically” (Ramirez & Evans, p. 39). Tinto (1996) also stressed the importance of goal setting for first-year students. Although most first-year students are uncertain about their goals upon entering college, the development of goals is an integral part of becoming a successful student because “uncertainty can undermine the willingness of students to perform the work needed to remain in college” (Tinto, p. 2).

A probation intervention program designed by Humphrey (2006) emphasized goal setting and found it to be effective. That is, students who participated in the program earned statistically higher GPAs than students who did not participate. Coleman and Freedman (1996) also studied a program for probationary students in which students concentrated on setting goals and then developed strategies to achieve those goals. Students who participated in this goals-based program earned statistically higher GPAs than students who did not participate. Other intervention programs included goal setting as part of their programs (Austin, Cherney, Crouner, and Hill, 1997; Heerman and Maleki, 1994 and Miller and Sonner, 1996). None of these latter authors empirically evaluated the effectiveness of their programs, but they do highlight the common use of goal setting in probation programs.

Policies and procedures

Tinto (1999) emphasized that institutions can create “educational settings” (p. 5) that promote student retention. One important component to such an educational setting is students’ access to information and advice. “Students are more likely to persist and graduate in settings that provide clear and consistent information about institutional requirements” (Tinto, p. 5). In addition to improving academic skills, therefore, students need to be aware of policies and procedures that will affect them. These include continuance policies, financial aid policies and the procedures for obtaining assistance and information at the institution.

A probation intervention program developed by Ramirez and Evans (1988) incorporated information about institutional policies. They found that students who participated in the program earned higher GPAs but did not empirically evaluate the

results. Brooks-Harris, Mori, and Higa (1999) also created a program for students on academic probation that helped them learn about institutional policies and resources in addition to study skills and goal setting. They determined that “students are more apt to be successful if they learn how to take advantage of campus resources rather than expecting the institution to continually provide intrusive intervention” (Brooks-Harris et al., p. 51). In working with probationary students, Brocato (2000) found that there is a need to “educate students on campus policies and procedure” (page 1). None of the programs that included information about institutional policies empirically evaluated their results.

Learning styles

One of the unique aspects of LADDERS is that students in the program are encouraged to understand how they learn through the use of a learning style assessment tool developed by Lois Breur Krause (Krause, 2003). Students use the assessment to identify learning environments and learning strategies that are most appropriate for their individual learning style. No studies were found that used learning style awareness in programs designed for probationary students. However, studies that examined the use of learning style awareness with first year students are included in the literature review and provide supporting evidence for using learning style awareness with probationary students. The current study will add to the literature on probation intervention by evaluating the use of learning style awareness as part of a remediation program for probationary students.

Matthews (1991) examined the effects of learning style on the grades of 796 first-year students at five institutions. She found statistically significant differences in GPA

based on students' learning styles and that particular learning styles were more often associated with academic success in a student's first year. Recommendations based on Mathews' research included the recommendation that "it is urgent that colleges and universities recognize, accept and understand diversity in regard to learner typologies" (Mathews, p. 264). Mathews added that her study called for counselors and advisors to "teach about learning style, thus helping students understand their own strengths and weaknesses" (Mathews, p. 265).

Research conducted by Lenehan, Dunn, Ingham, Singer, and Murray (1994) examined the effect of learning styles on first-year student achievement. Students completed an inventory to determine their learning style and were then given study techniques based on their particular learning style. The results showed that students who participated in the study earned statistically higher GPAs than students who did not participate. The researchers concluded that, "this study clearly supports identifying the learning styles of entering freshmen and subsequently providing each with study strategies congruent with their individual learning preferences" (Lenehan et al., p. 465).

In writing about first-year students, Thompson and Thornton (2002) emphasized that the use of learning styles can aid in the first-year students' transition to college. Learning how to learn is an important part of the adjustment process and will help students in their first year (Thompson & Thornton). Teaching students about their learning style supports the goal of a smooth first-year transition. Fritz (2002) also emphasized the importance of learning styles, "Learning style inventories can be used to create personal learning profiles that will empower students to become active learners and successful participants in their own education" (Fritz, p. 183).

Motivation

Self-efficacy, self-confidence, and motivation are important contributors to student success. Self-efficacy, or a person's belief that they can be successful, has a potent effect on their attitude towards goals and how they approach tasks. Bandura (1993) found that self-efficacy is strongly related to a person's success and that this has applications in the educational environment. An ACT policy report compiled using data collected from several national surveys over as many years identified academic self-confidence and achievement motivation as closely related to college success (Lotkowski, Robbins, & Noeth, 2004). Recommendations for retention programs put forth in the ACT report include one that urges institutions to "increase levels of academic self confidence, [and] achievement motivation" (Lotkowski et al., p. 22).

Hirsch (1994) investigated the characteristics of students with "difficult learning histories" (p. 10). He found that these students tend to possess lower self-esteem. Probation students by definition have experienced difficulties in learning. Hirsch (1994) recommends that faculty and advisors "avoid negative motivation" such as "you could do this if you wanted to" (p. 12) and "model positive self-talk and encourage students to use it" (p.12).

A survey of over 300 students conducted by Isaak, Graves, and Mayers (2006) sought to determine what problems the students perceived as hindrances to their academic progress. Half of the students surveyed were on academic probation and half in good standing. Both groups identified similar problems with academic skills but the probationary group identified motivation more often as a roadblock to academic success.

In a study on the effect of student characteristics on academic success, Lammers (2001) found that motivation is an important contributor to student success and intervention programs that fail to include motivation are not as effective. “Study skills training by itself will not be effective unless the instruction is combined with effective motivational techniques” (Lammers, p. 78). Other researchers who found similar results concerning the importance of motivation and self-efficacy to academic success include Gore (2006); Horn, Bruning, Schraw, and Curry (1993) and Isaak, Graves, and Mayers (2006).

These authors note the relationship among academic success, self-confidence and motivation. No study could be found in the literature, however, that provides a definitive causal relationship between motivation and academic success in retention programs. The fact that students are experiencing academic success could just as easily be the reason for the students’ self-confidence and motivation. Even so, the authors of several studies on probation intervention programs reported that they stressed motivation to encourage students and recommended using motivation to increase academic success.

Foreman and Rossi (1996) found that some students, even though they had completed a study skills program, were still not academically successful. They suggest that the missing component is self-confidence. The researchers therefore developed a probation intervention program that included self-confidence building techniques in addition to study skills and goal setting. Students who participated in the program increased their GPA but the authors did not statistically evaluate this increase (Foreman & Rossi).

Other researchers have included motivation and self-esteem building techniques in programs designed for students on probation. Humphrey (2006) reported on a successful group probation intervention program that had facilitators assign their students specific tasks each week. Students shared weekly reports on their individual tasks with the group and the group provided support and encouragement to the student. "Having their fellow students recognize this accomplishment gives many students the needed incentive to get out of bed in the morning" (Humphrey, p. 149). Students who participated in the program earned significantly higher GPAs than students who did not participate.

Kamphoff, Hutson, Amundsen, and Atwood (2007) implemented a program that used goal setting and positive affirmations together with discussions on personal responsibility and self-management to assist probationary students. Students who participated in the program earned significantly higher GPAs than students who were assigned to a control group that did not participate in the program. They noted that probation programs rarely use a positive approach in working with students; rather than concentrate on a students' potential, the programs focus on students' weaknesses. The approach of Kamphoff et al. encourages students through an upbeat attitude because "the use of positive self-talk and affirmations is a critical factor in changing the mindset of the student on academic probation" (Kamphoff et al., p. 401).

Summary of program content

Content in programs designed for students in academic difficulty includes training in academic skills, goal setting, and information on institutional policies and procedures. Although this content can be found in many programs, LADDERS is unique in that it

includes all three of these topics in one program. Additionally, LADDERS provides students with an awareness of their learning style and seeks to motivate students. As with format, the LADDERS program represents a complex and interrelated treatment that makes it difficult to isolate the impact of any individual component of the LADDERS program content.

Training in academic skills is a common thread in probation intervention programs. Foreman et al. (1990), Humphrey (2006) and Lipsky and Ender (1990) all reported significant differences in the GPA favoring students who participated in probation intervention programs that included training in academic skills as compared to students who did not participate. Other programs included academic skills training in their program design, yet no empirical evaluation was conducted.

Two studies (Coleman and Freedman, 1996; and Humphrey, 2006) included goal setting in their programs for probationary students. They reported that the students in the intervention programs earned significantly higher GPAs than comparison students.

The inclusion of information about institutional policies and procedures in the LADDERS program stemmed from Tinto's assertion that, "Students are more likely to persist and graduate in settings that provide clear and consistent information about institutional requirements" (Tinto, p. 5). Brocato (2000), Brooks-Harris et al. (1999) and Ramirez and Evans (1988) reported on probation intervention programs that included information about institutional policies and procedures. All three reported higher GPAs for students attending their programs although none included comparison groups or inferential statistical tests.

LADDERS encourages students to become aware of their individual learning styles and to use study strategies specific to their individual learning style. Learning style awareness was included in LADDERS based on research (Lenehan et al., 1994) that showed success using learning styles with first-year students even though learning style awareness has not been used with probationary students. This study will add to the body of literature by evaluating the use of learning style awareness in a program designed for students on probation.

Motivation and encouragement is infused throughout the LADDERS program. Both Humphrey (2006) and Kamphoff et al. (2007) used motivation in their programs for students on probation. They both reported significant differences in GPAs for students who attended the probation programs. Humphrey, as discussed in the previous section, did not find significant differences in retention. Kamphoff reported an increase in retention but did not empirically evaluate this difference.

One empirical study reviewed in the literature (Humphrey, 2006) is very similar to this study on the effectiveness of LADDERS. Humphrey's program used a similar format and some of the same content elements as the LADDERS program. The LADDERS program differs, however, in that it includes information on institutional policies and procedures and learning style awareness.

Alignment of the literature with the LADDERS program

The effective components of successful probation intervention programs can be mapped onto the elements used in LADDERS; a voluntary group intervention program that meets weekly for an entire semester and uses faculty and administrators as facilitators. The content developed for LADDERS can also be mapped to the literature; a

program that includes improvement of academic skills, goal setting, information about institutional policies and procedures, learning style awareness, and motivation.

Tinto (1996, 1997, 1999) stresses building communities of learners and forging connections between students and between faculty and students. Group probation intervention programs accomplish such community building and have been shown to be effective for assisting students in academic difficulty (Coleman and Freedman, 1996; Damashek, 2003; Foreman and Rossi, 1996; Humphrey, 2006; and Lipsky and Ender, 1990). LADDERS has adopted the group support format and relies upon the group dynamic in the opening success activity and the small group discussions. Students who have completed the program are urged to return to assist new participants in subsequent semesters. The LADDERS program uses the group format to build community and has modeled the group format after other successful probation intervention programs that use this same approach.

LADDERS is a voluntary program and therefore, students who attend the program could be considered to be more motivated in their academic success. Lipsky and Ender (1990) argue that “motivation is important, but it is not enough if students do not have direction in how to appropriately use study techniques” (Lipsky and Ender, p. 14). Other voluntary probation intervention programs have reported success (Coleman and Freedman, 1996; Humphrey, 2006; Jeschke, Johnson and Williams, 2001; and Lipsky and Ender, 1990).

The literature (Brotherton, 2001; Coleman and Freedman, 1996; Damashek, 2003; Foreman and Rossi, 1996; Humphrey, 2006; Lipsky and Ender, 1990 and Newton, 1990) suggests that lengthier programs that meet regularly are more effective than programs

that do not meet as long or regularly. Students who participate in LADDERS meet for one hour every week for an entire semester. Facilitators, who volunteer in the program, are urged to ask the students, “how was your week?” and students who attend LADDERS know that every week they will be asked about their classes, assignments, test grades and other issues. The LADDERS probation intervention program provides a measure of accountability for students and a consistent, long-term interaction between faculty and staff and the student.

The use of faculty, staff and administrators as facilitators in effective probation intervention programs is common (Austin, Cherney, Crouner, and Hill, 1997; Brocato, 2000; Foreman, Wilkie, and Keilen, 1990; Heerman and Maleki, 1994; and Humphrey, 2006). Therefore, faculty, administrators, and staff members were asked to participate as facilitators in the LADDERS program. The facilitators met with students in the small groups and were available for individual meetings as well. The use of faculty and staff facilitators increases the likelihood that students will forge relationships with faculty and staff members, which, according to Tinto (1990, 1996, 1999), is essential to improving student retention.

Academic skills serve as a cornerstone of many probation intervention programs reviewed in the literature (Brocato, 2000; Heerman and Maleki, 1994; Lipsky and Ender, 1990; Miller and Sonner 1996; Newton, 1990; Sax, 2003 and Tinto, 1999). LADDERS targets specific academic skills as part of the program’s curriculum. These include study strategies, time management, and approaches to test taking. Study strategies are infused throughout the program and students are continually challenged to examine how they are studying, reading the text and taking notes; they are also encouraged to adopt new

academic skills as appropriate. Students also participate in a time management calculator exercise early in the semester and one LADDERS session concentrates totally on test anxiety and test taking skills.

One component of the LADDERS program is devoted to goal setting. Students are asked to identify their strengths and record their long and short-term goals and to refer to and adjust these goals often during the semester. Throughout the program they are encouraged to recognize how their individual strengths can be used to help meet their goals. The importance of goal setting for students in academic difficulty has been stressed in the literature (Austin et al., 1997; Coleman and Freedman, 1996; Heerman and Maleki, 1994; Humphrey, 2006; Miller and Sonner, 1996; Ramirez and Evans, 1988; and Tinto, 1996).

Another goal of the LADDERS program is to help students become independent and self-sufficient students by providing them with them knowledge about institutional policies, procedures and resources. Facilitators in the LADDERS program, therefore, stress the need for students to know about campus policies and resources and teach them how to find the policies, resources and assistance that they need. Several studies reviewed in the literature emphasize the need for students to understand institutional policies and procedures (Brocato, 2000; Brooks-Harris, Mori, and Higa, 1999; Ramirez and Evan, 1988; and Tinto, 1999).

LADDERS students complete a learning style inventory developed by Krause (2003) and then receive study, reading, and examination strategies specific to each learning style. Students are encouraged to use the strategies specific to their learning style and to reflect on their own learning. They are divided into small discussion groups

based on their learning style, which are led by facilitators who exhibit the same learning style.

The use of learning style awareness in a probation intervention program is a unique feature of the LADDERS program. Studies reviewed in the literature describe the advantages of making students aware of their individual learning style (Fritz, 2002; Lenehan, Dunn, Ingham, Singer, and Murray, 1994; Matthews, 1991; and Thompson and Thornton, 2002), but there were no studies found that used learning style awareness specifically with probationary students.

The literature contains many references that highlight the correlation between academic success and motivation and self-efficacy (Bandura, 1993; Gore, 2006; Hirsch, 1994; Horn, Bruning, Schraw, and Curry, 1993; Isaak, Graves, and Mayers, 2006; Lammers, 2001 and Lotkowski, Robbins, and Noeth 2004). The LADDERS program adopts a positive approach meant to motivate students and bolster their self-efficacy. In all discussions with students, the emphasis is on “how to improve” their academic standing and utilize their strengths, not on failure or the fact that they are on academic probation. The opening activity of every session is a “candy bar toss” designed to celebrate the small accomplishments that students make every week. Successes that students share vary; it may be a good grade on a test or quiz, or as simple as a student who has struggled with attending class met his or her goal of perfect attendance for the week. Students are encouraged when they see other probation students accomplishing their goals. Examples of probation intervention programs that have successfully used motivation and self-efficacy techniques can be found in the literature (Foreman and Rossi, 1996; Humphrey, 2006; and Kamphoff, Hutson, Amundsen, and Atwood, 2007).

The LADDERS program is a hybrid program that has adopted successful components from many different probation intervention programs found in the literature. The comprehensive nature of the content along with the addition of learning style awareness and motivation makes the LADDERS program unique.

Background Variables

Early research findings on student attrition highlighted differences in retention rates as a function of gender and ethnicity (Bean, 1980; Tinto, 1982) and high school GPA (Bean). Bean studied attrition rates and found differences in the rates for men and women, and he also determined that high school GPA was correlated to student retention. Bean recommended that, “any program designed to reduce student attrition should take these differences into account” (Bean, p. 185) and that future research be conducted on student attrition with respect to gender and ethnicity. Tinto (1982) echoed Bean’s (1980) call for research into student retention across gender and ethnicity.

A review of more recent literature reveals that although special programs have been developed by most institutions to solve the retention problem, there has not been consideration for the differences in gender and ethnicity and high school GPA referred to by Bean and Tinto. The literature still cites the need for more in-depth research into *who* or what “subset of students” receives the most benefit from retention programs (Braxton, Hirschy, and McClendon, 2004; DuBrock, 2000; Liu & Liu, 1999; Seidman, 2005 and Smith, 1995). Braxton et al. (2004), DuBrock (2000), Liu and Liu (1999) and Smith (1995) cite the need to compare the impact of these programs across gender and ethnicity. Braxton et al. (2004) and Seidman (2005) have called for research into the effect of

retention programs on student populations based on both cognitive and non-cognitive predictors.

The present study focuses on the effectiveness of the LADDERS program for retaining probationary students and improving their GPA. In addition to determining the effectiveness of the program; however, this study will compare the effect of the LADDERS program across different groups of students based on demographic differences (gender and ethnicity), cognitive attributes (as measured by high school GPA), and non-cognitive attributes (as measured by the Transition to College Inventory (TCI) score).

Gender and Ethnicity

Access to postsecondary education is increasing, yet literature that examines the influence of gender and ethnicity on student success and retention is limited. Data compiled by the National Center for Educational Statistics from 2002-2003 confirm the fact that women and non-minorities account for the largest number of degrees conferred. Women receive 58% of all bachelor's degrees; and although the number of minority students in higher education is increasing, the degree completion rate for non-white students was still only 22% in 2002-2003 (Knapp et al., 2005).

The literature suggests that a difference exists in academic success and retention rates across both gender and ethnicity. Kinloch, Frost, and MacKay (1993) found that males and African Americans experience higher academic probation rates than females or other ethnic groups. Dixon (2003) examined probation statistics at a community college in California and reported that minorities and males were more likely to be placed on academic probation than whites or females. Findings from other studies revealed that

minority students experienced higher probation rates and less academic success (Jones, 2000; Mansfield, Pinto, Parente, and Wortman, 2004; O'Hare, 1986 and Ramirez & Evans, 1988;).

Hagedorn, Maxwell, and Hampton (2001, p. 243) found that retention rates differed across gender and ethnicity, "the retention rates of African-American men in community colleges are among the lowest of all ethnic groups nationally." They also discovered that "African-Americans are the only racial group in which females appear to frequently retain greater rewards than males" (Hagedorn et al., p. 244). Liu & Liu (1999) studied the retention rates of students at a mid-sized university and determined that minority students were retained at significantly lower rates. DuBrock (1999) and Smith (1995) also reported differences in retention rates based on both gender and ethnicity.

A probation intervention program developed by Kamphoff et al. (2007) significantly increased the GPA of students who participated as compared to students who did not participate. The researchers recognized, however, that "most theories examining college student success were based on data drawn from traditional-aged, white, middle-class students" (Kamphoff et al., p. 410). They cite the "need for investigation into how intervention strategies should be modified for...demographic groups" (Kamphoff et al., p. 410). Other studies have also cited the need for research on academic success programs focusing on gender and ethnicity (Coleman and Freedman, 1996; Liu and Liu, 1999; and Mann, Hunt, & Alford, 2004).

A limited number of studies have tried to identify the cause of the differences in retention rates and academic achievement between students based on gender and ethnicity. Mostly, however, the research has documented differences between students

based on factors that affect academic success including academic skills, relationships with faculty and self-efficacy.

The differences in test anxiety and study habits of students based on gender and ethnicity was the focus of research conducted by Rasor and Rasor (1998). They found that minority students have higher levels of test anxiety and poorer study habits and that females report higher levels of test anxiety. Lammers (2001) noted that although females experience higher levels of test anxiety, they enjoy higher levels of academic achievement; he attributed this to preparation because he found that females spent more time studying.

In a study on the effects of faculty mentoring on academic achievement, Anderson, Dey, Gray, and Thomas (1995) discovered that “faculty interest in a student’s progress was strongly associated with grade point average for men, but showed only a weak association with grade point average for women, especially nonwhite women” (Anderson et al., p. 18). They also found that women, especially white women, wanted “honest feedback about [their] skills and abilities” (Anderson et al., p. 18).

Mayo and Christenfeld (1999) conducted a study on the self-efficacy of students based on gender and ethnicity. They determined that both gender and ethnicity have an effect on the expectations of success in an academic setting. Non-minority men expected that they would be successful at academic tasks. Non-minority women did not expect that they would be as successful as other students but that women have the ability to be successful. Minority women did not expect to be successful at academic tasks nor did they expect other minority women to be successful. Minority men rated their

expectations for success the lowest and did not expect other minority men to be successful.

Research conducted by Sheu and Sedlacek (2002) examined the willingness of students to seek help with academic skills and career counseling. They observed that African-American students are more likely than white students to accept help. Additionally, "African-Americans had more positive attitudes toward seeking help only for study skills, time management trainings and career counseling" (Sheu & Sedlacek, p. 12). They also found that "female students were more willing to utilize professional help sources than males, regardless of ethnicity" (Sheu & Sedlacek, p. 13).

Guiffrida (2005) studied the expectations of African-American students and those from other ethnic groups with regard to their relationships with faculty. He determined that African-American students expected and needed a more student-centered relationship with their faculty and advisors than did other students. However, the level of involvement expected by African-American students is often not consistent with the level of involvement that faculty and advisors at institutions expect to provide (Guiffrida, 2005).

Through a survey of the experiences of African-American students at predominantly white campuses, Credle and Dean (1991) developed a model for working with African-American students in an academic setting. They articulated a series of recommendations and emphasized that African-American students need to 1) learn the organizational system of the institution and its policies; 2) connect with a mentor; and 3) explore career options.

Flowers (2004) reviewed the literature on the retention of African-American students and also formulated recommendations for working with this population of students. Two of his recommendations echo those put forth by Credle and Dean (1991): 1) advise African-American students on the support systems and services the institution can provide to them and 2) provide support to African-American students in the form of career and goal counseling.

Differences in student success based on gender and ethnicity have been recognized (Dixon, 2003; Jones, 2000; Kinloch et al., 1993; Mansfield et al., 2004; O'Hare, 1986 and Ramirez and Evans, 1988) and some researchers have attempted to explain why the differences exist (Anderson et al., 1995; Guiffrida, 2005; Mayo and Christenfeld, 1999; Rasor and Rasor, 1998 and Sheu and Sedlacek; 2002) and others have suggested strategies for working with students based on ethnicity (Credle and Dean, 1991 and Flowers, 2004). The research on the LADDERS program intends to add to the literature by determining if differences exist in the effectiveness of a probation intervention program when gender and ethnicity are taken into account.

High School GPA

Research on college students' high school GPA focuses on using the GPA to predict retention and academic success of students in a college setting. Although the Scholastic Aptitude Test (SAT) and ACT are used in admissions decisions, numerous studies have shown that high school GPA is a more accurate predictor of both retention (Astin and Oseguera, 2005; DuBrock, 1999; Feldman, 1993; Lotkowski, Robbins, and Noeth, 2004 and Smith, Edminster, and Sullivan, 2001) and academic performance (Bontekoe, 1992; Mortenson, 2005 and Trombley, 2000) in college. This study will

examine if the effectiveness of an academic probation intervention program differs among students based on their high school GPA.

Waugh, Micceri, and Takalkar (1994) correlated the retention information for over 8,000 students with numerous predictive factors. They found that “SAT/ACT scores are unrelated to retention” (Waugh et al., p. 5). Their results also showed that students who earned a higher GPA in high school were retained at a higher rate. Hagedorn, Maxwell, and Hampton (2001) studied the retention of African-American males and determined that high school GPA and goal commitment were the best predictors of retention for this group of students. Snyder, Hackett, Stewart, and Smith (2002) examined the retention rates of over 500 students and discerned that high school GPA was the best predictor of retention rates.

In looking at the differences between probationary students and students in good standing, Isonio (1995) determined that, “past academic history is a strong predictor of current academic performance” (p. 9) and that high school GPA could help predict which students would experience difficulty. Trombley (2000) also compared the characteristics of students in good standing and students on academic probation at an urban college. She found that “students on probation reported a lower high school GPA than students in good standing” (Trombley, p. 239). Bryson, Smith, and Vineyard (2002) also found that high school GPA is a more accurate predictor of college success for African-American students than white students.

Existing research has highlighted the relationship between high school GPA and academic success. However, no research exists that examines the differences in the effectiveness of a probation intervention program between students based on high school

GPA. This study examines the high school GPA of the students participating in the LADDERS program to determine if there is a relationship between a student's high school GPA and the effectiveness of the LADDERS probation intervention program.

Non-cognitive factors

Non-cognitive factors refer to those attitudes and traits that students bring with them to college and include academic skills, motivation, goals and self-efficacy. The definition of which attitudes and traits are considered to be non-cognitive factors vary between authors but Robbins et al. (2004) provide the most comprehensive definition and classification of non-cognitive factors in their meta-analysis of 109 studies on college students' academic performance and retention. Using definitions provided by the authors of the studies reviewed, Robbins et al. identified nine constructs or categories of non-cognitive factors that are important to achievement and persistence: achievement motivation, academic goals, institutional commitment, perceived social support, social involvement, academic self-efficacy, general self-concept, academic-related skills and contextual influences. The importance of many of these attitudes and traits has been reviewed individually in the previous section on program content; studies that examine non-cognitive factors collectively usually include several of these attitudes and traits.

Tracey and Sedlacek (1984) surveyed incoming freshmen using the Non-Cognitive Questionnaire (NCQ), an instrument of their design, and found that a student's non-cognitive traits were predictive of both retention and performance in college. They also determined that SAT scores were not predictive of either performance or retention (Tracey & Sedlacek, 1984). In a follow-up study they refined their research to determine if the predictive value of non-cognitive traits vary with ethnicity. They found that the

particular factors affecting performance and retention differed among white and minority students (Tracey & Sedlacek, 1985). Specifically, it was found that the most predictive non-cognitive variable for minority students is academic self-efficacy, a finding echoed by Mayo and Christenfeld (1999).

Arbona and Novy (1990) examined non-cognitive factors as predictors of retention and performance. Their results “suggest that for white students, academically-related variables are the best predictors of grades, whereas nonacademic variables are the best predictors of persistence in college” (Arbona & Novy, p. 420). Similarly, Schwartz and Washington (2002) found that non-cognitive variables were reliable in predicting the academic success of black students. Robbins et al. (2004) showed that different factors predicted retention and performance; retention is best predicted by academic goals, academic self-efficacy and academic related skills whereas performance is best predicted by academic self-efficacy and achievement motivation (Robbins et al.).

Old Dominion University assesses the non-cognitive factors that incoming first-year students bring with them to college using the Transition to College Inventory (TCI) (Pickering, Calliotte, & McAuliffe, 1992). The TCI can be divided into five constructs: 1) reasons for attending college; 2) reasons for choosing Old Dominion University; 3) extra-curricular activities and commitments in the senior year of high school; 4) self-assessment of ability and traits; and 5) self-prediction of academic and social success in college (Pickering et al.). This instrument has been used at Old Dominion University for over twelve years to predict which students will encounter academic difficulty and are at risk of leaving the university after their first year. The present study seeks to determine if

there is a relationship between a student's non-cognitive attributes (as measured by the TCI) and the effectiveness of the LADDERS probation intervention program.

Summary of background variables

The purpose of this research is to determine the effectiveness of the LADDERS probation intervention program and if its impact varies based on a student's gender, ethnicity, cognitive attributes and non-cognitive attributes. The students' GPA in the semester that they participated in the LADDERS program and student retention from first to second year will be used to measure the program's success.

Bean (1980) and Tinto (1982) highlighted the differences in student retention and success based on gender, ethnicity and high school GPA and they called for research into these differences. Other authors (Braxton, Hirschy, and McClendon, 2004; DuBrock, 2000; Liu & Liu, 1999; Seidman, 2005 and Smith, 1995) continue to advocate for research into the retention and success of different subsets of students based on gender, ethnicity, and cognitive and non-cognitive attributes.

Some authors (Anderson et al., 1995; Guiffrida, 2005; Mayo and Christenfeld, 1999; Rasor and Rasor, 1998 and Sheu and Sedlacek; 2002) have attempted to explain why differences exist in the academic success of students based on their gender and ethnicity. They found that factors that affect academic success; academic skills, student relationships with faculty members and self-efficacy, differ based on gender and ethnicity. Credle and Dean (1991) and Flowers (2004) recommended that faculty and administrators working with African American students help them 1) learn the organizational system of the institution and its policies; 2) connect with a mentor; and 3) explore career options. The LADDERS program addresses both the factors affecting

academic success and the specific topics recommended by Credle and Dean and Flowers in an effort to improve the academic success of all students.

Numerous studies have established the link between high school GPA and academic success and retention in college (Astin and Oseguera, 2005; Bontekoe, 1992; DuBrock, 1999; Edminster, and Sullivan, 2001; Feldman, 1993; Hagedorn et al., 2001; Mortenson, 2005; Smith, Lotkowski, Robbins, and Noeth. 2004; Snyder et al., 2002; Trombley, 2000 and Waugh et al., 1994). No research exists however, that examines the differences in the effectiveness of a probation intervention program between students with different high school GPAs. This research examines the high school GPA of the students participating in the LADDERS program to evaluate whether there is a relationship between a student's high school GPA and the effectiveness of the LADDERS probation intervention program.

Non-cognitive factors include the attitudes and traits that students bring with them to college. Tracey and Sedlacek (1984 and 1985) determined that non-cognitive factors predict student academic performance and retention in college. Arbona and Novy (1990) expanded on the work of Tracey and Sedlacek finding that the specific non-cognitive traits used to predict performance and retention varied with ethnicity. Old Dominion University measures the non-cognitive attributes of all incoming first-year students using the TCI (Pickering et al., 1992). This study determines if the effectiveness of a probation intervention program is influenced by the non-cognitive attributes of the students in the program.

Study and Rationale

The literature abounds with descriptions of probation and retention programs but as the review of literature illustrates, only a handful of authors (Bednar and Weinberg, 1970; Coleman and Freedman, 1996; Foreman et al., 1990; Humphrey, 2006; Kamphoff et al., 2007 and Lipsky and Ender, 1990) empirically evaluated the effectiveness of their programs. This research contributes to the literature on retention and probation programs by empirically evaluating the effectiveness of a probation intervention program.

The LADDERS program incorporates similar content and format as found in many probation and retention programs but has added content pertaining to learning style awareness. Learning style awareness has been shown to be successful for first-year students (Lenehan, Dunn, Ingham, Singer, and Murray, 1994 and Matthews, 1991), but no research exists that specifically uses this approach with probationary students. This study will add extend this line of inquiry by evaluating a probation intervention program that uses learning style awareness with probationary students.

The literature has cited the need to study the effectiveness of probation intervention programs and if their impact varies based on a student's gender, ethnicity, cognitive attributes and non-cognitive attributes (Bean, 1980; Braxton et al., 2004; DuBrock, 2000; Kamphoff et al., 2007; Liu and Liu, 1999; Seidman, 2005; Smith, 1995 and Tinto, 1982). This study will contribute to the literature by examining the effectiveness of a probation intervention program on students of different gender, ethnicity, cognitive attributes and non-cognitive attributes

In response to the review of literature, this research seeks to answer the following questions.

1. Is there a difference in academic achievement, as measured by GPA and retention rates, between students who attend the LADDERS program for students on academic probation and those who do not?
2. Is there a difference in the effectiveness of the LADDERS program, based on demographic characteristics (gender and ethnicity) of the student and LADDERS attendance?
3. Is there a difference in the effectiveness of the LADDERS program, based on the cognitive attributes (high school GPA) of the student and LADDERS attendance?
4. Is there a difference in the effectiveness of the LADDERS program, based on non-cognitive attributes (as measured by the TCI score) of the student and LADDERS attendance?

To address these questions two hypotheses will be posited based on the literature reviewed in this chapter.

1. Students on academic probation who attend the LADDERS program will earn a significantly higher semester GPA and be retained at a significantly higher rate from first to second year than students on academic probation who do not participate in LADDERS.

To address the relationship between the GPA and retention of students who participate in LADDERS and their demographic characteristics (gender and ethnicity), cognitive attributes (high school GPA) and non-cognitive attributes (as measured by the TCI score) a second non-directional hypothesis will be evaluated. The second hypothesis is non-

directional because there was not enough compelling research evidence to support a directional hypothesis.

2. The effectiveness of the LADDERS program will be influenced by students' demographic characteristics (gender and ethnicity), cognitive attributes (high school GPA) and non-cognitive attributes (as measured by the TCI score).

Summary

The LADDERS program is designed to increase retention and academic achievement of students in academic difficulty. It has incorporated the best practices and adopted individual activities from retention and probation programs proven successful through empirical research. LADDERS also includes activities intended to increase student self-efficacy and motivation, components shown through research to be related to student achievement. The use of learning-style awareness in a probation intervention program is unique to LADDERS. This factor has been correlated to increased academic achievement for first-year students but it has not been studied in the context of students in academic difficulty.

The review of literature illustrated that differences exist in students' academic achievement and retention based on their gender and ethnicity, cognitive attributes and non-cognitive attributes. This study intends to add to the existing literature on student retention and achievement by determining how the effectiveness of the LADDERS probation intervention program is influenced by gender and ethnicity, cognitive and non-cognitive attributes.

Chapter 3

METHODS

Design and Overview

The present study employs a non-experimental, *ex post facto* design to determine whether the LADDERS (Let Academic Difficulty Disappear to Energize and Retain Students) program developed by Old Dominion University is an effective model that can be used to improve academic achievement and retention rates of probationary undergraduate students. Two matched groups of students were compared on mean semester GPA and retention across the number of LADDERS sessions attended. Additionally, this research evaluated the relationship between the GPA and retention of students who participate in LADDERS and their gender, ethnicity, cognitive and non-cognitive attributes.

The study uses quantitative methods to assess the following research questions:

1. Is there a difference in academic achievement, as measured by GPA and retention rates, between students who attend the LADDERS program for students on academic probation and those who do not?
2. Is there a difference in the effectiveness of the LADDERS program, based on demographic characteristics (gender and ethnicity) of the student and LADDERS attendance?
3. Is there a difference in the effectiveness of the LADDERS program, based on the cognitive attributes (high school GPA) of the student and LADDERS attendance?

4. Is there a difference in the effectiveness of the LADDERS program, based on non-cognitive attributes (as measured by the TCI score) of the student and LADDERS attendance?

Participants

A total of 406 first-year students were invited to participate in the LADDERS program during the second semester of the 2003, 2004 and 2005 academic years. This population does not include transfer students; only students who began their first year at Old Dominion. All first-year students, advised in one of six colleges, who were placed on academic probation, received an invitation. A GPA of less than 2.0 defines academic probation. The LADDERS program is voluntary and usually slightly less than 50% of all students who were invited attended at least one session. The program lasts for an entire semester (14 weekly meetings). Not all students who participated attended all 14 meetings.

Table 1 shows the demographic breakdown of students who were invited to participate in the LADDERS program. Slightly more males than females were invited and a larger number of white students were invited than black students. About a third of the students were an ethnicity other than white or black.

Table 1

Demographic Characteristics of Participants invited to LADDERS

Demographic Characteristics	Number of Participants
Male	217
Female	189
White Non-Hispanic	187
Black Non-Hispanic	137
Hispanic	20
Asian/Pacific Islander	31
American Indian/Alaskan Native	3
Other	13
Did not provide	15

The students invited to participate in LADDERS entered college with a B average from high school; their average high school GPA was 3.12. Of the students invited to LADDERS 70.5% were considered to be at low risk for academic probation using the TCI. Only 13.8% were considered to be at high risk for academic probation and 15.7% were considered to be at medium risk for academic probation. Therefore, few of the invited students were considered “at risk” for academic probation based on TCI scores, yet they all found themselves with a first semester GPA less than 2.0. Of students invited to LADDERS, a total of 271 or 64.4% of them returned to the university after their first year.

A total of 406 students were invited to LADDERS; 191 students attended the program at least once and 215 never attended. The high school GPA, TCI risk group and demographic characteristics of the students who participated in LADDERS were

compared to the students who did not participate to determine if there were significant differences between the two groups of students on these variables. Table 2 shows the differences between students who participated in LADDERS and those who did not along with any significant differences. An independent t-test compared the mean high school GPA of the two groups and found no significant difference ($t(404) = -1.16, p = .246$). Additionally, there was no significant difference between the TCI risk categories of students in the two groups $\chi^2(2, N = 406) = 3.48, p = .176$. The two groups did differ significantly, however, in their demographic characteristics. Based on the odds ratios female students were 1.65 times more likely to attend LADDERS than male students $\chi^2(1, N = 406) = 5.80, p = .016$. African American students were 3.0 times more likely to attend the program than White students or those students classified as Other $\chi^2(2, N = 406) = 26.65, p < .001$. This finding is consistent with research published by Sheu and Sedlacek (2002). They found that “African American students tended to have more positive attitudes toward seeking help” and that “female, regardless of race, were more receptive of study skills and time management training” (Sheu & Sedlacek, p. 1).

Table 2

Differences between students who participated in LADDERS and those who did not

Variable	Participated in LADDERS	Did not participate	Sig.
Gender	90 male	127 male	.016
	101 female	88 female	
Ethnicity	71 white	116 white	< .001
	89 black	48 black	
	31 other	51 other	
TCI Risk group	28 high	33 high	.176
	25 medium	40 medium	
	142 low	142 low	
Average High school GPA	3.13	3.10	.485

Data Collection

At Old Dominion University, first year students with a high school GPA less than 2.8 or students who were not decided about a major were identified as “at risk” and were advised by a central office and received intrusive advising their first semester. If these students were placed on academic probation after their first semester, they received intervention from the central advising office. All other first year students were advised in their colleges and did not receive intrusive advising during their first semester. All of the students in this second group who were placed on academic probation after their first semester were invited to the LADDERS program. The semester GPA and retention

statistics for every student that was invited to LADDERS was collected at the end of the second semester whether they attended the program or not.

Data that is available about the students invited to LADDERS includes demographic characteristics (gender and ethnicity), cognitive predictors of student success (high school GPA), non-cognitive predictors of student success (as measured by the Transition to College Inventory (TCI)), the first semester GPA at Old Dominion (which is referred to as Fall GPA), the GPA from the second semester at Old Dominion (which is referred to as the Spring GPA), the number of times that the student attended the LADDERS program (0-14) and whether the student was retained at the university after the first year.

Variables and Operational Definitions

The variables used in evaluating LADDERS are explained in this section. The independent variables include attendance in the LADDERS program, demographic characteristics, cognitive predictors and non-cognitive predictors. The dependant variables include Spring GPA and retention. A summary of the operational definition of all the variables used in this study is included in Table 3.

Table 3

Operational Definitions

Variable	Operational Definition
Demographic characteristics	Self reported Gender: male or female Ethnicity: non-minority, minority, other
Cognitive attributes	High school GPA from students' high school transcript
Non-cognitive attributes	Score on the TCI reported as high, medium or low risk group for probation. Score obtained from Office of Institutional Research
Spring GPA	Students' GPA for the semester they attend LADDERS. Obtained from students' ODU transcript.
Retention	Enrollment in second year, obtained from students' ODU transcript. 1. retained: students enrolled in classes their second year 2. not retained: students did not enroll in classes their second year

LADDERS Attendance

The number of times the student attended LADDERS, recorded by the researcher

Attendance

The students' attendance in LADDERS was recorded weekly and is reflected in the data analysis by the variable referred to as "attend." Each student's attendance in LADDERS was recorded weekly. Although this variable is continuous, and ranges from 0 to 14, in the analyses the attendance will be divided into four categories; high attendance, medium attendance, low attendance and no attendance. The number of students in each of the four categories is shown in Table 4.

Table 4

Attendance of Participants invited to LADDERS grouped by category

Attendance category	Number of times student attended LADDERS	Number of Participants
Zero	Never attended LADDERS	215
Low attendance	Attended LADDERS 1-4 times	58
Medium attendance	Attended LADDERS 5-9 times	62
High attendance	Attended LADDERS 10 or more times	71

Demographic characteristics

The demographic characteristics used in this study are gender and ethnicity. The gender and ethnicity for each student was obtained from BANNER, the Old Dominion University student information system. Gender and ethnicity was self-reported by the

students on their university admissions application. The variable gender is coded as either male or female. Student ethnicity is coded as minority, non-minority or other for the purpose of data analysis. As described in Table 1, most of the participants were either White Non-Hispanic (n = 187) or Black Non-Hispanic (n = 137). Because there were so few participants in the other ethnic groups, these have been collapsed into the Other category (n = 82).

Cognitive predictors

Students' high school GPA was used as a predictor of cognitive ability. High school GPA was chosen for this measure because numerous studies have shown that high school GPA is a more accurate predictor of both retention (Astin and Oseguera, 2005; DuBrock, 1999; Feldman, 1993; Lotkowski, Robbins, and Noeth, 2004 and Smith, Edminster, and Sullivan, 2001) and academic performance (Bontekoe, 1992; Mortenson, 2005 and Trombley, 2000) in college. The high school GPA was obtained from the student information system, which records the GPA from the students' high school transcripts.

Non-cognitive predictors

Non-cognitive predictors used in this study are represented by the Transition to College Inventory (TCI) score. Old Dominion University assesses the non-cognitive factors that incoming first-year students bring with them to college using the TCI survey instrument (Pickering, Calliotte, & McAuliffe, 1992). This instrument is administered to students during Preview orientation and has been used for over twelve years to predict which students will encounter academic difficulty and are at risk of leaving the university after their first year. The TCI score itself is a continuous variable but is used to classify

students' risk for probation as high, medium or low. The non-cognitive variable used in the analysis of data, therefore will be risk group, which has three levels: high, medium and low. The TCI score for each student was obtained from the Office of Institutional Research, the office responsible for administering the instrument.

The Transition to College Inventory (TCI) is an instrument that was developed at Old Dominion University to survey students on non-cognitive characteristics identified in the literature as important to first year student success. The survey is composed of 115 questions or items that measure attitudes, characteristics and behaviors in high school and predicts performance and involvement in college of the incoming students. A factor analysis resulted in nine factors; college involvement, influences on college choice, student role commitment, athletic orientation, personal and academic concerns, self-confidence, institutional commitment, socializing orientation and independent activity focus. The TCI authors used a regression analysis to compare student responses on the TCI to the students' performance in their first semester for over 8,000 students at multiple institutions and determined that only 5 of the factors, composed of 45 items, were significantly related to academic performance.

1. Student Role Commitment: the items on this factor include the attitudes and behaviors that are associated with students who are successful in college such as time management and study skills as well as completion of assignments and the importance of succeeding academically.
2. Athletic Orientation: the items on this factor refer to the amount of time a student anticipates spending on organized sports or personal exercise programs.

3. Self-confidence: these items reflect the students' confidence in their academic and personal skills and abilities.
4. Socializing Orientation: items on this factor include the type of social activities students will pursue in college and the amount of time they will devote to these activities.
5. Independent Activity Focus: the amount of time a student will spend on solo activities such as reading, exercising or other activity that is done by the student alone.

For each of the 45 items on the TCI there are responses that correlate to responses given by students who completed their first semester in academic difficulty. The student's TCI score is the total number of questions for which the student chose that targeted response. Students with a TCI score of 5 and less are considered at low risk for being placed on academic probation. Students with a TCI score between 6 and 8 are considered medium risk and TCI scores of 9 or more are considered high risk for academic probation. The Appendix contains a table showing each of 45 items that make up the TCI score organized by factor.

The TCI considers a range of non-cognitive variables that affect a student's performance in their first semester. The advantage of using the TCI is that this range of non-cognitive variables is aggregated into one variable, the TCI score. Although the TCI score is a measure of non-cognitive attributes, for this study students will be compared based on their risk category.

The TCI was designed to predict student success; validity was demonstrated by "comparing the responses to each item by first-year students who ended their first

semester in academic difficulty versus those who did not” (Pickering, Calliotte, Macera, & Zerwas, 2007; p.3). Using a logistic regression they found that the TCI accurately predicted which students finished their first semester in academic difficulty.

The developers of the TCI did not calculate reliability coefficients for the instrument. They used the factor analysis and a stepwise regression to demonstrate reliability and validity. In a personal communication, the authors indicated that due to questions that this study prompted about reliability and validity, they plan to undertake a review of the existing data this coming year to determine reliability and validity using other statistical methods. The lack of reliability coefficients for the TCI is a limitation of using this instrument.

The Transition to College Inventory has been used in several other dissertations to predict student performance among distinct populations. Freeze (2000) used the TCI to predict the academic performance and retention of first year students in a community college. Although Freeze could not identify which non-cognitive factors were most predictive of a student’s academic performance and retention, the instrument in its entirety predicted student performance and retention with a significance level of $p < .001$. Duggan (2003) modified the TCI for use with transfer students. She also found that the instrument accurately predicted student performance and retention. Cunningham (1994) studied the accuracy of using TCI scores of student athletes to predict success in college. Using discriminant analysis, he found that the TCI score was the most predictive of student academic performance and retention. These studies further support the validity of the TCI in predicting success in college. The LADDERS study builds on these previous

works by examining if the effectiveness of a probation intervention program varies with a student's TCI score.

Semester GPA

The GPA for each student's first year at Old Dominion is used in this study. The Fall GPA is the GPA from the student's first semester at Old Dominion and was used to determine probation status. Students with a first semester GPA of less than 2.0 are placed on academic probation. The Spring GPA is one of the dependant variables and refers to the GPA the student earned during the semester they were invited to LADDERS. Both the Fall and Spring GPA are continuous variables and were obtained from the BANNER system.

Retention

The student retention statistic, the other dependant variable, is based on student enrollment subsequent to the first year. Students who attended Old Dominion after their first year were retained and students who did not attend after their first year were not retained. The retention data was obtained from the BANNER system. Retention is a dichotomous variable that denotes whether a student is enrolled in coursework the semester after they participated in LADDERS.

Data Analysis

The analyses and results were organized by research question. Table 5 lists the research questions, the variables examined and the statistical tests used to evaluate the questions.

Question 1

Is there a difference in academic achievement, as measured by GPA and retention rates, between students who attend the LADDERS program and those who do not?

This is a two-part question: do students in LADDERS earn higher GPAs and are they retained at a higher rate? For the first question, an analysis of variance (ANOVA) determined if there was a significant difference in the Spring GPAs of the students based on their attendance in LADDERS. The dependant variable was Spring GPA and the independent variable was attendance in LADDERS.

The second question was evaluated using logistic regression. The criterion variable was retention and the predictor variable was number of times the student attended LADDERS. A logistic regression was used because the study is examining if there is a significant difference in retention. Retention is a categorical variable, a student is either retained or not, and categorical variables are evaluated using logistic regression.

Question 2

Is there a difference in the effectiveness of the LADDERS program, based on demographic characteristics (gender and ethnicity) of the student and LADDERS attendance?

This research question determined whether a student's gender and ethnicity, along with attendance influence the effectiveness of the LADDERS program as measured by 1) Spring GPA and 2) retention. To evaluate this question a subset of the data set, only those students, who attended LADDERS, was used. The first part of the question was examined using a Factorial ANOVA with gender (male, female), ethnicity (minority, non-minority, other) and attendance (high, medium, low) as the independent variables

and Spring GPA as the dependant variable. The second part of the question was examined using a logistic regression with the same independent variables but with the categorical variable, retention, as the predictor variable.

Question 3

Is there a difference in the effectiveness of the LADDERS program, based on the cognitive attributes (high school GPA) of the student and LADDERS attendance?

As in the previous case, this question was evaluated using only a subset of the data. This question determined if a student's cognitive attribute, as measured by high school GPA, along with attendance influences the effectiveness of the LADDERS program as measured by 1) Spring GPA and 2) retention. First, a Factorial ANOVA was performed to determine if there was a significant difference in the Spring GPAs of the students based on their high school GPA and participation in LADDERS. The dependant variable was Spring GPA and the independent variables were high school GPA and LADDERS' attendance (high, medium, low).

A logistic regression evaluated the second part of this question. The predictor variables were high school GPA and attendance and the criterion variable was retention.

Question 4

Is there a difference in the effectiveness of the LADDERS program, based on non-cognitive attributes (as measured by the TCI) of the student and LADDERS attendance?

This research question determined whether a student's non-cognitive attributes, along with attendance influences the effectiveness of the LADDERS program as measured by 1) Spring GPA and 2) retention. Again, only a subset of the data was used

to evaluate this question. First, the question was examined using a Factorial ANOVA with TCI risk group (high, medium, low) and LADDERS attendance (high, medium, low) as the independent variables and Spring GPA as the dependent variable. The question was next examined using a logistic regression with the same independent variables but the categorical variable, retention, as the predictor variable. Additionally, student subscale scores on the TCI were analyzed as part of question 4 to determine if there was a difference in the effectiveness of LADDERS based on a student's subscale scores.

Table 5 summarizes the research questions and analyses used in this study. For each question the variables are identified and the analyses used to evaluate the question are listed.

Table 5

Questions evaluated

Question	Independent Variables	Dependent Variables	Statistical Test
Question 1	Attendance	Spring GPA	ANOVA
		Retention	Logistic regression
Question 2	Gender and ethnicity	Spring GPA	Factorial ANOVA
	LADDERS Attendance	Retention	Logistic regression
Question 3	High School GPA	Spring GPA	Factorial ANOVA
	LADDERS Attendance	Retention	Logistic Regression
Question 4	Risk group	Spring GPA	Factorial ANOVA
	LADDERS Attendance	Retention	Logistic regression

Chapter 4

RESULTS

This research seeks to determine whether the LADDERS program can be used as an effective model for working with students on academic probation. Specifically, this study examined the effect of attendance in LADDERS on student semester GPA and retention. Additionally, the influence of gender, ethnicity, cognitive factors and non-cognitive factors on the effectiveness of LADDERS was considered.

Findings

Research Question 1: Effect of LADDERS attendance on GPA and retention

The first research question examined the difference in academic achievement, as measured by GPA and retention between students who attended the LADDERS program and those who did not. This is a two-part question: do students in LADDERS earn higher semester GPAs and are they retained at a higher rate? This question only considered two levels of attendance; attended at least one session of LADDERS and never attended.

For the first part of the question, a one-way analysis of variance (ANOVA) was conducted to evaluate if students who participated in at least one session of LADDERS earned a significantly higher GPA. The dependant variable was Spring GPA, and the independent variable; attend, consisted of two levels; attended at least one session and never attended. The ANOVA indicated significant differences in semester GPA between the two groups, $F(1, 404) = 21.23, p \leq .001, \text{partial } \eta^2 = .050$. Students who participated in at least one session of the LADDERS program earned a significantly higher mean semester GPA ($M = 2.05, SD = 1.00$) than students who never participated

($M = 1.60$, $SD = 0.95$). Table 6 provides the mean semester GPA and standard deviation for students who attended the LADDERS program and those who did not.

Table 6

Mean semester GPA of students who participated in LADDERS and those who did not

Students	Mean GPA	Standard Deviation
Participated in LADDERS (n = 191)	2.05	1.00
Did not participate (n = 215)	1.60	0.95

The second part of question 1 examined the relationship between attending LADDERS and retention. A Chi-Square was used to determine if students who attend at least one session of LADDERS were more likely to be retained after their first semester than students who never attended LADDERS. There was no significant difference in the retention rates of students in the two groups $\chi^2(1, N = 406) = 3.178, p = .076$. Students who attended at least one session of LADDERS were not significantly more likely to be retained after their first semester than a student who did not participate. The contingency table for the Chi-Square analysis is contained in Table 7.

Table 7

Contingency table showing frequency of students retained by attendance

Attendance	Not retained	Retained	Percent retained
Never attended	81	134	62
Attended at least one session	56	135	71

This question was re-examined using logistic regression to determine if the number of times a student attended LADDERS (0 – 14) could be used to predict retention. The contingency table for this analysis is contained in Table 8. The logistic regression model established that the number of times a student attended the program was a significant predictor of retention. For every one-unit increase in attendance, the odds of the student being retained to the second semester increased by a factor of 1.10. Table 9 lists the odds ratio, degrees of freedom and significance for variables used in the logistic regression.

Table 8

Contingency table showing frequency of students retained by attendance

Number of times attended	Not retained	Retained	Percent retained
0	81	134	62
1	9	12	57
2	2	7	78
3	12	8	40
4	0	8	100
5	7	2	22
6	3	5	63
7	8	12	60
8	5	7	58
9	2	11	85
10	2	11	85
11	2	13	87
12	2	16	89
13	0	14	100
14	2	9	82

Table 9

Odds ratio for logistic regression model that uses number of times attended to predict retention

Variable	<i>B</i>	Df	<i>P</i>
Number of times attended	1.10	1	<.001
Constant	1.46	1	.003

These findings indicate that attendance in LADDERS does affect both the semester GPA and the retention of students. The impact of this program, however, is dependant upon the number of times the student attends. Therefore, in the examination of subsequent research questions, the variable attendance will be included in the analyses.

Research Question 2: Effect of gender, ethnicity and LADDERS attendance on GPA and retention

The second research question evaluates the relationship between the student's gender and ethnicity, along with attendance, on the effectiveness of the LADDERS program. To address this question a subset of the data set, only those students, who attended at least one session of LADDERS, was used. This question first examines the effect of gender, ethnicity and attendance in LADDERS on semester GPA individually. Next, the two-way interactions between gender and attendance, ethnicity and attendance and gender and ethnicity are studied, followed by the three-way interaction of gender, ethnicity and attendance.

There was a significant main effect for the number of times a student attended the program and their mean semester GPA, $F(2,173) = 8.31, p < .001, \text{partial } \eta^2 = .088$. A

post hoc test revealed that mean semester GPA was significantly higher for students with high attendance ($M = 2.47$, $SD = 0.66$) than for students with medium ($M = 1.95$, $SD = 0.98$) or low attendance ($M = 1.66$, $SD = 1.04$). There was no significant difference between the mean GPA of students with low attendance and students with medium attendance. Table 10 lists the means and standard deviations for students with high, medium and low attendance in LADDERS.

Table 10

Semester GPA of students with high, medium and low attendance in LADDERS

Attendance	N	M	SD
Low attendance	58	1.66	1.04
Medium attendance	62	1.95	0.98
High attendance	71	2.45	0.66

The main effect for gender was not significant, $F(1,173) = 3.13$, $p = .078$, partial $\eta^2 = .018$. Although the ANOVA did not indicate significant differences, the mean semester GPA for males ($M = 1.89$, $SD = 0.92$) was lower than the mean semester GPA for females ($M = 2.20$, $SD = 0.97$). Table 11 displays the means and standard deviations of male and female students who attended LADDERS.

Table 11

Semester GPAs for male and female students who attended LADDERS

Gender	N	M	SD
Males	90	1.89	0.92
Females	101	2.20	0.97

The main effect for ethnicity was not significant, $F(2,173) = 1.25$, $p = .29$, partial $\eta^2 = .014$; although minority students ($M = 2.20$, $SD = 0.86$) earned higher mean semester GPAs than non-minority students ($M = 1.94$, $SD = 1.03$) or those whose ethnicity was classified as other ($M = 1.86$, $SD = 1.00$). Table 12 contains the mean semester GPAs for students in LADDERS based on ethnicity.

Table 12

Semester GPAs for students who attended LADDERS by ethnicity

Ethnicity	N	M	SD
Non-minority	71	1.95	1.03
Minority	89	2.20	0.86
Other	31	1.86	1.00

The interaction effect between gender and attendance was evaluated and no significant differences in mean semester GPAs were found, $F(2, 173) = 0.055$, $p = .946$, partial $\eta^2 = .001$. As observed with the main effect for gender, the mean semester GPAs of females with high ($M = 2.57$, $SD = 0.64$), medium ($M = 2.15$, $SD = 1.05$) and low ($M = 1.71$, $SD = 1.06$) attendance were higher than mean semester GPAs for males with high ($M = 2.32$, $SD = 0.66$), medium ($M = 1.77$, $SD = 0.89$) and low attendance ($M = 1.59$, $SD = 1.05$); however these differences were not statistically significant. Table 13 provides the descriptive statistics for the GPAs of students based on gender and attendance in LADDERS.

Table 13

Semester GPAs for students who attended LADDERS based on gender and attendance

		Males			Females		
		N=90			N=101		
Attendance in	N	M	SD	N	M	SD	
LADDERS							
Low	28	1.59	1.05	30	1.71	1.06	
Medium	33	1.77	0.89	29	2.15	1.05	
High	29	2.32	0.66	42	2.57	0.64	

The interaction effect for ethnicity and attendance was not significant, $F(4,173) = 1.26$, $p = .29$, partial $\eta^2 = .028$. Table 14 presents the descriptive statistics for students by ethnicity and attendance in LADDERS.

Table 14

Mean Semester GPA as a function of Ethnicity and LADDERS attendance

Ethnicity	Attendance	N	M	SD
Non-minority	Low	24	1.48	1.11
	Medium	22	1.81	0.99
	High	25	2.52	0.66
Minority	Low	22	1.78	0.94
	Medium	32	2.16	0.90
	High	35	2.51	0.64
Other	Low	12	1.78	1.12
	Medium	8	1.48	1.10
	High	11	2.22	0.71

The ANOVA indicated no significant 3-way interaction between attendance in LADDERS, gender and ethnicity, $F(4,173) = .627, p = .644, \text{partial } \eta^2 = .014$. The means and standard deviations for the Spring GPA as a function of attendance, gender and ethnicity are listed in Table 15. It is interesting to note that with the exception of females classified as Other ($M = 2.28, SD = 1.18$), all students with low attendance in LADDERS, regardless of gender or ethnicity (non-minority male, ($M = 1.66, SD = 1.10$), minority male ($M = 1.64, SD = 1.11$) other male, ($M = 1.43, SD = 1.01$), non-minority female ($M = 1.24, SD = 1.14$), minority female ($M = 1.85, SD = 0.88$)), earned a mean semester GPA of less than 2.0.

Table 15

*Means and Standard Deviations for Spring GPA as a function of Gender,
Ethnicity and LADDERS attendance*

Ethnic Group	Gender	Attendance	Mean	SD
Non-minority	Male	Low	1.66	1.10
		Medium	1.70	0.98
		High	2.51	0.68
	Female	Low	1.24	1.14
		Medium	2.05	1.07
		High	2.52	0.67
Minority	Male	Low	1.64	1.11
		Medium	1.92	0.84
		High	2.19	0.60
	Female	Low	1.85	0.88
		Medium	2.37	0.93
		High	2.71	0.59
Other	Male	Low	1.43	1.01
		Medium	1.34	0.72
		High	2.06	0.83
	Female	Low	2.28	1.19
		Medium	1.56	1.35
		High	2.29	0.72

The second part of research question 2 used logistic regression to determine if student retention could be predicted from gender, ethnicity and attendance in the LADDERS program, both individually and as an interaction effect. First, a logistic regression examined the relationship between attendance in LADDERS (high medium, low) and retention. As seen in the contingency table found in Table 16, students with high attendance in LADDERS are retained at a higher rate.

Table 16

Contingency table showing frequency of students retained by times attended

Attendance	Not retained	Retained	Percent Retained
Low	23	35	60
Medium	25	37	60
High	8	63	89

The results of the logistic regression reveal that the differences in attendance do significantly predict retention. The odds ratio indicates that students with high attendance in LADDERS are 5.18 times more likely to be retained than students with low attendance and 5.32 times more likely to be retained than students with medium attendance. Table 17 lists the odds ratio, degrees of freedom and significance for variables used in the logistic regression.

Table 17

Odds ratio for logistic regression model that uses attendance in LADDERS to predict retention

Variable	<i>B</i>	df	<i>P</i>
Attendance	-	2	<.001
Attendance level 1	.193	1	<.001
Attendance level 2	.188	1	<.001
Constant	7.875	1	<.001

Gender, ethnicity and attendance in LADDERS were evaluated as predictors of retention individually and attendance was found to be the only significant predictor. Next, a regression model that included gender and attendance; ethnicity and attendance and gender, ethnicity and attendance was evaluated. As illustrated in Table 18 only the interaction between one level of ethnicity and attendance was significant. The interpretation of this interaction is explained below with the corresponding contingency table contained in Table 20.

Table 18

Significance and degrees of freedom for the logistic regression model that evaluates the interaction effects between attendance, gender and ethnicity

Variable	<i>df</i>	<i>P</i>
Attendance by gender	2	.873
Attendance level 1 by gender	1	.602
Attendance level 2 by gender	1	.999
Attendance by ethnicity	4	.153
Attendance level 1 by ethnicity level 1	1	.014
Attendance level 1 by ethnicity level 2	1	.578
Attendance level 2 by ethnicity level 1	1	.602
Attendance level 2 by ethnicity level 2	1	.830
Ethnicity by gender	2	.931
Ethnicity level 1 by gender	1	.704
Ethnicity level 2 by gender	1	.999
Attendance by ethnicity by gender	4	.995
Attendance level 1 by ethnicity level 1 by gender	1	.863
Attendance level 1 by ethnicity level 2 by gender	1	.999
Attendance level 2 by ethnicity level 1 by gender	1	.999
Attendance level 2 by ethnicity level 2 by gender	1	1.000
Constant	1	< .001

The contingency tables for each of the interactions provide insight into the relationship between variables. Table 19 includes the contingency table for student retention as a function of attendance and gender. The logistic regression that examined the interaction effect between gender and attendance was not significant. Female students with the highest attendance in LADDERS earned higher GPAs than male students; however, male students were retained at a higher rate (93%) than female students (86%) at the highest attendance level.

Table 19

Contingency table for attendance by gender

Gender	Attendance	Not retained	Retained	Percent retained
Male	Low	11	17	61
	Medium	17	16	48
	High	2	27	93
Female	Low	12	18	60
	Medium	8	21	72
	High	6	36	86

The interaction between attendance and ethnicity is highlighted in the contingency table included in Table 20. The lowest level of attendance for non-minority students was determined by the logistic regression to be significant in predicting retention. The interpretation of the odds ratio reveal that non-minority students who attend the lowest number of LADDERS are 5.98 times more likely to not be retained as students whose ethnicity is classified as other and attend the highest number of sessions. These results

may be a reflection of the small sample size or may be providing evidence that LADDERS is most effective with students whose ethnicity is classified as Other. Although not significant, students with higher attendance in LADDERS are retained at a higher rate regardless of ethnicity. The conclusion that can be drawn from these findings is that further investigation into the interaction between probation interaction and ethnicity must be examined.

Table 20

Contingency table for attendance by ethnicity

Ethnic Group	Attendance	Not retained	Retained	Percent retained
Non-minority	Low*	14	10	42
	Medium	10	12	55
	High	2	23	92
Minority	Low	5	17	77
	Medium	9	23	72
	High	5	30	86
Other	Low	4	8	67
	Medium	6	2	25
	High	1	10	91

*significant at the .05 level, $B = 0.167$

Table 21 contains the contingency table for the full regression model. The most obvious relationship that can be seen from this table is that higher attendance in

LADDERS results in higher retention. This is consistent with the statistical results that show that attendance is a significant predictor of retention.

Table 21

Contingency table for attendance by ethnicity by gender

Ethnic Group	Gender	Attendance	Not retained	Retained	Percent retained
Non-minority	Male	Low	8	6	43
		Medium	8	7	47
		High	2	11	85
	Female	Low	6	4	40
		Medium	2	5	71
		High	0	12	100
Minority	Male	Low	1	6	86
		Medium	6	9	60
		High	0	13	100
	Female	Low	4	11	73
		Medium	3	14	82
		High	5	17	77
Other	Male	Low	2	5	71
		Medium	3	0	0
		High	0	3	100
	Female	Low	2	2	50
		Medium	3	2	40
		High	1	7	88

These findings indicate that for students in the LADDERS program, there is no significant difference in academic achievement or retention based on the gender and ethnicity of the student. The number of sessions students attend, however is important to achievement and retention. Students with high attendance in the LADDERS program earned higher semester GPAs than students with medium or low attendance and these students were retained at a higher rate.

Research Question 3: Effect of high school GPA and LADDERS attendance on academic achievement and retention

The third research question seeks to determine if 1) a student's cognitive attribute, as measured by high school GPA, have an effect on student achievement and retention, and 2) does a student's cognitive attribute, along with attendance in LADDERS, have an effect on student achievement and retention. As with the last research question, a subset of the data set, only those students, who attended at least one session of LADDERS, was used.

First, an ANOVA was performed to determine if there was a significant difference in the Spring GPAs of the students based on their high school GPA. Next, the interaction effect of high school GPA by attendance was examined. The dependant variable used was Spring semester GPA and the independent variables were high school GPA (high, medium, low) and LADDERS' attendance (high, medium, low). The main effect of attendance on students' semester GPA was presented as part of research question 2 and will not be repeated in this section.

The main effect for high school GPA was not significant, $F(2,188) = 1.426$, $p = .243$, partial $\eta^2 = .015$. Students with the highest high school GPAs ($M = 2.21$, $SD =$

0.97) earned higher Spring semester GPAs than students with medium ($M = 2.02$, $SD = 0.87$) or low ($M = 1.93$, $SD = 1.01$) high school GPAs but the differences were not statistically significant. Table 22 provides the mean Spring semester GPAs for students by high school GPA.

Table 22

Semester GPA of students with high, medium and low high school GPAs

High school GPA	N	M	SD
Low	64	1.93	1.01
Medium	64	2.02	0.87
High	63	2.21	0.97

A factorial ANOVA indicated no significant interaction effect between attendance in LADDERS and high school GPA, $F(4,182) = .896$, $p = .467$, partial $\eta^2 = .019$. The means and standard deviations for the Spring GPA as a function of attendance and high school GPA are listed in Table 23. Although these differences are not significant, students with the highest attendance in LADDERS, earned the highest mean semester GPA across all levels of high school GPA.

Table 23

Means and Standard Deviations for Spring GPA as a function of high school GPA and LADDERS attendance

High school GPA	LADDERS Attendance	N	Mean	SD
Low	Low	23	1.72	1.12
	Medium	21	1.71	0.97
	High	20	2.41	0.76
Medium	Low	20	1.66	0.97
	Medium	21	2.08	0.91
	High	23	2.29	0.62
High	Low	15	1.56	1.07
	Medium	20	2.06	1.05
	High	28	2.67	0.57

The second part of the research question was examined using a logistic regression to determine if high school GPA and the interaction between high school GPA and LADDERS attendance can predict student retention. As noted, the use of LADDERS attendance to predict retention will not be repeated in this section as it was discussed previously in question 2.

High school GPA alone did not predict retention. The contingency table contained in Table 24 reveals that more students were retained at the lowest level of high school GPA (73%) than were retained at the medium (67%) or high levels (71%) of high school

GPA although these results are not statistically significant. Table 25 lists the degrees of freedom and significance for the variables used in the logistic regression that tested high school GPA as a predictor of student retention.

Table 24

Contingency table showing frequency of students retained by high school GPA

High school GPA	Not retained	Retained	Percent retained
Low	17	47	73
Medium	21	43	67
High	18	45	71

Table 25

Significance and degrees of freedom for the logistic regression model that uses high school GPA to predict retention

High school GPA	df	P
High school GPA	2	.705
High school GPA level 1	1	.404
High school GPA level 2	1	.626
Constant	1	.171

The interaction of high school GPA across levels of LADDERS attendance was evaluated to determine if student retention could be predicted. The regression model did not produce statistically significant results; the significance and degrees of freedom for the variables in the model are listed in Table 26.

Table 26

Significance and degrees of freedom for the logistic regression model that uses the variables high school GPA and attendance

Variable	df	<i>p</i>
Attendance by high school GPA	4	.717
Attendance level 1 by high school GPA level 1	1	.924
Attendance level 1 by high school GPA level 2	1	.557
Attendance level 2 by high school GPA level 1	1	.486
Attendance level 2 by high school GPA level 2	1	.538
Constant	1	.001

The contingency table for this regression analysis is contained in Table 27 and illustrates that the students with the highest attendance in LADDERS are retained at the highest rates regardless of high school GPA.

Table 27

Contingency table for high school GPA across levels of LADDERS attendance

High school GPA	Attendance	Not retained	Retained	Percent retained
Low	Low	7	16	70
	Medium	9	12	57
	High	1	19	95
Medium	Low	9	11	55
	Medium	8	13	62
	High	4	19	83
High	Low	7	8	53
	Medium	8	12	60
	High	3	25	89

The results for Research question 3 indicate that for students in the LADDERS program, high school GPA does not affect academic achievement and retention. As with the previous research question, the number of sessions of LADDERS the student attended is important. Students with high attendance in LADDERS earn higher semester GPAs and are retained at a higher rate than students with medium or low attendance across all levels of high school GPA.

It should be noted that the range of high school GPAs for the students in this study was somewhat restricted. As discussed in Chapter 1, the LADDERS program was designed for students who were predicted to be successful in college. Students were

predicted to be successful based, in part, on high school GPA; therefore the restricted range of high school GPAs is not surprising and may account for the lack of significant findings related to high school GPA.

Research Question 4: Effect of non-cognitive attributes and LADDERS attendance on GPA and retention

The last research question in this study seeks to determine if a student's non-cognitive attributes along with attendance in LADDERS, affect the students' Spring GPA and retention. Students' non-cognitive attributes are measured using the Transition to College (TCI) inventory. The TCI assigns each student to a risk group (high, medium or low) based on the total TCI score. This research question will use the TCI risk group as the non-cognitive variable and only data from those students, who participated in LADDERS, will be used. First, an ANOVA was performed to determine if there are significant differences in Spring semester GPAs based on the students' TCI risk group (high, medium, low). Secondly, the interaction effect of TCI risk group across LADDERS attendance (high, medium, low) was examined. As part of question 2, the effect of attendance on students' semester GPA was discussed so it will not be repeated in this section.

As expected, the students who were classified as low risk ($M = 2.10$, $SD = 0.98$) for academic difficulty earned higher mean semester GPAs than the students classified as either medium ($M = 2.08$, $SD = 0.89$) or high ($M = 1.81$, $SD = 0.94$) risk. The main effect for TCI risk group, however, was not significant, $F(2,188) = 1.098$, $p = .336$, partial $\eta^2 = .012$. Table 28 provides the mean Spring semester GPAs for students by TCI risk score.

Table 28

Mean Semester GPA by TCI risk group

TCI risk group	N	M	SD
Low	114	2.10	0.98
Medium	48	2.08	0.89
High	29	1.81	0.94

A factorial ANOVA indicated no significant interactions between participation in LADDERS and TCI risk group, $F(4,182) = .645$, $p = .631$, partial $\eta^2 = .014$. The means and standard deviations for the Spring GPA as a function of attendance and TCI risk group are listed in Table 29. Although the differences were not significant, students with low TCI risk scores earned higher semester GPAs than students with high TCI risk scores across all levels of LADDERS attendance.

Table 29

Means and Standard Deviations for Spring GPA as a function of TCI risk group and LADDERS attendance

TCI risk group	LADDERS Attendance	N	Mean	SD
Low	Low	31	1.70	1.06
	Medium	36	1.84	1.01
	High	47	2.57	0.68
Medium	Low	17	1.72	1.05
	Medium	17	2.19	0.84
	High	14	2.38	0.60
High	Low	10	1.42	1.05
	Medium	9	1.90	1.12
	High	10	2.12	0.52

The second part of the question was examined using a logistic regression to predict student retention from the TCI risk group (low, medium, high) and to predict retention from the interaction of the TCI risk group and LADDERS attendance (low, medium, high). The use of attendance in the LADDERS program to predict retention was discussed previously in research question 2 and will not be repeated in this section. The TCI risk group was not significant for predicting retention but, as illustrated in the contingency Table 30, more students were retained than not retained across all levels of

TCI risk groups. Table 31 lists the degrees of freedom and significance for the variables used in the logistic regression.

Table 30

Contingency table showing frequency of students retained by TCI risk group

Risk group	Not retained	Retained	Percent retained
Low	32	82	72
Medium	14	34	71
High	10	19	66

Table 31

Significance and degrees of freedom for the logistic regression model that uses TCI risk score to predict retention

Variable	<i>Df</i>	<i>P</i>
Risk group	2	0.796
Risk group level 1	1	0.499
Risk group level 2	1	0.626
Constant	1	0.100

A subsequent logistic regression was performed to determine if the interaction of the TCI risk group across levels of LADDERS attendance could be used to predict student retention. The regression model did not produce statistically significant results; the significance and degrees of freedom for the variables in the model are listed in Table 32. The contingency table for this regression analysis is contained in Table 33 and

indicates that the students with the highest attendance in LADDERS are retained at the highest rates regardless of TCI risk group.

Table 32

Significance and degrees of freedom for the logistic regression model that uses the variables TCI risk score and attendance

Variable	df	P
Attendance by TCI risk score	4	.927
Attendance level 1 by TCI risk score level 1	1	.520
Attendance level 1 by TCI risk score level 2	1	.995
Attendance level 2 by TCI risk score level 1	1	.776
Attendance level 2 by TCI risk score level 2	1	.993
Constant	1	.037

Table 33

Contingency table for TCI risk group across levels of LADDERS attendance

TCI Risk Group	Attendance	Not retained	Retained	Percent retained
Low	Low	11	20	65
	Medium	15	21	58
	High	6	41	87
Medium	Low	7	10	59
	Medium	6	11	65
	High	1	13	93
High	Low	5	5	50
	Medium	4	5	56
	High	1	9	90

These results echo those from the previous two research questions. Attendance in the LADDERS program has an effect on academic achievement. The other variable, TCI risk group, has no significant affect on academic achievement. Attendance predicts retention but TCI risk group does not.

As described in Chapter 3 (p. 63), the TCI is a 115-item inventory that assesses students on their non-cognitive attributes. The inventory was previously factor analyzed and nine factors emerged, five of which (Student Role Commitment, Athletic Orientation, Socializing Orientation, Self-Confidence and Independent Activity Focus) are significantly related to academic performance (Pickering, Calliotte, & McAuliffe, 1992). The subscores for each of the five factors were calculated for each participant in this

study and collapsed into low and high based on frequency distributions. These scores were then examined to determine if the subscore for any of the five factors that contribute to the TCI has a significant effect on the students' academic achievement or retention.

Using the total risk factors, as reflected in the TCI risk score, may have obscured the significant contribution of the TCI scales to Spring semester GPA and retention.

Secondly the interaction effect for each subscore, along with attendance in LADDERS, was evaluated to determine the effect of the subscore across LADDERS attendance on student GPAs and retention.

Each of the five factors (Student Role Commitment, Athletic Orientation, Self-Confidence, Socializing Orientation and Independent Activity Focus) are treated as individual variables in these analyses even though combined, they compose the TCI risk score. These five factors were chosen for the present study because the dependant variables pertain to academic achievement and these five factors were previously found to correlate to academic performance. As explained in Chapter 3 (p. 63), students receive one point toward their total subscore each time their answer on a survey question corresponds to an answer that was given by students who were placed on academic probation. Higher subscores on these factors are more closely correlated to students on probation than lower scores.

Each of the individual factor subscores (high, low) were compared using ANOVA to determine if significant differences existed in the mean semester GPA based on the factor subscore. None of the results showed a significant difference in mean semester GPA based on the factor subscore. Table 34 lists the means and standard deviations for the semester GPA by subscore for each of the factors.

Table 34

Mean Semester GPA by TCI Factor subscore

Factor	Factor subscore	N	Mean	SD
Student Role Commitment	Low	103	2.00	1.03
	High	88	2.11	.86
Athletic Orientation	Low	146	2.05	0.97
	High	45	2.07	0.90
Self Confidence	Low	92	1.94	0.94
	High	99	2.15	0.96
Socializing Orientation	Low	109	2.17	0.91
	High	82	1.89	1.00
Independent Activity Focus	Low	110	2.03	0.98
	High	81	2.09	0.92

A Factorial ANOVA was performed to determine the interaction effect between the subscores for each of the factors (high, low) and LADDERS attendance (high, medium, low). The ANOVA indicated no significant interaction between attendance at LADDERS and the subscore on any of the five factors. The means and standard deviations for the students' Spring GPA as a function of attendance and the subscore on each of the five factors are listed in Table 35.

Table 35

Means and Standard Deviations for Spring GPA as a function of subscore on

TCI factors and LADDERS attendance

Factor	Factor subscore	LADDERS attendance	N	Mean	SD
Student Role Commitment	Low	Low	34	1.62	0.98
		Medium	32	1.79	1.13
		High	37	2.53	0.74
	High	Low	24	1.71	1.15
		Medium	30	2.11	0.77
		High	34	2.40	0.55
Athletic Orientation	Low	Low	45	1.65	1.08
		Medium	53	1.97	0.96
		High	48	2.50	0.66
	High	Low	13	1.69	0.97
		Medium	9	1.79	1.10
		High	23	2.40	0.67
Self Confidence	Low	Low	27	1.54	0.97
		Medium	32	1.87	1.02
		High	33	2.34	0.67
	High	Low	31	1.76	1.11
		Medium	30	2.02	0.95
		High	38	2.57	0.63

Socializing Orientation	Low	Low	29	1.57	1.07
		Medium	35	2.17	0.75
		High	45	2.56	0.69
	High	Low	29	1.75	1.03
		Medium	27	1.66	1.17
		High	26	2.31	0.58
Independent Activity Focus	Low	Low	36	1.47	0.98
		Medium	31	1.96	1.00
		High	43	2.54	0.68
	High	Low	22	1.96	1.09
		Medium	31	1.93	0.97
		High	28	2.36	0.63

A logistic regression was used to determine if student retention could be predicted from the subscore on any of the five factors (low, high). Logistic regression was also used to determine if retention could be predicted from the interaction between the subscore and LADDERS attendance (low, medium, high).

The subscore on the five factors by themselves did not significantly predict retention; the significance and degrees of freedom for the variables in the model are listed in Table 36. As seen in the contingency table, included in Table 37, more students were retained than not retained across all levels of the subscore for each of the five factors.

Table 36

Significance and degrees of freedom for the logistic regression model that uses the TCI factor subscores to predict retention

Factor	Df	P
Student Role Commitment	1	0.372
Athletic Orientation	1	0.412
Self Confidence	1	0.993
Socializing Orientation	1	0.343
Independent Activity Focus	1	0.936

Table 37

Contingency table showing the frequency of students retained by subscore for each factor

Factor	Subscore	Not retained	Retained	Percent retained
Student Role Commitment	Low	33	70	68
	High	23	65	74
Athletic Orientation	Low	45	101	69
	High	11	34	76
Self Confidence	Low	27	65	71
	High	29	70	71
Socializing Orientation	Low	29	80	73
	High	27	55	67
Independent Activity Focus	Low	32	78	71
	High	24	57	70

Next, a logistic regression was examined for each of the factor subscores to determine if the interaction between the subscore on each of the five factors and attendance in the LADDERS program could predict student retention. The significance and degrees of freedom for the variables in the model are listed in Table 38. There was one significant interaction effect between attendance in LADDERS and a factor subscore which is highlighted on the contingency table included in Table 39. Students with the lowest level of the Independent Activity Focus subscore and a medium level of attendance are less likely to be retained than students with a high Independent Activity Focus subscore and high attendance in LADDERS.

Table 38

Significance and degrees of freedom for the logistic regression model that uses the variables LADDERS attendance and the subscore on each factor

Factor	Variable	df	P
Student Role Commitment	Attendance by subscore	2	0.451
	Attendance level 1 by subscore	1	0.209
	Attendance level 2 by subscore	1	0.404
Athletic Orientation	Attendance by subscore	2	0.701
	Attendance level 1 by subscore	1	0.465
	Attendance level 2 by subscore	1	0.958
Self Confidence	Attendance by subscore	2	0.858
	Attendance level 1 by subscore	1	0.595
	Attendance level 2 by subscore	1	0.635
Socializing Orientation	Attendance by subscore	2	0.569
	Attendance level 1 by subscore	1	0.301
	Attendance level 2 by subscore	1	0.361
Independent Activity Focus	Attendance by subscore	2	0.041
	Attendance level 1 by subscore	1	0.365
	Attendance level 2 by subscore	1	0.032

Table 39

Contingency table for subscore on each factor across levels of LADDERS attendance

Factor	Subscore	Attendance	Not retained	Retained	Percent retained
Student Role Commitment	Low	Low	13	21	62
		Medium	14	18	56
		High	6	31	84
	High	Low	10	14	58
		Medium	11	9	63
		High	2	32	94
Athletic Orientation	Low	Low	19	26	58
		Medium	21	32	60
		High	5	43	90
	High	Low	4	9	69
		Medium	4	5	56
		High	3	20	87
Self Confidence	Low	Low	11	16	59
		Medium	13	19	59
		High	3	30	91
	High	Low	12	19	61
		Medium	12	18	60
		High	5	33	87

Socializing Orientation	Low	Low	10	19	66
		Medium	13	22	63
		High	6	39	87
	High	Low	13	16	55
		Medium	12	15	56
		High	2	24	92
Independent Activity Focus	Low	Low	16	20	56
		Medium*	9	22	71
		High	7	36	84
	High	Low	7	15	68
		Medium	16	15	48
		High	1	27	96

*significant at the .05 level, $B = 13.689$

This research question examined the relationship between non-cognitive attributes, as measured by the TCI (and the subscores that compose the TCI index) and the academic achievement and retention of probationary students. The question also considered whether the TCI scores and subscores of students, along with their attendance in LADDERS, affect the academic achievement and retention of probationary students.

There was no significant difference between mean GPAs based on the TCI risk group or the interaction between the TCI risk group and participation in LADDERS. Additionally, there was no significant difference in retention based on the TCI risk group of the student or the interaction of the TCI risk group with LADDERS attendance. A subsequent series of analyses examined the relationship between the subscores of the TCI

and the interaction between the subscore of the TCI and LADDERS attendance to the GPA and retention of probationary students. As described in Chapter 3, the TCI was factor analyzed and five factors were found to predict academic difficulty: student role commitment, athletic orientation, self-confidence, socializing orientation and independent activity focus.

For each of the individual subscores, the mean semester GPAs were compared to determine if significant differences existed based on the subscore alone or the interaction between the subscore and LADDERS attendance. None of the analyses reported a significant main or interaction effect for the factor subscores. The results of these analyses indicate that attendance in LADDERS results in significant differences in mean semester GPA but that no significant differences exist between mean semester GPA based on TCI score or the TCI factor subscores.

Logistic regressions were also performed to determine if the subscores on the TCI factors or the interaction between the subscores and participation in LADDERS could predict retention of probationary students. The results of the logistic regression analyses indicated that attendance in LADDERS predicted retention but that the TCI score alone did not predict retention. None of the analyses that examined the effect of the subscores on retention produced significant effects. An analysis to determine the interaction effect between attendance and each of the subscores indicated only once significant result. Students with medium participation and low scores on the Independent Activity Focus subscores were retained at a significantly lower rate than students with high attendance and high subscores on that factor. It is difficult to assign meaning to this interaction as it involves only one level of a factor subscore.

Summary

Data from the LADDERS program for three Spring semesters was analyzed to determine if students who participated in the program earned significantly higher GPAs and were retained at a significantly higher rate. The data was further analyzed to determine if there was a difference in the effectiveness of LADDERS based on gender, ethnicity, cognitive attributes and non-cognitive attributes.

Question 1

The first research question examined the difference in academic achievement, as measured by GPA, and retention between students who attended at least one session of the LADDERS program and those who did not. Significant differences were found between the mean GPAs of students who attended LADDERS and those who did not. Significant results were also found for student retention based on the number of LADDERS sessions attended. The findings indicate that students who attend at least one session of LADDERS earn a significantly higher mean semester GPA than students who never attend. Additionally, for each session of LADDERS a student attends, the odds of that student being retained increases by a factor of 1.10.

Question 2

The second research question sought to determine if a relationship exists between gender and ethnicity, and gender and ethnicity along with attendance, on the effectiveness of the LADDERS program as measured by Spring GPA and retention. Significant differences in mean GPAs and retention were reported for students based on attendance; however, there were no significant differences in mean GPA or retention based on gender or ethnicity. There was no interaction effect between attendance, gender and ethnicity.

These findings indicate that for students who attend LADDERS, the level of attendance, high, medium or low, is important to both the semester GPA and retention. Students with high attendance earn significantly higher mean GPAs than students with medium or low attendance. High attendance also results in higher retention. For students who attend LADDERS, the odds ratio indicates that students with high attendance in LADDERS are 5.18 times more likely to be retained than students with low attendance and 5.32 times more likely to be retained than students with medium attendance. These results also indicate however, that the LADDERS program is equally effective for students regardless of their gender or ethnicity.

Question 3

The third research question evaluated the effect of a student's cognitive attribute, as measured by high school GPA, and the students' cognitive attribute, along with attendance in LADDERS. Significant differences in mean semester GPAs were reported for students based on attendance but there was no significant difference in mean semester GPA based on a student's high school GPA. Additionally, there was no interaction effect between attendance and high school GPA. As shown across analytical models throughout, attendance is significantly related to academic achievement. Prior High school GPA is not significant with the academic achievement of students in the LADDERS program.

Question 4

The last research question examined whether a student's non-cognitive attributes, and their non-cognitive attributes, along with attendance in LADDERS, result in significant differences in mean semester GPA and retention. The student's non-cognitive

attributes were measured using the Transition to College Inventory (TCI), which results in a risk score (high, medium or low) for academic difficulty. Significant differences in mean GPAs and retention were reported for students based on attendance but there was no significant difference in mean semester GPA or retention based on a student's TCI score. There was no interaction effect between attendance and TCI score. The LADDERS program is equally effective for probationary students across all levels of TCI risk scores.

The TCI was previously factor analyzed and five factors were found to contribute to the TCI score. Subscores on each of the five factors were calculated for every student and analyzed independently to determine if a particular factor had an effect on student academic achievement. These analyses indicated that no significant differences exist in students' mean semester GPA or retention based on the factor subscores. One level of the Independent Activity Focus subscore, did however, result in a significant interaction effect on the medium level of attendance. It is difficult to assign meaning to this result as it involves one subscore on one level of attendance.

Chapter 5

CONCLUSION AND DISCUSSION

This study sought to determine whether the LADDERS program is an effective model that can be used to improve academic achievement and retention rates of probationary undergraduate students. Two hypotheses were evaluated in this research study.

1. Students on academic probation who attend the LADDERS program will earn a significantly higher semester GPA and be retained at a significantly higher rate from first to second year than students on academic probation who do not participate in LADDERS.
2. The effectiveness of the LADDERS program will be influenced by students' demographic characteristics (gender and ethnicity), cognitive attributes (high school GPA) and non-cognitive attributes (as measured by the TCI score).

The first hypothesis addresses the effectiveness of the LADDERS program and predicts that LADDERS will improve both academic achievement and retention. Using the theoretical frameworks established by Tinto (1975) and Astin (1984), LADDERS was designed to emphasize building relationships between the probationary student and the institution. More recent research however has recognized the complex reasons that students are not successful in college. The ensuing body of literature guided the creation of the LADDERS program. The result was a probation program that incorporates an effective program format components (voluntary, group program, meets weekly, facilitated by faculty and staff) and program content (information on and assistance with

academic skills, goal setting, knowledge of institutional policies and procedures and learning styles) shown to be successful through research.

The second hypothesis addresses the relationship between academic achievement and retention of students who participate in LADDERS and their demographic characteristics (gender and ethnicity), cognitive attributes (high school GPA) and non-cognitive attributes (as measured by the TCI score). This hypothesis is non-directional because there was not enough compelling research evidence to support a directional hypothesis. The decision to include this line of inquiry into the current research stemmed from the drumbeat heard in the literature concerning probation intervention. Research studies over the past two decades have repeatedly cited the need to examine the effectiveness of probation intervention programs based on a student's gender, ethnicity, cognitive attributes and non-cognitive attributes (Bean, 1980; Braxton et al., 2004; DuBrock, 2000; Kamphoff et al., 2007; Liu and Liu, 1999; Seidman, 2005; Smith, 1995 and Tinto, 1982).

The current study is significant for several reasons. As seen in the review of the literature, descriptions of probation and retention programs are common but only a handful of authors (Bednar and Weinberg, 1970; Coleman and Freedman, 1996; Foreman et al., 1990; Humphrey, 2006; Kamphoff et al., 2007 and Lipsky and Ender, 1990) have empirically evaluated the effectiveness of their probation intervention programs. This research adds to the literature on retention and probation programs by empirically evaluating the effectiveness of a probation intervention program. This study responds to a need highlighted in the literature to examine the effectiveness of probation intervention programs across gender, ethnicity, cognitive attributes and non-cognitive attributes.

Additionally, this study adds to the body of knowledge by incorporating learning style awareness into probation intervention. Learning style awareness has been shown to be successful for first-year students (Lenehan, Dunn, Ingham, Singer, and Murray, 1994 and Matthews, 1991), but no research exists that specifically uses this approach with probationary students.

Discussion

In reviewing the literature on probation intervention, a dichotomy emerges in the approach to working with probationary students. One approach, stemming from theories developed by Tinto (1975) and Astin (1984), emphasizes building relationships with students and encourages activities that promote connecting students to each other and the institution. The second approach focuses on activities that remediate student deficiencies in academic skills such as study techniques, goal setting, motivation and knowledge of institutional policies and procedures. The LADDERS program incorporates both of these approaches in its design along with the awareness of learning styles in working with probation students. In addition to program content, program format must be considered in the evaluation of probation intervention programs. LADDERS is a voluntary group program that meets weekly and is facilitated by faculty and staff. The evaluation of LADDERS, therefore has taken a holistic view because of the difficulty in isolating any one program component for evaluation.

Studies on probation intervention programs found in the literature have focused on one or more academic skills and some have mentioned relationship building, however only a few studies (Bednar and Weinberg, 1970; Coleman and Freedman, 1996; Foreman et al., 1990; Humphrey, 2006; Kamphoff et al., 2007 and Lipsky and Ender, 1990),

regardless of their focus, have been empirically evaluated for their effectiveness. Of those studies, only Coleman and Freedman, 1996; Foreman et al., 1990; Humphrey, 2006; Kamphoff et al., 2007 and Lipsky and Ender, 1990 considered the program format in their research. LADDERS differs from all of these studies in that it includes the use of learning style awareness. There is empirical evidence (Lenehan, Dunn, Ingham, Singer, and Murray, 1994 and Matthews, 1991) that showed the effectiveness of using learning style awareness with first-year students, however no research exists that examines the use of learning style awareness with probationary students.

One research study (Humphrey, 2006) reviewed in the literature empirically evaluated a program very similar to LADDERS. Both programs use a similar format and differ only in that LADDERS includes information about institutional policies and procedures and learning style awareness. Humphrey found that her program was effective in improving students' academic achievement but did not find significant differences in retention rates between students who attended the program and those who did not.

Effectiveness of LADDERS

The first research question in the current study examined the overall effectiveness of the LADDERS program on the academic achievement and retention of probationary students. Measures of effectiveness of the LADDERS program include semester GPA and retention to the second year. The present findings indicate that students who attend at least one session of LADDERS earn significantly higher GPAs than students who do not attend. Additionally, the odds of a student being retained increases with each session of LADDERS they attend.

The significant difference in GPA between students who attended LADDERS and those who did not echo findings by Coleman and Freedman (1996), Foreman et al. (1990), Humphrey (2006), Kamphoff et al. (2007) and Lipsky and Ender (1990). Only two of those studies (Humphrey, 2006 and Lipsky and Ender, 1990) examined the retention rates of students who participated in a probation intervention program. Humphrey found no relationship between attendance and retention; Lipsky and Ender found no relationship with one of two cohort groups but for the other group, attendance in their probation intervention program did significantly predict retention. Neither of these studies considered the number of times attended in their analyses, only the relationship between attendance and retention.

In his Interactionist Theory and in subsequent studies, Tinto (1975, 1990, 1996, 1999) emphasized the importance of students' relationships with the institution, their faculty and their peers to persistence. The LADDERS program stresses the group in its design and the small group sessions promote relationships between students and between students and facilitators. This design may explain why the results from this research run counter to Humphrey's findings and Lipsky and Ender's mixed results.

Effectiveness of LADDERS across gender and ethnicity

The need to examine the effectiveness of retention and probation programs across demographic characteristics has been cited for over two decades (Bean, 1980; Braxton, Hirschy, and McClendon, 2004; DuBrock, 2000; Liu & Liu, 1999; Smith, 1995 and Tinto, 1982). The second question examined in this research studied the relationship between gender and ethnicity and attendance in the LADDERS program on the academic achievement and retention of probationary students.

No significant differences were found in the academic achievement or retention of students in the LADDERS program across gender or ethnicity. At first glance this lack of significant findings suggests no differences on outcomes as a function of these variables, but a review of the literature provides a different perspective. Several studies that have examined the influence of demographic characteristics on academic achievement and retention (Dixon, 2003; Hagedorn, Maxwell, and Hampton, 2001; Jones, 2000; Kinloch, Frost, and MacKay, 1993; Liu & Liu, 1999; Mansfield, Pinto, Parente, and Wortman, 2004; O'Hare, 1986; Ramirez & Evans, 1988) have found that minority students and males experience the lowest achievement and retention rates. For students who attended LADDERS, the program was equally effective for all students, essentially ameliorating the differences between these groups. In fact, minority students earned higher mean semester GPAs and were retained at a higher rate although the differences were not statistically significant.

Several findings in studies related to academic achievement and retention provide insight into the LADDERS program's success with probationary students regardless of gender and ethnicity. First, Sheu and Sedlacek (2002) found that minority students and females were more receptive to accepting help than male or non-minority students. Help acceptance by participants is an important element in the success of any probation intervention program. Minority students were found to suffer from higher levels of test anxiety and poorer study habits (Rasor and Rasor, 1998) and Mayo and Christenfeld (1999) found that minority students have the lowest expectations of success in an academic setting. Additionally, Guiffrida (2005) found that minority students expect to have more interactions with faculty. Credle and Dean (1991) and Flowers (2004)

developed recommendations for working with minority students that included 1) advise African-American students on the support systems and services the institution can provide to them and 2) provide support to African-American students in the form of career and goal counseling.

LADDERS was designed using the best practices for working with students found in the literature. This over-arching approach provides participants with a comprehensive support system that counters many of the concerns expressed by researchers studying minority students. LADDERS was developed to help students:

1. improve their study habits and encourages them to understand their individual learning style;
2. develop academic self-efficacy;
3. form relationships with a faculty member;
4. learn about institutional services and
5. formulate goals and career objectives.

All students benefit from the support provided by LADDERS but the fact that this program is equally effective for all students regardless of gender or ethnicity helps explain previous findings on the effect of gender and ethnicity on academic achievement and retention. Some of the less complete programs may not have been as effective in addressing the needs of males and minority students.

The studies (DuBrock, 1999; Hagedorn, Maxwell, and Hampton, 2001; Jones, 2000; Liu & Liu, 1999; Mansfield, Pinto, Parente, and Wortman, 2004; O'Hare, 1986; Ramirez & Evans, 1988; and Smith, 1995) that have looked at the relationship between ethnicity and retention have found that minority students are retained at lower rates than

non-minority students. Hagedorn, Maxwell, and Hampton (2001, p. 243) found “the retention rates of African-American men in community colleges are among the lowest of all ethnic groups nationally.” In another study at a mid-sized university Liu & Liu (1999) determined that minority students were retained at significantly lower rates. Although the differences are not significant, minority students in LADDERS are retained at a higher rate (79%) than non-minority (63%) or students classified as other (65%) and female students are retained at a slightly higher rate (74%) than male students (66%). A comparison of students based on both ethnicity and gender revealed that minority men who attended LADDERS were retained at the highest rate of all students (80%) followed closely by minority females (78%). Nonminority males (57%) and males classified as other (62%) were retained at the lowest rates of all students. Although not significant, these differences suggest the effectiveness of LADDERS when working with minority students, particularly males.

Effectiveness of LADDERS across high school GPA

The third question in this research study examined whether high school GPA significantly predicted the effectiveness of LADDERS. No research could be found that examined the effectiveness of probation intervention programs across levels of high school GPA. However, numerous studies have established the link between high school GPA and academic success and retention in college (Astin and Oseguera, 2005; Bontekoe, 1992; DuBrock, 1999; Edminster, and Sullivan, 2001; Feldman, 1993; Hagedorn et al., 2001; Mortenson, 2005; Smith, Lotkowski, Robbins, and Noeth, 2004; Snyder et al., 2002; Trombley, 2000 and Waugh et al., 1994) and some research (Isonio, 1995 and Trombley, 2000) has found that high school GPA predicts academic success.

These studies tend to suggest that students on probation who have a low high school GPA are doomed to earn lower semester GPAs than probationary students with higher high school GPAs.

The current findings run counter to research that has found high school GPA predicts academic success and retention in college. For students in the LADDERS program there is no significant difference in academic achievement or retention based on high school GPA. The results could suggest that the effect of LADDERS on the academic achievement and retention of probation students supplants the effect of high school GPA. However an alternative explanation may be that the population in this study is restricted. As noted in Chapter 3, the students who participated in LADDERS were predicted to be successful upon entering college. The mean high school GPA of this group is 3.13 with a range between 2.54 and 4.0. Sixty-five percent of the students entered Old Dominion with a high school GPA of 3.0 or greater.

The literature also notes the correlation between high school GPA and student retention (Astin and Oseguera, 2005; DuBrock, 1999; Hagedorn et al., 2001; and Smith, Lotkowski, Robbins, and Noeth. 2004). The results of a study by Waugh, Micceri, and Takalkar (1994) showed that students who earned a higher GPA in high school were retained at a higher rate. Snyder, Hackett, Stewart, and Smith (2002) examined the retention rates of over 500 students and found that high school GPA was the best predictor of retention rates. The results produced in this study do not support those conclusions. Students who attend LADDERS were retained equally across all levels of high school GPA suggesting that the effect of LADDERS may offset the effect of high

school GPA on retention. Again, an alternative explanation could be the restricted range of high school GPA with the study population.

Effectiveness of LADDERS across non-cognitive attributes

The final research question explored the relationship between students' non-cognitive attributes and academic achievement and retention. A few studies exist that link non-cognitive attributes such as academic skills, motivation, goal setting and self-efficacy to academic achievement and retention (Arbona and Novy, 1990; Robbins et al., 2004; Schwartz and Washington, 2002; and Tracey and Sedlacek, 1984 and 1985). At Old Dominion University, the non-cognitive attributes of all incoming first-year students are measured using the Transition to College Inventory (TCI), which assigns each student a risk score based on the results of the inventory (Pickering et al., 1992). This risk score is used to predict which students are at greatest risk for probation and departure from the university.

The present findings showed no relationship between academic achievement and the students' risk score. Additionally, the risk score was not predictive of retention. It is interesting to note that the population studied in this research was composed of students who had been placed on academic probation after their first semester in college yet 60% of them were at low risk for academic probation according to the TCI.

The subscores for each of the five factors that comprise the TCI score were subsequently analyzed to determine if there was an effect on achievement and retention based on the TCI subscores. As with the TCI risk score, no relationship was evident between the subscores of the TCI and academic achievement. Additionally, the subscores did not predict retention. Only one significant result emerged, which was

difficult to interpret because it was one level of the Independent Activity Focus at one level of LADDERS attendance.

Summary

The results from this study indicate that the LADDERS program can be used as an effective model for working with students on academic probation. By providing information on and assistance with academic skills, goal setting, knowledge of institutional policies and procedures and learning styles, the LADDERS program significantly increased the mean semester GPA and retention rates of students who attended the program over students who did not attend. The bulk of this study concentrated on students who had attended the LADDERS program at least once. Their academic achievement and retention rates were compared across gender, ethnicity, high school GPA and the TCI risk score and its component factors.

Throughout this study the effect of attendance in LADDERS and its interaction with the other variables was considered. Attendance emerged as the most important variable for effecting academic achievement and predicting retention. The number of times a student attended the LADDERS program had a significant effect on both the mean semester GPA and retention rates of students. This result was expected. The LADDERS program is a voluntary group program that meets weekly. Over an entire semester, it provides students with information on and assistance with academic skills, goal setting, knowledge of institutional policies and procedures and learning styles. LADDERS represents a complex and interrelated treatment incorporating several individual components designed so that students receive the treatment over the course of

the semester and the more sessions a student attends, the more complete the treatment they receive.

One of the most surprising results from this study is that minority males who attended LADDERS were retained at the highest rate of all students. The preponderance of the literature emphasizes the fact that this population has the lowest retention rates among college students. Of the students who attend LADDERS, however, minority males have the highest retention rates although the differences are not significant.

Limitations

Selection bias is the major limitation in this study. Participation in LADDERS is voluntary and although every effort is made to encourage all students to attend, usually only about half of the invited students participate in the program. In the review of literature on probation programs that were empirically evaluated, those with voluntary participation were shown to be more effective in improving academic achievement and retention. The voluntary nature of LADDERS suggests that attendees may be more motivated than students who do not attend. The students who attended at least one session of LADDERS and those who did not were compared prior to the study. There was no significant difference between the groups on high school GPA or TCI score. There was however a significant difference in the demographic characteristics of the two groups, a higher proportion of minority and female students chose to attend LADDERS. If students applied to attend LADDERS and only some were chosen then the motivation factor would be removed and more balanced, better matched groups could be formed.

A second threat to internal validity is the course load for each student and the rigor of courses taken by different students. Since all students are not taking the same

classes or the same number of classes, some students could potentially be taking an easier course load. It is very difficult to quantify the “difficulty of course load” because every student and every student’s schedule is different. Additionally, students with heavier course loads may be less likely to attend a voluntary program.

The sample in this study was limited to students predicted to be successful upon entering the university; therefore the range of high school GPAs was restricted. The restriction in sample to those students predicted to be successful could not be avoided because of the administrative structure of the university. This study provides an insight into the effectiveness of a program which can be expanded now that administrative units have been reorganized.

One of the variables in this study is the TCI score. The TCI score is based off of self-reported data on students’ perceptions of their non-cognitive attributes such as social desirability, self-confidence, study skills and motivation for attending college. The developers of the TCI did not calculate reliability coefficients for the instrument. They used a factor analysis along with a stepwise regression to demonstrate reliability and validity. Although this instrument has been used in several studies (Cunningham, 1994; Duggan, 2003 and Freeze, 2000), the lack of reliability coefficients for the TCI is a limitation of using this instrument.

External validity may be affected because this study involves students at only one institution and therefore generalizability is limited. Additionally, the sample size is limited. However, the impetus for this study was in response to calls for research on probation programs cited in the literature. This study, therefore, will help guide future research on probation programs.

Directions for Future Research

Academic achievement and student retention are important issues in today's climate of accountability and dwindling resources in higher education. Institutions recruit students predicted to be successful yet many of these end their first semester in academic difficulty. Given its effectiveness with a somewhat limited population, LADDERS may serve as a model for working with these students. Future research might take this model and expand it to include more students and students who are admitted to an institution provisionally. Additionally, the students in this study need to be followed longitudinally to determine their success across years and their graduation rates.

This research examined the effectiveness of the LADDERS probation intervention program on first year students with one semester of college coursework only. Future research could expand this study to examine the effectiveness of LADDERS with transfer students. That research could also examine if there is a difference in effectiveness based on the number of semesters a student has completed in college prior to attending LADDERS.

The LADDERS program built upon the research on probationary students by incorporating the best practices for working with probationary students found in the literature and adding learning style awareness. As such, the LADDERS program consists of many components and it is not possible in this study to isolate the effectiveness of any one component. Future studies may wish to try and isolate individual components included in LADDERS such as learning styles, knowledge about institutional policies and procedures, motivation and study and time management skills and their effectiveness in

working with probationary students. This study could be improved upon by using an experimental approach that employs a control group that does not receive the components contained in LADDERS or that receives only a portion of the components. Another direction for future studies could be to develop an approach that would tailor the components that students receive based on their individual needs.

This study expands existing research by examining the effectiveness of a probation intervention program across students' demographic characteristics, cognitive and non-cognitive attributes. Additional variables could also be examined in future studies to determine the influence that student family income, student employment, academic major, age of the student and a student's self-efficacy has on the effectiveness of a probation intervention program. Future research could also include a variable that compares students who have declared their majors to those who are undecided. With increased access to higher education, researchers must look across student populations to determine the effectiveness of programs on different subsets of the population. Future research can no longer ignore the needs for research cited for over two decades (Bean, 1980; Braxton et al., 2004; DuBrock, 2000; Kamphoff et al., 2007; Liu and Liu, 1999; Seidman, 2005; Smith, 1995 and Tinto, 1982).

This line of research also has implications for working with other unique student populations. The LADDERS program is a model for working with students. Research could be expanded to determine if this model would be effective for assisting students who are not necessarily on academic probation but need to improve their academic achievement. Some examples include student athletes, students preparing for

professional exams such as the Medical College Admissions Test (MCAT) or students who are conditionally admitted to college.

This line of inquiry could also be expanded to determine if the LADDERS model is effective in working with high school students. If the LADDERS program was used with high school students it might have an impact on the preparation of students who enter college, helping them have a most successful first year.

Conclusion

Student retention no longer affects only the individual student. It is crucial to institutional accountability, rankings and revenue. The current and future job market as well as the continued progress of society hinges on an educated workforce. Research on retention, therefore, must provide empirical evidence on the effectiveness of programs designed to assist students.

The over-arching conclusion that can be drawn from the results of this study is that participation in the LADDERS program leads to higher GPA and greater retention of students. In that sense, LADDERS serves as a model for working with probationary students. Further investigation into the effectiveness of LADDERS showed no significant differences between students based on their gender, ethnicity, high school GPA and non-cognitive attributes. Regardless of the demographic characteristics and cognitive and noncognitive attributes of the students, attendance in LADDERS resulted in higher mean semester GPAs and retention rates.

Secondly, it appears that participation in LADDERS improves the retention rates of minority males. No significant differences were found in retention rates between students based on gender and ethnicity but the retention rate for minority male students

was higher than that of any other group. Because this is counter to the volume of literature on this subject, this finding should be highlighted.

The body of knowledge concerning student success offers insight into the reasons that students fail. LADDERS is a compilation of many components that have a basis in research. The theoretical framework of Tinto (1975) and Astin (1984) led to the emphasis on the group and the use of faculty and administrators as facilitators. The content of LADDERS comes from literature on probation intervention programs, only some of which were empirically evaluated. The format elements were also modeled after successful probation intervention programs. Learning style awareness was added to LADDERS because of its effective use with first year students in retention programs. Although it is not possible to know if any one component or format element was individually effective in improving student achievement and retention, the combination of elements did significantly improve student achievement and retention. Finally, the variables examined in this study were chosen because of the continued call in the literature to evaluate probation programs across student characteristics and attributes. This research answered that call and provided additional empirical evidence on working with probationary students.

Implications for Practice

LADDERS has been shown to be effective in improving the academic achievement and retention of probationary students. Some recommendations for practice can be drawn from this research. First, the LADDERS program should be continued and expanded to include all first-year students on academic probation. With all first-year students involved in the program, the evidence gathered can provide the groundwork for

future research suggested above. Transfer students compose a large segment of the student population at Old Dominion as at other institutions. The LADDERS program might be expanded to include transfer students as well.

One of the limitations with this study is that LADDERS is voluntary which poses a threat to internal validity due to selection bias. Other institutions that choose to adopt the LADDERS model may opt to make the program mandatory. Although the attendance in the program would greatly improve, the literature suggests that volunteer programs are more effective than mandatory programs. Therefore, the methodological concerns must be reconciled with the practical concerns of delivering the most effective type of retention program.

Finally, LADDERS could be implemented at other types of institutions. This research has shown the effectiveness of LADDERS on a large, diverse campus with first-year students. The retention problem is not limited to large diverse institutions, so the question looms as to its effectiveness at an institution with different characteristics.

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Appendix: Items that contribute to TCI Index organized by factor

Factors significantly related to	Individual items that contribute to TCI score
academic performance	
Student Role Commitment	<p data-bbox="712 401 1158 436">It is important to be a good student</p> <p data-bbox="712 474 1268 510">I expect to work hard at studying in college</p> <p data-bbox="712 548 1318 583">I am an active participant in my college studies</p> <p data-bbox="712 621 1215 657">I will be proud to do well academically</p> <p data-bbox="712 695 1207 730">I admire people who are good students</p> <p data-bbox="712 768 1219 804">I will allow sufficient time for studying</p> <p data-bbox="712 842 1364 947">I see myself continuing my education in some way throughout my life</p> <p data-bbox="712 984 1306 1020">I want others to see me as an effective student</p> <p data-bbox="712 1058 1260 1094">I feel motivated to be successful in college</p> <p data-bbox="712 1131 1417 1167">Attain feelings of accomplishment and self-confidence</p> <p data-bbox="712 1205 1364 1241">Prepare myself for graduate or professional school</p>
Athletic Orientation	<p data-bbox="712 1278 910 1314">Physical health</p> <p data-bbox="712 1352 1290 1388">Opportunity to participate in varsity athletics</p> <p data-bbox="712 1425 1191 1461">To develop and use my athletic skills</p> <p data-bbox="712 1499 1133 1535">Participating in organized sports</p> <p data-bbox="712 1572 1001 1608">Exercising on my own</p> <p data-bbox="712 1646 1273 1751">Use campus athletic facilities for individual or group recreational activities</p> <p data-bbox="712 1789 1067 1824">Participate in varsity sports</p>

Self Confidence

General academic ability

Reading comprehension

Study skills

Writing ability

Drive to achieve

Leadership ability

Interpersonal communication skills

Graduate with honors

Social Orientation

Popularity with the opposite sex

Old Dominion's location close to the beach

To participate in college social life

Drank alcoholic beverages

Socializing with friends

Partying

Independent Activity Focus

Watching TV

Playing computer/video games

Using the Internet

Doing hobbies

VITA

EDUCATION:

- 1978** **COLLEGE OF WILLIAM AND MARY**, Williamsburg, VA
BACHELOR OF SCIENCE with a major in GEOLOGY
- 1983** **OLD DOMINION UNIVERSITY**, Norfolk, VA
MASTER OF SCIENCE with a major in GEOPHYSICAL SCIENCE
Thesis: "Methods of Soil and Sediment Oxide Reduction"
- In Progress** **OLD DOMINION UNIVERSITY**, Norfolk, VA
DOCTOR of PHILOSOPHY in EDUCATION with an emphasis on Higher
Education Administration

EXPERIENCE:

- July 2000-present** **OLD DOMINION UNIVERSITY**, Norfolk, VA
Assistant Dean, College of Sciences: responsible for administration of all
undergraduate activities within the college. .

TEACHING EXPERIENCE:

- 1995-present** **OLD DOMINION UNIVERSITY**, Norfolk, VA
Instructor, courses taught: Historical Geology, Earth Science, Physical Geology,
Environmental Geology, Meteorology, Soils, Oceanography for Teachers,
Geology of the National Parks. Chief Departmental Advisor, Department of
Ocean, Earth and Atmospheric Sciences.
- 1995-1996** **TIDEWATER COMMUNITY COLLEGE**, Virginia Beach, VA
Adjunct Instructor, courses taught: Oceanography I and Oceanography II.
- 1993-1994** **VALENCIA COMMUNITY COLLEGE**, Orlando, FL
Instructor, taught introductory geology courses.
- 1990-1992** **HAWAII PACIFIC UNIVERSITY**, Honolulu, HI
Instructor, courses taught: Physical Science, Biology, Anthropology,
Environmental Science. Also developed a Physical Geology course that
incorporated field component.

PRESENTATIONS:

- 2007** **Hawaii International Conference on Education**, "An Online Solution to a
Critical Teaching Shortage."
- 2003** **National Conference on Students In Transition**, "LADDERS: A step up for
probationary students."
- 2002** **NACADA NATIONAL CONFERENCE**, "Climbing LADDERS to Academic
Success."
- 2000** **NACADA NATIONAL CONFERENCE**, "Using Technology to Enhance the
Learning Community Experience."